VAAGDEVI COLLEGE OF ENGINEERING

Autonomous

Bollikunta, Khila Warangal (Mandal), Warangal Urban-506 005 (T.S), www.vaagdevi.edu.in

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course outcomes for M.Tech – Power System Automation and Control (45) for the year 2015-16

Course Outcome	**Year/Semester I/I Sem**	**Subject Name (Subject Code)** Advanced Power System Analysis (A953101)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Identify the methods and assumptions in modeling of machines.		
2	Recognize the different frames for modeling of AC machines.		
3	Illustrate the voltage and torque equations in state space form for different machines		
4	Develop the mathematical models of various machines like, induction motor and Synchronous machines using modeling equations.		
5	Analyze the developed models in various reference frames		
6	Assess the machine dynamics in various operating conditions		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Advanced Power System Protection (A953102)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basic function of a circuit breaker, all kinds of circuit breakers and relays		
2	Differentiate fuse and circuit breakers under fault condition		
3	Learn constructional details of static relays and importance of duality of comparators in them.		
4	Study the operation of static relay applied for over current protection		
5	Able to apply static relay for transformer and transmission line protection		
6	Basic principle of operation and application of microprocessor based relaying.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Modern Control Theory (A953103)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Various terms of basic and modern control system for the real time analysis and design of control systems.		
2	To perform state variables analysis for any real time system.		
3	Apply the concept of optimal control to any system.		
4	Able to examine a system for its stability, controllability and observability.		
5	Implement basic principles and techniques in designing linear control systems.		
6	Formulate and solve deterministic optimal control problems in terms of performance indices.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** EHV AC Transmission (A953104)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Identify the different aspects of Extra High Voltage A.C and D.C Transmission		
2	Demonstrate EHV AC transmission system components, protection and insulation level for over voltages		
3	Estimate the Statistical procedures for line designs, scientific and engineering Principles in power systems.		
4	Power Frequency Voltage control and over-voltages in EHV lines		

5	Study the concept of Corona in E.H.V. lines and impact of RI in EHV lines		
6	Design the EHV cables and study their charcteristics		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** High Voltage Engineering (A953105)	**L: 3 T: 0 P: 0 C:3**
After the completion of this course, the students should be able to			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Advanced Digital Signal Processing (A953106)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Comprehensive understanding of using advanced controllers in measurement and control instrumentation.		
2	Illustrate about data acquisition - process of collecting information from field instruments.		
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.		
4	Comprehend Programming in Ladder Logic, addressing of I/O.		
5	Apply PID and its Tuning.		
6	Development of ladder logic programming for simple process		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Quality (A953107)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	To relate the basic architecture and addressing modes of a microcontroller.		
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development		
3	demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE		
4	analyze a typical I/O interface and to discuss timing issues		
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.		
6	Translate Hardware applications using Microcontrollers.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Microcontrollers and applications (A953108)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To relate the basic architecture and addressing modes of a microcontroller.		
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development		
3	demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE		
4	analyze a typical I/O interface and to discuss timing issues		
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.		
6	Translate Hardware applications using Microcontrollers.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Distribution Automation (A953109)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the need of structure of power system automation and its evolution.		

2	Classify various power system automation schemes		
3	Learn to implement power system automation and protection using SCADA.		
4	Learn the importance of EMS in power system operation.		
5	Learn the architecture of PLC and its application in power system automation		
6	Know the control schemes of distribution automation and substation automation		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Optimization Techniques (A953110)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Study the need of optimisation in electrical engineering problems		
2	Learn the conventional or classical optimisation techniques		
3	Learn to formulate the problem with constrained and unconstrained cases		
4	Explore various modern intelligent optimisation techniques		
5	Apply these techniques to real world problems such as transportation problem, travelling salesman problem		
6	Study various limitations in these techniques		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital control systems (A953111)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Deduce the control system to block diagram for various analysis		
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.		
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.		
4	Know sampling and reconstruction, Z -transforms.		
5	Replace the conventional control system with Digital control system.		
6	Evaluate to Apply Z-plane analysis of discrete time control systems		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Renewable energy systems (A953112)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Explore various renewable energy sources to produce electrical energy		
2	Study the characteristics of PV cell- photo voltaic modules and its applications		
3	Learn the basics of wind energy conversion systems and bio-mass energy generation		
4	Explore various Wave energy conversion machines - Ocean Thermal Energy conversion schemes		
5	Know the need of hybrid energy systems such as geothermal and fuel cells		
6	Study the impact of various renewable energy sources on environment.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A953113)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Study the basic power handling capabilities of HVDC lines		
2	Explore various configurations and conversion principles of static power converters		
3	Learn the rectifier and inverter operations, commutation process at converter stations.		
4	Apply AC/DC filters for harmonic elimination in HVDC link		
5	Explore various controls adapted in HVDC converters		
6	Identify various instability problems in HV AC and DC system		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Analysis of power Electronic converters (A953114)	**L: 3 T: 0 P: 0 C: 3**

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After the completion of this course, the students should be able to			
1	Understand the characteristics and principle of operation of modern power semiconductor devices.		
2	Comprehend the concepts of different power converters and their applications		
3	Analyze and design switched mode regulators for various industrial applications		
4	Knowledge on various converter topologies		
5	Choose appropriate device for a particular converter topology.		
6	Use power electronic simulation packages for analyzing and designing power converters.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A953115)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basics of an embedded system		
2	Learn the method of designing an embedded system for any type of applications		
3	Understand the operating systems concepts, types and choosing RTOS		
4	Design, implement and test an embedded system		
5	Understand types of memory and interacting to external world		
6	Learn embedded firmware design approaches		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Systems Lab-I (A953116)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Able to demonstrate the symmetrical and unsymmetrical fault in the generator.		
2	Realise the Ferranti effect in the transmission line and implement feeder protection under over current operation by constructing the circuits		
3	Study the operation various static relays for over current and over voltage condition		
4	Visualise the differential protection of transformer for external and internal faults		
Course Outcome	**Year/Semester I/II Sem**	**Subject Name (Subject Code)** Power System Dynamics (A953201)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the basics of system dynamics and able to analyse steady state stability and transient stability		
2	Able to model synchronous machine to analyse steady state operation analyse its dynamics of operation.		
3	Model the excitation system analyse the dynamics of the synchronous machine connected to infinite bus.		
4	Examine the small signal stability of the system using Routh's Hurwitz criterion		
5	Know the need of PSS in control signals		
6	Dynamic compensator analysis of single machine infinite bus system with and without PSS.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Flexible AC Transmission Systems (FACTS) (A953202)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Know the concepts and types of FACTS controllers		
2	Learn various converters employed for FACTS controllers		
3	Study the impact of FACTS devices in the power flow in the AC system		

4	Learn various shunt compensation using SVC and STATCOM		
5	Learn various series compensators such as TCSC, TSSC		
6	Explore the concept of UPFC and its application.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power System Operation and Deregulation (A953203)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Acquire basic knowledge on restructuring of power industry and market models.		
2	Impart knowledge on fundamental concepts of congestion management		
3	Knowledge on various ancillary service providers		
4	Illustrate various international Transmission pricing paradigms		
5	Idea on framework of Indian power sector and its initiatives		
6	The reforms in Indian power sector		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Gas Insulated Systems(GIS) (A953204)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Programmable Logic Controllers and their Applications (A953205)	**L: 4 T: 0 P: 0 C:4**
After the completion of this course, the students should be able to			
1	Gain Comprehensive knowledge of using advanced controllers in measurement and control instrumentation.		
2	Illustrate about data acquisition - process of collecting information from field instruments.		
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.		
4	Comprehend Programming in Ladder Logic, addressing of I/O.		
5	Apply PID and its Tuning.		
6	Develop ladder logic programming for simple process		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** High frequency magnetic components (A953206)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the fundamentals of magnetic devices		
2	Explore the properties of magnetic core materials		
3	Study the various effects that exists the round conductor carrying AC currents		
4	Evaluate the energy stored in coupled inductors of transformers		
5	Design of transformers for fly-back converters in CCM		
6	Design the integrated inductors and self capacitance for high frequency applications		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reactive Power Compensation and Management (A953207)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Identify the necessity of reactive power compensation		
2	Describe load compensation		
3	Select various types of reactive power compensation in transmission systems		
4	Characterize distribution side and utility side reactive power.		
5	Understand issues related to power system stability and control.		

6	Detect reactive power compensation techniques & their practical importance		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power System Reliability (A953208)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Voltage Stability (A953209)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Identify the necessity of reactive power compensation		
2	Describe load compensation		
3	Select various types of reactive power compensation in transmission systems		
4	Characterize distribution side and utility side reactive power.		
5	Understand issues related to power system stability and control.		
6	Detect reactive power compensation techniques & their practical importance		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Instrumentation & Control (A953210)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Survey various methods of power generation		
2	Understand the importance of instrumentation in power generation		
3	Explore various measuring and supervising systems involved in thermal power plant processes such as boiler and turbine units		
4	Understand various controls employed in boiler		
5	Explore the temperature and pressure controls in turbine		
6	Study the nuclear power plant instrumentation		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Intelligent Control (A953211)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the architecture of Intelligent control		
2	Learn the basic artificial neural network and its mathematical model		
3	Train and test the neural network with various configurations.		
4	Apply genetic algorithm for various optimisation problems		
5	Model and control different system with fuzzy logic controller		
6	Explore various power system problem and apply GA, NN and Fuzzy controller		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Smart grid technologies (A953212)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Recite the structure of an electricity market in either regulated or deregulated market		

	conditions.		
2	Understand the advantages of DC distribution and developing technologies in distribution		
3	Discriminate the trade-off between economics and reliability of an electric power system.		
4	Differentiate various investment options (e.g. generation capacities, transmission, renewable, demand-side resources, etc) in electricity markets.		
5	Analyze the development of smart and intelligent domestic systems.		
6	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** AI Techniques in Electrical Engineering (A953213)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on soft computing techniques such as artificial neural networks, Fuzzy logic and genetic Algorithms.		
2	Learn the concepts of feed forward neural networks and feedback neural networks.		
3	Get the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy rules		
4	Acquire complete knowledge on genetic algorithm including three genetic operators		
5	Explore various power system problems which can utilize these AI techniques		
6	Assess system stability using AI techniques		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reliability Engineering (A953214)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Energy Auditing, Conservation & Management (A953215)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the necessity of conservation of energy		
2	Generalize the methods of energy management		
3	Illustrate the factors to increase the efficiency of electrical equipment		
4	Detect the benefits of carrying out energy audits.		
5	Analyze the power factor and to design a good illumination system		
6	Determine pay back periods for energy saving equipment.		
Course	**Year / semester**	**Subject Name (Subject Code)** Power Systems Lab-II (A953216)	**L: 0 T: 0 P: 4 C:**

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Outcome	**I/II Sem**		**2**
After the completion of this course, the students should be able to			
1	Study the characteristics of microprocessor based relays		
2	Able to protect the feeder from faulty condition using over current relay operation		
3	Study the Characteristics of IDMT Electromagnetic Over Current Relay		
4	Study the phase failure and phase reversal protection with static negative sequence relay		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Seminar-II (A953217)	**L: 0 T: 0 P: 4 C:2**

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MBA R18 COURSE OUTCOMES

I/I SEM				
Course out come	**Year/ semester: I/I Sem.**	**Subject name code: Business Environment (M18MB01)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Explains the concept of BE and different techniques of environmental scanning process.			
2	Describes economic systems, GATT, WTO, Fiscal and monitory policies			
3	Emphasizes on Industrial Policy and regulatory structure			
4	Explains socio political environment.			
5	Interprets India trade policy, EXIM Policies and FEMA.			
Course out come	**Year/ Semester: I/I Sem**	**Subject name code: Managerial Economics (M18 MB02)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	solve problems faced by the business organization			
2	apply the tools and techniques in real business situations.			
3	determine the production factors and returns			
4	analyse the different costs			
5	formulate different pricing strategies and profit policies			
Course out come	**Year/ semester: I/I Sem.**	**Subject name code: Management and Organization Behaviour (M18MB03)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Show the significance of fundamentals of Management and its contributions.			
2	Outline the planning process and types of plans in dynamic environment, develop the decision making styles in various situations in organization.			
3	Demonstrate the organization structures with its merits and demerits, Contrast between authority, power and influence, Asses the significance of controlling in an organization.			
4	Examine individual and group behavior in an organization using personality theories			
5	Identify how managers apply different leadership styles and motivation theories in an organization.			
Course out come	**Year/ semester: I/I Sem.**	**Subject name code: Accounting for Management (M18MB04)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Explain the importance of Accounting.			
2	Explain Accounting cycle in preparing financial statements of the company.			
3	Plan the process of issue of shares and debentures for raising capital by the company.			

4	Analyze and interpret financial position of the company using ratio analysis, Vertical and Horizontal analysis.			
5	Make use of funds flow statements in the company.			
Course out come	**Year/semester: I/I Sem.**	**Subject name code: Statistics for Management (M18MB05)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Explain the role of statistics and statistical techniques in management decision making and choose appropriate measures of central tendency and dispersion.			
2	Define correlation and also measure the degree of correlation between variables and estimate the relationship between independent and dependent variables using regression lines.			
3	Distinguish between parametric and non-parametric test.			
4	Classify Null- hypothesis and alternative Hypothesis, hypothesis testing for making decisions using student's t test.			
5	Categorize one-way and two-way classification of ANOVA and examine goodness of fit by using Chi-square test.			
Course out come	**Year/ semester: I/I sem**	**Subject name code: Business Communication (M18MB06)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Explain the importance of written communication skills appropriate for business situations.			
2	Demonstrate the student effectively deliver on oral presentations.			
3	Examine the students report writing skills and develop the positive writing skills.			
4	Identify the barriers of communication			
5	Minimize the student negative attitudes towards the verbal and nonverbal communication			
Course out come	**Year/ semester: I/I sem**	**Subject name code: Information Technology Lab (M18MB07)**	**No. of Hours L:0 T:0 P:3**	**Credits:3**
On successful completion of this course, student should be able to:				
1	To create awareness about MS-word, creation of document and mail merge.			
2	To construct the spreadsheets and data analysis with statistical tools.			
3	Create and manage Database & data mining.			
4	List out the procedure of mail merge and build the presentation graphics through power point creation			
I/II Sem				
Course out come	**Year/ semester: I/II Sem.**	**Subject name code: Marketing Management (M18MB08)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Outline the role and functions of marketing.			
2	Identify and demonstrate the nature of marketing environment.			
3	Explain the Market research project/process.			

4	Make use of PLC for framing marketing strategies and appraise the importance of promotion mix.			
5	Utilize the different pricing strategies for profit maximization.			
Course out come	**Year/ semester: I/II Sem.**	**Subject name code: Human Resource Management (M18MB09)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Define the basic concepts of HRM, Its model.			
2	Demonstrate HRP process and Job Analysis.			
3	Illustrate the techniques and tools for training and Development, performance appraisal.			
4	Infer Industrial Relations System Grievance redressal mechanism and dispute settlements.			
5	Recommend and appraise the contemporary issues related to HR practices in Global perspective.			
Course out come	**Year/ semester: I/II sem**	**Subject name code: Financial Management (18MBA10)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Identify the importance of profit maximization and wealth maximization			
2	Apply different techniques for investment decision process and measuring the cost of capital			
3	Analyze the capital structure theories			
4	Examine the factors determining dividend and its valuation			
5	Assess the needs and planning of working capital			
Course out come	**Year/ semester: I/II sem**	**Subject name code: Business Research Methods (M18MB11)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	What is research methodology and why it is useful.			
2	Explain the research problem and research design			
3	Make use of questionnaire and methods of data collection			
4	Importance of research structure			
5	Influence of research reference			
Course out come	**Year/ semester: I/II Sem.**	**Subject name code: Quantitative Analysis for Business Decisions (M18MB12)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Define OR and OR Model.			
2	Construct the structure of LPP.			
3	Compare Two-phase method and Big-M method.			
4	Build the mathematical model of transportation problem.			
5	How to solve the Assignment problem.			
Course out come	**Year/ semester: I/II sem**	**Subject name code: Cost & Management Accounting (M18MB13)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**

On successful completion of this course, student should be able to:				
1	Distinguish Financial Accounting, Cost accounting & Management Accounting			
2	Analyze Costing for specific industries.			
3	Apply Break Even analysis for various business problems			
4	Classify and evaluate budgets.			
5	Compare and contrast standard cost ,estimated cost & marginal cost			
Course out come	**Year/ semester: I/II sem**	**Subject name code: Soft Skills Lab (M18MB14)**	**No. of Hours L:0 T:0 P:4**	**Credits:3**
On successful completion of this course, student should be able to:				
1	show how to overcome fear of facing interviews			
2	Improve communication skills and able to convince their view point to the superior, peers and subordinates.			
3	Adopt Time management skills to efficiently manage time in meeting deadlines.			
4	Compare Traits of positive thinking and high achievers..			
5	Improve General knowledge and current information.			

II/I Sem				
Course out come	**Year/ semester: II/I Sem.**	**Subject name code: Strategic Management (M18MB15)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Formulate organizational objectives, policies, vision and mission and outline the concepts in strategic management.			
2	Define the role of strategist in an organization.			
3	Evaluate the performance by using qualitative and quantitative benchmarking technique.			
4	Identify diversifying strategies and define why firms diversify?			
5	Propose strategies for competing in global markets.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Entrepreneurship (M18MB16)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Explains characteristics, Qualities, Skill and Functions of Entrepreneur.			
2	Infers financial Institutions assistance to promote Entrepreneurship.			
3	Relates Technological competitiveness, legal regulatory systems, patents, trademarks and intellectual property rights to Entrepreneurship.			
4	Summarizes necessity for business ethics and ethical guidelines in business.			
5	Recalls corporate governance and its History and theoretical basis of corporate Governance.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Intellectual Property Rights (M18MB17A)**	**No. of Hours L:4 T:0 P:0**	**Credits: 3**
On successful completion of this course, student should be able to:				
1	Outline the increasing importance of intellectual property rights			
2	Utilize post registration procedures and trade mark registration process			

3	Explain the copyright principles and rights			
4	Prioritize the law of patents and patent ownership.			
5	Develop the trade secret and maintenance.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Stress Management (M18MB17B)**	**No. of Hours L:4 T:0 P:0**	**Credits:3**
On successful completion of this course, student should be able to:				
1	Define the stress and Symptoms of stress			
2	Identify various issues in crisis management			
3	Develop the relationship between the teams			
4	Improve the organization personality of employee			
5	Discuss the skills required for personality development			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Agri-Business Management (M18MB17C)**	**No. of Hours L:4 T:0 P:0**	**Credits:3**
On successful completion of this course, student should be able to:				
1	Define the role of agriculture in economic development			
2	Make use of marketing of agriculture produce and agencies through which agriculture produce is marketed			
3	Identify and eliminate the defects of agricultural marketing			
4	Inspect the agricultural prices and price policy			
5	Plan the duties and responsibilities of marketing functionaries.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Tourism and Hospitality Management (M18MB17D)**	**No. of Hours L:4 T:0 P:0**	**Credits: 3**
On successful completion of this course, student should be able to:				
1	List out the different concepts of Tourism management			
2	Identify the factors affecting hospitality and tourism industry			
3	Improve the employment opportunities in Hospitality			
4	Develop the eco system and ecotourism activities			
5	Solve the various problems in tourism and Hospitality management			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Indian Constitution (M18MB17E)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define Indian constitution and constitutional history			
2	Explain federalism and centre-state relationship			
3	Make use of state secretariat and it structure			
4	Determine the importance of election commission			
5	Improve the welfare of SC/ST/BC and women			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Yoga and Spirituality (M18MB17F)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Spell the aim and objectives of Yoga			
2	Explain the need and importance of Yoga			
3	Make use of Astanga Yoga			
4	Examine effects of Asanas and pranayama on various system of the body			

5	Improve the spirituality at workplace			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Consumer Behavior (M18MB18M1)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Understand consumer behaviour research process and rural consumer behavior.			
2	Understand the environmental influences on consumer behavior and able to appreciate the importance of cultural adaptation of consumer behavior.			
3	Analyze Individual personality and self-concept, consumer perception, changing attitudes of consumers, consumer learning and information processing.			
4	Establish the relevance of consumer behaviour models in decision making.			
5	Makeup role of consumerism, consumer safety, and consumer information at market place.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Sales and Distribution Management (M18MB19M2)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Explain the fundamentals of sales management.			
2	Define and formulate the strategies to effectively manage company's sales operations and identify the roles and responsibilities of the sales manager.			
3	Develop the sales force productivity and control.			
4	Analyze and implement distribution channel strategy.			
5	Examine the channels efficiency and effectiveness in wholesaling and retailing.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Product and Brand Management (M18MB20M3)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Discuss the role of products in product management.			
2	Evaluate the role of product manager in modern marketing			
3	Explain the product portfolios to compare the competitive strategies for products.			
4	Survey the product positioning strategies to gain a good place in the minds of customers			
5	Why PLC is important for a product and to a company			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Security Analysis and Portfolio Management (M18MB18F1)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Analyze investment alternatives and make investment policy recommendation including the determination of an optimal asset allocation.			
2	Examine various types of bonds in the stock markets			
3	To define equity analysis and valuation			
4	Construct optimal portfolios following the tenets of modern portfolio theory			
5	Discuss various types of mutual funds schemes			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Financial Institutions, Markets and Services (M18MB19F2)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				

1	Define the financial Institutions markets and services, Explain the financial Reforms after 1991, Regulations and promotional Institutions.			
2	Outline the Banking and non-Banking Institutions.			
3	Distinguish the structure and functioning of money market & capital market.			
4	Evaluate of lease finance and Hire Purchase.			
5	Elaborate functions and activities of Investment bankers.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: International Financial Management (M18MB20F3)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	To determine different international Business Methods			
2	To evaluate Balance of payments and International Monetary system			
3	To Make use of foreign exchange market movements.			
4	To make experiment with exchange rate movements			
5	To find the opportunities in International financial markets			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Leadership and Change Management (M18MB18H1)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define leadership roles and functions.			
2	How to become an effective leader and his/her leadership styles.			
3	Explains leadership styles in organizational work settings.			
4	Solve the various problems while inviting change in organization.			
5	Distinguish the relationship between power, politics and conflicts.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Management of Industrial Relations (M18MB19H2)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Demonstrate industrial relation and Indian IR system			
2	Outline the trade union, types and their recognition			
3	Analysis dispute settlement missionary and its instruments			
4	Develop grievance handling procedure			
5	Analyze collective bargaining levels and legal frameworks			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Compensation Management (M18MB20H3)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the compensation management and its objectives			
2	Explain issues and models of executive compensation			
3	Explain the components of pay structure and its strategy			
4	Determine international compensation system and managing variations in international pay			
5	Plan employee stock ownership plans and broad based option plans			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Internship and Seminar (M18MB21)**	**No. of Hours L:0 T:0 P:0**	**Credits: 02**

On successful completion of this course, student should be able to:				
1	Improve their practical knowledge by working in any organization			
2	Apply their conceptual learning to practical business problems			
3	List out organizational working teams and dynamics of organization			
4	Develop his competencies for future job requirement			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Global Entrepreneurship (M18MB18E1)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the background of entrepreneurship and Global entrepreneurship			
2	Explain critical factors for starting a new venture			
3	Analyze the environmental situation and market opportunity			
4	Develop financial assumptions and identifying the startup capital resource			
5	Estimate startup capital requirement and legal environment			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: MSME Management(M18MB18E2)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define issues and challenges of MSMEs.			
2	Explain various business opportunities, and formalities for setting up an enterprise			
3	Develop rural entrepreneurship and a entrepreneurship			
4	Identify and develop sources of financial support			
5	Build the role of government in promoting entrepreneurship			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Women Entrepreneurship (M18MB20E3)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Defines women Entrepreneurship, Nature and its intention.			
2	Constructs status of women Entrepreneurship.			
3	Analyze the challenges of women Entrepreneurship in Indian scenario.			
4	Outline the Role of financial institutions in women Entrepreneurial development programmes.			
5	Develop strategic perspective in family business and in Intrapreneurship.			
II/II Sem				
Course out come	**Year/ semester: II/II sem**	**Subject name code: Business Laws and Ethics (M18MB22)**	**No. of Hours L:4 T:0 P:0**	**Credits: 04**
On successful completion of this course, student should be able to:				
1	Outline the various laws affecting the business concern. Define the procedure for incorporation and winding up of company			
2	Categorize contracts and define essential elements of Indian contract act and its remedies for breach. Explain the general principles, conditions and warranties in contract of sale.			
3	Choose the appropriate negotiable instrument under the negotiable instrument act. Determine the rules and regulations of GST in India.			
4	Asses the ethical issues in business.			
5	Identify the issues and challenges in cybercrime and its need in Indian context.			
Course out	**Year/ semester:**	**Subject name code: Production**	**No. of Hours**	**Credits:**

come	**II/II sem**	**and Operations Management (M18MB23)**	**L:4 T:0 P:0**	**04**
On successful completion of this course, student should be able to:				
1	Determine optimum production methods. Compare and contrast production methods			
2	Illustrate the product and process design.			
3	Choose the appropriate facilities location and Plant layout.			
4	Choose and apply the techniques of sequencing and scheduling in production control. Asses the concepts of quality control.			
5	Apply materials management techniques for inventory controlling.			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Gender Sensitization (M18MB24A)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Discuss about key biological aspects of genders.			
2	Find Demographic consequency			
3	Create insight into gendered division of labour and its relation to politics and economics			
4	Identify causes of Sexual violence.			
5	Develop a sense of appreciation of women in all walks of life.			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Disaster Management (M18MB24B)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define concept of Environmental Hazards & Disasters.			
2	Identify causes of earthquakes.			
3	Discuss about the disasters and their impact on the environment.			
4	Estimate sedimentation & Environmental problems			
5	Formulate corrective measures of Erosion & Sedimentation.			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Health Care Management (M18MB24C)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Identify the prevailing health care system in India			
2	Avail the facility provided by the health policies			
3	Adopt the benefits from different programs introduced by government			
4	Utilize different healthcare schemes and funds offered by WHO and UNICEF			
5	Outline the trends in the health insurance sector			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Data Analytics (M18MB24D)**	**No. of Hours L:4 T:0 P:0**	**Credits:03**
On successful completion of this course, student should be able to:				
1	Explain basic Data concepts such as Data Analytics concepts to include Importance of data analytics, data visualization tools, Descriptive Statistical Measures, Predictive Analytics, Data Mining, and Simulation			
2	Apply knowledge to solve simple tasks using data analytics techniques with computer (MS Excel).			
3	Identify the advantages and disadvantages of simulation, risk analysis and decision tree analysis			
4	Measure the data analytics parameters (descriptive analytics, diagnostic analytics, predictive analytics and prescriptive analytics).			

5	Choose the data analytics techniques for solving practical problems in business.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Disability & Rehabilitation (M18MB24E)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the Disability and Rehabilitation services			
2	Identify causes and prevention of impairments			
3	List out the different models of service delivery			
4	Explain the barriers of Rehabilitation and reforming policies			
5	Design the community based Rehabilitation, awareness and participation			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Sustainability Management (M18MB24F)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	List out the History and emergence of sustainable development			
2	Explain the Indian Judiciary system and Sustainability development			
3	Develop the quality of life, equation of poverty population and pollution			
4	Prioritize biodiversity conservation and ecosystem integrity			
5	Design the sustainable development strategies			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Customer Relationship Management (M18MB25M4)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the various concepts in customer relationship management			
2	Determine the importance of customer relationship management			
3	Explain the recent trends in customer relationship management			
4	Build the customer relations and customer profile			
5	Develop strategies for customer, retention and development			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Services Marketing (M18MB26M5)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Differentiate Marketing services Vs. Physical services, analyze services marketing mix and Gaps model of service quality.			
2	Understand consumer requirements and extend customer relationships with regard to services.			
3	Identify critical issues in service design, service blue printing, plan new service development process and service standards.			
4	Explain the Employee's and Customer's roles in service delivery.			
5	Integrate services marketing communications and five categories of strategies, and creates an environment that achieves excellence in customer service. Design the key issues in pricing of services.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: International Marketing (M18MB27M6)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define international marketing and its environment			
2	Understand world trade, features and opportunities			

3	Compare the domestic market with international market			
4	Discuss the various factors influencing pricing decisions			
5	Develop the global marketing program and segmentation of product and services			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Financial Derivatives (M18MB25F4)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define significance of derivatives in stock in commodity market.			
2	Explain players in Derivative market			
3	Differentiate forward and future contract			
4	Analyze Trading with option			
5	Explain strategies involving option			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Strategic Investment & Financing Decisions (M18MB26F5)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define investment decisions under conditions of risk and uncertainty			
2	Make use of discounted payback, post payback, return on investment and surplus payback			
3	Maximize the advantages of leasing and leasing decisions			
4	Develop the various strategies for financing decisions			
5	Solve various problems on mergers and acquisitions			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Corporate Taxation and Planning (M18MB27F6)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Express Basic concepts of direct & Indirect taxes and able to compute Residential Status and Scope of Total Income of a Company and exempted Incomes of company.			
2	Compute total Income of corporate.			
3	Identify the importance of Tax planning, Tax Management and able to use Tax planning techniques towards Capital Structure decisions.			
4	Use the tax planning with reference to setting up of a new business.			
6	Perform tax planning in respect of mergers and Amalgamations.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: International Human Resource Management (M18MB25H4)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define nature, scope and components of IHRM.			
2	Compare IHRM and domestic HRM			
3	Tell transfer policies and compensation management			
4	Identify IHRM practices in selected countries			
5	Classify workers and cadres			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Performance Management Systems (M18MB26H5)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				

1	Define performance management and methods of performance appraisal			
2	Measure the employee performance towards the predetermine standards			
3	Examine the performance management system and appraisal practices in Asian countries			
4	Improve the employee performance through performance related concepts			
5	Identify the Legal issues involved in performance management and reward systems			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Strategic Human Resource Management (M18MB27F6)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Find linkage between strategic business planning (SBP) and strategic HR development (SHRD)			
2	Discuss about trends in utilization of HR and relocation of work			
3	Identify managerial issues in strategic formulation.			
4	Compare Results Oriented vs Process oriented measures.			
5	Evaluate strategic contribution of traditional areas such as selection , training and compensation			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Comprehensive Subject Viva-Voce (M18MB28)**	**No. of Hours L:0 T:0 P:0**	**Credits: 02**
On successful completion of this course, student should be able to:				
1	Appraise and strengthen the students conceptual knowledge in all the subjects of the semester.			
2	Maximize the competencies regarding subjects.			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Main project and viva-voce (M18MB29)**	**No. of Hours L:0 T:0 P:0**	**Credits: 04**
On successful completion of this course, student should be able to:				
1	Gain knowledge on real time working environment.			
2	Develop skills in report writing through data collection, data analysis, data extraction, presentation and interpretation.			
3	Analyze best practices, system, processes, procedures and policies of a company/industry in different functional areas.			
4	Improve research knowledge on business problems			
5	Recommend suggestions in scope of the organization			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Entrepreneurial Finance (M18MB25E4)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the challenges of entrepreneurs for raising finance.			
3	Build the skills, frame works and knowledge in entrepreneurial finance.			
4	Determine the venture worth and basic mechanisms of venture valuation.			
5	Decide and develop projected financial statements for discounted cash flow valuation.			
6	Build the financing for the growing ventures.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Entrepreneurial Marketing**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**

		(M18MB26E5)		
On successful completion of this course, student should be able to:				
1	Explain the characteristics, functions of marketing and its challenges.			
2	Define the concept of enterprise growth and forms and types and they able to adapt operative and strategic targets for growth, and evaluate SWOT analysis.			
3	Compare growth strategies and models for choosing best strategy in marketing.			
4	Explain segmenting, Targeting, positioning and pricing in entrepreneurial communication strategy.			
5	Analyze and able to choose best entrepreneurial marketing tools.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Creativity Innovation & Entrepreneurship (M18MB27E6)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Explain the creativity phenomenon including spiritual and social routes of creativity			
2	Adapt entrepreneurial and empowerment creativities.			
3	Apply different creative problem solving techniques.			
4	Apply innovation management techniques for new product development.			
5	Apply different innovation techniques for micro and macro economies.			

Viswambhara Educational Society

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

Department of Mechanical Engineering

COURSE OUTCOMES FOR B.TECH - ME R18 FOR THE YEAR 2018-2019

Course Outcome	Year/Semester I/I Sem	Subject Name (Subject Code) LINEAR ALGEBRA AND CALCULUS (B18MA01)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations			
2	Find the Eigen values and Eigen vectors			
3	Reduce the quadratic form to canonical form using orthogonal transformation			
4	Analyze the nature of sequence and series.			
5	Solve the applications on the mean value theorems.			
6	Evaluate the improper integrals using Beta and Gamma functions			
7	Find the extreme values of functions of two variables with/ without constraints.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ENGLISH (B18EN01)	**No. of Hours L:2 T:0 P:0**	**Credits:2**
After the completion of this course, the students should be able to				
1	Use English Language effectively in spoken and written forms.			
2	Comprehend the given texts and respond appropriately.			
3	Communicate confidently in various contexts and different cultures.			
4	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ENGINEERING CHEMISTRY (B18CH01)	**No. of Hours L:3 T:1 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	The knowledge of molecular and electronic changes, band theory related to conductivity.			
2	The knowledge of water treatment and corrosion.			
3	The knowledge of organic reaction mechanisms and polymers.			
4	Apply phase rule and adsorption to construct the materials by analyzing their compositions.			

5	The required principles and concepts of electro chemistry and batteries.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ENGINEERING GRAPHICS (B18ME01)	**No. of Hours L:1 T:0 P:4**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyse the Projections of Points.			
2	Understand the projections of solids.			
3	Estimate the use of drawings, dimensioning, scales and conic sections			
4	Modify the applications of this knowledge in computer graphics.			
5	Compare the Conversion of Isometric views to Orthographic views			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB(B18EN02)	**No. of Hours L:0 T:0 P:2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Better understanding of nuances of English language through audio- visual experience and group activities.			
2	Speaking with clarity and confidence which in turn enhances their employability skills.			
Course Outcome	**Year /semester I/II Sem**	**Subject Name (Subject Code)** DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (B18MA02)	**No. of Hours L:3 T:1 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Identify whether the given differential equation of first order is exact or not			
2	Solve higher differential equation and apply the concept of differential equation to real world problems.			
3	Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and gravity for cubes, sphere and rectangular parallel piped.			
4	Evaluate the line, surface and volume integrals and converting them from one to another.			
Course Outcome	**Year /Semester I / II Sem**	**Subject Name (Subject Code)** ENGINEERING PHYSICS **(**B18PH03**)**	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	The student learns about transformation concept learns basics of quantum mechanics.			
2	The student gains knowledge on basics of rigid body dynamics and lasers which leads to new innovations and improvements.			
3	The knowledge of physics relevant to engineering is critical for converting ideas into technology..			
4	Characterization and study of properties of optodevices helps the students to prepare new materials for various engineering applications.			
Course Outcome	**Year /Semester I / II Sem**	**Subject Name (Subject Code)** ENGINEERING MECHANICS (B18CE01)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				

1	Know the fundamental knowledge of Specification of force vector.			
2	Compare Spatial Force systems.			
3	Understand the Coplanar Force Systems.			
4	Apply Deformation of Stepped shaft due to axial loading in problems.			
5	Evaluate Kinematics Problems and Kinetics Problems.			
Course Outcome	**Year /Semester I / II Sem**	**Subject Name (Subject Code)** ENGINEERING WORKSHOP & IT 0WORKSHOP (B18ME02)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Know the fundamental knowledge of various trades and their usage in real time Applications.			
2	Compare Foundry, Welding, Black smithy, Fitting, Machine shop and house wiring.			
3	Understand the basis for analyzing power tools in construction and wood working, electrical engineering and mechanical engineering.			
4	Apply basic concepts of computer hardware for assembly and disassembly.			
Course Outcome	**Year /Semester I / II Sem**	**Subject Name (Subject Code)** ENGINEERING PHYSICS LAB (B18PH04)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	The laboratory course helps the student how to operate different equipments related to engineering. It also allows the student to develop experimental skills to design new experiments in engineering.			
2	The course enlightens the student about modern equipment like solar cell, optical fibre etc.,			
3	With the exposure to these experiments, the student can compare the theory and correlate with experiment.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (B18EE02)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Learn Basic circuit concepts such as electrical parameters, quantities , laws and network reduction techniques and apply the network theorems with DC excitation in the systems			
2	Analyze the steady state operation of single phase and three phase AC circuits and study the relationship between voltage and current for delta and star connections.			
3	Explore the construction, working , control and testing of various DC and AC Machines			
4	Gain knowledge on basic electronic devices such as P-N junction Diode, rectifiers and filter with their V-I characteristics.			
5	Acquire extended knowledge on next generation of electronic devices such transistors,zener diode and SCR devices.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** METALLURGY AND MATERIAL SCIENCE (B18ME03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the bond formation, grains and grain boundaries in crystalline metals.			

2	Apply lever rule in calculating the liquid and solid percentage.			
3	Apply heat treatment processes to different materials to get required properties.			
4	Gain knowledge about advanced materials like composites & ceramics.			
5	Analyze the applications and the properties of cast irons and steels.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** MECHANICS OF SOLIDS (B18ME04)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Understand the concepts of stress and strain in mechanics of solids and material properties.			
2	Apply the fundamental concepts of shear force & bending moment for Cantilever beam, simply supported beam & overhanging beam with point loads, UDL, gradually varying loads & their combination.			
3	Apply the fundamental concepts of Bending stresses & shear stresses for different Beams.			
4	Apply the different methods to determine the deflection & slope of different beams like double integration method, Area moment method & Macaulay's method.			
5	Apply the Lame's equation to determine stresses in Thick cylinders. To understand the concept of torsion and its application to circular shafts.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** THERMODYNAMICS (B18ME05)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the basic thermodynamic principles and their applications			
2	Apply the laws of thermodynamics for different thermal systems.			
3	Use mollier diagram and steam tables to find the properties of pure substances.			
4	Calculate different properties of perfect gases, real gases and mixtures of perfect.			
5	Analyse different power cycles.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** MACHINE DRAWING (B18ME06)	**No. of Hours L:1 T:0 P:2**	**Credits:2**
After completion of this course, the student shall be/shall				
1	Understand various conventions used in machine drawing.			
2	Prepare the assembly and part drawings from component drawing.			
3	Identify the use of various machine components.			
4	Interpret and make conclusions about a given drawing.			
5	Apply the First angle projection.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** MECHANICS OF SOLIDS AND METALLURGY LAB (B18ME07)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Identify grain and grain boundary, crystal structure of different materials.			

2	Study the microstructure of various materials.			
3	Analyze the correlation between Mechanical and Metallurgical properties.			
4	Perform material testing and analyze various material properties.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** FUELS AND LUBRICANTS LAB (B18ME08)	**No. of Hours L:0 T:0 P:2**	**Credits:1**
After completion of this course, the student shall be/shall				
1	Apply different methods to determine the flash point & fire point of liquid fuels.			
2	Apply carbon residue test to determine carbon% in liquid fuels.			
3	Apply Different methods to determine viscosity of Liquid lubricants.			
4	Apply different methods to determine the calorific value of fuels.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB (B18EE03)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	1 Learn to simplify complex electric and electronic circuits by applying the KVL and KCL laws.			
2	Identify the optimal loading on the system.			
3	Analyze the performance of DC machines.			
4	Identify and analyze the performance and operation of semi conducting devices.			
Course Outcome	**Year /Semester II / I Sem**	**Subject Name (Subject Code)** INDIAN CONSTITUTION (B18MC04)	**No. of Hours L:2 T:0 P:0**	**Credits:0**
After completion of this course, the student shall be/shall				
1	To introduce the concepts and features Indian constitution.			
2	To identify the core values reflected in Preamble of the Constitution.			
3	To examine the nature of the Indian federal system and the parliamentary form of government.			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** GENDER SENSITIZATION (B18MC07)	**No. of Hours L:2 T:0 P:0**	**Credits:0**
After completion of this course, the student shall be/shall				
1	Students will have developed a better understanding of important issues related to gender in contemporary India.			
2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and films.			
3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter them.			
4	Students will acquire insights into the gendered division of labour and its relation to politics and economics.			
5	Men and women students and professionals will be better equipped to work and live in			

	harmony. Students will develop a sense of appreciation of women in all walks of life.			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** PROBABILITY & STATISTICS (B18MA05)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Use probability theory and deals with modelling uncertainty and apply discrete and continuous probability, in order to evaluate the probability of real world events.			
2	Develop discrete probability distributions and its applications, and use these techniques to generate data from Binomial and Poisson Distributions.			
3	Develop continuous probability distributions and its applications, and use these techniques to generate data from Normal Distribution.			
4	Perform correlation analysis, in order to estimate the nature and the strength of the linear relationship that may exist between two variables of interest, Perform regression analysis to estimate the magnitude of change in one variable due to a given change in the other variable.			
5	Construct confidence interval estimates for population parameters and conduct hypothesis tests concerning population parameters, for single and multiple populations based on sample data. And also perform Student T-test, F-test and X2- test(chi-square).			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** FLUID MECHANICS & HYDRAULIC MACHINERY (B18ME09)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Apply mathematics and basic sciences and translates this knowledge to understand fluid flow principles and their applications.			
2	Understand fundamental knowledge of the mechanics of fluid at rest and in motion.			
3	Observe fluid phenomena by developing and using the principles, laws.			
4	Analyze fluid interactions with natural and constructed systems.			
5	Associate fundamental knowledge & performance of different turbines & pumps.			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** THERMAL ENGINEERING–I (B18ME10)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Understand the concept and working of two and four strokes I.C. engines.			
2	Analyse the normal and abnormal condition for the combustion of SI and CI engines also the parameters which effect the combustion characteristics.			
3	Able to calculate the performance of the engine with different parameters.			
4	Get knowledge about compressors and their classifications.			
5	Differentiate various compressor on the basis of their working and requirement and can use suitable one.			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** KINEMATICS OF MACHINES (B18ME11)	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				

1	Identify the basic mechanisms involved in machines.			
2	Develop familiarity with application of kinematics theories to real-world machines.			
3	Identify the basic relations between distance, time, velocity and acceleration.			
4	Understand analytical linkage analysis, determine cam profiles			
5	Analyze gear trains and gear profiles.			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** PRODUCTION TECHNOLOGY (B18ME12)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Apply the knowledge of casting, welding joints and forces and power requirements in metal forming processes.			
2	Relate the melting, solidification, pattern allowances, gating and riser design of mold cavity, aspects of casting.			
3	Understand basic calculations of forces and power requirements in the metal forming operations.			
4	Differentiate the application of welding using the arc welding, gas welding, resistance welding, soldering and brazing.			
5	Survey the defects occurring in forging operation.			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** FLUID MECHANICS & HYDRAULIC MACHINERY LAB (B18ME13)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Apply knowledge of fluid mechanics and hydraulic machines and translates this knowledge for understanding fluid flow principles and their application to experiments.			
2	Practical exposure by using components vacuum gauge, pressure gauge, manometers, pipes, motors, pumps & turbines.			
3	Use comparison of theoretical values with the real parameters.			
4	Know and understand the experimental analysis in turbines and pumps with parameters such as discharge, head of water, speed of brake drum.			
Course Outcome	**Year /Semester II / II Sem**	**Subject Name (Subject Code)** PRODUCTION TECHNOLOGY LAB (B18ME14)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Understand basic knowledge and concepts of various experiments.			
2	Perform joining of materials (similar/dissimilar) using welding.			
3	Analyze the concepts of extrusion and design of die.			
4	Operate injection molding and blow molding machines.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** MACHINE TOOLS AND METAL CUTTING (B18ME15)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Apply cutting mechanics to metal machining based on cutting force and power			

	consumption.			
2	Operate lathe, milling machines, drill press, grinding machines, etc.			
3	Evaluate mach inability of different materials using specific cutting forces and surface finish.			
4	Understand Principles of design of Jigs and fixtures.			
5	Compare grinding, lapping and honing operations.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** DYNAMICS OF MACHINERY (B18ME16)	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Analyze the forces and torques in mechanisms and machines in operation. Know the function of governors, clutches and bearings.			
2	Compute the frictional torque in clutches and braking torque in brakes.			
3	Design the flywheel for different IC engines.			
4	Evaluate the balancing masses in rotary and reciprocating balancing.			
5	Calculate the frequencies of different vibrations.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** DESIGN OF MACHINE MEMBERS – I (B18ME17)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Design a particular machine element and make use of standards parts and dimensions using design data book.			
2	Design of shafts , shaft couplings like flange couplings, flexible couplings.			
3	Determine the Stresses and deflections of bolded joints, keys, cotters, knuckle joints.			
4	Determine the Stresses and deflections of helical springs.			
5	Design of riveted, welded joint and screwed joints.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** METROLOGY AND SURFACE ENGINEERING (B18ME18)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Apply mathematics to calculations of surface texture assessment by using C.L.A. and R.M.S. methods.			
2	Analyse principles of optics, interference, light to optical flats, interferometers, microscopes and optical measuring instruments.			
3	Compare tabulated physical data that are useful to assembly of components, clearance, transition, interference fits.			
4	Illustrate linear, angular measurement by using various micrometers, bevel protractor, auto collimator etc.,			
5	Classify the basic techniques of surface engineering, surface treatment, surface coatings, and surface cleanings.			

Course Outcome	Year /Semester III/ I Sem	Subject Name (Subject Code) THERMAL ENGINEERING – II (B18ME19)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Understand the basic concept behind the thermal power plant.			
2	Get knowledge about working of boilers with their specification.			
3	Analyze the importance of nozzle and condenser in steam power plant.			
4	Identify the different types of steam turbines and use accordingly to the requirement.			
5	Get the concepts of gas power plant with its different components.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (B18MB01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	To study fundamental concepts in managerial economics and financial analysis including certain basic issues governing the business operations.			
2	To learn the concepts of demand, elasticity of demand and demand forecasting and methods of demand forecasting.			
3	To learn various issues involved in production decision analysis.			
4	To gain the knowledge of Break – Even Analysis and its importance in managerial decision making.			
5	To learn different types of market environment under various types of competition.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** DESIGN OF MACHINE MEMBERS – I (B18ME17)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Design a particular machine element and make use of standards parts and dimensions using design data book.			
2	Design of shafts , shaft couplings like flange couplings, flexible couplings.			
3	Determine the Stresses and deflections of bolded joints, keys, cotters, knuckle joints.			
4	Determine the Stresses and deflections of helical springs.			
5	Design of riveted, welded joint and screwed joints.			
6	To gain the knowledge of new economic environment in post – liberalization scenario.			
7	To know the concepts of capital budgeting and various methods of capital budgeting and its application in business decision making.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** ENTREPRENEURSHIP DEVELOPMENT (B18MB03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	To understand the mindset of the entrepreneurs, identity ventures for launching, develop an idea on the legal framework. and also understand strategic perspectives in entrepreneurship.			

Course Outcome	Year /Semester III/ I Sem	Subject Name (Subject Code) ENERGY STORAGE SYSTEMS (B18EE49)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Apply the technology to have energy storage system for any electrical Loads.			
2	To save the electrical power in peak time loads using ESS..			
3	To store energy and to avoid the environmental pollution			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** THERMAL ENGINEERING LABORATORY (B18ME20)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Identify various types of engines and their parts.			
2	Understand the power of different engine and where they can be used.			
3	Estimate the performance of different engine and analyze them.			
4	Analyze engines to set better efficiencies by knowing Brake specific fuel consumption of the engines.			
Course Outcome	**Year /Semester III/ I Sem**	**Subject Name (Subject Code)** METROLOGY AND MACHINE TOOLS LABORATORY (B18ME21)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Use different types of measuring instruments			
2	Perform different operations on Lathe machines.			
3	Measure angles and taper measurements.			
4	Evaluate different heights by using Vernier height gauge.			
5	This course provides fundamental knowledge and principles of machining to the operation of different marching processes on machine tools.			
6	The course draws upon knowledge of metal cutting principles turnouts the lathes, milling, drilling, shaping, slotting, and grinding machines.			
7	The course shows how to evaluate machined work piece surface finish and dimensional accuracy using metrology equipment.			
8	Students will be able to differentiate the lubrication and cooling effects of various cutting fluids.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** FINITE ELEMENT METHODS (B18ME22)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Student is able to analyze real time engineering objects and to present a well designed structures.			
2	Student can analyze bars beams, shafts and array symmetric solids.			
3	Student is able to understand and analyze the heat flow and know the temperature distribution at various points on the components.			
4	Student can analyze any complicated structure by utilizing the computer software like ANSYS instead of analytical methods.			

5	Estimate Load vector and stresses in 2D problems.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** DESIGN OF MACHINE MEMBERS – II (B18ME23)	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Design journal and roller bearings,			
2	Design engine parts like connecting rod, crank pins, crank shafts, pistons, cylinder and cylinder liner.			
3	Understand Power transmission system by belt drives and chain drives.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** HEAT& MASS TRANSFER (B18ME24)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the basics of heat transfer with good knowledge of conduction , convection and radiation.			
2	Identify the free convection and forced convection requirement for particular design.			
3	Analyse the concept of heat convection and get better result from free convection.			
4	To know the concept of hydrodynamics and thermal boundary in forced convection.			
5	Design effective heat exchanger by considering concepts of radiation heat transfer along with conduction and convection.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** ENVIRONMENTAL SCIENCE (B18MC02)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Recall previously learned ecosystem and find how the biodiversity changes went in the environment.			
2	Demonstrate outlines of types of pollutions and related to day-to-day life.			
3	Organize important seminars on natural resources.			
4	Apply models of food chains and energy flow models to solve the identified parameters.			
5	Classify the types of pollutants and distinguish the functions of sustainable development that take part in the environment.			
6	Design the experiments with BOD, COD, OD and to estimate the micro organisms which cause contamination and can propose solutions.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** INDUSTRIAL MANAGEMENT (ELECTIVE-I) (B18MB05)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Plan an organizational structure for a given context in the organisation carry out production operations through Work study.			
2	Carry out production operations through Work study.			
3	Understand the markets, customers and competition better and price the given products appropriately			

4	Ensure quality for a given product or service.			
5	Plan and control the HR function better.			
6	Plan, schedule and control projects through PERT and CPM.			
7	Evolve a strategy for a business or service organisation.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** DATABASE MANAGEMENT SYSTEMS (OPEN ELECTIVE) (B18CS08)	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	A strong foundation in core Computer Science and Engineering, both theoretical and applied concepts.			
2	An ability to apply knowledge of mathematics, science, and engineering to realworld problems.			
3	Ability to model, understand, and develop complex software for system software as well as application software.			
4	An ability to communicate effectively, both in writing and oral.			
5	The broad education necessary to understand the impact of computer science and engineering solutions in the scientific, societal and human contexts			
7	A recognition of the need for, and an ability to engage in life-long learning.			
8	A knowledge of contemporary issues.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** DISASTER MANAGEMENT (OPEN ELECTIVE) (B18CE54)	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Acquire the knowledge of disaster Management			
2	Understand the vulnerability of ecosystem and infrastructure due to a disaster			
3	Acquire the knowledge of Disaster Management Phases			
4	Understand the hazard and vulnerability profile of India			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** NANO TECHNOLOGY (B18ME25)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the fundamentals of Nanotechnology			
2	Know the different classes of nano materials			
3	Impart basic knowledge on various synthesis and characterization techniques involved in Nanotechnology			
4	Make the learner familiarize with nanotechnology potentialities.			
5	Apply transfer interdisciplinary systems engineering approaches to the field of nanotechnology.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** MECHATRONICS (PROFESSIONAL ELECTIVE-I) (B18ME26)	**No. of Hours L:3 T:0 P:0**	**Credits:3**

After completion of this course, the student shall be/shall				
1	Use the control system; mechatronics design systems and measurement systems.			
2	Work on various actuating systems.			
3	Convert the signals from one form to another form.			
4	Estimate the micro controllers and micro processors.			
5	Develop the simple programming code for PLC's.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** AUTOMOBILE ENGINEERING (PROFESSIONAL ELECTIVE-I) (B18ME27)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the various parts used in automotive pollution standards.			
2	Understand different types of fuel injection system and pump system.			
3	Analyze the cooling systems depending upon the cooling requirements for particular automobile and Understand different types of ignition systems used in case of an automobile.			
4	Understand the power transmission in automobile gearbox and clutch system.			
5	Understand various transmission systems, steering systems and suspension and breaking systems.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** MAINTENANCE AND SAFETY ENGINEERING (PROFESSIONAL ELECTIVE-II) (B18ME28)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand The maintenance in equipment life cycle.			
2	Analyse The preventive and corrective measures in maintenance.			
3	Estimate The inventory control in maintenance.			
4	Classify The incosting and budget preparation			
5	Compare the reliability measures, reliability networks and reliability analysis			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** MECHANICS OF COMPOSITE MATERIALS (PROFESSIONAL ELECTIVE-II) (B18ME29)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Highlight the appropriate use of composite materials in the industry			
2	Understand the significance of replacing existing metal structures with composite materials whenever beneficial.			
3	Comprehend the complexity of design of composite materials and structures.			
4	Apply knowledge of mechanics of composite materials for analyzing advanced materials			

	involved in current trends and research area.			
5	Apply the knowledge of composite materials for designing structures for aerospace applications and smart structures.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** REFRIGERATION & AIR CONDITIONING (PROFESSIONAL ELECTIVE-II) (B18ME30)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand all the basic principles of refrigeration.			
2	Prepare a model refrigeration system and designing various components according to the requirement.			
3	Design an A.C. unit by calculating the heat loads.			
4	4. Observe and analyze large capacity units like ice plants, cold storages and centralA.C. units.			
5	Know all Psychrometric properties and processes.			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** HEAT TRANSFER LAB (B18ME31)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Student is able to analyze and conduct the experiments to know the heat transfer and temperatures.			
2	Student is able to interpret the experimental knowledge in the real life situation like in, electric iron, and refrigerator.			
3	Student is able to possess the application knowledge of engine radiation, air condition chambers, solar collectors etc.			
4	Student can design a heat transfer system to cool the given component to required temperature within the desired time			
Course Outcome	**Year /Semester III/ II Sem**	**Subject Name (Subject Code)** ADVANCED ENGLISH COMMUNICATION SKILLS LAB (B18EN03)	**No. of Hours L:0 T:0 P:3**	**Credits:2**
After completion of this course, the student shall be/shall				
1	Developing effectively and appropriate vocabulary to be used contextually.			
2	Inculcating flair for Writing and felicity in written expression.			
3	Enhancing job prospects.			
4	Acquiring effective speaking abilities.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** CAD/CAM (B18ME32)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Observe the various input and output devices used in CAD/CAM systems.			
2	Understand 2D and 3D transformations problems .			
3	Write the programs for different models by using NC part programming.			

4	Analyze the Group Technology (GT)			
5	Differentiate CAQC (Computer Aided Quality Control) and CIM (Computer Integrated Manufacturing) systems.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** INSTRUMENTATION AND CONTROL SYSTEMS (B18ME33)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Gain knowledge on various parts of machine and IC engine. Understand the design construction of machine parts.			
2	To gain knowledge of functioning of parts such as connecting rod, eccentric etc.			
3	To understand how heat and electricity are combined in calibrating thermoelectric devices, especially resistance temperature detector, thermo couple.			
4	To measure the displacement using LVDT transducer. To gain knowledge on flow measurement using rotameter.			
5	Classify Open and closed systems Servomechanisms.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** UNCONVENTIONAL MACHINING PROCESSES (PROFESSIONAL ELECTIVE-III) (B18ME34)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand selection of processes.			
2	Design the components of Abrasive Jet machining process.			
3	Observe surface properties after machining without destructing the material.			
4	Select the material with respect to process.			
5	Apply plasma for machining like Magnetic abrasive finishing, Abrasive flow finishing etc.,			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** DESIGN FOR MANUFACTURING (PROFESSIONAL ELECTIVE-III) (B18ME35)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Classify the steps in design process.			
2	Understand the overview of various machining processes.			
3	Apply the factors in design of weldments.			
4	Analyse general design recommendations of extrusion.			
5	Compare the development of systematic dfa methodology.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** POWER PLANT ENGINEERING (PROFESSIONAL ELECTIVE-III) (B18ME36)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the different types of operation takes place in the power plant with its			

	plant layout.			
2	Got knowledge about internal combustion power plants and their uses.			
3	Explore the opportunities to improve the capacity and the efficiency of hydro electric power plant.			
4	Understand the concept of nuclear power generation and find out the better way against radiation hazards.			
5	Analyze the plant economics and the environmental considerations for the establishment of plant.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** PRODUCTION PLANNING & CONTROL (PROFESSIONAL ELECTIVE-IV) (B18ME37)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Design and plan an economical production system.			
2	Learn about effective utilization of plant resources.			
3	Provide alternate production strategies.			
4	Guide shop floor people for manufacturing products of required quantity.			
5	Define dispatcher and its procedures.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** ROBOTICS (PROFESSIONAL ELECTIVE-IV) (B18ME38)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Apply the knowledge of robotics in real time human life applications			
2	Analyse the concept of CAD/CAM and automation to the robotics.			
3	Compare knowledge of robot applications in manufacturing like, material handling, loading and unloading etc.			
4	Experiment the robotics to the spot and continuous arc welding and spray painting.			
5	Relate the Robot Application in Manufacturing.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** COMPUTATIONAL FLUID DYNAMIC S (PROFESSIONAL ELECTIVE-IV) (B18ME39)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Describe Governing equations of CFD.			
2	Analyze problems with Euler and Navier Stokes Eqns.			
3	Evaluate CFD codes.			
4	Analyze different models with different algorithms.			
5	Understand Finite volume formulations for diffusion equation.			

Course Outcome	Year /Semester IV / I Sem	Subject Name (Subject Code) AUTOMATION IN MANUFACTURING (PROFESSIONAL ELECTIVE-V) (B18ME40)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Analyse necessity of automating any industry and procedure to be adopted for automation.			
2	Define different types of automated flow lines, transfer lines.			
3	Associate all types of material handling systems and adaptive control systems.			
4	Choose packages available for advanced techniques available in mechanical engineering.			
5	Discuss the Techniques of Rapid Proto typing.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** MECHANICAL VIBRATIONS (PROFESSIONAL ELECTIVE-V) (B18ME41)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Students acquire the ability to format mathematical models of problems in vibrations systems (damped & undamped subjected to non periodic forcing functions).			
2	Students will have an ability to obtain the complete solution for the motion of vibrator.			
3	Students will be able to obtain design parameters and indicate methods of solutions for complicated vibratory problems.			
4	Students will be able to solve the vibrations problems for multi degrees of freedom.			
5	Students will be able to obtain numerical solutions in vibrations problems.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** NON CONVENTIONAL ENERGY SOURCES (PROFESSIONAL ELECTIVE V) (B18ME42)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Apply the technology to capture the energy from the renewable sources like sun, Wind, ocean, biomass, geothermal.			
2	Use different renewable energy sources to produce electrical power minimize the use of conventional energy sources to produce electrical energy.			
3	Identify the fact that the conventional energy resources are depleted.			
4	Understand direct energy conversion.			
5	Learn different methods in solar energy system.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** CAD/CAM LAB (B18ME43)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Draw the part drawings which are utilized in real time applications.			
2	Understand the different types of stress analysis, load calculations by using ANSYS			

	software.			
3	Analyze 2D and 3D part drawings using AutoCAD, CREO software packages.			
4	Develop and understand the NC part program generation by using CADEM packages.			
Course Outcome	**Year /Semester IV / I Sem**	**Subject Name (Subject Code)** INSTRUMENTATION AND CONTROL SYSTEMS LAB (B18ME44)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Identify the different pressure gauges.			
2	Understand the different types of temperature measurements.			
3	Analyze the calibration of capacitive transducer for angular displacement.			
4	Evaluate seismic pickup for the measurement of vibration amplitude.			
Course Outcome	**Year /Semester IV / II Sem**	**Subject Name (Subject Code)** INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE-I) (B18MB06)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	An ability to apply knowledge of mathematics, science and engineering to real world problem.			
2	Ability to model, understand and develop complex software for system software as well as application software.			
3	The broad education necessary to understand the impact of computer science and engineering solutions in the scientific, societal and human contexts.			
4	A recognition of the need for, and an ability to engage in life-long learning.			
Course Outcome	**Year /Semester IV / II Sem**	**Subject Name (Subject Code)** AIR POLLUTION AND CONTROL (OPEN ELECTIVE) (B18CE53)	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Acquire the knowledge of Air pollution Concepts.			
2	Acquire the knowledge of Effects of air pollution.			
3	Acquire the knowledge of Air pollution Control devices.			
4	Acquire the knowledge of Air quality monitoring devices.			
Course Outcome	**Year /Semester IV / II Sem**	**Subject Name (Subject Code)** STATISTICAL OPERATIONS RESEARCH (OPEN ELECTIVE-III) (B18MA07)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Find optimum solutions by various techniques of Linear Programming Problem.			
2	Analyze the optimum expenditure of the products by Transportation Problem.			
3	Find out the optimum allocation and time of the tasks.			
4	Examine the graphical solution of a game theory problems.			
5	Formulate concrete problems using Queuing theoretical approaches and gain strong knowledge and principles of Queuing Theory.			

Course Outcome	Year /Semester IV / II Sem	Subject Name (Subject Code) PLANT LAYOUT & MATERIAL HANDLING (PROFESSIONAL ELECTIVE – VI) (B18ME47)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Get the knowledge of various types of material handling systems.			
2	Understand applications of different types of plant layouts.			
3	Get the knowledge of applications of ergonomics in material handling.			
4	Get the knowledge of designing of cost effective material handling systems.			
5	Understand merits of different types of plant layouts.			

Course Outcome	Year /Semester IV / II Sem	Subject Name (Subject Code) CNC TECHNOLOGIES (PROFESSIONAL ELECTIVE – VI) (B18ME48)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Understand the basic procedures and concepts of programming, set up and operation of a CNC Machining Center.			
2	Identify and understand the basic programming codes.			
3	Create geometry and tool paths from the specifications on a blueprint for simple parts using Master cam programming software.			
4	Identify and define the functions of the CNC machine control.			
5	Analyze the CNC machining center for manufacturing simple parts.			

Course Outcome	Year /Semester IV / II Sem	Subject Name (Subject Code) JET PROPULSION & ROCKET ENGINEERING (PROFESSIONAL ELECTIVE – VI) (B18ME49)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Compare the characteristics & performance of aerospace propulsion systems.			
2	Estimate their Performance and behavior of ramjets.			
3	Analyze preliminary designs of rocket to meet specified requirements.			
4	Identify testing and instrumentation methods for cryogenics like nuclear and plasma and propulsion.			
5	Understand the fundamentals of turbojet, ramjet and their performance evaluation.			

Viswambhara Educational Society

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

Department of Mechanical Engineering

COURSE OUTCOMES FOR M.TECH – THERMAL ENGINEERING R18 FOR THE YEAR 2018-2021

Course Outcome	Semester I Sem	Subject Name (Subject Code) ADVANCED THERMODYNAMICS (M18TE01)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Emphasize the relevance of Evaluation of thermodynamic properties of working substance			
2	Know the applications of Energy properties of real gases, Vapour pressure, Clausius			
3	Know about Psychometric mixture properties and psychometric chart, Air conditioning processes, cooling towers.			
4	Get uses of the Combustion Reactions, Enthalpy of formation. Entropy of formation, Reference levels of tables. Energy of formation, Heat reaction			
5	Solve a problem in Review binary vapour cycle, co generation and combined cycles, Second law analysts of cycles and Refrigeration cycles.			
6	Know about Fuel cells, Thermo electric energy, Thermo ionic power generation, Thermodynamic devices magneto hydronamic generations, Photovoltaic cells.			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code) ADVANCED FLUID MECHANICS (M18TE02)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Applications of In viscid Flow of Incompressible Fluids			
2	Applicability of Basic Laws of fluid Flow			
3	Understanding the Viscous Flow			
4	Get Knowledge on Boundary Layer Concepts			
5	Deal with Fundamental concept of turbulence			
6	Deal with Thermodynamic basics – Equations of continuity, Momentum and Energy – Acoustic Velocity Derivation of Equation for Mach Number			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code) ADVANCED REFRIGERATION AND AIR CONDITIONING (M18TE03)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Deal with Components of Vapor Compression System			
2	Develop the study skills on Production of Low Temperature			
3	Develop the study skills on Steam Jet refrigeration system: Representation on T-s and h-s diagrams – limitations and applications			
4	Enable students on Construction of Psychometric chart, Requirements of Comfort Air – conditioning ,Thermodynamics of human body.			

5	Equip students with Parameters influencing the Effective Temperature. Summer, winter and year round air – conditioning systems			
6	Make students aware of Humidification and dehumidification equipment, Systems of Air cleaning Grills and diffusers Fans and blowers Measurement and control of Temperature and Humidity			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** TURBO MACHINES (M18TE04)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the Fundamentals of turbo machines and their applications			
2	Applicability of steam nozzle and steam turbine in power plant and the relation of their flow on performance of plant.			
3	To equip students with the fundamental of thermodynamics concepts for gas dynamics			
4	Get Knowledge about type and working principle of centrifugal compressors			
5	Deal with Fundamental concept of Axial flow compressors and different type of cascade systems			
6	To understand relations of degree of reaction for maximum performance of axial flow gas turbines			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ENERGY MANAGEMENT (M18TE05)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the need of energy management and its principles.			
2	Analyze the requirement of energy audit and its concepts.			
3	Understand the concepts of economic analysis and its scope.			
4	Get Knowledge about methods of evaluation of projects.			
5	Deal with Fundamental concept energy audit			
6	Demonstrate the application of alternative energy sources in energy management			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** GAS TURBINES (M18TE06)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Explain the Applications and classifications of gas turbine			
2	Applicability of different processes for improving the performance of the plant.			
3	Analysis of Ideal and Real cycle gas turbines and concept of improving the efficiency.			
4	Get Knowledge about fundamental equations and laws of rotating machines			
5	Learn the basic and advanced concepts and working principles of different type of compressors.			
6	To determine the importance of effective combustion system for maximize the efficiency of gas turbine plant.			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** NON CONVENTIONAL ENERGY SOURCES (M18TE07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				

1	Know about Solar Energy Applications: Solar water heating. Space heating, Active and passive heating Energy
2	Deal with Structure of earth, Geothermal Regions, Hot springs. Hot Rocks
3	Deal with to solve a problem in Thermionic & thermoelectric generation, MHD generator.
4	Deal with Fusion, Fusion reaction, P-P cycle, Carbon cycle, Deuterium cycle, Condition for controlled fusion, Fuel cells and photovoltaic.
5	To enable students on energy sources. Plant productivity, Biomass wastes, aerobic and Anaerobic bioconversion processed
6	To equip students with Wind, Beaufort number, Characteristics, Wind energy conversion systems, Types, Betz model. Interference factor

Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** EQUIPMENT DESIGN FOR THERMAL SYSTEMS (M18TE08)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**

After the completion of this course, the students should be able to	
1	Get details about heat exchanger and its classifications.
2	Determine the effect of increasing pipes in performance of heat exchanger and get idea about double pipe heat exchanger.
3	Understand the working principle of steam condenser and explore the condensation of single vapors.
4	Get Knowledge about processes like vaporization, evaporation and reboiling and study about the equipments used for these processes
5	To understand the working principle of cooling tower
6	Determine the design requirement of effective cooling tower

Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ADVANCED THERMAL ENGINEERING LAB (M18TE09)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**

After the completion of this course, the students should be able to	
1	Understand the Analysis of air conditioning unit.
2	Understand the Analysis of heat pipe.
3	Know about Performance analysis of flat plate collector.
4	Know about Performance analysis of evacuative tube concentrator

Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** MODELING AND ANALYSIS LAB-I (M18TE10)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**

After the completion of this course, the students should be able to	
1	Understand the Analysis of flow profile on the designed nozzle.
2	Understand the Designing the diffuser and Analysis of flow profile on the designed diffuser.
3	Understand the Analysis of fluid flow on over curved surface.
4	Understand the Analysis of force exerted by the fluid jet on fixed flat plate

Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** RESEARCH METHODOLOGY (M18MC01)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**

After the completion of this course, the students should be able to				
1	Understand that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right			
2	Compose and write quality research reports and attain familiarity with intellectual property rights.			
3	Understand research problem formulation			
4	Analyze research related information			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** STRESS MANAGEMENT (M18AC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	To understand the need of energy management and its principles.			
2	Analyze the requirement of energy audit and its concepts.			
3	Understand the concepts of economic analysis and its scope.			
4	Get Knowledge about methods of evaluation of projects			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED HEAT TRANSFER (M18TE11)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Emphasize the General heat Conduction equation.			
2	Know the Lumped system analysis			
3	Know about Equations of fluid flow			
4	To understand the concept of free convection, boiling and condensation			
5	Get the knowledge about transfer of heat in the space and at higher temperature.			
6	Understand the concepts of mass transfer and significance of non dimensional numbers			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED I.C. ENGINES (M18TE12)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Design and operating Parameters			
2	Applicability of Thermo-chemistry of Fuel-Air mixtures.			
3	Understanding the effect of Volumetric Efficiency on the performance of the engines.			
4	Get Knowledge on Mean velocity and turbulent characteristics.			
5	Deal with Abnormal combustion Fuel factors, MPFI.			
6	To determine Emissions, Measurement & Exhaust Gas Treatment			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** CRYOGENIC ENGINEERING (M18TE13)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the main concept of cryogenic systems.			
2	To know the importance and applications of gas liquefaction			
3	Understand the working of liquefaction systems for various types of gases			
4	Equip students with the knowledge of gas separation systems and purification systems.			

5	To impart knowledge on cryogenic refrigeration systems			
6	Make students aware applications of cryogenic system in space technology			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** JET PROPULSION AND ROCKET ENGINEERING (M18TE14)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the concept of turbo jet propulsion system and performance of flight.			
2	Enable students to learn the concept of rocketry and its fundamentals.			
3	To impart knowledge on the effect of nozzle design on the performance of jet propulsion.			
4	Get idea about the combustion chemistry of fuels used in rocketry.			
5	Equip students with the knowledge of advanced rocket engines.			
6	To learn the various method of liquid rocket propulsion system			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ALTERNATE FUELS (M18TE15)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Availability and properties of alternate fuels, general use of Alcohols, LPG, hydrogen, and ammonia.			
2	Deal with Properties as engine fuel, alcohols and gasoline blends.			
3	Deal with to solve a problem in performance in SI & CI Engines.			
4	Deal with performance and emission characteristics, bio diesel and its characteristics			
5	To enable students on Layout of an electric vehicle, advantage and Limitations, specifications, system components.			
6	To equip students with electronic control system.			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED COMPUTATIONAL FLUID DYNAMICS (M18TE16)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand Finite difference method, finite volume method, finite element method			
2	Consider Solution methods of elliptical equations			
3	Understand Boundary layer equations for laminar, turbulent flow			
4	Solve numerical on Burgers equations: Explicit and implicit schemes, Runge- Kutta method.			
5	Get knowledge on Formulations of incompressible viscous flows by finite difference methods.			
6	Get knowledge on Finite volume method via finite difference method			
Course Outcome	**Semester II Sem**	Subject Name (Subject Code) THERMAL AND NUCLEAR POWER PLANTS (M18TE17)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the Type of Power plants, Direct energy conversion system.			
2	Analysis and Understand Recent developments in power generation.			
3	Know about Feed water heaters.			

4	To impart knowledge on Combined cycle power plant and its importance.			
5	To understand the concepts of Nuclear Reactor and its Classification			
6	Get knowledge on Factors affecting the economics			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** THERMAL MEASUREMENTS & PROCESS CONTROLS (M18TE18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the fundamental principles of measuring instruments.			
2	Identify the working principle of all the instruments used to determine the flow.			
3	Develop the advanced thermometers for different type of operations.			
4	Measure the level by direct or indirect methods.			
5	Impart knowledge on principles used for process control.			
6	Design open as well as closed loop control system			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED INTERNAL COMBUSTION ENGINES LAB (M18TE19)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand the effect of change in compression ratio on the performance of diesel& petrol engine.			
2	Analyze the effect of change in fuel injection timing on the performance of diesel engine.			
3	Understand and analysis Flame propagation analysis of gaseous fuels.			
4	Use different type of fuels and analyze its effect on the performance of diesel and petrol			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** MODELING AND ANALYSIS LAB-II (M18TE18)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Aware of Thermal stress analysis of piston head of diesel engine for real condition.			
2	Design of intake and exhaust valve for diesel engine.			
3	Analyze the thermal stress of crank rod of diesel engine for real operating conditions.			
4	Understand effect of thermal stress on the intake and outlet valve of IC engines			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ENGLISH FOR RESEARCH PAPER WRITING (M18AC01)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	To understand the nuances of language and vocabulary in writing a Research Paper.			
2	To develop the content, structure and format of writing a research paper.			
3	To give the practice of writinga Research Paper.			
4	To enable the students to evolve original research papers without subjected to plagiarism			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED MATERIALS FOR THERMAL SYSTEMS (M18TE22)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Understand the fundamentals of different type of testing methods.			
2	Analysis and Understand Impact Behavior Heat Treatment of Steels and Cast Irons.			
3	Impart knowledge on fundamentals of Nuclear Power Plant and Their Materials			
4	Get knowledge about materials in Fuel cells and Solar Cells Electro catalyst.			
5	Determine the advancement of use of super alloys.			
6	Design advanced energy storage system.			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** COMPUTER SIMULATION OF SI & CI ENGINES (M18TE23)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Impart knowledge on importance of computer simulation of IC engines.			
2	To understand the concept of Wiebe's function in SI engine modeling.			
3	Determine the importance of Watsons and White house and Way models in CI engines.			
4	Understand the basics of gas exchange processes.			
5	Equip students with knowledge of heat transfer to the surrounding from the IC engines.			
6	Analyze the effect of friction in moving parts of the engines on the performance of engines			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED FINITE ELEMENT ANALYSIS (M18TE24)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the Basic concepts, historical back ground, applications of FEM.			
2	Analysis and Understand Virtual energy principle			
3	Know about 1-D Structural Problems.			
4	Impart knowledge on Hermite shape functions, stiffness matrix, and Load vector.			
5	Know about Finite element modeling of Axi-symmetric solids			
6	Get knowledge on Dynamic considerations and Dynamic equations			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED OPTIMIZATION TECHNIQUES & APPLICATIONS (M18MA01)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about the basics of one dimensional Optimization methods.			
2	Choose the ways to use Direct search method			
3	Calculate dynamic programming.			
4	Construct linear programming			
5	Analyze integer programming			
6	Categorize stochastic programming.			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** BUSINESS LAW AND ETHICS (M18MB23)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know the Business Laws related to incorporating a company			

2	Identify the Importance of Ethics in Business
3	Categorize Cyber Crime and Legal Aspects.
4	Analyze Business Ethics.
5	Understand Negotiable Instruments Act – 1881
6	Compare Need for cyber laws in the Indian context.

COURSE OUTCOMES FOR B.TECH-CSE R18 FOR THE YEAR 2018-2019

Course Outcome	Year/Semester I/I Sem	Subject Name (Subject Code) LINEAR ALGEBRA AND CALCULUS (B18MA01)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Understand the principles of matrix to calculate the characteristics of system of linear algebraic equations using multiple methods.			
2	Determine eigen values, eigen vectors and orthogonally diagonalize symmetricmatrices.			
3	Analyze the nature of sequence and series to identify the convergence.			
4	Evaluate limits of single-variable functions graphically and computationally. Analyze improper integrals using Beta and Gamma functions.			
5	Calculate Partial derivatives, Jacobian and extrema of functions of multiple variables with or without constraints.			
Course Outcome	**Year /Semester I / I Sem**	**Subject Name (Subject Code)** APPLIED PHYSICS (B18PH01)	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Illustrate fabrication of semi conductors, photo detectors, design basis of quantum mechanics			
2	Recall facts of wave optics extend & construct basics of wave optics.			
3	Interpret about lasers, which leads to new innovations and improvements			
4	Elaborate and formulate the study of characterization properties of opto-devices, organize the students to prepare new materials for various engineering applications			
5	Apply basic knowledge on principles and recalls facts of light properties, and motivate for new innovations and analyse applications of optical fibers			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ENGLISH(B18EN01)	**No. of Hours L:2 T:0 P:0**	**Credits:2**
After the completion of this course, the students should be able to				
1	Use English Language effectively in spoken and written forms.			
2	Comprehend the given texts and respond appropriately.			
3	Communicate confidently in various contexts and different cultures			
4	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.			
5	Develops and Communicates by stating main ideas relevantly and coherently in speaking &writing.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ENGINEERING GRAPHICS (B18ME01)	**No. of Hours L:1 T:0 P:4**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyze the Projections of points.			
2	Understand the Projections of solids.			
3	Estimate the use of Drawings, dimensioning, scales and conic sections.			
4	Modify the Applications of this knowledge in Computer Graphics.			
5	Compare the conversion of isometric views to Orthographic views.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING(B18CS01)	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understanding how problems are posed and how they can be analyzed for obtaining solution.			
2	Understanding the fundamentals of C programming.			

3	Learning of sequencing, branching, looping and decision making statements to solve Scientific and engineering problems.			
4	Implementing different operations on arrays and creating and using of functions to solve problems			
5	Ability to design and implement different types of file structures using standard Methodology			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** APPLIED PHYSICS LAB (B18PH02)	**No. of Hours L:0 T:0 P:3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Operate different equipments related to light & electronics.			
2	Develop experimental skills to design new experiments & circuit design.			
3	Understand about modern equipment like solar cell, optical fibre etc.,			
4	Have Exposure to develop novel semi conductor devices.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING – LAB (B18CS02)	**No. of Hours L:0 T:0 P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Understand basic structure of the C Programming, data types, declaration and usage of variables, control structures and all related concepts.			
2	Ability to understand any algorithm and Write the C programming code in executable form.			
3	Implement Programs using functions, pointers and arrays, and use the pre-processors to solve real time problems.			
4	Ability to use file structures and implement programs on files.			
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (B18MA02)	**No. of Hours L:3 T:1 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Apply the fundamental concepts of ordinary differential equations to real time problems.			
2	Find the complete solution of a non homogeneous differential equations and applying its conceptsin solving physical problems of Engineering.			
3	Evaluate the multiple integrals in various coordinate systems.			
4	Apply the concepts of gradient, divergence and curl to formulate Engineering problems.			
5	Analyze line, surface and volume integrals using fundamental theorems.			
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (B18EE02)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Learn Basic circuit concepts such as electrical parameters, quantities , laws and network reduction techniques and apply the network theorems with DC excitation in the systems			
2	Analyze the steady state operation of single phase and three phase AC circuits and study the relationship between voltage and current for delta and star connections			
3	Explore the construction, working , control and testing of various DC and AC Machines			
4	Gain knowledge on basic electronic devices such as P-N junction Diode, rectifiers and filter with their V-I characteristics.			
5	Acquire extended knowledge on next generation of electronic devices such transistors, zener diode and SCR devices.			

Course Outcome	Year / semester I/II Sem	Subject Name (Subject Code) ENGINEERING CHEMISTRY (B18CH01)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Recall previous knowledge regarding atomic and molecular structure.			
2	Design polymeric engineering materials. Recall basic organic reactions			
3	Construct batteries and classify different electronics and electrical like cells , electrodes, e.t.c…help them to construct different electrical/ electronic parts.			
4	Examine which type of impurities are present in water, specification of drinking water and explain the corrosion behavior/ activity of metals.			
5	Apply phase rule and adsorption to construct the materials by analyzing their compositions.			
Course Outcome	Year / semester I/II Sem	Subject Name (Subject Code) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB(B18EN02)	No. of Hours L:0 T:0 P:2	Credits: 1
After the completion of this course, the students should be able to				
1	Neutralization of the influence of the sounds of their mother tongue			
2	Better understanding of nuances of English language through audio- visual experience and group activities			
3	Speaking with clarity and confidence which in turn enhances their employability skills			
4	Using language appropriately for public speaking			
Course Outcome	Year / semester I/II Sem	Subject Name (Subject Code) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB (B18EE03)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Learn to simplify complex electric and electronic circuits by applying the KVL and KCL laws.			
2	Identify the optimal loading on the system.			
3	Analyze the performance of DC machines			
4	Identify and analyze the performance and operation of semi conducting devices.			
Course Outcome	Year / semester I/II Sem	Subject Name (Subject Code) ENGINEERING WORKSHOP & ITWORKSHOP (B18ME02)	No. of Hours L:0 T:0 P:3	Credits:1 .5
After the completion of this course, the students should be able to				
1	Know the fundamental knowledge of various trades and their usage in real time Applications.			
2	Gain knowledge of Foundry, Welding, Black smithy, Fitting, Machine shop and house wiring.			
3	Understand the basis for analyzing power tools in construction and wood working, electrical engineering and mechanical engineering.			
4	Use basic concepts of computer hardware for assembly and disassembly.			
Course Outcome	Year / semester II/I Sem	Subject Name (Subject Code) **MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE(B18CS03)**	No. of Hours L:4 T:0 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Evaluate the notions of propositions, predicate formulae, Rules of inference.			
2	Illustrate and describe various types of Relations and Functions.			
3	Apply knowledge of Mathematics, Combinations & Permutations, Binomial Multinomial theorems, Pigeon hole principles.			
4	Develop to solve the recurrence relations by using various methods.			
5	Perceive the basic concepts of graph theory and apply for real time examples.			

Course Outcome	Year / semester II/I Sem	Subject Name (Subject Code) DIGITAL LOGIC DESIGN & MICRO PROCESSORS(B18EC49)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Understand the basic concepts of different Number systems and basic theorems using inBoolean algebra.			
2	Design the logic circuits using basic logic gates by reducing the Boolean expressions withthe help of Karnaugh Map.			
3	Analyze various types of combinational and sequential circuits.			
4	Understand the internal organization of popular 8086microprocessors.			
5	Learn the design of microprocessors – based systems			
Course Outcome	Year / semester II/I Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSYEMS(B18CS04)	No. of Hours L:4 T:0 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Perceive the fundamental concepts of database management.			
2	Analyze database models & Entity Relationship models and to draw the E-R diagram forthe given case study.			
3	Apply relational Database Theory, and be able to write relational algebra expressions forqueries.			
4	Apply Normalization Process to construct the database and explain Basic Issues ofTransaction processing.			
5	Compare the basic Database storage structures and access techniques: File Organizationindexing methods including B- Tree and Hashing.			
Course Outcome	Year / semester II/I Sem	Subject Name (Subject Code) DATA STRUCTURES THROUGH C++(B18CS05)	No. of Hours L:4 T:0 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	To find the difference between structured programming and object oriented programming Language and understanding the features of C++ supporting object oriented programming.			
2	To explain and apply the major object oriented concepts to implement object orientedPrograms in C++.			
3	To build the basic knowledge to handle operations like insertions, deletions, searching, andTraversing mechanisms in linear data structures.			
4	Examine with advanced data structure such as hash tables and priority queue datastructures.			
5	Ability to have knowledge on trees, balanced trees, graphs and developing C++ code fornon- linear data structures, and different sorting techniques.			
Course Outcome	Year / semester II/I Sem	Subject Name (Subject Code) COMPUTER ORGANIZATION & ARCHITECTURE(B18CS06)	No. of Hours L:4 T:0 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Perceive basics Computer types, buses, registers.			
2	Understand basic design of Computer, addressing modes, Micro Program Example.			
3	Perceive control unit operations and arithmetic Operations.			
4	Understand various Peripheral devices operations.			
5	Design memory organization that uses banks for different word size operations.			
Course Outcome	Year / semester II/I Sem	Subject Name (Subject Code) DIGITAL LOGIC DESIGN & MICROPROCESSORS	No. of Hours L:0 T:0 P:3	Credits: 1.5

		LAB(B18EC50)		
After the completion of this course, the students should be able to				
1	Demonstrate various types of logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR)and flip flops.			
2	Analyze and design various types of combinational and sequential circuits.			
3	Develop microprocessor based programs for Arithmetic and Logical Operations			
4	Develop microprocessor based programs for various problems.			
Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS LAB(B18CS07)**	**No. of Hours L:0 T:0 P:3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Design database schema for given Application.			
2	Transform ER Model to Relational Model.			
3	Apply the normalization techniques for development of application software to realisticproblems.			
4	Construct SQL queries to retrieve information from databases.			
Course Outcome	**Year/semester II/I Sem**	**Subject Name (Subject Code) DATA STRUCTURES THROUGH C++ Lab(B18CS08)**	**No. of Hours L:0 T:0 P:3**	**Credits:1 .5**
After the completion of this course, the students should be able to				
1	To be able to design and implement Object Oriented Programming concepts.			
2	Be able to select the appropriate Data Structure for given problem.			
3	To illustrate operations like searching, insertion, deletion and traversing mechanism onVarious Data Structures.			
4	To understand and apply the hashing techniques.			
Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code) ENVIRONMENTAL SCIENCE(B18MC02)**	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Recall previously learned ecosystem and find how the biodiversity changes went in theenvironment.			
2	Demonstrate outlines of types of pollutions and related to day-to-day life.			
3	Organize important seminars on natural resources.			
4	Apply models of food chains and energy flow models to solve the identified parameters.			
5	Classify the types of pollutants and distinguish the functions of sustainable developmentthat take part in the environment.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) STATISTICAL METHODS FOR ENGINEERS(B18MA04)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Use probability theory and deals with modeling uncertainty in order to evaluatethe probability of real time events.			
2	Develop discrete and continuous probability distributions to generate data from Binomial, Poisson and Normal Distributions.			

3	Perform correlation and regression analysis, in order to estimate the nature andthe strength of the linear relationship between two variables.			
4	Construct confidence interval estimates for population parameters to test the hypothesis.			
5	Formulate concrete problems using Queuing theoretical approaches and gainstrong knowledge and principles of Queuing Theory.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) DESIGN AND ANALYSIS OF ALGORITHMS (B18CS09)**	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Expose student's to few known methods of solution processes, build new solution algorithms, analyze the asymptotic performance of algorithms and to write rigorous correctness proofs for algorithms.			
2	Identify appropriate data structures and algorithm design methods for specified classes of applications.			
3	Perceive how the choice of data structures and algorithm design methods would impact theperformance of programs and how to compare them.			
4	Design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound			
5	Perceive methods to deal with logarithmic type, polynomial type and non-polynomial type of classes of problems and Synthesis of efficient algorithms in common engineering designsituations would be discussed.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) FORMAL LANGUAGES AND AUTOMATA THEORY(B18CS10)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Explain basic concepts in formal language theory, grammars, automata theory(DFA&NFA), computability theory, and complexity theory.			
2	Know the production rules of regular expressions and grammars, includingcontext: free and context: sensitive grammars.			
3	Construct a pushdown automata and context free, regular, normal formgrammars to design computer languages			
4	Evaluate solution for various problems using a theoretical computer (Turingmachine) for a computer language.			
5	Explain the relationship among language classes and grammars with the help ofChomsky Hierarchy, and Distinguish between decidability and undecidability.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) OPERATING SYSTEMS (B18CS11)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Compare various Operating Systems architectures, IO structures, Network Structure			
2	Analyze the virtual memory, paging and memory allocation techniques for variousapplications.			
3	Apply Deadlock prevention and Deadlock Detection algorithms and perceive the workingof an operating system as a File manager, I/O manager, Process manager.			
4	Understand the overview of Disk Storage Structure.			
5	Analyze assess access controls to protect files.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) MANAGERIAL ECONOMICS & FINANCIAL**	**No. of Hours L:3 T:0 P:0**	**Credits:3**

		ACCOUNTANCY(B18MB01)		
After the completion of this course, the students should be able to				
1	Understand the nature, scope and importance of Managerial Economics.			
2	Know what demand is, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand.			
3	Know how production function is carried out to achieve least cost combination of Inputsand how to analyze cost.			
4	Understand the characteristics of different kinds of markets and outline different form ofbusiness organization and analyze how capital budgeting techniques are used for investment decisions.			
5	Know how to prepare final accounts and how to interpret them, analyze and interpretfinancial statements using ratio analysis.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) OPERATING SYSTEMS LAB (B18CS12)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Apply CPU scheduling algorithms, Page replacement algorithms.			
2	Explain Bankers Algorithm for Dead Lock Avoidance & Dead Lock Prevention			
3	Describe the concepts of paging and segmentation.			
4	Make use of Linux commands.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) WEB TECHNOLOGIES LAB(B18CS13)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Develop applications for a range of problems using object oriented programmingtechniques.			
2	Design GUI based applications and Applets for web applications.			
3	How to connect a java program with the mysql database.			
4	Develop web pages using advanced server side programming through Servlets and JSP.			
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code) GENDER SENSITIZATION (B18MC07)**	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Define the need and importance of women empowerment.			
2	Extend the levels of understanding and classification of gender disparities.			
3	Identify the need of equal distribution of work in the entire sector irrespective ofgender.			
4	Construct the emergency needs of saving girl child.			
5	Improves thinking levels to find solution to the missing women and bring realizationin the society.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) DATA COMMUNICATIONS AND COMPUTER NETWORKS (B18CS14)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Illustrate basic computer network technology.			
2	Identify the different types of network topologies and protocols.			

3	Categorize the hardware and software commonly used in data communications and networking.			
4	Interpret Design and Evaluate subnet masks and addresses to fulfill networking requirements			
5	Analyze the features and Operations of TCP/UDP, FTP, HTTP, SMTP,SNMP etc.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) COMPILER DESIGN (B18CS15)**	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Apply the knowledge of modern phases of compiler and its features.			
2	Identify the similarities and differences among varies parsing techniques.			
3	Explain semantic analysis in the context of the compilation process.			
4	Design a symbol table format for the language defined by a grammar			
5	Analyze the code generation algorithm.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) SOFTWARE ENGINEERING (B18CS16)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Define Software Engineering and list core principles of software engineering and understand various process models			
2	Develop an understanding of software requirements and be able to prepare SRS document.			
3	Understand software design engineering process using structural and object oriented approaches and be able to model.			
4	Differentiate the techniques of verification and validation in the process of software development, Apply the testing strategies on different level of implementation (unit, integration,…)			
5	Understand and able to compute quality measures and develop a software quality assurance plan for a software development.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) MACHINE LEARNING (B18CS17)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Explain the theory underlying machine learning.			
2	Learn beyond binary classification.			
3	Recognize and implement various genetic algorithms.			
4	Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models			
5	Able to analyze the data using R Programming.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) PRINCIPLES OF PROGRAMMING LANGUAGES (PROFESSIONAL ELECTIVE-I) (B18CS18)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Analyze Syntax related concepts including context free grammars, Attribute Grammar parse trees.			
2	Perceive the semantic issues associated with function implementations.			

3	Perceive the concepts of Abstraction and Encapsulation constructs of classes, interfaces, packages of various Language Examples.			
4	Perceive the implementation of object oriented languages.			
5	Compare the Functional Programming Languages and Logic Programming Languages.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) COMPUTER GRAPHICS (PROFESSIONAL ELECTIVE-I) (B18CS19)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Get overview on applications areas of Computer Graphics, Graphic devices and Monitors.			
2	Learn about basic tools for constructing pictures with straight lines, methods for performing geometric transformations i.e 2-Dimensional, curves, filled area, celNo. of Hours L:array patterns, and text.			
3	Learn about various surface functions such as quadrics, polygon surfaces, super quadrics, splines or blobby objects and 3-Dimensions transformations in computer graphics.			
4	Describe the importance of viewing. Learn major considerations in the generation of realistic graphic displays, detecting visible surfaces in a 3-Dimension scene and designing animation sequences.			
5	Discuss the applications of computer Graphics. Analyze the fundamentals of animations			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) MOBILE APPLICATION DEVELOPMENT (PROFESSIONAL ELECTIVE-I) (B18CS20)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Student understands the working of Android OS Practically.			
2	Ability to evaluate and select appropriate solutions to the mobile computing platform.			
3	Ability to develop the user interface.			
4	Ability to work with SQLITE DB.			
5	Student will be able to develop, deploy and maintain the Android Applications.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE-I) (B18MB06)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Understand the legal rights related to design, trade and unfair competition.			
2	Ability to apply and assess principles in intellectual property.			
3	Discuss the real time areas related to semiconductor chip protection act.			
4	Develop different law of patents.			
5	Introduce trade secret and apply state law and trade secret law.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) DISASTER MANAGEMENT (OPEN ELECTIVE-I) (B18CE53)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Perceive the various types of disaster.			
2	Interpret the various types of Hazards and Vulnerability.			
3	Perceive different approaches of disaster risk reduction.			
4	Describe the disaster management and safety plan.			

5	Discuss the various disaster risks in India.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) MANAGEMENT SCIENCE (OPEN ELECTIVE –I) (B18MB02)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Outline the fundamentals of management and contributions to management.			
2	Define the social Responsibilities of an organization towards stakeholders and build the suitable organization structure and to identify factors influencing plant location and layout decisions.			
3	Know importance of materials management, evaluate quality of products using SQC techniques and Identify the basic concepts of marketing mix and Human Resource concepts.			
4	Know how PERT and CPM different and to construct network by proper planning organizing an managing the efforts to accomplish a successful project.			
5	Appraise all contemporary management practices and analyze how these contemporary management practices one applicable in modern business and service organizations.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) COMPUTER NETWORKS AND COMPILER DESIGN LAB (B18CS21)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Create any topology using network devices and build a device for sharing on network.			
2	Explain the major software and hardware technologies used on computer networks.			
3	Demonstrate a working process of lexical analysis, parsing and other compiler design aspects.			
4	Interpret the working of lex and yacc compiler for debugging of programs.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) MACHINE LEARNING LAB (B18CS22)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course the students should be able to :				
1	Discuss different application on Machine Learning problems.			
2	Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.			
3	Improve the performance of Machine Learning algorithms with different parameters.			
4	Understand the latest issues raised by current researchers.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) INDIAN CONSTITUTION (B18MC04)**	**No. of Hours L:2 T:0 P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Demonstrate the fundamental rights and duties of a citizen			
2	Classify the administrative structure of the Indian union			
3	Identify the power of state government and make use of positions			
4	Categorize the various department and local administrations responsibilities			
5	Functions of election commission and its roles			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) NETWORK PROGRAMMING (B18CS23)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				

1	Demonstrate advanced knowledge of OSI layers, TCP & UDP concepts, Networking.
2	Summarize the TCP socket functions and Byte Ordering.
3	Make use of TCP client server applications and analyze I/O Multiplexing and socket options.
4	Define about the Elementary UDP sockets and Address conversions.
5	Explain inter process communication consisting of pipes, FIFOs, Semaphores, Message Queues and Remote Procedure Calls

Course Outcome	Year / semester	Subject Name (Subject Code)	No. of Hours	Credits:3
	III/II Sem	SOFTWARE TESTING (B18CS24)	L:3 T:0 P:0	

After the completion of this course, the students should be able to

1	Design test cases suitable for a software development for different domains.
2	Prepare test planning based on the document.
3	Identify suitable tests to be carried out.
4	Validate test plan and test cases designed.
5	Use of automatic testing tools.

Course Outcome	Year / semester	Subject Name (Subject Code)	No. of Hours	Credits:3
	III/II Sem	DATA WAREHOUSING AND DATA MINING (B18CS25)	L:3 T:0 P:0	

After the completion of this course, the students should be able to

1	Introduce data mining concepts and develops understanding of data mining application.
2	Develop an understanding of data warehouse, designing and using data in data warehouse using various operations.
3	Develop an outlook of Association rule mining, association rule mining methods and their application on some sample data sets, evaluate these methods based on need.
4	Develop an understanding of classification and prediction, classification methods and their application on some sample data sets, evaluate these methods based on need.
5	Develop conceptual understanding of clustering, various clustering methods and their application on some sample data sets, evaluate these methods based on need.

Course Outcome	Year / semester	Subject Name (Subject Code)	No. of Hours	Credits:3
	III/II Sem	WEB SERVICES (B18CS26)	L:3 T:0 P:0	

After the completion of this course, the students should be able to

1	Implement Web service client and server with interoperable systems like core distributed computing, J2EE, SOA, WSDL, UDDI and EBXML
2	Perceive and analyze the principles of SOAP.
3	Perceive the implement Web Services life cycle, Anatomy of WSDL definition document.
4	How to utilize the semantics of web services. Working with UDDI, programming with UDDI, UDDI data structures.
5	Explore interoperability between different frameworks. Design web based applications that use web services

Course Outcome	Year / semester	Subject Name (Subject Code)	No. of Hours	Credits:3
	III/II Sem	ADVANCED DATABASE MANAGEMENT SYSTEMS (PROFESSIONAL ELECTIVE-II) (B18CS27)	L:3 T:0 P:0	

After the completion of this course, the students should be able to

1	Define Database Languages, Models along with Client Server Architecture.
2	Explain principles of Database Recovery protocols.

3	Construct EER model for real world problems.			
4	Determine various database security issues.			
5	Adapt with advanced Data models and its applications.			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) DESIGN PATTERNS (PROFESSIONAL ELECTIVE-II) (B18CS28)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Identify the appropriate design patterns to solve object oriented design problems.			
2	Identify and implement appropriate solutions to recurring programming problems by consulting technical documentation and specifications, including design pattern catalogs and existing source code.			
3	Understand basic elements of structural patterns and their implementation.			
4	Understand basic elements of creational patterns and their implementations.			
5	Understand basic elements of behavioral patterns and their implementation along with growth in the field of using design patterns.			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) OPEN SOURCE SOFTWARE (PROFESSIONAL ELECTIVE-II) (B18CS29)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Install and run open-source operating systems.			
2	Gather Information about free and open source software projects from software releases and from sites on the internet.			
3	Build and modify one or more free and open source software packages.			
4	Ability to learn version control system and interface with version control systems used by development communities.			
5	Contribute software to and interact with free and open source software development Projects.			
Course Outcome	**Year / semester III/I Sem**	**Subject Name (Subject Code) AIR POLLUTION CONTROL (OPEN ELECTIVE – II) (B18CE52)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Perceive Air pollution Concepts.			
2	Analyze the Effects of air pollution on the environment.			
3	Identify the significance of meteorological factors in pollutant dispersion and to predict the pollutant concentration.			
4	Apply plume dispersion modelling and assess the concentrations.			
5	Perceive Air quality monitoring devices.			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) BIOMEDICAL INSTRUMENTAION (OPEN ELECTIVE – II) (B18EC23)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Understand the functions of bio amplifiers, characteristics of medical instruments and bio signals.			
2	Discuss the various internal, external Bio electrodes and relations between electrical and mechanical activities of heart.			
3	Compare various concepts of Cardiac Instrumentation and gain the knowledge about			
4	Analyze the Therapeutic Equipment and their operation.			

5	Acquires knowledge about neuro-muscular Instrumentation like ECG EMG and EEG.			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) DIGITAL IMAGE PROCESSING (OPEN ELECTIVE – II) (B18EC24)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Gain the knowledge of digital image fundamentals and image transforms.			
2	Discuss the analysis of image enhancement in spatial and frequency domain.			
3	Understand the different methods to restore an image.			
4	Inspect different image segmentation techniques and understand morphological image processing.			
5	Analyze the different image compression techniques.			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) ADVANCED ENGLISH COMMUNICATION SKILLS LAB (B18EN03)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Developing effectively and appropriate vocabulary to be used contextually			
2	Inculcating flair for Writing and felicity in written expression.			
3	Enhancing job prospects.			
4	Acquiring effective speaking abilities			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) NETWORK PROGRAMMING LAB (B18CS30)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Elaborate basic UNIX commands, shell scripts and AWK scripts.			
2	Organize and manipulate files and directories.			
3	Model TCP and UDP client server applications and outline the I/O multiplexing concepts of Select and Poll functions.			
4	Design inter process communication consisting of pipes, FIFOs, Semaphores and message Queues and develop RPC applications.			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) DATAMINING AND SE LAB (B18CS31)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Develop a design of data warehouse and implement OLAP operations.			
2	Explore WEKA for data mining task such as association rule mining, classification and clustering using a few algorithms from the respective task.			
3	Explore text mining using WEKA and apply classification using Naive bayes technique.			
4	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.			
Course Outcome	**Year / semester III/II Sem**	**Subject Name (Subject Code) LOGICAL REASONING & QUANTITATIVE APTITUDE (B18MC05)**	**No. of Hours L:2 T:0 P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.			
2	Interpret given information correctly, determine which mathematical model best describes the data.			

3	Correctly apply mathematical language and notation to explain the reasoning underlying their conclusions			
4	Improve their mathematical skills in various general aspects to solve real world problems.			
5	Ability to draw conclusions or make decisions based on logical reasoning and mathematical ability.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) NETWORK SECURITY & CRYPTOGRAPHY (B18CS32)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Identifies various types of vulnerabilities, attacks, mechanisms and security services.			
2	Compare and contrast symmetric and asymmetric encryption algorithms.			
3	Implementation of message authentication, hashing algorithms and able to understand kerberos.			
4	Explore the attacks and controls associated with IP, transport level, web and E-mailsecurity.			
5	Develop intrusion detection system, solutions for wireless networks and designing ofvarious types of firewalls.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) MANAGEMENT AND ORGANISATIONAL BEHAVIOR (B18MB04)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Evolution of Management and contribution of Management thinkers.			
2	The relevance of environmental scanning, planning and to take decisions.			
3	Organizing and controlling.			
4	Individual and group Behaviour.			
5	Leadership and Motivation.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) CLOUD COMPUTING (PROFESSIONAL ELECTIVE-III) (B18CS33)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Perceive the main concepts, key technologies of virtualization			
2	Describe the architecture and infrastructure of cloud computing with all services of cloudand deployment models.			
3	Analyze the issues of cloud computing like cloud security. Explain the core issues of cloudcomputing such as security and privacy			
4	Identify problems; analyze various cloud computing solutions using python. Writecomprehensive case studies by analyzing different cloud computing solutions			
5	Perceive the virtualization and cloud computing concepts. Develop scalable applicationsusing AWS.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) INFORMATION SYSTEMS AND AUDITING (PROFESSIONAL ELECTIVE-III) (B18CS34)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Recognize the propensity of errors and remedies in processes involving InformationTechnology.			
2	A consummate knowledge of risks and controls in IT operations in Industry.			

3	Apply the information systems auditing methodology. Identify and manage the securitycontrols.			
4	Provide protective IT security guidelines for various types of Industries. Analyze thecurrent issues in auditing			
5	The necessary wherewithal to become an IS Auditor and/or Security specialist eventually. Evaluate asset safeguarding and data integrity, system effectiveness and system efficiency.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) ARTIFICIAL INTELLIGENCE (PROFESSIONAL ELECTIVE-III) (B18CS35)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Remember various AI concepts like the AI technique, level of model, there underlyingassumptions etc.			
2	Perceive the concepts of AI search techniques. Solve various problems by apply in search methods			
3	Apply knowledge Representation techniques. Analyze different structures of representation.			
4	Evaluate AI search techniques. Analyze different Planning Techniques			
5	Create Expert systems.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) SOFT COMPUTING (PROFESSIONAL ELECTIVE-IV) (B18CS36)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Learn basics of artificial neural network and soft computing techniques.			
2	Perceive various supervised learning networks and training algorithms of various Associativememory networks			
3	Perceive the algorithms for pattern association unsupervised learning networks, Specialnetworks.			
4	Apply functional mappings in fuzzy sets. Interpret the Scope of Membership functions andperceive defuzzification methods and discussions on concepts of fuzzy sets			
5	Analyze and comprehends the concepts and applications of genetic algorithms, various softcomputing techniques for problem solving			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) BUSINESS INTELLIGENCE AND BIG DATA(PROFESSIONAL ELECTIVE-IV) (B18CS37)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Explain the foundations, definitions and capabilities of Bigdata.			
2	List the definitions, concepts, architectures and challenges in Big data environment. Outline the definitions, concepts, and enabling technologies of big data analytics			
3	Understand concepts on Handoop Ecosystem in Big data.			
4	Analyze the Map reduce programming in Big data Analytics.			
5	Apply Security big data technologies in business intelligence using geospatial data, location-based analytics, social networking, Web 2.0, reality mining, and cloud computing.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) SOFTWARE PROJECT MANAGEMENT (PROFESSIONAL ELECTIVE-IV) (B18CS38)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**

After the completion of this course, the students should be able to				
1	Gain knowledge of software economics, phases in the life cycle of software development, project organization, and project control and process instrumentation.			
2	Summarize software economics, software development life cycle, artifacts of the process, workflows, checkpoints, project organization and responsibilities, project control and process instrumentation.			
3	Choose the right software development approach. Compare various project organizations and responsibilities.			
4	Analyze the major and minor milestones, artifacts and metrics for management and technical perspective.			
5	Design software product using conventional and modern principles of software project management.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) NANO TECHNOLOGY (OPEN ELECTIVE-III) (B18ME25)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Know the importance of nano scale ,types and their properties.			
2	Identify quantum mechanical phenomenon in two and three dimensional confinements.			
3	Understand the applications of carbon nano structures.			
4	Differentiate nano scale characterization techniques.			
5	Categorize nano devices and other devices.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) ENTREPRENEURSHIP DEVELOPMENT (OPEN ELECTIVE-III) (B18MB03)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Define the nature and Qualities of Entrepreneur and relate to types of ownership.			
2	What are risk Reduction, market scope and Imitation strategies.			
3	Explain the legal regulations system and IPRs and summarize the source of finance fromdifferent institutions.			
4	Identify the needs of business ethics and develop the principles.			
5	Evaluate the issues of corporate governance and interpret the guidelines. Elaborate theconcept of social responsibility and improve professional ethics.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) EMBEDDESYSTEMS (OPEN ELECTIVE-III) (B18EC31)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Explain the different embedded system design techniques and the metrics or challenges in designing them.			
2	Understand the complete architecture of 8051 and Advanced Processor.			
3	Demonstrate Software programming in Assembly language and High Level Language.			
4	Classify the different Real Time Operating System (RTOS), RTOS Vx Works, WindowsCE.			
5	Understand the Embedded Software Development Process and Tools and Perform testing onTesting on Host Machine, Simulators, Laboratory Tools			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) MINI PROJECT & INTERNSHIP (B18CS46)**	**No. of Hours L:0 T:0 P:0**	**Credits:2**

After the completion of this course, the students should be able to				
1	Perceive, plan and execute a mini project as an individual or in a team in development ofmini project.			
2	Prepare a technical report based on the Mini project.			
3	As a team student can organize, record and compile their work done throughout the projectin an efficient manner.			
4	Develop effective communication skills for presentation of mini project related activities.			
5	Demonstrate technical seminar based on the Mini Project work carried out.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) NETWORK SECURITY & CRYPTOGRAPHY LAB (B18CS39)**	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Implement the cipher techniques.			
2	Apply the mathematical foundation required for various cryptographic algorithms.			
3	Develop the various security algorithms.			
4	Use different open source tools for network security and analysis.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) MAJOR PROJECT PHASE – I (B18CS47)**	**No. of Hours L:0 T:0 P:8**	**Credits:4**
After the completion of this course, the students should be able to				
1	Uses fundamental knowledge and skills in engineering and apply it effectively on a project.			
2	Apply knowledge of the ‘real world’ situations that a professional engineer can encounter.			
3	Apply critical and creative thinking in the design of software, Hardware and Networkingprojects.			
4	As a team student can organise, record and compile their work done throughout the projectin an efficient manner.			
5	Manage any disputes and conflicts within and outside their team.			
6	Demonstrate a sound technical knowledge of their selected project topic.			
7	Demonstrate the knowledge, skills and attitudes of a professional engineer.			
8	Summarize an appropriate list of literature review, analyse previous work and relate them tocurrent project.			
Course Outcome	**Year / semester IV/I Sem**	**Subject Name (Subject Code) HUMAN VALUES AND PROFESSIONAL ETHICS (B18MC09)**	**No. of Hours L:2 T:0 P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Perceive the importance of ethics and values in life and society.			
2	Develop moral responsibility and mould them as best professionals.			
3	Create ethical vision and achieve harmony in life.			
4	Provide a critical perspective on the socialization of men and women.			
5	Perceive the important issues related to gender in contemporary India.			

Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) INTERNET OF THINGS (IoT) (PROFESSIONAL ELECTIVE-V) (B18CS40)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Interpret the vision of IoT from global context.			
2	Perceive building blocks of Internet of Things and its characteristics.			
3	Learn the basic concepts of Python. Implement the python programming using Raspberry.			
4	Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks			
5	Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.			
Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) ADVANCED OPERATING SYSTEMS (PROFESSIONAL ELECTIVE-V) (B18CS41)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Discuss the various synchronization, scheduling and memory management issues demonstrate the Mutual exclusion.			
2	Deadlock detection and agreement protocols of Distributed operating system			
3	Discuss the various resource management techniques for distributed systems			
4	Identify the different features of real time and mobile operating systems			
5	Install and use available open source kernel. Modify existing open source kernels in terms of functionality or features used			
Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) PYTHON PROGRAMMING (PROFESSIONAL ELECTIVE-V) (B18CS42)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Read, write, execute by hand simple Python programs.			
2	Structure simple Python programs and decomposing program into functions.			
3	Represent compound data using Python lists, tuples, dictionaries,			
4	Read and write data from/to files in Python Programs.			
5	To build software for real needs.			
Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) CYBER SECURITY& HACKING (PROFESSIONAL ELECTIVE-VI) (B18CS43)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Outline key terms and concepts in cyber law, intellectual property and cybercrimes.			
2	Explore the vulnerabilities, threats and cybercrimes posed by criminals.			
3	Identify various security challenges phased by mobile devices.			
4	Identify various types of tools and methods used in cybercrime, develops the secure countermethods to maintain security protection.			
5	Analyze the cyber security risk management policies in order to adequately protect anorganization's critical information and assets.			

Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) SERVICE ORIENTED ARCHITECTURE (PROFESSIONAL ELECTIVE-VI) (B18CS44)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Design various service layers			
2	Model service candidate derived from existing business documentation.			
3	Design the composition of SOA.			
4	Design application services for technology abstraction.			
5	Principles of Service-Orientation			

Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) INFORMATION RETRIEVAL SYSTEMS (PROFESSIONAL ELECTIVE-VI) (B18CS45)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Define Vector space model, understand various similarity coefficient and measures.			
2	Develop an Understanding on Relevance feedback, , Clustering, Regression Analysis,Thesauri.			
3	Apply various Retrieval Utilities for Information Retrieval.			
4	Develop an Understanding about Signature files, Duplicate document detection.			
5	Apply IR principles to locate relevant information large collection of data.			

Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) TECHNICAL SEMINAR (B18CS48)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Identifies, understand and discuss current, real -world issues.			
2	Explain the role of self-efficacy, personal goals, and motivation in improving academic life			
3	Describe the behaviours and characteristics of an effective learner. Gain knowledge of fast and rapidly changing by self learning			
4	Practice finding relevant course material on the Internet and incorporate them in their courses. Develop articles and presentation skills			
5	Develop the interpersonal skills, soft skills and creativity. Present features of the developedproject to the targeted group through written and oral communication.			

Course Outcome	Year / semester IV/II Sem	Subject Name (Subject Code) MAJOR PROJECT PHASE –II (B18CS49)	No. of Hours L:0 T:0 P:16	Credits:8
After the completion of this course, the students should be able to				
1	Uses fundamental knowledge and skills in engineering and apply it effectively on a project.			
2	Apply knowledge of the ‘real world’ situations that a professional engineer can encounter.			
3	Apply critical and creative thinking in the design of software, Hardware and Networking projects.			

4	As a team student can organize, record and compile their work done throughout the projectin an efficient manner.
5	Manage any disputes and conflicts within and outside their team.
6	Demonstrate a sound technical knowledge of their selected project topic.
7	Demonstrate the knowledge, skills and attitudes of a professional engineer.
8	Summarize an appropriate list of literature review, analyze previous work and relate them tocurrent project.

COURSE OUTCOMES FOR M.TECH-CSE R18 FOR THE YEAR 2018-2020

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Data Structures and Algorithms(M18CS01)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Define knowledge basic on data structures to store and retrieve an ordered or unordered data. Such as, arrays, linked lists, trees, heaps, and hash tables.			
2	Develop knowledge on applications of data structures having the ability to implement algorithms to perform operation as create, insert, delete, search, and sorting.			
3	Learn to analyze and to compare efficiency of an algorithm.			
4	Understand the basic concepts of latest techniques.			
5	Ability to have concepts on tree and graphs.			
6	Implement various projects on these data structures and plan B-Trees to implement different various operations.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Distributed Systems(M18CS02)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Explain distributed system design and its properties.			
2	List the principles underlined along with its functionality.			
3	Implement problems and challenges with these principles.			
4	Identify the effectiveness and shortcomings for solutions.			
5	Identify the principles that are based on these contemporary distributed systems.			
6	Explain its affect on software design to identify the features.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Internet of Things(M18CS03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Describe the basic terminology, latest technology along with its applications.			
2	Discuss the protocols based on the concepts such as machine to machine.			
3	Illustrate the IOT devices using Python Scripting Language.			
4	Develop an application with Raspberry PI platform which can be widely used in many applications of IoT devices.			
5	Implement it widely that can be used in many applications of IoT devices.			
6	Design a web application framework on REST ful web API.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Machine Learning(M18CS04)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Discuss different application on Machine Learning problems.			
2	Describe various algorithms on Machine Learning mentioning its strengths and weaknesses..			

3	Illustrate the basic theory focused on Machine Learning
4	Improve the performance of Machine Learning algorithms with different parameters.
5	Analyze current research papers
6	Understand the latest issues raised by current researchers

Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Cloud Computing(M18CS05)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Discuss main concepts, key strengths, and limitations for cloud computing.			
2	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.			
3	Explain the issues on cloud computing along with security, privacy, and interoperability.			
4	Choose and use the appropriate technology, methods on these issues.			
5	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.			
6	Provide the appropriate solutions on cloud computing based on the application.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Data Science(M18CS06)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Describe a Data Science, skill sets available for a data scientist.			
2	Discuss the terms Statistical Inference, its significance to explore data analysis.			
3	Understand Data Science Process and its components interact			
4	Adapt APIs tools to understand the Web data.			
5	Illustrate EDA and the Data Science as a case study.			
6	Plan a effective visualization on given data.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Advanced Wireless and Mobile Networks(M18CS07)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Discuss the state-of-the-art in network protocols, architectures and applications			
2	Analyze existing network protocols and networks.			
3	Develop new protocols on networking			
4	Describe novel ideas in the area of Networking via term-long research projects.			
5	Implement various protocols on localization Methods.			
6	Design a real time applications on RFID.			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Scripting Languages(M18CS08)	No. of Hours L:3 T:0 P:0	Credits: 3
1	Explain scripting as well as contributions on scripting languages.			
2	Discuss Python on regard as the object-oriented concepts,			
3	Design the different built-in objects of Python,			
4	Discuss advanced applications such as TCP/IP network programming, multithreaded programming, Web applications, discrete-event simulations, etc.			
5	Develop different modules on exception handling applications.			
6	Plan a Real Time Web systems.			
Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Research Methodology(M18MC01)	No. of Hours L:2 T:0 P:0	Credits: 2
On successful completion of this course, students will be able to:				
1	Acquire knowledge on Research Design and statistical methods in research.			
2	Analyze the various methods in Data Collection, Data Organization and different approaches of Data Representation.			
3	Understand all the basic concepts required to prepare a. Research synopsis b. Dissertation c. Writing a good research proposal			
4	Interpret the Scope of Patent Rights and Administration of Patent System.			
Course Outcome	Year /Semester I Sem	Subject Name (Subject Code) English for Research Paper Writing(M18MC01)	No. of Hours L:2 T:0 P:0	Credits:0
On successful completion of this course, students are able to:				
1	Obtain complete knowledge on Definition of a research paper, Purpose of writing any research paper, its Scope and Benefits.			
2	Understand the standard English formats .for scripting the best research paper			
3	Analyze all the Qualitative and Quantitative Research Methodologies and the ethics of plagiarism.			
4	Explain the detailed process of writing and publishing any research paper and perform a case study on paper writing.			
Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Data Structures and Algorithms Lab(M18CS09)	No. of Hours L:0 T:0 P:4	Credits:2
After the completion of this course, the students should be able to				
1	Analyze algorithms efficiency .			
2	Summarize and implement various searching and sorting techniques.			
3	Demonstrate stack, queue and linked list with various operations			
4	Implement different trees and graphs concepts.			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Cloud Computing Lab (M18CS10)	No. of Hours L:0 T:0 P:4	Credits:2
1	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.			
2	Explain the issues on cloud computing along with security, privacy, and interoperability			
3	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.			
4	Provide the appropriate solutions on cloud computing based on the application.			

II-SEMESTER

Course Outcome	Year/Semester II Sem	Subject Name (Subject Code) Network Programming(M18CS11)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Determine Linux utilities.			
2	Identify file handling techniques and signals.			
3	Explain what is IPC and network programming in Java.			
4	Learn how processes communicate with each other across a Computer Network.			
5	Develop Network programming using TCP/UDP sockets			
6	Implement Real Time and current trends in client server Application.			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Soft Computing Techniques(M18CS12)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Understand the fuzzy logic, concepts of fuzziness involved in fuzzy set theory			
2	Explain the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic.			
3	Build the fundamental theory, concepts of neural networks.			
4	Identify different neural network architectures, algorithms, applications along their limitations.			
5	Classify different learning rules, architectures to learn several neural network paradigms along with its applications.			
6	Deploy different applications of these models to solve engineering			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Computer Vision(M18CS13)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Elaborate development of algorithms and techniques.			
2	Analyze and interpret the visible world around us with real time problems.			

3	Apply the fundamental concepts on multi-dimensional signal processing, feature extraction, pattern analysis visual geometric modeling, stochastic optimization etc.			
4	Take part to makeup and contribute in research developments in the field of computer vision.			
5	Explain different applications ranging from Biometrics, Medical diagnosis, document processing, mining of visual content, to surveillance, advanced rendering etc.			
6	Identify applications In-vehicle vision system.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Data Preparation and Analysis(M18CS14)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Work for a business environment dealing with data preparation.			
2	Prepare data marts for statistical analysis using SAS software.			
3	Implement SAS with an efficient			
4	Analyze data from databases to clean the data for statistical analysis in SAS.			
4	Develop many strategies to deal with imperfect real world data.			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Digital Forensics(M18CS15)	**No. of Hours L:3 T:1 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Discuss digital forensics related to investigative process.			
2	Explain the legal issues to prepare, perform digital forensic analysis based on the investigator's position.			
3	Demonstrate the techniques, usage of digital forensics tools			
4	Elaborate digital forensics in detail.			
5	Analyze the state of the practice, gaps in technology, policy, and legal issues			
6	Develop techniques used on Data Analysis, cybercrime.			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Distributed Databases (M18CS16)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Describe various techniques used for data fragmentation, replication, and allocation for a distributeddatabase.			
2	Compare simple strategies for executing a distributed query optimization.			
3	Learn the two-phase commit protocol on multiple nodes.			
4	Describe distributed concurrency control.			
5	Illustrate techniques based on the distinguished voting methods.			
6	Learn different types of Heterogeneous Database System			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Human Computer Interaction(M18CS17)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Discuss the characteristics of graphical and web user interfaces.			
2	Understand the principles of design of business function.			
3	Demonstrate the system menus and screen based controls.			

4	Adapt the goals and conceptualization interaction.			
5	Design the process of interaction and affective aspects			
6	Compare the framework, predictive models and prototypes.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Software Process and Project Management (M18CS18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Discuss and plan to execute projects based on required standards.			
2	Understand the range of tools used on project management**.**			
3	Analyze the concepts related on project governance and methodologies.			
4	Apply critical analysis on solving problems and planning process.			
5	Describe planning, Risk and issues management.			
6	Plan process, pragmatic planning service delivery and quality assurance			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Stress Management (M18AC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
On successful completion of this course, students will be able to:				
1	Maintain a stress awareness log. Include identification of causes, symptoms, and analysis of effects.			
2	Gather information on current stress management techniques and evaluate personal relevance.			
3	Practice specific techniques, track effectiveness, and revise to meet personal preferences.			
4	Choose an adaptable stress management plan for academic success incorporating selected techniques.			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Network Programming Lab(M18CS19)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
On successful completion of this course, students are able to:				
1	Understand the concepts of Socket commands.			
2	Implement Connection-Oriented Service using standard ports.			
3	Define Connectionless and Connection Oriented Service.			
4	Plan a case study on client and server and construct a Remote Command Execution using sockets.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Digital Forensics Lab (M18CS20)	**No. of Hours L:0 T:0 P:2**	**Credits:2**
After the completion of this course, the students should be able to				
1	Understand the methods available for retrieving the lost data.			
2	Classify the various mobile forensic techniques and how to handle them.			
3	Identify the different Open-source intelligence techniques			
4	Demonstrate how to develop certification for Cyber Forensic.			

Course Outcome	Year / semester I I Sem	Subject Name (Subject Code) Mini Project (M18CS21)	No. of Hours L:0 T:0 P:2	Credits: 2
1	Enhance students' knowledge in current technology			
2	Develop leadership ability and responsibility to execute the given task			
3	Enhance their employability skills along with real corporate exposure			
4	Elaborate the completed task and compile the report.			

III-SEMESTER

Course Outcome	Year/Semester Ⅲ Sem	Subject Name (Subject Code) Semantic Web & Social Networks (M18CS22)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Perceive the concept structure of the semantic web technology and how this technology revolutionizes the World Wide Web and its uses.			
2	Analyze the concepts of metadata, semantics of knowledge and resource, ontology, andtheir descriptions in XML-based syntax and web ontology language (OWL).			
3	Describe logic semantics and inference with OWL.			
4	Use ontology engineering approaches in semantic applications			
5	Program semantic applications with Java API.			
6	Perceive the concept structure of the semantic web technology and how this technology revolutionizes the World Wide Web and its uses.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Mobile Application and Security (M18CS23)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students are able to:				
1	Explain the mobile issues and development strategies.			
2	Discuss WAP and mobile security issues.			
3	Define the Bluetooth security issues.			
4	Classify the SMS Security issues.			
5	Demonstrate the Enterprise Security on the Mobile OS.			
6	Develop Application and security on Mobile OS.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Compiler for HPC (M18CS24)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Transform algorithms in the computational area to efficient programming code for modern computer architectures.			
2	Discuss, organize and handle programs for scientific computations.			
3	Develop tools for performance optimization and debugging.			
4	Analyze code with respect to performance and suggest and implement performance improvements.			
5	Report on performance analysis in clear and correct writing.			
6	Implement algorithms on sparse graphs.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Advanced Optimization Techniques (M18MA01)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Describe problem clearly, identify and analyze the individual functions.			
2	Analyze study on solving optimization problem.			
3	Translate verbal formula on optimization problem.			
4	Design algorithms, reliably to find an approximate solution.			
5	Compare the performance of an algorithm.			
6	Discovery, study, understand and solve optimization techniques using algorithms			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Waste Management (M18SE27)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students are able to:				
1	Compare the subject from the technical, legal and economical points .			
2	Learn solid waste management.			
3	Describe environment for sound management.			
4	Understand a municipal solid waste management system.			
5	Plan a solid waste management system for decision makers.			
6	Design an incineration facility.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Embedded System Design (M18VL07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Describe embedded systems, design, technology to explain its metrics or challenges.			
2	Design custom single – purpose processors using combinational as well as sequential logic.			
3	Discuss about optimizing single – purpose processors. Discuss about the basic architecture andoperation of general purpose processors.			
4	Define and distinguish between a timer and a counter, various types of timers and UniversalAsynchronous Receiver/ Transmitter. Explain controllers for LCD, Keypad and Stepper Motor.			

5	Discuss common memory types ROM , RAM, advanced RAM. Explain microprocessor interfacingand arbitration methods, various protocols like serial, parallel.			
6	Explain basics of interrupts, architectures like Round Robin, Real – Time Operating Systemarchitecture.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Dissertation Phase-I (M18CS25)	**No. of Hours L:0 T:0 P:20**	**Credits: 10**
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

IV-SEMESTER

Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Dissertation Phase-II (M18CS26)	**No. of Hours L:0 T:0 P:32**	**Credits: 16**
On successful completion of this course, students will be able to:				
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOMES FOR B.TECH-EEE R18

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	I Sem	**Linear Algebra and Calculus**	**B18MA01**	**L/T/P :3/1 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Define system of linear equations to matrix and explore various methods of solving homogenous and non-homogenous equations.				
2	Find matrix rank, Eigen values & Eigen vectors and to find the inverse and power of matrix. Reduce linear equations to quadratic equations and transform into canonical form.				
3	Discuss convergence and divergence in its simplest form, classifying difference between a sequence and series in application context and further investigate infinite process.				
4	Judge the consequences and geometrical approach to the mean value theorems and engineering applications to mathematical problems. Learn to adopt different techniques for multi-dimensional change of variables to transform the coordinates over which integration proceeds.				
5	Understand the maximum & minimum function of two and three variable involving limits with Partial differential equations and recognize their applications in developing mathematical models.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	I Sem	**Applied Physics**	**B18PH01**	**L/T/P :4/0 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Illustrate fabrication of semiconductors, photo detectors, design basis of quantum mechanics				
2	Recall facts of wave optics extend & construct basics of wave optics.				
3	Interpret about lasers, which leads to new innovations and improvements				
4	Elaborate and formulate the study of characterization properties of opto-devices, organize the students to prepare new materials for various engineering applications				
5	Apply basic knowledge on principles and recalls facts of light properties, and motivate for new innovations. Analyze applications of optical fibers				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	I Sem	**English**	**B18EN01**	**L/T/P :2/0 /0**	**2**
By the end of the course, students will be able to					
1	Use English Language effectively in spoken and written forms.				
2	Comprehend the given texts and respond appropriately.				
3	Communicate confidently in various contexts and different cultures.				
4	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.				
5	Develops and Communicates by stating main ideas relevantly and coherently in speaking & writing				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	I Sem	Engineering Chemistry	B18CH01	L/T/P :3/1 /0	4
The basic concepts included in this course will help the student to gain:					
1	Recall previous knowledge regarding atomic and molecular structure.				
2	Design polymeric engineering materials. Recall basic organic reactions				
3	Construct batteries and classify different electronics and electrical like cells, electrodes, etc., help them to construct different electrical/ electronic parts.				
4	Examine which types of impurities are present in water, specification of drinking water and explain the corrosion behavior/ activity of metals.				
5	Apply phase rule and adsorption to construct the materials by analyzing their compositions.				
Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	I Sem	English Language and Communication Skills Lab	B18EN02	L/T/P :0/0 /2	1
After learning the contents of this subject, the student must be able to					
1	Capable in Better Understanding of nuances of language through audio-visual experience and group activities.				
2	Develop Neutralization of accent for intelligibility				
3	Speak out with clarity and confidence thereby enhances the employability skills of the students by acquiring knowledge and techniques.				
4	Extend to speak fluent English, through advanced vocabulary to improve quality in speaking.				
Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	I Sem	Applied Physics Lab	B18PH02	L/T/P :0/0 /3	1.5
After learning the contents of this subject, the student must be able to					
1	Operate different equipment's related to light & electronics				
2	Develop experimental skills to design new experiments & circuit design				
3	Understand about modern equipment like solar cell, optical fiber etc.,				
4	Have Exposure to develop novel semiconductor devices.				
Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	I Sem	Engineering Workshop/IT Workshop	B18ME02	L/T/P :0/0 /3	1.5
After learning the contents of this subject, the student must be able to					
1	Perform different trade exercise.				
2	Assemble and Disassemble a computer and diagnostic exercises with installation of operating systems and Linux Tools				
3	Explore industrial environment and operation of power tools				
4	Gain knowledge of foundry, welding, black smithy, fitting and house wiring				
Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	II Sem	Differential Equations And Vector Calculus	B18MA02	L/T/P :3/1 /0	4
After learning the contents of this subject, the student must be able to					
1	Recall fundamentals of differential equations to build its solutions and Summarize differential equations and inspect its exactness process. Connect real world problems to				

	concept of differential equations				
2	Identify, analyze, formulate and perceive physical situation whose behavior can be described by ordinary differential equations.				
3	Interpret the multiple integrals for functions and elaborate areas and volumes in different situations. Evaluate line, surface and volume integrals to predict its outcomes.				
4	Utilize the concept of gradient, divergence and curl of vector field to predict areas and volumes				
5	Explain importance of integrals theorems to design different geometries and their characteristics.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Electrical Circuits-I**	**B18EE01**	**L/T/P :3/1 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Learn basics of electrical circuits such as laws, transformation and network reduction techniques.				
2	Explore the basic principles and concepts involved in AC circuits and analyze power in series and parallel AC circuits				
3	Understand various network theorems and its applications in electrical circuits.				
4	Analyze the series and parallel magnetic circuits with basic magnetic principles and laws of electromagnetic induction.				
5	Explore various network topologies and analyze the networks with loop and nodal methods with dependent and independent current and voltage sources.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Electronic Devices And Circuits**	**B18EC01**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand operation of analog devices and circuits. Evaluate the characteristics and equivalent circuit of diodes				
2	Acquire knowledge of rectifiers and filters and their classifications				
3	Analyze the operation of oscillators and amplifiers.				
4	Learn transistor biasing and stabilization				
5	Design multi vibrators and wave shaping circuits using basic components				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Programming for Problem Solving**	**B18CS01**	**L/T/P :4/0 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Understand the fundamental basics of programming language and learn to illustrate a problem in flowchart. Learn the basic operators and expressions in C programming.				
2	Analyze the concepts of sequencing, branching, looping with respective decision making statements and also explore various functions and storage classes.				
3	Implement different operations for problems using arrays, Strings and structures.				
4	Learn the basics of pointers and various operations using pointers				
5	Explore various file handling functions employed in problem solving.				
Course	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**

Outcome	II Sem	Electronic Devices and Circuits Lab	B18EC02	L/T/P :0/0 /2	1
After learning the contents of this subject, the student must be able to					
1	Understand the use of RPS & CRO & different meters and test electronic circuits using experiment boards.				
2	Explore the operation of different electronic components and design electronic circuits to meet specific requirements.				
3	Understand working principle of electronic circuits.				
4	Evaluate the characteristics of the electronic circuits.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	II Sem	**Programming for Problem Solving Lab**	**B18CS02**	**L/T/P :0/0 /2**	
After learning the contents of this subject, the student must be able to					
1	Understand the fundamentals of C programming.				
2	Analyze concepts of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.				
3	Implement different operations on arrays and functions to solve problems.				
4	Design and implement different types of file structures using standard methodology.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	II Sem	**Engineering Graphics**	**B18ME01**	**L/T/P :1/0 /4**	
After learning the contents of this subject, the student must be able to					
1	Learn the principles of Engineering Graphics and their significance, ISO and ANSI standards for coordinate dimensioning- usage of Drawing instruments, lettering				
2	Perform projection of lines inclined to one or two planes				
3	Perform the projections and views on the planes and solids				
4	Development of surfaces on solids and understand and draw different types of conic sections				
5	Convert orthographic views into isometric views and vice versa. And explore various computer technologies for graphical communication				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Sem	**Electrical Circuits – II**	**B18EE07**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the basics of network representation, method of analyzing the network and duality of network.				
2	Analyze balanced and unbalanced three phase circuits and measure voltage, current and power in three phase star and delta connections				
3	Study the transient response of series and parallel RLC circuits for DC and sinusoidal excitations. Analyze the response for step, ramp, impulse etc., using Laplace transformation				
4	Study different types of network functions and evaluate the network parameters in two port network using transformed variables				
5	Learn about different types of filters and Fourier analysis applied to AC circuits				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	III Sem	**Numerical Methods and Complex Variables**	**B18MA03**	**L/T/P :3/1 /0**	

After learning the contents of this subject, the student must be able to					
1	Find a better approximate root of a given equation				
2	Estimate the derivative at a given value and integral of function				
3	Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems				
4	Taylor's and Laurent's series expansions of complex function				
5	Evaluate bilinear transformation.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Power Systems – I**	**B18EE08**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Gain the knowledge on operation of Hydro Electric generation.				
2	Acquire and interpret fundamental concepts Thermal generation.				
3	Understand various economic aspects of Power system and tariff.				
4	Acquire knowledge on power system distribution systems and substation				
5	Understand design of underground cables				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Electrical Machines-I**	**B18EE09**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Evaluate the stored and converted energy and also exerted force in electromechanical energy conversion devices.				
2	Able to analyze and design the types of dc generators				
3	Able to select appropriate D.C Generator to meet the requirements of the application in industry				
4	To understand the characteristics and concept s of speed control.				
5	Able to Test the performance and select appropriate D.C machine to meet the requirements of the application in industry.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Electromagnetic Fields**	**B18EE10**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Analyze the relation between the electric field and the magnetic field, about the various laws such as EFI, Potential and other concepts of these fields				
2	Understand the behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics.				
3	Understand the magnetic field concepts using Biot-Savart law and Ampere's law				
4	Analyze the relation between two or more conductors when subjected to magnetic fields				
5	Understand the concepts of time varying fields in both electric and magnetic fields and their relationship in evaluating power				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Object Oriented Programming & Data Structures**	**B18CS50**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Find the difference between structured programming and object oriented programming language and understanding the features of C++ supporting object oriented programming.				

2	Explain and apply the major object oriented concepts to implement object oriented programs in C++.				
3	Build the basic knowledge to handle operations like insertions, deletions, searching, and traversing mechanisms in linear data structures.				
4	Examine with advanced data structure such as hash tables and priority queue data structures.				
5	Attain the knowledge on trees, balanced trees, graphs and developing C++ code for nonlinear data-structures and Pattern Matching Algorithms.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Electrical Circuits Lab**	**B18EE11**	**L/T/P :0/0 /3**	**1.5**
After learning the contents of this subject, the student must be able to					
1	Explain the concept of circuit laws				
2	Verify network theorems				
3	Determine Z, Y and ABCD parameters for a given two port network.				
4	Evaluate the time response and frequency response characteristics of RLC series circuit and their resonance conditions.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Data Structures Through C++ Lab**	**B18CS08**	**L/T/P :0/0 /3**	**1.5**
After learning the contents of this subject, the student must be able to					
1	To be able to design and implement Object Oriented Programing concepts.				
2	To select the appropriate Data Structure for given problem				
3	To illustrate operations like searching, insertion, deletion and traversing mechanism on various Data Structures and to gain practical knowledge on the applications of Data Structure				
4	To understand and apply the hashing techniques and to able to design and implement Linear and Non-Linear Data Structure.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Environmental Sciences**	**B18MC02**	**L/T/P :2/0 /0**	**0**
After learning the contents of this subject, the student must be able to					
1	Recall previously learned ecosystem and find how the biodiversity changes went in the environment.				
2	Demonstrate outlines of types of pollutions and related to day-to-day life.				
3	Organize important seminars on natural resources				
4	Apply models of food chains and energy flow models to solve the identified parameters.				
5	Classify the types of pollutants and distinguish the functions of sustainable development that take part in the environment.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Pulse Digital And Linear Integrated Circuits**	**B18EC45**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand operational amplifiers with linear integrated circuits				
2	Classify the different families of digital integrated circuits and their characteristics.				
3	Identify the applications of diode as integrator, differentiator, clippers, clamper circuits				
4	Understand the timer circuits and phase locked loops				

5	Explore various A-D and D-A converters and its applications				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Electrical Machines-II**	**B18EE12**	**L/T/P :3/1 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Understand the concepts and performance of single phase transformer.				
2	Test the performance of single phase Transformer				
3	Choose a suitable three phase transformer based on its application and also convert three phase to two phases or vice versa.				
4	Understand the concepts of Construction, operation characteristics, testing (concept of circle diagram) and speed.				
5	Analyze speed torque characteristics and control the speed of induction motors				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Electrical Measurements and Instrumentation**	**B18EE13**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Identify Different types of measuring instruments and their construction, operation and characteristics				
2	Classify Resistance, voltage, current measurements through potentiometers, voltage and current measurements through instruments transformers				
3	Find Power and energy measurements through watt and energy meters with examples.				
4	Calculate Resistance measurements through DC bridges, capacitance and inductance measurements through AC bridges and different types of transducers				
5	Gain Knowledge on Measurement of frequency and phase through CRO, range extension of measuring instruments and different types of errors & their reduction methods in measuring instruments.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Power Systems – II**	**B18EE14**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Represent power system in P.U values.				
2	Calculate inductance and capacitance of single phase and three phase.				
3	Analyse performance of transmission line				
4	Understand the transients on transmission line				
5	Compute sag and string efficiency.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Control Systems**	**B18EE15**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the concept of feedback and analyze the control system components by their Mathematical modeling				
2	Estimate the time domain specifications and steady state error				
3	Apply various time domain and frequency domain techniques to assess the system performance.				
4	Improve the system performance by designing a suitable controller and/or a compensator for a specific application				

5	Test system Controllability and Observability using state space representation and applications of state space representation to various systems.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Sem	**Switching Theory and Logic Design**	**B18EC05**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Utilize and explain the functionality of logic gates (AND, NAND, OR, NOR, XOR, XNOR, NOT).				
2	Design different combinational circuits using minimization techniques.				
3	Explain various flip flops, and design of registers and counters.				
4	Apply the design procedures to design basic sequential circuits.				
5	Analyze and design of small sequential circuits and to use standard sequential functions/building blocks to build more complex circuits.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1.5**
	IV Sem	**Pulse Digital and Linear Integrated Circuits Lab**	**B18EC47**	**L/T/P :0/0 /3**	
After learning the contents of this subject, the student must be able to					
1	Understand the applications of diode as integrator, differentiator, clippers and clamper circuits.				
2	Design circuits using operational amplifiers for various applications.				
3	Analyze the VCO & PLL circuits.				
4	Understand and implement DAC conversions using OP AMP.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1.5**
	IV Sem	**Electrical Machines Lab-I**	**B18EE16**	**L/T/P :0/0 /3**	
After learning the contents of this subject, the student must be able to					
1	Select range of apparatus based on the ratings of DC Machines.				
2	Determine Characteristics of DC machines by conducting tests				
3	Evaluate the efficiency of the machine by analyzing test results.				
4	Study speed control methods for dc machines				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	V Sem	**Electrical Machines-III**	**B18EE17**	**L/T/P :3/0/0**	
After learning the contents of this subject, the student must be able to					
1	Demonstrate basic concepts of AC machines.				
2	Analyze the concepts of regulation of synchronous generators				
3	Evaluate performance characteristics of synchronous machines.				
4	Analyze the operating characteristics of synchronous motors				
5	Identify the Construction, operation and characteristics of single-phase motor and special machines				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	V Sem	**Power System Protection**	**B18EE18**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the basic construction and principle of arc interruptions in Circuit Breaker and its				

	types				
2	Understand the basic principle of electromagnetic Relay Operation and its various types to different applications.				
3	Explore the various schemes of protecting generator and transformers.				
4	Explore various relaying operation in protecting the transmission line and bus bar.				
5	Learn the necessity of neutral grounding and protection against overvoltage.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Power Electronics**	**B18EE19**	**L/T/P :3/1 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Understand the differences between signal level and power level devices				
2	Examine single phase-controlled rectifier circuits.				
3	Understand three phase-controlled rectifier circuits.				
4	Learn the operation of DC-DC choppers				
5	Study the operation of DC-AC converters and AC-AC voltage regulators				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Electric Machine Design**	**B18EE20**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the basic design consideration, standards. Study the heat dissipation, cooling characteristics and electrical characteristics of various dielectric materials.				
2	Understand the design, choice of materials and specifications in DC machines				
3	Understand and design the main dimensions of each parts of a transformers				
4	Design the constructional features of induction motors and estimate their currents and reactance				
5	Design the constructional features of synchronous motors				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Electrical Distribution Systems**	**B18EE21**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand design of various loads				
2	Analyze the need of substations and there erection and site selection				
3	Understand protection of distribution system.				
4	Acquire knowledge of power factor improvement.				
5	Calculate the distribution voltage drop calculations.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Signals And Systems**	**B18EC03**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Apply the knowledge of vectors, orthogonal basis to signals. Analyze the spectral characteristics of continuous-time periodic signals using Fourier series.				
2	Demonstrate and apply Fourier transform on various signals.				
3	Apply the Laplace transform and Fourier transform for the analysis of continuous-time signals				
4	Analyze systems based on their properties and determine the response of LTI system				
5	Understand the concepts of convolution and correlation of signals.				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	V Sem	Database Management Systems	B18CS04	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Understand the fundamental concepts of database management and analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.				
2	Apply relational Database Theory, and be able to write relational algebra expressions for queries and Utilize the knowledge of basics of SQL and construct queries using SQL.				
3	Apply Normalization Process to construct the database. Explain Basic Issues of transaction processing				
4	Understand Concurrency control and Recovery strategies of DBMS.				
5	Compare the basic Database storage structures and access techniques: File Organization, indexing methods including B- Tree and Hashing.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Computer Organization**	**B18EC12**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Explain the I/O and memory organization in depth.				
2	Develop assembly language programs for various applications				
3	Estimate the basic components of computers and extend the design of Digital Logic Circuits and apply to Computer Organization.				
4	Analyze the memory organization and evaluate the performance of Computer systems.				
5	Understand the basic chip design and organization of 8086 with assembly language programming and Compare RISC and CISC Architectures.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Internet of Things**	**B18CS40**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Interpret the vision of IOT from a global context.				
2	Perceive building blocks of Internet of Things and its characteristics.				
3	Learn the basic concepts of Python				
4	Implement the python programming using Raspberry				
5	Design a REST				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**ELECTRICAL MACHINES – II LAB**	**B18EE22**	**L/T/P :0/0 /3**	**1.5**
After learning the contents of this subject, the student must be able to					
1	Select range of apparatus based on the ratings.				
2	Draw the Equivalent circuits and analyze various AC machines				
3	Determine performance and Characteristics of AC machinery				
4	Evaluate the efficiency of the machine by analyzing test results				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Electrical Measurements & Instrumentation Lab**	**B18EE23**	**L/T/P :0/0 /3**	**1.5**
After learning the contents of this subject, the student must be able to					

1	Compare performance of MC, MI and Dynamometer types of measurements, Energy meter.				
2	Determine the circuit parameters using AC and Dc bridges.				
3	Compute the errors CT's and PT's.				
4	Understand the performance of industrial instruments				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Control Systems Lab**	**B18EE24**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Analyze the time & Frequency response of control systems				
2	Evaluate the performance of feedback control systems.				
3	Examine the response of PID controllers				
4	Identify the Performance of AC & DC servo motors				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Human Values and Professional Ethics**	**B18MC09**	**L/T/P :2/0 /0**	**0**
After learning the contents of this subject, the student must be able to					
1	Perceive the importance of ethics and values in life and society				
2	Develop moral responsibility and mould them as best professionals.				
3	Create ethical vision and achieve harmony in life				
4	Provide a critical perspective on the socialization of men and women.				
5	Perceive the important issues related to gender in contemporary India.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Power System Operation and Control**	**B18EE25**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Analyse economic operation of power system.				
2	Understand the working of hydrothermal coordination.				
3	Analyse load frequency control of Single area and Two area power system				
4	Understand power factor and voltage control				
5	Acquire knowledge on reactive power control.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Managerial Economics and Financial Analysis**	**B18MB01**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the nature, scope and importance of Managerial Economics.				
2	Know what is demand, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand				
3	Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.				
4	Understand the characteristics of different kinds of markets and outline different form of business organization and analyze how capital budgeting techniques are used for investment decisions.				
5	Know how to prepare final accounts and how to interpret them, analyze and interpret financial statements using ratio analysis.				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	VI Sem	Power Semiconductor Drives	B18EE26	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Analyze the operation of converter fed dc motors and four quadrant operations of dc motors using dual converters				
2	Describe the chopper fed dc motors in various quadrants of operation				
3	Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.				
4	Differentiate the stator side control and rotor side control of three phase induction motor.				
5	Explain the speed control mechanism of synchronous motors.				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	VI Sem	Renewable Energy Systems	B18EE27	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Apply the technology to capture the energy from the renewable sources like sun, wind, ocean, biomass, geothermal.				
2	Use different renewable energy sources to produce electrical power.				
3	Minimize the use of conventional energy sources to produce electrical energy.				
4	Identify the fact that the conventional energy resources are depleted.				
5	Explore the direct energy sources.				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	VI Sem	Electrical Engineering Materials	B18EE28	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Impart the knowledge on electrical engineering materials classification and their applications				
2	Study the performance characteristics of various semiconducting, dielectric and insulation materials and their applications in design of electrical and electronic devices.				
3	Identify various magnetic materials and their classification				
4	Learn various special purpose of materials				
5	Design various electronic components				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	VI Sem	Digital Signal Processing	B18EC16	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Explain the time domain and frequency domain representation of the signals.				
2	Identify the different types of the systems and their responses.				
3	Understand the inter relationship between DFT and various transforms and fast computation of DFT and appreciate the FFT processing				
4	Classify the different types of windowing techniques				
5	Design a digital filters for a given specifications and Apply the knowledge to real world processing applications.				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	VI Sem	Advanced Power Electronics	B18EE29	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Classify driver circuits for various power semiconductor devices				
2	Analyze the operation of multi-pulse converters				

3	Understand the operation of resonant converters.				
4	Know the differences between VSI and CSI.				
5	Gain knowledge on the operation of multilevel inverters.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Advanced Control Systems**	**B18EE30**	**L/T/P :3/0/0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand different non linearities and their describing functions.				
2	Describe the methods of Phase-plane trajectory of nonlinear control systems.				
3	Apply various theorems for stability analysis of linear and nonlinear systems.				
4	Implement modal control and calculus of variations.				
5	Formulate and solve optimal control problems.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**High Voltage Engineering**	**B18EE31**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand Transients in power system.				
2	Acquire the knowledge on breakdown in solid, Liquid and gaseous dielectrics.				
3	Understand the generation of high voltage and current.				
4	Identify the measurement of high voltage and current.				
5	Analyze power apparatus and insulation coordination.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Power Electronics Lab**	**B18EE32**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Study Characteristics of various Power Semiconductor devices.				
2	Analyze AC/AC and AC/DC Converters.				
3	Analyze the behavior of various DC/DC and DC/AC converters				
4	Understand types of Power Electronic converters and identify their applications				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Power Systems Lab**	**B18EE33**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Calculate Transmission line parameters, efficiency and regulation.				
2	Evaluate the Performance analysis of Over/Under Voltage Relay				
3	Understand the Analysis and performance testing of Feeder Protection System				
4	Calculate Sequence Reactances of 3-Φ Transformer.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Electronics Design Lab**	**B18EE34**	**L/T/P :1/0 /2**	**2**
After learning the contents of this subject, the student must be able to					
1	Design the various regulated power supplies for control boards.				
2	Gain knowledge on designing of various triggering circuits for SCR				
3	Develop scaling and conditioning circuits for various sensors.				
4	Develop PWM control and gate driver circuits for various power electronic applications.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Logical Reasoning and Quantitative Aptitude**	**B18MC05**	**L/T/P :2/0 /0**	**0**

After learning the contents of this subject, the student must be able to					
1	Improve their logical thinking in terms of general and mathematical concepts.				
2	Compete in academic as well as competitive levels through which students are able to solve the real world problems.				
3	Analyze the number systems				
4	Make quick decisions to face the critical arithmetic problems.				
5	Analyze the mathematical problems.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Computer Methods in Power Systems**	**B18EE35**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Learn to differentiate the incidence and primitive matrices of a network and form Ybus for network calculations				
2	Perform load flow to evaluate the complex voltage at all nodes in the power system				
3	Understand the faulted power system using Zbus of the system				
4	Analyse symmetrical components.				
5	Know the stability of the power system for small and large disturbance.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Microprocessors and Microcontrollers**	**B18EC20**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Illustrate the internal organization of popular 8086/8051 microprocessors/microcontrollers.				
2	Contrast hardware and software interaction and integration.				
3	Design microprocessors and microcontrollers-based systems and develop microcontroller based systems for real time applications.				
4	Develop knowledge about microcontroller 8051 and its programming.				
5	Explain the Memory organization, classification and their applications and Assess programming, interfacing etc of various devices with microprocessors and external world.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Soft Computing Techniques**	**B18EE36**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Learn the basic concepts of soft computing and differentiate it from hard computing				
2	Explore the fuzzy logic sets and fuzzy logic controller application to its real time problems				
3	Understand various architecture of ANNs and explore its applications of ANNs to solve some real-life problems				
4	Learn the basic concepts of GA and its different architecture to solve single objective optimization problem				
5	Understand the concept of multi-objective optimization problems (MOOPs) and issues of solving it.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Advanced Electrical Drives**	**B18EE37**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Analyse the operation of three phase converter fed dc motors				

2	Describe the VSI and CSI fed induction motor operation.				
3	Know the concept of vector control of induction motor drive.				
4	Understand the concept of direct torque control for three phase induction motor.				
5	Gain knowledge on vector control of PMSM drives and introduction to BLDC drives.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**HVDC and FACTS**	**B18EE38**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the basic knowledge on converters control schemes of HVDC system				
2	Apply harmonics filters for reactive power control.				
3	Analyze power flow analysis in HVDC systems.				
4	Understand basic concepts and necessity of FACTS controllers.				
5	Design various shunt and series compensators.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Electrical and Hybrid Vehicles**	**B18EE39**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Gain the knowledge on basic concepts of Electric Vehicles.				
2	Acquire and interpret fundamental concepts of advanced batteries and super capacitors.				
3	Identify various Motor drives used for Electric Vehicles.				
4	Understand various concepts of Electric Train.				
5	Acquire knowledge on series and parallel connections of EHV.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Power Quality**	**B18EE40**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Know the terminology, and definitions of various power quality problems				
2	Define and understand the components of current/power in sinusoidal/non-sinusoidal single phase supply/load systems				
3	Define and understand the components of current/power in sinusoidal/non-sinusoidal three phase supply/load systems				
4	Analyze the power outages, unbalance, voltage sag and distortions in power systems				
5	Design the passive shunt/series compensators and power filters				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Digital Control Systems**	**B18EE41**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Acquire a strong foundation in sampling and reconstruction Z-transforms.				
2	Apply knowledge of Mathematics, Z-plane analysis to discrete time control systems.				
3	Replace the conventional control system with Digital control system.				
4	Evaluate and apply Z-plane analysis of discrete time control systems				
5	Apply state feedback controllers and observers				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Management Science**	**B18MB02**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Plan an organizational structure for a given context in the organization carry out production				

	operations through Work study				
2	Carry out production operations through Work study.				
3	Understand the markets, customers and competition better and price the given products appropriately.				
4	Ensure quality for a given product or service				
5	Plan and control the HR function better.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Oops Trough Java**	**B18CS52**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Describe the concepts of Java Programming language				
2	Demonstrate the concepts of Polymorphism and Inheritance				
3	Develop robust applications using Exception handling.				
4	Develop multithreaded applications with synchronization				
5	Design GUI based applications and Applets for web applications.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**VLSI Design**	**B18EC21**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand IC technology and basic electrical properties of MOS and BiCMOS.				
2	Discuss the design process of VLSI circuit				
3	Develop and design the gate level circuits.				
4	Gain the knowledge to design data path subsystems like Adders, Shifters, ALUs etc				
5	Illustrate different programmable logic devices and CMOS testing				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Business Intelligence and Big Data**	**B18CS37**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Learn the basics concepts and fundamentals of big data analysis and examine its various types				
2	Understand the key technologies such as manipulating, storing, and analyzing big data.				
3	Understand the concept of map reduce and explore its extensions				
4	Explore various big data solutions to real world problems				
5	Understand the ethics and practices of big data analysis in the real world.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Microprocessors and Microcontrollers Lab**	**B18EC29**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Demonstrate experimentally basic programming of Microprocessor.				
2	Exhibit microprocessor interfacing with various peripherals for various applications.				
3	Demonstrate experimentally basic programming of microcontroller.				
4	Exhibit microprocessor interfacing with various peripherals for various applications.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Electrical Simulation Lab**	**B18EE42**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					

1	Get the basic simulation knowledge on electrical subjects				
2	Learn the time response and frequency response analysis				
3	Conduct load flow analysis				
4	Gain working knowledge on PSPICE software				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	VII Sem	**Advanced English Communication Skills Lab**	**B18EN03**	**L/T/P :0/0 /2**	
After learning the contents of this subject, the student must be able to					
1	Develop sound vocabulary and its proper use contextually				
2	Inculcate flair for Writing and felicity in written expression.				
3	Enhance job prospects.				
4	Acquire effective speaking abilities.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	VII Sem	**Mini Project and Summer Internship**	**B18EE43**	**L/T/P :0/0 /0**	
1	Students will be able to practice acquired knowledge within the chosen area of technology for project development				
2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.				
3	Reproduce, improve and refine technical aspects for engineering projects				
4	Work as an individual or in a team in development of technical projects and Communicate and report effectively project related activities and findings.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	VII Sem	**Project Stage – I**	**B18EE44**	**L/T/P :0/0 /8**	
1	Identify the problem by applying acquired knowledge.				
2	Ability to plan and implement an investigative or developmental project.				
3	In-depth skill to use some laboratory, modern tools and techniques				
4	Ability to communicate results, concepts, analyses and ideas in written and oral form.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VIII Sem	**Neural Networks and Fuzzy Systems**	**B18EE45**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the concepts of feed forward neural Networks				
2	Acquire adequate knowledge about feedback networks.				
3	Get knowledge about the concept of fuzziness involved in various systems and about fuzzy set theory.				
4	Gain knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.				
5	Explore knowledge of application of fuzzy logic control to real time systems in engineering.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VIII Sem	**Utilization of Electrical Energy**	**B18EE46**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					

1	Choose a right drive for a particular application				
2	Identify Heating and welding schemes for given application.				
3	Explain the basics of lighting and methods of illumination and its parameters				
4	Understand the different schemes of traction systems, its characteristics and its main components.				
5	Analyze electrical energy consumption for traction system.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Smart Grids**	**B18EE47**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand technologies for smart grid and features of Smart Grid in the context of Indian Grid.				
2	Assess the role of automation in Transmission/Distribution/substation				
3	Know various communication technologies involved in smart grids and importance of PMUs, EMS, WAMS, SCADA				
4	Classify various Smart Distribution Technologies				
5	Clarify the regulations and market models for smart grid and various tariffs				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Entrepreneurship Development**	**B18MB03**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the qualities and skills of entrepreneurship				
2	Explore various aspects that promotes entrepreneur in the society				
3	Understand the necessity of ethical guidelines in business				
4	Understand the basics of corporate governance and its mechanism				
5	Understand the impact of social responsibility of a entrepreneur				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Embedded Systems**	**B18EC31**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the basics of an embedded system				
2	Learn the method of designing an embedded system for any type of applications.				
3	Understand the operating systems concepts, types and choosing RTOS.				
4	Understand types of memory and interacting to external world.				
5	Learn embedded firmware design approaches.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Power Plant Engineering**	**B18ME36**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the layout of power generation units for different energy sectors.				
2	Identify different subsystem and systems of power generation sector.				
3	Compare existing and emerging alternative energy sources				
4	Analyze the opportunities in contributing towards the solving of energy crisis.				
5	Discuss general arrangement of power distribution.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Intellectual Property Rights**	**B18MB06**	**L/T/P :3/0 /0**	**3**

After learning the contents of this subject, the student must be able to					
1	Understand the basics and importance of intellectual property rights				
2	Explore the Purpose and function of trade marks and related processes				
3	Understand the importance of copy right and the issues involved in its violation				
4	Analyze the trade secrets and its associated laws				
5	Explore the new developments in IPR				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	VII Sem	**Technical Seminar**	**B18EE48**	**L/T/P :0/0 /0**	
1	Identify and analyze the real time Electrical Engineering problems				
2	Acquire awareness on latest technology and current trends in the field of Electrical Engineering.				
3	Participate in discussions for enhancement of knowledge				
4	Apply communication skills and Document and present technical reports following professional ethics.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 8**
	VII Sem	**Project Stage – II**	**B18EE49**	**L/T/P :0/0 /16**	
1	Identify the problem by applying acquired knowledge.				
2	Ability to plan and implement an investigative or developmental project.				
3	In-depth skill to use some laboratory, modern tools and techniques				
4	Ability to communicate results, concepts, analyses and ideas in written and oral form.				

VAAGDEVI COLLEGE OF ENGINEERING
AUTONOMOUS
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
M.TECH. (Software Engineering)

COURSE STRUCTURE
(R18 Regulations applicable for the batches admitted from Academic Year 2018-19 onwards)

I-SEMESTER

Course Outcome S.No	**Year/SemesterI Sem**	**Subject Name (Subject Code)** Data Structures and Algorithms(M18CS01)	**No. of HoursL:3 T:0 P:0**	**Credits: 3**
1	Understand the basics of Algorithms and Analyze the performance and complexity of Algorithms			
2	Explain the concepts of basic data structures: Linear and Non Linear and compare how the storageand retrieval of data is done on these data structures.			
3	Gain knowledge about applications of data structures including creating, inserting, deleting, searching and sorting of data for each data structure.			
4	Experiment with using linear data structures like stacks, queues and linked list for real time applications.			
5	Distinguish between Trees and Graphs and the areas where best applicable.			
6	Be able to decide an appropriate data structure for any specific problem.			
Course Outcome	**Year/SemesterI Sem**	**Subject Name (Subject Code)** Software Development Methodologies (M18SW01)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Review the basics of software engineering, processes, models and practices.			
2	Understand software requirement engineering and its application using various models.			
3	Understand design thinking at varied levels i.e architectural and component level and to also user interface			
4	Understand testing and its theoretical background along with metrics to test source code, applications and maintenance of application			
5	Develop understand on risks, risk identification, risk projection, Risk refinement, risk management and dealing with change management, survey few tools for configuration management.			
Course Outcome	**Year/SemesterI Sem**	**Subject Name (Subject Code)** Cloud Computing (M18CS05)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Discuss main concepts key strengths, and limitations for cloud computing			
2	Develop the architecture along with specific infrastructure on cloud computing including SaaS, PaaS , public cloud, private cloud, hybrid cloud, etc			
3	Explain the issues on cloud computing along with security, privacy, and interoperability			
4	Choose and use the appropriate technology, methods on these issues			
5	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.			
6	Provide the appropriate solutions on cloud computing based on the application.			
Course Outcome	**Year/SemesterI Sem**	**Subject Name (Subject Code)** Component Based Software Engineering (M18SW02)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**

1	Understand component based software development, models and approaches
2	Demonstrate the role of team in building component based software development.
3	Identify the processes involved in Design of Software Component Infrastructures and study existing models.
4	Demonstrate the learnt principles in effective reuse and maintenance of software
5	Survey technologies that support implementation of component based software development

Course Outcome	Year/SemesterI Sem	Subject Name (Subject Code)	No. of Hours	Credits: 3
		Internet Technologies and services(M18SW03)	L:3 T:0 P:0	
1	Survey client side technologies for web development.			
2	Understand life cycle of a java servlet and apply it to a develop software.			
3	Develop understanding on JSP and enhance the solution using JSP program.			
4	Create awareness on Struts framework and its application , develop complex solution using this framework.			
5	Introduce web services and service oriented architecture to develop seamless applications that are portable and highly interoperable.			

Course Outcome	Year/SemesterI Sem	Subject Name (Subject Code)	No. of Hours	Credits: 3
		Software requirements and Estimation (M18SW04)	L:3 T:0 P:0	
1	To develop an understanding of software requirements and asses their nature.			
2	To analyze software requirement management.			
3	To be able to estimate the cost of software development by understanding various methods.			
4	To be able to draw conclusions on effort, schedule and cost estimation			
5	Survey tools for requirements management, software estimation tools.			

Course Outcome	Year/SemesterI Sem	Subject Name (Subject Code)	No. of Hours	Credits: 3
		Object Oriented Software Engineering (M18SW05)	L:3 T:0 P:0	
1	To understand Scope of Object-Oriented Software Engineering, Software Life-Cycle Models, Software Process.			
2	To analyze role of teams, tools for the trade, testing.			
3	To be able to create reusable and portable applications.			
4	To be able to draw conclusions from requirement workflow.			
5	Design and implement workflow and maintain post delivery..			

Course Outcome	Year/SemesterI Sem	Subject Name (Subject Code)	No. of Hours	Credits: 3
		Information Theory and Coding (M18SW06)	L:3 T:0 P:0	
1	Ability to learn about information and entropy			
2	Ability to learn about Hamming weight, minimum distance decoding and different types of codes.They also learn about syndrome calculation and design of an encoder and decoder.			
3	Understanding the sequential search and Viterbi algorithm			
4	Apply knowledge on text compression techniques. They also learn about speech and audio coding			
5	Apply knowledge on image compression, graphics interchange format, JPEG and MPEG standards.			

Course Outcome	Year/SemesterI Sem	Subject Name (Subject Code)	No. of Hours	Credits: 2
		Research Methodology(M18MC01)	L:2 T:0 P:0	
1	Acquire knowledge on Research Design and statistical methods in research.			
2	Analyze the various methods in Data Collection, Data Organization and different approaches ofData Representation.			

3	Understand all the basic concepts required to prepare a. Research synopsis b. Dissertation c. Writing a good research proposal			
4	Interpret the Scope of Patent Rights and Administration of Patent System.			
Course Outcome	**Year/SemesterI Sem**	**Subject Name (Subject Code)** English for Research Paper Writing(M18AC01)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
1	Obtain complete knowledge on Definition of a research paper, Purpose of writing any research paper , its Scope and Benefits.			
2	Understand the standard English formats .for scripting the best research paper.			
3	Analyze all the Qualitative and Quantitative Research Methodologies and the ethics of plagiarism.			
4	Explain the detailed process of writing and publishing any research paper and perform a case study on paper writing.			
Course Outcome	**Year/SemesterI Sem**	**Subject Name (Subject Code)** Software Development Methodologies Lab (M18SW07)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Review the basics of software engineering, processes, models and practices.			
2	Understand software requirement engineering and its application using various models.			
3	Understand design thinking at varied levels i.e architectural and component level and to also userinterface.			
4	Understand testing and its theoretical background along with metrics to test source code, applications and maintenance of application			
5	Develop an understand on risks, risk identification, risk projection, Risk refinement, risk management and dealing with change management, survey few tools for configuration management.			
Course Outcome	**Year/SemesterI Sem**	**Subject Name (Subject Code)** Cloud Computing Lab (M18CS10)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.			
2	Explain the issues on cloud computing along with security, privacy, and interoperability.			
3	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.			
4	Provide the appropriate solutions on cloud computing based on the application.			

II - SEMESTER

Course Outcome S.No	**Year/SemesterII Sem**	**Subject Name (Subject Code)** Software Quality Assurance and Testing (M18SW08)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Apply modern software testing processes in relation to software development and project management.			
2	Create test strategies and plans, design test cases, prioritize and execute them.			
3	Ability to learn and manage incidents using software testing tools.			
4	Contribute to efficient delivery of software solutions and implement improvements in the software development processes.			
5	To gain expertise in designing, implementation and development of computer based systems and IT processes.			

6				
Course Outcome	**Year/SemesterII Sem**	**Subject Name (Subject Code)** Software Project and Project Management (M18CS18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Discuss and plan to execute projects based on required standards.			
2	Understand the range of tools used on project management**.**			
3	Analyze the concepts related on project governance and methodologies.			
4	Apply critical analysis on solving problems and planning process.			
5	Describe planning, Risk and issues management.			
6	Plan process, pragmatic planning service delivery and quality assurance			
Course Outcome	**Year/SemesterII Sem**	**Subject Name (Subject Code)** Software Architecture and Design Patterns (M18SW09)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	To understand the concept of patterns and the Catalog.			
2	To discuss the Presentation tier design patterns and their affect on: sessions, client access, validation and consistency.			
3	To understand the variety of implemented bad practices related to the Business and Integration tiers.			
4	To highlight the evolution of patterns.			
5	To learn how to add functionality to designs while minimizing complexity			
Course Outcome	**Year/SemesterII Sem**	**Subject Name (Subject Code)** Agile Software Development(M18SW10)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Understand the architecture, creating it and moving from one to any, different structural patterns.			
2	Analyze the architecture and build the system from the components.			
3	Design creational and structural patterns.			
4	Learn about behavioral patterns.			
5	Do a case study in utilizing architectural structures			
Course Outcome	**Year/Semester IISem**	**Subject Name (Subject Code)** Bigdata Analytics (M18SW11)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Understand what Big Data is and why classical data analysis techniques are no longer adequate			
2	Understand the benefits that Big Data can offer to businesses and organizations			
3	Understand conceptually how Big Data is stored			
4	Understand how Big Data can be analysed to extract knowledge			
5	Communicate with data scientists			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Software Security Engineering (M18SW12)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	An ability to analyze security and privacy and properties of systems.			
2	An ability to conduct user-cantered design for security engineering.			
3	An ability to understand programming constraints with systems security.			
4	An understanding of limitations and advantages of security protocols, functional and attacker perspectives, password authentication and various alternative systems.			
5	Discussing the Security adopting considerations and limitations			
6				
Course	**Year/SemesterI**	**Subject Name (Subject Code)** Business Process Management (M18SW13)	**No. of Hours**	**Credits: 3**

Outcome	**Sem**		**L:3 T:0 P:0**	
1	Develop new or improved innovative business processes from gap analysis through process design in support of a company's strategic objectives in a socially responsible manner.			
2	Develop business models that support a company's strategic objectives.			
3	Articulate the interdependence between financial and operational metrics used in value chain analysis to key decision makers.			
4	Appraise the impact on financial and operational performance of specific			
5	Evaluate the opportunities for business process and supply chain improvement based on currentbest practices across industries, as well as new breakthrough thinking.			
6	Analyze the key business processes that drive the value chain of an organization throughout theentire product life cycle.			
Course Outcome	**Year/Semester IISem**	**Subject Name (Subject Code)** Cyber Security(M18CN12)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Understand the different kinds of security attacks			
2	Define a internetwork security model and identify the TCP			
3	Identify and classify the different types of attacks and suggest appropriate conventionalencryption algorithms to be applied.			
4	Gain complete knowledge in number system and areas of applications in public key cryptography algorithms.			
5	Interpret the importance of digital signatures, digital Certificates, Certificate Authority for electronic document transfer on internet.			
6	Demonstrate IP security architecture and explain how Pretty Good Privacy (PGP) and S/MIME provides Email privacy.			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Stress Management (M18AC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
1	Maintain a stress awareness log. Include identification of causes, symptoms, and analysis of effects.			
2	Gather information on current stress management techniques and evaluate personal relevance.			
3	Practice specific techniques, track effectiveness, and revise to meet personal preferences.			
4	Create an adaptable stress management plan for academic success incorporating selected techniques.			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Software Testing Lab(M18SW14)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Understanding Selenium tool to perform testing			
2	Writing test suits for applications			
3	Construct and test simple programs.			
4	Understanding the use of bug tracking and testing tool			
5	Ability to learn any open source Testing tool			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Bigdata Analytics Lab (M18SW15)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Understand what Big Data is and why classical data analysis techniques are no longer adequate			
2	Understand the benefits that Big Data can offer to businesses and organizations			
3	Understand conceptually how Big Data is stored			
4	Understand how Big Data can be analysed to extract knowledge			
5	Communicate with data scientists			

Course Outcome	Year/SemesterII Sem	Subject Name (Subject Code) Mini Project(M18SW16)	No. of Hours L:0 T:0 P:2	Credits: 2
1	Enhance students' knowledge in current technology			
2	Develop leadership ability and responsibility to execute the given task			
3	Enhance their employability skills along with real corporate exposure			
4	Elaborate the completed task and compile the report.			

III-SEMESTER

Course Outcome	Year/Semester IIISem	Subject Name (Subject Code) Information Retrieval Systems (M18SW17)	No. of Hours L:3 T:0 P:0	Credits: 3
1	Define Vector space model, understand various similarity coefficient and measures.			
2	Develop an Understanding on Relevance feedback, , Clustering, Regression Analysis, Thesauri.			
3	Apply various Retrieval Utilities for Information Retrieval.			
4	Develop an Understanding about Signature files, Duplicate document detection.			
5	Apply IR principles to locate relevant information large collection of data.			
Course Outcome	**Year/Semester III Sem**	**Subject Name (Subject Code)** Principles of Information Security (M18SW18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Understand the importance of Information Security.			
2	Describe the need and role of network security.			
3	Deploy the security Technologies and adapt various firewalls and Intrusion detection systems.			
4	Implement the techniques used in cryptography.			
5	Plan methods for information security and demonstrate it with Real Time problems.			
Course Outcome	**Year/Semester III Sem**	**Subject Name (Subject Code)** Computer Foreinsics (M18SW19)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Understand the concepts of E-Commerce consumer application.			
2	Demonstrate Electronic payment systems using smart cards & Analyze broad view of Work flow and corporate Data warehouses.			
3	Customize the supply chain management and digital documents & Adapt advertise and Marketing based information.			
4	Discover new methods and strategy for E-commerce infrastructure.			
5	Discuss issues on privacy and legal E-commerce & Develop electronic and desktop video processing			
Course Outcome	**Year/Semester III Sem**	**Subject Name (Subject Code)** Advanced Optimization Techniques (M18MA01)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Describe problem clearly, identify and analyze the individual functions.			
2	Analyze study on solving optimization problem.			
3	Translate verbal formula on optimization problem.			
4	Design algorithms, reliably to find an approximate solution.			
5	Evaluate and compare the performance of an algorithm.			
6	Discovery, study, understand and solve optimization techniques using algorithms.			
Course Outcome	**Year/Semester III Sem**	**Subject Name (Subject Code)** Waste Management (M18SE27)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Evaluate the subject from the technical, legal and economical points .			
2	Learn solid waste management.			

3	Describe environment for sound management.
4	Understand a municipal solid waste management system.
5	Plan a solid waste management system for decision makers.
6	Design an incineration facility.

Course Outcome	Year/Semester	Subject Name (Subject Code)	No. of Hours	Credits: 3
	IIISem	Embedded System Design (M18VL07)	L:3 T:0 P:0	
1	Explain the different embedded system design techniques and the metrics or challenges in designing them.			
2	Understand the complete architecture of 8051 and Advanced Processor.			
3	Demonstrate Software programming in Assembly language and High Level Language.			
4	Develop code for object oriented Programming, Embedded Programming using Macros and Functions in c++ and java.			
5	Classify the different Real Time Operating System (RTOS), RTOS Vx Works, Windows CE.			
6	Understand the Embedded Software Development Process and Tools.			

Course Outcome	Year/Semester	Subject Name (Subject Code)	No. of Hours	Credits: 10
	III Sem	Dissertation Phase-I (M18SW20)	L:0 T:0 P:20	
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

IV-SEMESTER

Course Outcome	Year/Semester	Subject Name (Subject Code)	No. of Hours	Credits: 16
	IV Sem	Dissertation Phase-II (M18SW21)	L:0 T:0 P:32	
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

VAAGDEVI COLLEGE OF ENGINEERING

Autonomous

Bollikunta, Warangal Urban-506 005 (T.S)

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES (CO's) FOR B.TECH – CIVIL ENGINEERING (R18)

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Linear Algebra and Calculus(B18MA01)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Write the matrix representation of a set of linear equations and to analyze the solution of the system of equations.			
2	Find the Eigen values and Eigen vectors and Reduce the quadratic form to canonical form using orthogonal transformations.			
3	Analyze the nature of sequence and series.			
4	Solve the applications on the mean value theorems and Evaluate the improper integrals using Beta and Gamma functions.			
5	Find the extreme values of functions of two variables with/ without constraints.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** English (B18EN01)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Use English Language effectively in spoken and written forms.			
2	Comprehend the given texts and respond appropriately.			
3	Communicate confidently in various contexts and different cultures.			
4	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.			
5	Develops and Communicates by stating main ideas relevantly and coherently in speaking & writing.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Engineering Chemistry (B18CH01)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Recall previous knowledge regarding atomic and molecular structure.			
2	The knowledge of organic reaction mechanisms and polymers.			
3	The required principles and concepts of electro chemistry and batteries.			
4	The knowledge of water treatment and corrosion.			
5	Apply phase rule and absorption to construct the materials by analyzing their compositions.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Engineering Graphics (B18ME01)	No. of Hours : **L: 1 T: 0 P: 4**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Learn the principles of Engineering graphics and their significance.			
2	Perform projection of lines inclined to one or two planes.			
3	Perform the projections and views on the planes and solids.			
4	Development of surfaces on solids and draw different sections.			
5	Convert orthographic views into isometric views and explore various computer technologies.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Programming for Problem Solving (B18CS01)	No. of Hours : **L: 4 T: 0 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understanding how problems are posed and how they can be analyzed for obtaining solutions.			
2	Understanding the fundamentals of C programming.			
3	Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.			
4	Implementing different operations on arrays and creating and using of functions to solve problems.			
5	Ability to design and implement different types of file structures using standard methodology.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** English Language Communication Skills Lab (B18EN02)	No. of Hours : **L: 0 T:0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Better understanding of nuances of English language through audio- visual experience and group activities			
2	Speaking with clarity and confidence which in turn enhances their employability skills			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Programming for Problem Solving Lab (B18CS02)	No. of Hours : **L: 0 T:0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Design the fundamentals of C programming.			
2	Write C programs using operators			
3	Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.			
4	Implementing different operations on arrays and creating and using of functions to solve problems.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Differential Equation and Vector Calculus (B18MA02)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**

After the completion of this course, the students should be able to				
1	Identify whether the given differential equation of first order is exact or not			
2	Solve higher differential equation and apply the concept of differential equation to real world problems			
3	Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and gravity for cubes, sphere and rectangular parallel piped.			
4	Evaluate the Gradient, Divergence and Curl of vector field to predict areas and volumes.			
5	Evaluate the line, surface and volume integrals and converting them from one to another			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Physics (B18PH03)	No. of Hours : **L: 4 T: 0 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	The student learns about transformation concept.			
2	The student gains knowledge on basics of rigid body dynamics.			
3	Learns about basics of quantum mechanics.			
4	Characterization and study of properties of optodevices helps the students to prepare new materials for various engineering applications.			
5	Gain knowledge about lasers which leads to new innovations and improvements.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Mechanics (B18CE01)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the force system and Degree of freedom			
2	Understand the special force system			
3	Develop algebraic relationships among Key physical parameters and variables based on analysis of a specifiedsystem			
4	Apply the principles of mechanics for solving practical problems related to equilibrium of rigid bodies and particle inmotion.			
5	Apply the dynamic ,motion principles in engineering field			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** OOP's and Data Structures (B18CS50)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To find the difference between structured programming and object oriented programming language and understanding the features of C++ supporting object oriented programming.			

2	To explain and apply the major object oriented concepts to implement object oriented programs in C++.			
3	To build the basic knowledge to handle operations like insertions, deletions, searching, and traversing mechanisms in linear data structures.			
4	Examine with advanced data structure such as hash tables and priority queue data structures.			
5	Ability to have knowledge on trees, balanced trees, graphs and developing C++ code for non-linear data structures, and different sorting techniques.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Workshop & IT Workshop (B18ME02)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Know the fundamental knowledge of various trades and their usage in real time Applications.			
2	Gain knowledge of Foundry, Welding, Black smithy, Fitting, Machine shop and house wiring.			
3	Understand the basis for analyzing power tools in construction and wood working, electrical engineering and mechanical engineering.			
4	Use basic concepts of computer hardware for assembly and disassembly.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Physics Lab (B18PH04)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	The laboratory course helps the student how to operate different equipments related to engineering.			
2	It also allows the student to develop experimental skills to design new experiments in engineering.			
3	The course enlightens the student about modern equipment like solar cell, optical fibre etc.,			
4	With the exposure to these experiments, the student can compare the theory and correlate with experiment.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** OOP's and Data Structures Lab (B18CS51)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Apply the oops concepts like inheritance, polymorphism, abstraction and many more to solve probles using c++.			
2	Understand basic data structures such as arrays, linked lists, stacks and queues.			
3	Able to write programs on hash functions and concepts of collision and its resolution methods , graphs, trees and heaps.			
4	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.			

Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Probability and Statistics (B18MA04)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Use probability theory and deals with modelling uncertainty and apply discrete and continuous probability, in order to evaluate the probability of real world events.			
2	Develop discrete probability distributions and its applications, and use these techniques to generate data from Binomial and Poisson Distributions.			
3	Develop continuous probability distributions and its applications, and use these techniques to generate data from Normal Distribution.			
4	Perform correlation analysis, in order to estimate the nature and the strength of the linear relationship that may exist between two variables of interest, Perform regression analysis to estimate the magnitude of change in one variable due to a given change in the other variable.			
5	Construct confidence interval estimates for population parameters and conduct hypothesis tests concerning population parameters, for single and multiple populations based on sample data. And also perform Student T-test, F-test and X2- test (chi-square).			
Course Outcome	Year / Semester : II /III-Sem	**Subject Name (Code):** Strength of Materials–I (B18CE02)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Outline the various stresses and strains.			
2	Draw the shear force and Bending moment diagram for different beams.			
3	Evaluate the flexural and shear stresses for various sections.			
4	Calculate the slope and deflection of determinant beams.			
5	dentify the concepts of torsion and spring subjected to loading.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Fluid Mechanics (B18CE03)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Demonstrate the basic properties of fluids and the principles of manometer.			
2	Compute dimensional flows of a pipe applying continuity equation.			
3	Calculate measurement of flow by Eulers and Bernoulli's equation.			
4	Differentiate laminar and turbulent flow and various losses in pipe flow.			
5	Determine drag force and lift force of hydraulic structure.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Surveying (B18CE04)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Identify the classification of surveying and its instruments.			
2	Calculate the horizontal and vertical angle using Tacheometric surveying.			

3	Understand the process of control surveying and adjustments.			
4	Know the concept of Hydrographic and Astronomical surveying.			
5	Understand the principle of Total station and GPS surveying.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Basic Electrical and Electronics Engineering (B18EE02)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	NA			
2	NA			
3	NA			
4	NA			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Strength of Materials Lab (B18CE05)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Identify the bending behavior of beams using bending test.			
2	Determine the behavior of material under torsion.			
3	Determine the hardness of materials using different test.			
4	Find out the characteristic of material using compression, impact and shear test.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Surveying Lab (B18CE06)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Calculate area of given plot/points using chain survey.			
2	Determine the angle/distance of given points using compass survey.			
3	Find out the angle, distance and height of the given points using theodolite surveying			
4	Determine the distance of the given points using Total station			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Basic Electrical and Electronics Engineering Lab (B18EE03)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Learn to simplify complex electric and electronic circuits by applying the KVL and KCL laws.			
2	Identify the optimal loading on the system.			
3	Analyze the performance of DC machines.			
4	Identify and analyze the performance and operation of semi conducting devices.			

Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Environmental Sciences (B18MC02)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Recall previously learned ecosystem and find how the biodiversity changes went in the environment.			
2	Demonstrate outlines of types of pollutions and related to day-to-day life.			
3	Organize important seminars on natural resources.			
4	Apply models of food chains and energy flow models to solve the identified parameters.			
5	Classify the types of pollutants and distinguish the functions of sustainable development that take part in the environment.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Building Materials and Construction Planning (B18CE0)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Categorize stone and brick material with their properties			
2	Contrast the importance of concrete and its properties			
3	Outline the different building components			
4	Explain different building services and NBS/IS norms			
5	Build knowledge about masonry and finishing work			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Strength of Materials – II (B18CE08)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analysis the fixed and continuous beams.			
2	Evaluate the direct and bending stresses of different structures.			
3	Determine the critical load of columns and stresses developed in thick and thin cylinders.			
4	Understand the concept of principal stresses and strain energy.			
5	Analyze the unsymmetrical bending of beams and shear centre for different section.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Hydraulics & Hydraulic Machinery (B18CE09)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Apply fundamental knowledge in open-channel hydraulics in Civil Engineering.			
2	Describe dimensional analysis and similarity to develop hydraulic model.			
3	Describe dimensional analysis and similarity to develop hydraulic model.			
4	Gain knowledge of hydraulic turbines and their operational design.			
5	Evaluate the performance of centrifugal pumps and hydropower plants.			

Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Structural Analysis – I (B18CE10)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Build knowledge about energy principles and computing deflection of beams.			
2	Analyze the different types of arches.			
3	Gain knowledge about cables and suspension bridges.			
4	Analyses the propped cantilever and continuous beam.			
5	Contrast the concept of plastic analysis of structures.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Engineering Geology (B18CE11)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand properties of rocks within the framework of fundamental concepts of basic sciences and with emphasis on their practical utility in civil engineering.			
2	Model physical and mechanical properties of rocks and rock mass through quantification.			
3	Justify importance of residual stresses in rock mass and to model the redistribution of stresses during.			
4	Identify subsurface information and groundwater potential sites through geophysical investigation.			
5	Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Basic Mechanical Engineering (B18ME52)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Identify the Various Energy sources and IC engines systems.			
2	Apply the Metal removal process using Lathe, drilling and Milling operations.			
3	Compare the application and usage of various engineering Materials.			
4	Analyze the Principle of operation of Impulse and reaction turbine.			
5	Discuss the importance of engineering materials.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Fluid Mechanics & Hydraulic Machinery Lab (B18CE12)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Calibrate flow measuring devices used in pipes, channels and tank			
2	Demonstrate practical understanding of the minor and friction losses in pipe flows and characterize laminar and turbulent flows.			
3	Demonstrate a practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.			
4	Compare the results of analytical models introduced in a lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.			

Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Engineering Geology Lab (B18CE13)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Learn about the ground surface features based on map patterns of contour within the framework of fundamental concepts of basic sciences with emphasis on practical application in civil engineering.			
2	Identify physical and mechanical properties of rocks and minerals and its application in civil engineering uses.			
3	Measure strike and dip of the bedding planes.			
4	Interpret and draw the sections for geological maps showing horizontal beds, vertical beds, inclined beds, folds, faults.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Building Drawing Lab – CAD (B18CE14)	No. of Hours : **L: 0 T: 1 P: 2**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Use the usage of AutoCAD commands.			
2	Draw the plan and elevation of the building structures.			
3	Draw the 2D & 3D building elements.			
4	Detail the building components in Auto CAD drawings.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Gender Sensitization (B18MC07)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Define the need and importance of women empowerment.			
2	Extend the levels of understanding and classification of gender disparities.			
3	Identify the need of equal distribution of work in the entire sector irrespective of gender.			
4	Construct the emergency needs of saving girl child.			
5	Improves thinking levels to find solution to the missing women and bring realization in the society.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Design of Steel Structures (B18CE15)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Explain and Design the connections.			
2	Analyse and Design the tension, compression members.			
3	Design the beams on plastic moment and the eccentric connections.			
4	Design the plate girder and various stiffeners.			
5	Analyse and Design the components of roof trusses.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Geotechnical Engineering (B18CE16)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Identify the problems in founding strata and suggest economically feasible solutions through systematic analysis.			
2	Analyse the water flow and providing solutions to counter the hydraulic pressures.			
3	Awareness of the classical concepts of soil mechanics and its necessity.			

4	Ability to analyze the consolidation settlements.			
5	Understand the principles of compaction to improve the soil stratum.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Concrete Technology (B18CE17)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Gain knowledge of cement materials and types of admixtures.			
2	Learn about types of aggregates, properties and its test.			
3	Design the mix proportion of concrete and learn fresh properties of concrete.			
4	Gain knowledge of hardened and durability properties of concrete.			
5	Obtain knowledge of special concretes and its application.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Engineering Hydrology (B18CE18)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Determine the quantity of precipitation available for a given catchment area.			
2	Apply different methods to formulate the velocity of stream flow.			
3	Discuss the importance of estimation of runoff, analysis of rainfall data and various hydrographs such as unit hydrograph, flood hydrograph and synthetic unit hydrograph.			
4	Make use of Techniques of the Hydrograph to forecast Flood discharge at various duration.			
5	Build the necessary theoretical background of ground water hydrology, types of aquifers and their yields.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Engineering Hydrology (B18CE18)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Determine the quantity of precipitation available for a given catchment area.			
2	Apply different methods to formulate the velocity of stream flow.			
3	Discuss the importance of estimation of runoff, analysis of rainfall data and various hydrographs such as unit hydrograph, flood hydrograph and synthetic unit hydrograph.			
4	Make use of Techniques of the Hydrograph to forecast Flood discharge at various duration.			
5	Build the necessary theoretical background of ground water hydrology, types of aquifers and their yields.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Structural Analysis-II (B18CE33)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analysis the portal frames by slope deflection method and learn to draw the shear force and bending moments diagram for frames.			
2	Apply the method of approach to analysis of portal frame by moment distribution method.			
3	Able to analysis beams and frames by Kani's method and Approximation method.			
4	Analyze the continuous beam, Pin jointed plane frame using the flexibility of stiffness method.			
5	Gain knowledge to calculate the Shear force and bending moment on the			

Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Remote Sensing (B18CE34)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the terminology,concept of remote sensing,types of radiation.			
2	Understand different characteristics of platforms,types of data acquisition systems.			
3	Able to understand the image formations, analyse the corrections.			
4	Apply the linear and non-linera techniques in image enhacements.			
5	Apply the remote sensing in engineering and science streams.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Environmental Impact Assessment (B18CE35)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Acquire the knowledge of Environmental impacts, control and regulations.			
2	Understand environmental clearances and guidelines.			
3	Understands environment laws and regulations.			
4	Acquire Knowledge to prepare an audit report.			
5	Prepare EIA reports and environmental management plans.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Managerial Economics and Financial Analysis (B18MB01)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the nature, scope and importance of Managerial Economics.			
2	Know what is demand, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand.			
3	Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.			
4	Understand the characteristics of different kinds of markets and outline different form of business organization and analyze how capital budgeting techniques are used for investment decisions.			
5	Know how to prepare final accounts and how to interpret them, analyze and interpret financial statements using ratio analysis.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Concrete Technology Lab (B18CE19)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Understand about the test on cement and aggregate.			
2	Evaluate the workability of fresh the Concrete.			
3	Determine the strength characteristics of harden concrete.			
4	Gain knowledge of non-destructive test on concrete.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Geo Technical Engineering Lab (B18CE20)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**

After the completion of this course, the students should be able to				
1	Classify soils and appropriately designate them.			
2	Calculate the permeability value of soil.			
3	Determine engineering properties of soil and suggest suitable field improvements.			
4	Determine the shear strength properties of soil.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Indian Constitution (B18MC04)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Have general knowledge and legal literacy about Indian Constitution and there by it helps to take up competitive examinations & to manage/face complex societal issues in society.			
2	Understand state and central policies(Union and State Excutive), fundamental Rights & their duties.			
3	Understand Electoral Process and special provisions in Constitution.			
4	Understand the Amendments in Indian Constitution.			
5	Understand powers and functions of Municipalities, Panchayats and Cooperative Societies, with Human Rights and NHRC.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Design of RC Structures (B18CE21)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Design the singly reinforced, doubly reinforced and flange sections.			
2	Design the RC beams under flexure, shear and torsion.			
3	Design the one-way slab, two-way slab and staircase.			
4	Design the axially loaded, uniaxial and biaxial bending columns.			
5	Design the isolated square, rectangular and circular footings			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Irrigation Engineering (B18CE22)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	List out the concepts, techniques and modernization of Irrigation and Learn about irrigation water management on-farm development and command area development.			
2	Distribution systems for canal irrigation and the basics of design.			
3	Unlined and lined irrigation canal design			
4	Analyze gravity and earth dams.			
5	Plan and design diversion Headworks.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Highway Engineering (B18CE23)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyze the planning process required for highways and design the geometric			
2	Describe design element: sight distance, horizontal curvature, super elevation,			
3	Know the concept of traffic volume and importance of road markings.			
4	Recommend suitable highway materials and design of flexible, rigid pavement			
5	Design overlay, analyze the causes for failure of flexible and rigid pavement			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Foundation Engineering (B18CE36)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				

1	Understand soil exploration methods and calculate the bearing capacity of soils.			
2	Detect the failures in slopes and suggest appropriate improvement methods.			
3	Determine the earth pressures and provide sustainable retaining structures.			
4	Analyze and design shallow foundations.			
5	Analyze and design deep foundations.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Advanced Surveying (B18CE37)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the traiangulation method,system,baseline measurements and			
2	Apply different methods to find locations			
3	Understand the basic principles of theodolite,photogrammetric			
4	Understand the terminology and concepts of astronomical surveying, different			
5	Apply the knowledge of Total Station and GPS in surveying.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Ground Improvement Techniques (B18CE38)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Select the ground improvement technique which is suitable and economical for			
2	Select different techniques based on the various types of soils in-situ.			
3	Design reinforced earth structures.			
4	Apply the knowledge of geo-synthetic material for usage.			
5	Apply the knowledge of modification by confinement.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Rehabilitation & Retrofitting of Structures (B18CE39)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand about distress & damage of structures.			
2	Understand about practical and NDT.			
3	Understand about corrosion of steel reinforcement.			
4	Understand about different techniques of repairs of Structures.			
5	Understand the Health Monitoring of Structures by Sensors.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Geographical Information System (B18CE40)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand The Concept Of Cadastral Maps.			
2	Able To Identify Ground Points,Different Sources Of Map Information.			
3	Able To Coordinate The Points Through Digital.			
4	Understand The Basics Of Open Source Software.			
5	Applying The GIS In The Maps With Alignemts.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Construction Management (B18CE41)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the management theories,roles,decision making techniques.			

2	Understand network techniques, management and its applications CPM & PERT.			
3	Able to get knowledge on resource planning,methods of budgets.			
4	Understand the concepts of contract,types of contract.			
5	Learn about legal and financial aspects, safety systems.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Human Values and Professional Ethics (B18EN04)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	It ensures students sustained happiness through identifying the essentials of human values and skills.			
2	It facilitates a correct understanding between profession and happiness.			
3	It helps students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.			
4	Ability to develop appropriate technologies and management patterns to create			
5	Learn ethichs in Global Issues and problems in extortion.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Database Management System (B18CS04)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Ability to understand the fundamental concepts of database management.			
2	Ability to analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.			
3	Apply relational Database Theory, and be able to write relational algebra expressions for queries.			
4	Utilize the knowledge of basics of SQL and construct queries using SQL.			
5	Apply Normalization Process to construct the database. Explain Basic Issues of transaction processing.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Power Plant Engineering (B18ME36)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the layout of power generation units for different energy sectors.			
2	Identify different subsystem and systems of power generation sector.			
3	Compare existing and emerging alternative energy sources			
4	Analyze the opportunities in contributing towards the solving of energy crisis.			
5	Discuss general arrangement of power distribution.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Advanced English Communications Skills Lab (B18EN03)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Developing effectively and appropriate vocabulary to be used contextually.			
2	Inculcating flair for Writing and felicity in written expression.			
3	Enhancing job prospects.			
4	Acquiring effective speaking abilities			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Highway Engineering Lab (B18CE24)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**

After the completion of this course, the students should be able to				
1	Characterize the pavement materials based on properties.			
2	Perform quality control tests on pavement materials.			
3	Gain knowledge on basic understanding of mix design.			
4	Understand the salient features of traffic studies.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Structural Design and Detailing Lab (B18CE25)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Draw and show the detailing of reinforcement in footings.			
2	Draw and show the detailing of reinforcement of different types of columns			
3	Draw and show the detailing of reinforcement of different types of beams			
4	Draw the steel structures.			
Course Outcome	Year / Semester : III / VI-Sem	**Subject Name (Code):** Logical Reasoning and Quantitative Aptitude (B18MC05)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	To improve their logical thinking in terms of general and mathematical concepts.			
2	To improve students to compete in academic as well as competitive levels through which students are able to solve the real world problems.			
3	To make quick decisions to face the critical problems.			
4	Improve their mathematical skills in various general aspects to solve real world problems.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Estimation and Valuation Practice (B18CE26)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Evaluate the detailed estimate of RC building.			
2	Evaluate the rate for construction activities.			
3	Prepare the report and tender for the contact works.			
4	Understands what type of contract is used for a specific work.			
5	Understands the importance of valuation.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Environmental Engineering (B18CE27)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Acquire the knowledge of the water borne diseases and Serve the community by making people aware with the different pollution related problems.			
2	Demonstrate the steps involved in water filtering.			
3	Acquire the knowledge of water distribution system and their fittings.			
4	Explain wastewater collection systems & design sewers.			
5	Gain knowledge of the different processes of water treatment and would be able to assist in the design of the water treatment plants.			

Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Watershed Management (B18CE42)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Comprehend the physical, biological and environmental aspects and their interrelations within a watershed.			
2	Identify the causes of soil erosion.			
3	Plan and design water harvesting and groundwater recharging structures.			
4	Choose and apply available system tools for systematic intervention.			
5	Formulate a vision and design a sustainable watershed management plan that shows an integrated approach towards the multiple use of land- and water resources and social equity and economic availability.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Transportation Engineering (B18CE43)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand various components and characteristics of traffic.			
2	Conduct different traffic studies and analyze the data.			
3	Analyze and determine the LOS of highway.			
4	Analyze and design the intersections.			
5	To know various traffic control devices and principles of highway safety.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Bridge Engineering (B18CE44)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Obtain knowledge of bridges and its loading.			
2	Design the deck slab and T-Beam bridges.			
3	Contrast components and design of plate girder and steel truss bridges.			
4	Identify the types of bearing and design of piers and abutments in bridges.			
5	Show the importance of bridge inspection and maintenance.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Pre stressed Concrete (B18CE45)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the principles and types of prestressing.			
2	Know the methods of prestressing and losses of prestress.			
3	Gain knowledge analyze of beams in flexure and shear.			
4	Outline the transfer of prestresses force in members.			
5	Analyze the composite beam and deflection.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Earthquake Engineering (B18CE46)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Discuss and explain causes of earthquake, Theory of vibration.			
2	Discuss and explain the load path, ductility and earthquake design requirements.			
3	Analyze and design of earthquake resistant RC structures.			

4	Anaalye and design of earthquake resistant masonry structures.			
5	Discuss the design methodology of structural and non-structural elements.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Reinforced Earth and Geotextiles (B18CE47)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the history and mechanism of reinforced soil.			
2	Become aware about situations where geosynthetics can be used.			
3	Know about various types of geosynthetics and their functions.			
4	Be able to do dimple design of reinforced soil retaining walls and reinforced earth beds.			
5	Able to apply different types of analysis in simple problems.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Entrepreneur Development (B18MB03)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Define the nature of entrepreneur and relate the skills and qualities of			
2	Classify SWOT and summarize the sources of finance			
3	Apply the ethical guidelines for business			
4	Identify the shadow economy and political issues			
5	Assess the issues of corporate governance and Improve the professional ethics.			
Course Outcome	Year / Semester : IV / VII-Sem	Industrial Management (B18MB05)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Define Entrepreneurship and Organization.			
2	Design Organizational structures and its uses.			
3	Estimate the cost and time for projects with the help of PERT and CPM.			
4	Explain the work and make use of work study techniques.			
5	Solve the various problems in operation management.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Digital Image Processing (B18EC24)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Gain the knowledge of digital image fundamentals and image transforms.			
2	Discuss the analysis of image enhancement in spatial and frequency domain.			
3	Understand the different methods to restore an image.			
4	Inspect different image segmentation techniques and understand morphological			
5	Analyze the different image compression techniques.			
Course Outcome	Year / Semester : IV / VII-Sem	**Subject Name (Code):** Environmental Engineering Lab (B18CE28)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Test water and wastewater samples to determine pH and conductivity.			
2	Determine BOD and COD of water.			
3	Determine chloride content in water.			
4	Estimate quality of water and wastewater.			

Course Outcome	Year / Semester : IV / VIII-Sem	**Subject Name (Code):** Pavement Design (B18CE48)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Contrast the factors effecting the pavements.			
2	Expose to the analysis concepts and procedures for stresses, strains and			
3	Understand the concept of soil modification and its suitability as ground			
4	Obtain the knowledge of design of flexible and rigid pavements by different			
5	Illustrate the design of pavement for low volume roads and overlays			
Course Outcome	Year / Semester : IV / VIII-Sem	**Subject Name (Code):** Solid Waste Management (B18CE49)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Acquire the knowledge of solid waste management.			
2	Explain solid waste disposal techniques.			
3	Acquire the knowledge of Biomedical waste disposal techniques.			
4	Select the appropriate method for solid waste collection, transportation, redistribution and disposal.			
5	Acquire the knowledge of e- waste disposal techniques.			
Course Outcome	Year / Semester : IV / VIII-Sem	**Subject Name (Code):** Finite Element Method (B18CE50)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Introduction to finite element method and define stress strain equation.			
2	Derive equations in finite element methods for 1Dand 2Dproblems.			
3	Formulate and solve basic problems in structural mechanics using different elements.			
4	Identify and formulate mathematical models for solution of simple and common engineering problems into finite element.			
5	Appreciate the importance of ethical issues pertaining to the effective utilization of FEA.			
Course Outcome	Year / Semester : IV / VIII-Sem	**Subject Name (Code):** Intellectual Property Rights (B18MB06)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Outline the increasing importance of intellectual property rights			
2	Utilize post registration procedures and trade mark registration process			
3	Explain the copyright principles and rights			
4	Prioritize the law of patents and patent ownership.			
5	Develop the trade secret and maintenance.			
Course Outcome	Year / Semester : IV / VIII-Sem	**Subject Name (Code):** Nanotechnology (B18ME25)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the fundamentals of Nanotechnology.			
2	Analyze the different classes of nano materials.			
3	Differentiate techniques involved in Nanotechnology.			
4	Compare nanotechnology potentialities.			

5	Estimate oxidation and metallization Mask and its application.			
Course Outcome	Year / Semester : IV / VIII-Sem	**Subject Name (Code):** Non-Conventional Energy Sources (B18ME42)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Apply the technology to capture the energy from the renewable sources like sun,			
2	Compare different renewable energy sources to produce electrical power minimize the use of conventional energy sources to produce electrical energy.			
3	Identify the fact that the conventional energy resources are depleted.			
4	Understand direct energy conversion.			
5	Differentiate limitations and principles of direct energy conversion.			

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Course Outcomes for B.Tech – ECE-R18 for the academic year 2018-19 onwards

Course Outcome	Year/Semester I/I Sem	Subject Name (Subject Code) LINEAR ALGEBRA AND CALCULUS (B18MA01)	L: 3 T: 1 P: 0 C: 4
After the completion of this course, the students should be able to			
1	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.		
2	Find the Eigen values and Eigen vectors and Reduce the quadratic form to canonical form using orthogonal transformations.		
3	Analyse the nature of sequence and series.		
4	Solve the applications on the mean value theorems and Evaluate the improper integrals using Beta and Gamma functions.		
5	Find the extreme values of functions of two variables with/ without constraints.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code) PROGRAMMING FOR PROBLEM SOLVING (B18CS01)**	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Understand how problems are posed and how they can be analyzed for obtaining solutions.		
2	Understanding the fundamentals of C programming.		
3	Learn the sequencing, branching, looping and decision making statements to solve scientific and engineering problems.		

4	Implement different operations on arrays and creating and using of functions to solve problems.		
5	Design and implement different types of file structures using standard methodology.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code) APPLIED PHYSICS (B18PH01)**	**L:4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Illustrate fabrication of semi conductors, photo detectors, design basis of quantum mechanics		
2	Recall facts of wave optics extend & construct basics of wave optics.		
3	Interpret about lasers, which leads to new innovations and improvements		
4	Elaborate and formulate the study of characterization properties of opto-devices, organize the students to prepare new materials for various engineering applications		
5	Apply basic knowledge on principles and recalls facts of light properties, and motivate for new innovations. analyze applications of optical fibers		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code) ENGLISH (B18EN01)**	**L: 2 T: 0 P: 0 C: 2**
After the completion of this course, the students should be able to			
1	Recall the enrichment of comprehension and fluency will be adaptable.		

2	Gain confidence in using language in varied situations		
3	Develops neutralization of accent for intelligibility.		
4	Adapt effective speaking abilities.		
5	Develops and Communicates by stating main ideas relevantly and coherently in speaking & writing.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code) APPLIED PHYSICS LAB (**B18PH02**)**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Operate different equipments related to light & electronics.		
2	Develop experimental skills to design new experiments & circuit design.		
3	Understand about modern equipment like solar cell, optical fiber etc.,		
4	Have Exposure to develop novel semi conductor devices.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code) ENGINEERING WORKSHOP & IT WORKSHOP (**B18ME02**)**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Know the usage of various tools and their applications in carpentry, tin smithy.		
2	Understand the usage of various tools and their application in black smithy, foundry, welding and house wiring.		
3	Make lap joint and dove tail joint in carpentry, scoope, funnel and tray items in tin smithy.		

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Course Outcome	Year / semester I/I Sem	Subject Name (Subject Code) PROGRAMING FOR PROBLEM SOLVING LAB (B18CS02)	L: 0 T: 0 P: 2 C: 1
After the completion of this course, the students should be able to			
1	Understand how problems are posed and how they can be analyzed for obtaining solutions..		
2	Understand basic structure of the C programming, declaration and usage of variables.		
3	Write C programs using operators. Implement different operations on arrays and creating and using of functions to solve problems.		
4	Learn the sequencing, branching, looping and implement different types of file structures and decision making statements to solve scientific and engineering problems.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (B18MA02)**	**L: 3 T: 1 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Identify whether the given differential equation of first order is exact or not		
2	Solve higher order differential equation and apply the concept of differential equation to real world problems		
3	Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped		
4	Utilize the concept of gradient divergence and curl of a vector field to predict area and volumes.		
5	Evaluate the line, surface and volume integrals and converting them from one to another.		

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Course Outcome	Year / semester I/II Sem	Subject Name (Subject Code) ENGINEERING CHEMISTRY (B18CH01)	L: 3 T: 1 P: 0 C: 4
After the completion of this course, the students should be able to			
1	Recall previous knowledge regarding atomic and molecular structure.		
2	Design polymeric engineering materials. Recall basic organic reactions		
3	Construct batteries and classify different electronics and electrical like cells , electrodes, e.t.c…help them to construct different electrical/ electronic parts.		
4	Examine which type of impurities is present in water, specification of drinking water and explain the corrosion behavior/ activity of metals.		
5	Apply phase rule and adsorption to construct the materials by analyzing their compositions.		
Course Outcome	Year / semester I/II Sem	Subject Name (Subject Code) ENGINEERING GRAPHICS (B18ME01)	L: 1 T: 0 P: 4 C: 3
After the completion of this course, the students should be able to			
1	Learn the development of surfaces.		
2	Understand the projections of solids		
3	Understand the isometric projections.		
4	Understand the orthographic projections.		
5	Make the use of drawings, dimensioning, scales and conic sections.		
Course Outcome	Year / semester I/II Sem	Subject Name (Subject Code) ELECTRICAL CIRCUITS(B18EE04)	L: 3 T: 0 P: 0 C: 3

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After the completion of this course, the students should be able to			
1	Learn basic concepts of electrical circuits, electrical parameters etc		
2	Relate the learned basics to understand the AC and DC circuits		
3	Analyse and solve the electric and magnetic circuits		
4	Learn to demonstrate various network theorems and resonance condition		
5	Apply various network theorems to solve real time application		
6	Assess various above concepts in real world problems		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** **ELECTRONIC DEVICES AND CIRCUITS(B18EC01)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1.	Explain the semiconductor theory and characteristics of the PN junction diode and Zener diode.		
2.	Compare and contrast the rectifiers with and without filters.		
3.	Understand the construction and voltage- current characteristics of Junction Transistor and illustrate the different configurations of transistor		
4.	Design and analyze the different biasing circuits and amplifier circuits.		

5.	Acquire knowledge about the construction, theory and characteristics of FET and MOSFET.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code) ELECTRONIC DEVICES AND CIRCUITS LAB (B18EC02)**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Identify and find the values of resistors, capacitors and inductors.		
2	Measure voltage, frequency and phase of any waveform using CRO		
3	Demonstrate the characteristics and operation of electronic devices.		
4	Demonstrate various amplifier circuits.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code) ENGLISH LANGUAGE & COMMUNICATIONS SKILLS LAB (B18EN02)**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Capable in Better Understanding of nuances of language through audio-visual experience and group activities.		
2	Able to develop Neutralization of accent for intelligibility.		
3	Capable to Speak out with clarity and confidence thereby enhances the employability skills of the students by acquiring knowledge and techniques.		
4	Extends to speak fluent English, through advanced vocabulary to improve quality in speaking.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)**	**L: 0 T: 0 P: 2 C: 0**

		ENVIRONMENTAL SCIENCE (B18MC02)	
After the completion of this course, the students should be able to			
1	Recall previously learned ecosystem and find how the biodiversity changes went in the environment.		
2	Demonstrate outlines of types of pollutions and explain in related to day to day life.		
3	Apply models of food chains and energy flow models to solve the identified parameters.		
4	Classify the types of pollutants and distinguish the functions of sustainable development that take part in the environment.		
5	Design the experiments with BOD,COD, OD and estimate the micro organisms which cause contamination and can propose solutions.		

	systems

Course Outcomes for M.Tech – VLSI SYSTEM DESIGN (R18) for the year 2018-19 onwards

Course Outcome	**Year/Semester I/I Sem**	**Subject Name (Subject Code)** CMOS DIGITAL INTEGRATED CIRCUIT DESIGN (M18VL01)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Relate, compare, interpret and make the use of the best CMOS design techniques for implementation, analysis & design of Combinational MOS logic circuits.		
2	Relate, compare, interpret and make the use of the best CMOS design techniques for implementation, analysis & design of Sequential MOS logic circuits.		
3	Know & tell different types of memories and compare performance evaluation of each memory modules so they can be able to think & justify how to improve performance by taking different structures.		
4	Define, simplify & justify which dynamic logic circuit can be used investigate CMOS circuits.		
5	Recommend various CMOS techniques and also other device technologies based on circuit constraints requirement.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** CMOS ANALOG INTEGRATED CIRCUIT DESIGN (M18VL02)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Define the parameters of MOS Devices & can predict the performance or behavior of Analog VLSI circuit.		
2	Use mathematical models of MOS transistors to evaluate their behavior in analog circuits & selects suitable design approaches while trading off conflicting requirements		
3	Analyze & characterize analog devices and systems & Designing CMOS analog circuits to achieve performance specifications		

4	Understand design issues related to analog VLSI system 7&working of MOS based data converter circuits.		
5	Make the significant use of knowledge of subject in research or on project in VLSI domain.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** DIGITAL SYSTEM DESIGN USING HDL(M18VL03)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Design and analyze combinational, sequential and arithmetic circuits using HDL.		
2	Understand digital system design flow, timing, synthesis and FPGA implementation issues.		
3	Solve engineering problems in the area of digital system design & Examine or Inspect for an optimum layout for IC layout at VLSI backend design.		
4	Design, analyze & can predict the performance characteristics of logic gates using NMOS, PMOS & CMOS technology at VLSI backend design.		
5	Tell an optimum trade with respect to three basic parameters of VLSI design for VLSI circuit at frontend or backend VLSI design		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** VLSI SIGNAL PROCESSING (M18VL04)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply the concepts of pipelining, parallel processing, retiming, folding and unfolding to optimize digital signal processing architectures		
2	Use of proper techniques for parallel processing design for scaling and round off noise computation		
3	Apply all techniques to improve implementations of several DSP algorithms, using both ASICs and off –the -shelf programmable digital signal processors		
4	Design high-speed, low-area, and low-power VLSI systems for a broad range of DSP applications		

5	Minimize the computational complexity using fast convolution algorithms & Make the significant use of knowledge of subject in research or on project in VLSI domain		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** VLSI TECHNOLOGY (M18VL05)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Build circuits using IC's.		
2	In depth knowledge of applying the concepts in real time applications.		
3	Understand the main elements of hierarchical IC design namely interested circuit technology, approaches to system design, architectural issues.		
4	Design implementation and layout & Use of tools for efficient designing.		
5	Make the significant use of knowledge of subject in research or on project in VLSI domain.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ALGORITHM FOR VLSI DESIGN AUTOMATION(M18VL06)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Describe and formulate the flow of VLSI Design for any application.		
2	Explain the algorithms for partitioning, floor planning, placement and routing the digital designs at frontend level & at backend VLSI Design level.		
3	Compare the various scheduling algorithms & Analyze & solve the issues related to logic synthesis & verification		
4	Explain the algorithms for partitioning, floor planning, placement and routing the MCM modules		
5	Make significant contribution in the research in based on design of CAD tool for VLSI design		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** EMBEDDED SYSTEM DESIGN (M18VL07)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			

1	Know the Basic Concept of Embedded Systems.		
2	Interpret the difference between Microcontrollers and Microprocessors.		
3	Apply the Software for Embedded System Design & concepts of Embedded OS.		
4	Explain and apply the concept of Embedded Firmware, RTOS Based Embedded System Design and Task function.		
5	Make significant contribution in the research in applications based on embedded system design.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** DEVICE MODELING (M18VL08)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the physics of and design elements of silicon MOSFETs.		
2	Explain the equations, approximations and techniques available for deriving a model with specified properties, for a general device characteristic with known qualitative theory		
3	Analyze the performance issues & inherent trade off involved in system design Offer clues to qualitative understanding of the physics of a new device and conversion of this understanding into equations.		
4	Utilize semiconductor models to analyze carrier densities and carrier transport & Simulate characteristics of a simple device using MATLAB, SPICE and SYNOPSYS		
5	Understand and analyze the inner working of semiconductor p-n diodes, Schottky barrier diodes and advanced MOSFET technology		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** ENGLISH FOR RESEARCH PAPER WRITING (M18AC01)	**L: 2 T: 0 P: 0 C: 0**
After the completion of this course, the students should be able to			
1	Understand the nuances of language and vocabulary in writing a Research Paper		
2	Develop the content, structure and format of writing a research paper		
3	Analyze and practice writing a Research Paper		
4	Enable the students to plan for original research papers without subjected to		

	plagiarism		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** RESEARCH METHODOLOGY (M18MC01)	**L: 2 T: 0 P: 0 C: 2**
After the completion of this course, the students should be able to			
1	Develop an understanding of IPR/ research methodology in the process of creation of patents through research		
2	Develop further research capabilities		
3	Design Important Concepts Related to Research Design		
4	Learn better report writing skills and Patenting		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HDL PROGRAMMING LABORATORY (M18VL09)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Apply the knowledge in Simulation and Synthesis of Digital Circuits.		
2	Design Various Combinational and Sequential circuits using Verilog HDL & HDL		
3	Explain the System Modeling with Tasks and Functions.		
4	Design of digital circuits using FPGA/CPLD boards.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital IC Design Laboratory (M18VL10)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Design CMOS inverters, logic circuits and transmission gates to specifications.		
2	Design latches and flip-flops asthe basic circuit for Random-Access- Memory (RAM) and Read-Only-Memory (ROM) cells.		
3	Understand the Design of Bi-CMOS Inverter, logic circuits.		
4	Design post Layout of Different logic circuits.		
Course	**Year / semester**	**Subject Name (Subject Code)**	**L: 3 T: 0 P: 0**

Outcome	**I/II Sem**	CMOS Mixed Signal Circuit Design (M18VL11)	**C: 3**
After the completion of this course, the students should be able to			
1	Build mixed signal circuits like DAC, ADC, PLL etc &Gain knowledge on filter design in mixed signal mode &To acquire knowledge on design different architectures in mixed signal mode.		
2	Analyze digital test and linear test engineers to the mixed signal world by teaching the basics of analog and mixed signal test methods. Sampling Theory, Frequency Domain Testing, and Digital Signal Processing		
3	Apply these fundamental concepts to different test methods and data validation for mixed signal parameters together with debugging, noise reduction and device interface techniques.		
4	Deal with the theory and design skills of CMOS op-amps, voltage reference circuits, switched capacitor circuits, sample-and- hold circuits, and A/D & D/A converters used in modern communication systems and consumer electronic products.		
5	Design of core mixed-signal IC blocks: comparators and data converters & System level design flow: top-down and bottom-up design methodologies		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** VLSI Design Verification and Testing (M18VL12)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on digital testing as applied to VLSI design &Acquire knowledge on testing of algorithms for digital circuits.		
2	Learn various testing methods for digital circuits & process of modern VLSI design, verification, and test.		
3	Develop and understanding for the advanced design concepts in modern VLSI technologies & Learn self-checking circuits where faults are detected by subcircuit called checker		
4	Gain the knowledge of testing and verification in VLSI design process, ATPG concepts for combinational and sequential circuits		
5	Specific techniques for designing high-speed, low-power, and easily-testable circuits		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Low Power VLSI Design (M18VL13)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			

1	Design Low power CMOS designs, for digital circuits & Gains knowledge on low power circuit design styles for VLSI circuits.		
2	Understand power estimation and optimization methods for VLSI circuits & causes of the power dissipation in digital ICs.		
3	Exploring the low power circuits and architectures for VLSI system.		
4	Understand the concept of VLSI circuit of low power operation & case study of low power design		
5	Design various circuits for optimize power		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Optimization Technique In VLSI Design (M18VL14)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on Optimization techniques involved in VLSI circuits.		
2	Analyze methods of optimization to engineering students, including linear programming, nonlinear programming, and heuristic methods		
3	Understand balance between theory, numerical computation, problem setup for solution by optimization software, and applications to engineering systems.		
4	Studies General optimization algorithm; necessary and sufficient conditions for optimality		
5	Demonstrate the Concept of Genetic Algorithms and Routing Procedures		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** High Speed VLSI Design (M18VL15)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on circuits and techniques involved in high speed VLSI circuits.		
2	Explore various design strategies to be followed for designing a high speed VLSI circuits.		
3	Understand the logic styles for designing a high speed VLSI circuit & Learn the basics of VLSI design for high speed processing		
4	Apply methods for logical efforts, logic styles, latching strategies, interface techniques and related issues.		
5	Acquire knowledge about High Speed VLSI Circuits Design & Learn the basics of VLSI design for high speed processing		
Course	**Year / semester**	**Subject Name (Subject Code)**	**L: 3 T: 0 P: 0 C: 3**

Outcome	**I/II Sem**	ASIC Design (M18VL16)	
After the completion of this course, the students should be able to			
1	To learn the fundamentals of ASIC and its design methods		
2	To gain knowledge on programmable architectures for ASICs & physical design of ASIC		
3	To prepare the student to be an entry level industrial standard cell ASIC or FPGA designer		
4	To give the student an understanding of issues and tools related to ASIC/FPGA design.		
5	Prepare the student for implementation, including timing, performance and power optimization, verification and manufacturing test		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** System On Chip Architecture (M18VL17)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn System on chip fundamentals, their applications		
2	Gain knowledge on SOC design & computation models of SOCs.		
3	Learn the basic concepts of NoC design by studying the topologies, router design and MPSoC styles & sample routing algorithms on a NoC with deadlock and livelock avoidance		
4	Understand the role of system-level design and performance metrics in choosing a NoC design		
5	Understand the relationship between semiconductor technology, computer architecture and computer networking in the design of the communication network for a MPSoC or a many-core design		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Semiconductor Memory Design & Testing (M18VL18)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the design of MOS memories and the various precautionary methods to be used in their design		
2	Learn overview of memory chip design, DRAM circuits, voltage generators,		

	performance analysis and design issues of ultra-low voltage memory circuits		
3	Acquire knowledge about High-Performance Subsystem Memories & Analyse RAM and DRAM Design		
4	Demonstrate Advanced Memory Technologies and High-density Memory Packing Technologies & Gains knowledge on various testing methods of semiconductor memories		
5	Get an overview on reliability of semiconductors and their testing		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Stress Management (M18AC02)	**L: 2 T: 0 P: 0 C: 0**
After the completion of this course, the students should be able to			
1	Enhance of Physical strength and flexibility.		
2	Learn to relax and focus.		
3	Relieve physical and mental tension		
4	Improve work performance/ efficiency.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Analog IC Design Laboratory (M18VL19)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Design Various Characteristics of MOS Logic		
2	Design Various Amplifier circuits using CMOS Logic		
3	Design Various circuits using Different Logic Styles		
4	Design Layout of Different logic circuits		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Mini Project (M18VL21)	**L: 2 T: 0 P: 0 C: 2**
After the completion of this course, the students should be able to			
1	Demonstrate a sound technical knowledge of their selected project topic.		
2	Identify and summarize an appropriate list of literature review, analyze previous researchers' work and relate them to current project.		

3	Present the project outlining the approach and expected results using good oral and written presentation skills.		
4	Apply critical and creative thinking in the design of engineering projects not only limited to electronics and communication engineering domain but if possible to other interdisciplinary domains as well.		
5	Design and develop a functional product prototype while working in a team		
6	Communicate with engineers and the community at large in written and oral forms.		
7	Consider the business context and commercial positioning of designed devices or systems		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Mixed Signal VLSI Laboratory (M18VL20)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Design Various Amplifier circuits using CMOS Logic		
2	Design Various Complex circuits using Different Logic Styles		
3	Design Layout of Different logic circuits		
4	Digital/analog circuits are to be designed and implemented using CAD tools.		
Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code)** High Speed VLSI Architectures for DSP Applications (M18VL22)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know about the graph representations of DSP algorithms, Convolution algorithms and the concept of parallel recursive and adaptive filters		
2	Analyze The graph representations of DSP algorithms, Convolution algorithms & concept of parallel recursive and adaptive filters		
3	Gain the idea of scaling and round off noise and about digital lattice filter structures		
4	Contribute the knowledge in the design of parallel recursive and adaptive filters		
5	Demonstrate variable description of digital filters and digital lattice filter structures		

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Course Outcome	**Year / semester**	**Subject Name (Subject Code)**	**L: 3 T: 0 P: 0 C:3**
	II/I Sem	Nano materials & Nano Technology (M18VL23)	
After the completion of this course, the students should be able to			
1	Understand the fundamental function of cells, and how nanotechnologies interact & Describe the various applications of nanotechnology in biotechnology & medicine.with cells.		
2	Explain the process of self-assembly – from single molecules into nanoparticles		
3	Describe and explain how nanoparticles are fabricated and characterized & principles of loading small molecule drugs, proteins or nucleic acids (DNA/RNA) into nanoparticles		
4	Describe and explain the scientific basis and medical benefits for using nanotechnology for treating diseases		
5	Demonstrate how nanotechnology-based innovation can drive better medicine and a stronger economy		
Course Outcome	**Year / semester**	**Subject Name (Subject Code)**	**L: 3 T: 0 P: 0 C: 3**
	II/I Sem	RF Circuit Design (M18VL24)	
After the completion of this course, the students should be able to			
1	Understand important and unique engineering issues at microwave and millimeter wave frequencies.		
2	Learn microwave network theory and the use of scattering matrix		
3	Learn design criteria for waveguide and coaxial microwave components.		
4	Learn the application of these components in the design of useful systems such as radars, receivers, etc.		
5	Work in small teams and design, fabricate and test a useful microwave component or device, which may be designed using microstripline technology.		
Course Outcome	**Year / semester**	**Subject Name (Subject Code)**	**L: 3 T: 0 P: 0 C: 3**
	II/I Sem	Soft Computing Techniques (M18CS12)	
After the completion of this course, the students should be able to			

1	Identify and describe soft computing techniques and their roles in building intelligent machines
2	Recognize the feasibility of applying a soft computing methodology for a particular problem
3	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems .
4	Apply genetic algorithms to combinatorial optimization problems & neural networks to pattern classification and regression problems
5	Effectively use existing software tools to solve real problems using a soft computing approach .

Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code)** Graph Theory & Optimization Techniques **(**M18MA02**)**	**L: 3 T: 0 P: 0 C: 3**

After the completion of this course, the students should be able to

1	Understand the concepts of probability & statics
2	Identify the strength and weakness of different theories
3	Design and employ appropriate method for solving computing problems
4	Analyze and compare the methods.
5	Solve computing problems independently.

Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code)** Waste Management(M18CE27)	**L: 3 T: 0 P: 0 C: 3**

After the completion of this course, the students should be able to

1	Acquire the knowledge of waste management
2	Explain solid waste disposal techniques
3	Acquire the knowledge of Bio medical waste disposal techniques
4	Acquire the knowledge of e- waste disposal techniques

5	Select the appropriate method for solid waste collection, transportation, redistribution and disposal		
Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code)** Dissertation Phase-I (M18VL25)	**L: 0 T: 0 P: 20 C:10**
After the completion of this course, the students should be able to			
1	Demonstrate a sound technical knowledge of their selected project topic.		
2	Identify and summarize an appropriate list of literature review, analyze previous researchers' work and relate them to current project.		
3	Formulate clearly a work plan and procedures.		
4	Present the project outlining the approach and expected results using good oral and written presentation skills.		
5	Undertake problem identification, formulation and solution.		
Course Outcome	**Year / semester II/II Sem**	**Subject Name (Subject Code)** Dissertation Phase-II (M18VL26)	**L: 0 T: 0 P: 32 C:16**
After the completion of this course, the students should be able to			
1	Apply critical and creative thinking in the design of engineering projects not only limited to electronics and communication engineering domain but if possible to other interdisciplinary domains as well.		
2	Demonstrate the knowledge, skills and attitudes of a professional engineer when working in a team		
3	Design and develop a functional product prototype while working in a team		
4	Communicate with engineers and the community at large in written and oral forms.		
5	Consider the business context and commercial positioning of designed devices or systems		

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcomes for M.Tech – Power Electronics (43) for the year 2015-16

Course Outcome	**Year/Semester I/I Sem**	**Subject Name (Subject Code)** Machine Modelling and Analysis(A943101)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Identify the methods and assumptions in modeling of machines.			
2	Recognize the different frames for modeling of AC machines.			
3	Illustrate the voltage and torque equations in state space form for different machines			
4	Develop the mathematical models of various DC machines and derive the transfer function of the DC motor.			
5	Study various transformations adopted in 3 phase machines and explore its starting methods			
6	Analyze the developed models in various reference frames through simulation study			
7	Assess the machine dynamics in various operating conditions			
8	Perform short circuits analysis with d-q model of machines.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Modern Control Theory (A943102)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Learn various terms of basic and modern control system for the real time analysis and design of control systems.			
2	Learn the basic mathematical preliminaries for modeling a control system			
3	Perform state variables analysis for any real time system			
4	Linearize the non-linear system model using various techniques			
5	Apply the concept of optimal control to any system.			
6	Examine a system for its stability, controllability and observability.			
7	Implement basic principles and techniques in designing linear control systems.			
8	Formulate and solve deterministic optimal control problems in terms of performance indices.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Electronic Devices and Circuits (A943103)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the characteristics and principle of operation of modern power electronics devices.			
2	Compare the features of various power electronic devices			
3	Comprehend the concepts of different power converters and their application			
4	Explore various driver circuits and its heat management system			
5	Study the effect of source and load inductance on the controller operation			
6	Analyse and design the switched mode regulator for various industrial application			
7	Explore various power factor improvement controllers			
8	Use power electronic simulation packages for analysing and designing power converters			
Course	**Year / semester**	**Subject Name (Subject Code)**	**L: 4 T: 0 P: 0**	**Credits: 4**

Outcome	**I/I Sem**	Special Machines (A943104)	**Total: 4**	
After the completion of this course, the students should be able to				
1	Learn the constructional features, principle of operation and methods of control of stepper motor.			
2	Realize the need for stepper motors and the various applications in industries.			
	Explore various hybrid stepping motor			
3	Get a clear picture of the operational characteristics and the applications of Switched Reluctance Motor.			
4	Know the various types of PMBLDC motors, rotor position sensors, methods of control and their applications			
5	Get a clear idea of the features, control and the applications of PMSM			
6	Explore the concept of linear induction motor and develop a double sided LIM from rotory induction motor			
7	Study the constructional details of permanent magnet axial flux machines (PMAF)			
8	Explore the applications of various special machines in day to day applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A943105)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the basic power handling capabilities of HVDC lines			
2	Explore various configurations and conversion principles of static power converters			
3	Learn the rectifier and inverter operations, commutation process at converter stations.			
4	Apply AC/DC filters for harmonic elimination in HVDC link			
5	Explore various controls adapted in HVDC converters			
6	Identify various instability problems in HV AC and DC system			
7	Study various over voltage problems in multi-terminal DC system			
8	Comprehend various converter faults and protection circuits .			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Programmable Logic Controllers and their Applications (A943106)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Gain Comprehensive knowledge of using advanced controllers in measurement and control instrumentation.			
2	Illustrate about data acquisition - process of collecting information from field instruments.			
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.			
4	Comprehend Programming in Ladder Logic, addressing of I/O.			
5	Apply PID and its Tuning.			
6	Develop ladder logic programming for simple process			
7	Execute , debug and test programs developed for digital and analog operations			
8	Reproduce block diagram representation on industrial applications using PLC			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Microcontrollers and Applications (A943107)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				

1	Relate the basic architecture and addressing modes of a microcontroller.			
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development			
3	Demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE			
4	Analyze a typical I/O interface and to discuss timing issues			
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.			
6	Translate Hardware applications using Microcontrollers.			
7	Gain working knowledge of ports and interrupts			
8	Introduce the need and use of interrupt structure, timers in respective applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A943108)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the basics of an embedded system			
2	Explore various issues in embedded software development and applications			
3	Learn the method of designing an embedded system for any type of applications			
4	Understand the operating systems concepts, types and choosing RTOS			
5	Design, implement and test an embedded system			
6	Understand types of memory and interacting to external world			
7	Learn embedded firmware design approaches			
8	Use ICE and software tools to address the issues in embedded systems			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital Control Systems (A943109)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Deduce the control system to block diagram for various analysis			
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.			
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.			
4	Know sampling and reconstruction, Z -transforms.			
5	Replace the conventional control system with Digital control system.			
6	Evaluate to Apply Z-plane analysis of discrete time control systems			
7	Apply state feedback controllers and observers			
8	Analyse the system stability using root locus , bode and Nyquist plots			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Optimization Techniques (A943110)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the need of optimisation in electrical engineering problems			
2	Learn the conventional or classical optimisation techniques			
3	Learn to formulate the problem with constrained and unconstrained cases			
4	Explore various modern intelligent optimisation techniques			
5	Apply these techniques to real world problems such as transportation problem, travelling salesman problem			
6	Study various limitations in these techniques			

7	Apply methods of sensitivity analysis and validate post processing results			
8	Explore various real time optimization problems.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital control systems (A943111)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Deduce the control system to block diagram for various analysis			
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.			
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.			
4	Know sampling and reconstruction, Z -transforms.			
5	Replace the conventional control system with Digital control system.			
6	Evaluate to Apply Z-plane analysis of discrete time control systems			
7	Apply state feedback controllers and observers			
8	Analyse the system stability using root locus , bode and Nyquist plots			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Renewable energy systems (A943112)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Explore various renewable energy sources to produce electrical energy			
2	Study the characteristics of PV cell- photo voltaic modules and its applications			
3	Learn the basics of wind energy conversion systems and bio-mass energy generation			
4	Explore various Wave energy conversion machines - Ocean Thermal Energy conversion schemes			
5	Know the need of hybrid energy systems such as geothermal and fuel cells			
6	Study the impact of various renewable energy sources on environment.			
7	Arrange storage energy and to avoid the environmental pollution			
8	Detect the environmental effects of energy conversion			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A943113)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the basic power handling capabilities of HVDC lines			
2	Explore various configurations and conversion principles of static power converters			
3	Learn the rectifier and inverter operations, commutation process at converter stations.			
4	Apply AC/DC filters for harmonic elimination in HVDC link			
5	Explore various controls adapted in HVDC converters			
6	Identify various instability problems in HV AC and DC system			
7	Study various over voltage problems in multi-terminal DC system			
8	Comprehend various converter faults and protection circuits .			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Analysis of Power Electronic Converters (A943114)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the characteristics and principle of operation of modern power semiconductor devices.			

2	Comprehend the concepts of different power converters and their applications			
3	Describe the importance of AC voltage controllers and cyclo-converters for various industrial applications			
4	Analyze and design switched mode power electronic converters for various industrial applications			
5	Analyze pulse width modulated inverters which are used in variable speed drives			
6	Choose appropriate device for a particular converter topology.			
7	Use power electronic simulation packages for analyzing and designing power converters.			
8	Choose appropriate power converter topologies and design the power stage and feedback controllers for various applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A943115)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the basics of an embedded system			
2	Explore various issues in embedded software development and applications			
3	Learn the method of designing an embedded system for any type of applications			
4	Understand the operating systems concepts, types and choosing RTOS			
5	Design, implement and test an embedded system			
6	Understand types of memory and interacting to external world			
7	Learn embedded firmware design approaches			
8	Use ICE and software tools to address the issues in embedded systems			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Converters Simulation Lab (A943116)	**L: 0 T: 0 P: 4 Total:4**	**Credits:4**
After the completion of this course, the students should be able to				
1	Able to simulate full converter circuits for various types of loading			
2	Acquire programming knowledge to study the systems dynamics in state space model			
3	Able to assess the frequency response of the system			
4	Analyse the system stability and PID controller application for steady state system operation.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Seminar-I (A943117)	**L: 0 T: 0 P: 4 Total:4**	**Credits:4**
Course Outcome	**Year/Semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Converters (A943201)	**L: 4 T: 0 P: 0 C: 4**	
After the completion of this course, the students should be able to				
1	Understand various advanced power electronics devices.			
2	Explore various advanced modulation techniques and its applications			
3	Describe the operation of multi-level inverters with switching strategies for high power applications.			
4	Comprehend the design of resonant converters and switched mode power supplies.			
5	Gain knowledge on various topologies converter circuits			
6	Develop and analyze various converter topologies.			
7	Design AC or DC switched mode power supplies.			
8	Explore various power conditioning devices			

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Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Control of DC Drives (A943202)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Learn basic preliminary requirements for operating DC drives		
2	Explore various rectifier fed DC drives		
3	Study the continuous and discontinuous modes of operation of single phase semi and full converter for DC drives		
4	Study the continuous and discontinuous modes of operation of three phase semi and full converter for DC drives		
5	Perform steady state analysis of three phase converter controlled DC motor drive		
6	Explore various current and speed controllers		
7	Perform steady state analysis of chopper controlled DC motor drive		
8	Simulate the dynamics of speed controlled DC motor drives		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Control of AC Drives (A943203)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Learn the speed torque characteristics variable voltage and variable frequency operation		
2	Study the operation of induction motor in constant torque and field weakening regions		
3	Understand the stator side controls employed for induction drives		
4	Employ speed and flux control in current fed inverter drive		
5	Evaluate the efficiency of the drive by applying optimization control		
6	Study the principles of vector control methods in rotor of induction drives		
7	Implement various speed control schemes in synchronous motor drives		
8	Study the characteristics and control of variable reluctance motor drive		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Quality (A943204)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Know the different terms and concepts of electric power quality in power systems.		
2	Learn about the applications of non-linear load.		
3	Identify and study the difference between system failures, outage and interruptions		
4	Predict various short and long interruptions		
5	Characterize and calculate the magnitude the single and three phases Voltage sag in the system		
6	Learn how to mitigate the power quality problems		
7	Learn about the application of FACTS device on DG side.		
8	Know the different characteristics of electric power quality in power systems.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Advanced Digital Signal Processing (A943205)	**L: 3 T: 0 P: 0 C:3**
After the completion of this course, the students should be able to			
1	Provide fundamental knowledge of analysing and processing of digital systems		
2	Study the relationship between continuous time and discrete time signals and systems		

3	Study the fundamentals of time , frequency and Z-Plane analysis and their interrelationships.		
4	Study and design digital filters form analysis to synthesis		
5	Explore few real world signal processing applications		
6	Get acquainted with FFT algorithms, multi-rate signal processing techniques.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Switched Mode Power Supplies (SMPS) (A943206)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply the basic concepts of power electronics for designing converters.		
2	Explore various design considerations.		
3	Explore various control circuits.		
4	Design and implement practical circuits for UPS, SMPS.		
5	Understand the effect of Electromagnetic interference (EMI).		
6	Understand the various protection aspects for the converters.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Flexible AC Transmission Systems (A943207)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the concepts and types of FACTS controllers		
2	Learn various converters employed for FACTS controllers		
3	Study the impact of FACTS devices in the power flow in the AC system		
4	Learn various shunt compensation using SVC and STATCOM		
5	Learn various series compensators such as TCSC, TSSC		
6	Explore the concept of UPFC and its application.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** High-Frequency Magnetic Components (A943208)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the fundamentals of magnetic devices		
2	Explore the properties of magnetic core materials		
3	Study the various effects that exists the round conductor carrying AC currents		
4	Evaluate the energy stored in coupled inductors of transformers		
5	Design of transformers for fly-back converters in CCM		
6	Design the integrated inductors and self capacitance for high frequency applications		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Dynamics of Electrical Machines (A943209)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Basics of machine theory of all types of machines		
2	Learn generalized modeling of all electrical machines		
3	Apply of Lagrange's equation solution of Electro dynamical equations.		
4	Understand the basic mathematical analysis of electrical machines and its characteristics.		
5	Understand behavior of electrical machines under steady state and transient state.		
6	Understand dynamic modeling of electrical machines		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Instrumentation & Control (A943210)	**L: 3 T: 0 P: 0 C: 3**

After the completion of this course, the students should be able to			
1	Survey various methods of power generation		
2	Understand the importance of instrumentation in power generation		
3	Explore various measuring and supervising systems involved in thermal power plant processes such as boiler and turbine units		
4	Understand various controls employed in boiler		
5	Explore the temperature and pressure controls in turbine		
6	Study the nuclear power plant instrumentation		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Intelligent Control (A943211)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the architecture of Intelligent control		
2	Learn the basic artificial neural network and its mathematical model		
3	Train and test the neural network with various configurations.		
4	Apply genetic algorithm for various optimisation problems		
5	Model and control different system with fuzzy logic controller		
6	Explore various power system problem and apply GA, NN and Fuzzy controller		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Smart grid technologies (A943212)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
2	Understand the advantages of DC distribution and developing technologies in distribution		
3	Discriminate the trade-off between economics and reliability of an electric power system.		
4	Differentiate various investment options (e.g. generation capacities, transmission, renewable, demand-side resources, etc) in electricity markets.		
5	Analyze the development of smart and intelligent domestic systems.		
6	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** AI Techniques in Electrical Engineering (A943213)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on soft computing techniques such as artificial neural networks, Fuzzy logic and genetic Algorithms.		
2	Learn the concepts of feed forward neural networks and feedback neural networks.		
3	Get the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy rules		
4	Acquire complete knowledge on genetic algorithm including three genetic operators		
5	Explore various power system problems which can utilize these AI techniques		
6	Assess system stability using AI techniques		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reliability Engineering (A943214)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			

1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Energy Auditing, Conservation & Management (A943215)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the necessity of conservation of energy		
2	Generalize the methods of energy management		
3	Illustrate the factors to increase the efficiency of electrical equipment		
4	Detect the benefits of carrying out energy audits.		
5	Analyze the power factor and to design a good illumination system		
6	Determine pay back periods for energy saving equipment.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Converters and Drives Lab (A943216)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Learn basic speed measurement and implement closed loop control in PMDC motor		
2	Experience the improved control of thyristor drive for PMDC motor over conventional control		
3	Learn to generate PWM signals using DSP		
4	Explore the inverter controls for solar PV systems		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Seminar-II (A943217)	**L: 0 T: 0 P: 4 C:2**
Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code)** Comprehensive Viva-Voce (A943301)	**L: 0 T: 0 P: 0 C:4**

COURSE OUTCOMES FOR B.TECH-CSE R20 FOR THE YEAR 2020-2021

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) LINEAR ALGEBRA AND CALCULUS (B20MA01)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
1	Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.			
2	Determine Eigen values, Eigenvectors of matrices.			
3	Analyse the nature of sequence and series to identify the convergence.			
4	Evaluate limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions.			
5	Calculate Partial derivatives, extreme of functions of multiple variables.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** MODERN PHYSICS (B20PH01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Understands the basic concepts and hypothesis of quantum mechanics			
2	Describes the characteristics and working of lasers and their use in various fields.			
3	Analyze and apply the concepts of wave optics for accurate determination of theinterference in thin films, Newton's rings and the diffraction in single slit etc.			
4	Classify the materials on the basis of energy band gap, and evaluates the carrierconcentration of given semiconductors for device applications			
5	Apply the concepts of the light propagation in optical fibres in opticalcommunication systems			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL AND ELECTRONICS ENGINEERING(B20EE01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electricalpower.			
2	Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance andPower Factor			
3	Learn the working principle of DC motors, Transformers			
4	Study the characteristics of PN Junction diode and zener diode			
5	Learn the basic of Amplifiers and Rectifiers.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING(B20CS01)	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understanding how problems are posed and how they can be analyzed for obtainingsolutions.			
2	Learning of sequencing, branching, looping and decision making statements tosolve scientific and engineering problems.			
3	Implementing different operations on arrays and creating and using of functionsto solve problems			
4	Understanding and exploring the various methods of memory allocations.			
5	Ability to design and implement different types of file structures using standardmethodology.			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) ENGINEERING DRAWING (B20ME01)	No. of Hours L:0 T:0 P:4	Credits: 2
After the completion of this course, the students should be able to				
1	Understand various commands, modify the applications and object properties in AUTOCAD			
2	Analyse the Projections of Points and solids			
3	Estimate the use of drawings, dimensioning, scales and conic sections			
4	Compare the Conversion of Isometric views to Orthographic view			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) PHYSICS LAB (B20PH05)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Estimate the frequency of tuning for and AC supply with the help of stretched strings			
2	Analyze as well as compare the intensity distribution of interference and diffraction patterns			
3	Draw the characteristics of electrical and electronic circuits and evaluate the dependent parameter			
4	Explore and understand the applications of semiconducting devices			
5	Evaluates the wavelength and radius of curvature of Plano convex lens by Newton's rings			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) PROGRAMMING FOR PROBLEM SOLVING LAB(B20CS02)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Understand basic structure of the C Programming, data types, declaration and usage ofvariables, control structures and all related concepts.			
2	Ability to understand any algorithm and Write the C programming code in executable form			
3	Implement Programs using functions, pointers and arrays, and use the pre-processors to solvereal time problems			
4	Ability to use file structures and implement programs on files.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS(B20MA02)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Apply the fundamental concepts of ordinary differential equations to real time problems			
2	Find the complete solution of a non homogeneous differential equations and applying its concepts inEngineering problems			
3	Evaluate the multiple integrals in various coordinate systems.			
4	Apply the concepts of gradient, divergence and curl to formulate Engineering problem			
5	Analyse line, surface and volume integrals using fundamental theorems.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) MODERN CHEMISTRY (B20CH04)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	The knowledge of electro chemical cells, different batteries			
2	The knowledge of principles and concepts in corrosion & it's control methods.			
3	The knowledge of Water treatment.			
4	The knowledge of Amino acids, Proteins and Nucleic acids			
5	The knowledge of principles and concepts in Forensic drug chemistry and it's analysis.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) DATA STRUCTURES AND ALGORITHMS(B20CS04)	No. of Hours L:4 T:0 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Define the basic techniques of algorithm analysis			
2	Examine the linear and non linear data structures.			
3	Develop Priority Queues and Balanced Trees			
4	Understand Hashing Techniques and Graph applications			
5	Apply suitable algorithms for sorting Technique			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) PYTHON PROGRAMMING(B20CS03)	No. of Hours L:4 T:0 P:0	Credits:4
After the completion of this course, the students should be able to				
1	Defining the fundamentals of writing Python scripts.			
2	Expressing the Core Python scripting elements such as variables and flow control structures.			
3	Apply Python functions to facilitate code reuse.			
4	Extending how to work with lists and sequence data.			
5	Implement file operations such as read and write and Adapting the code robust byhandling errors and exceptions properly.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) DATA STRUCTURES AND ALGORITHMS LAB(B20CS08)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Explaining the linear data structures such as List, Stack, Queue and its applications			
2	Implement non-linear data structure such as Trees, Graphs and its applications			
3	Apply suitable algorithms for sorting Techniques			
4	Choose appropriate algorithm for Searching and Hashing			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) PYTHON PROGRAMMING LAB(B20CS07)	No. of Hours L:0 T:0 P:3	Credits:1 .5
After the completion of this course, the students should be able to				
1	Expressing the Core Python scripting elements such as variables and flow control structures.			
2	Apply Python functions to facilitate code reuse			
3	Extending how to work with lists and sequence data.			
4	Implement file operations such as read and write and Adapting the code robust byhandling errors and exceptions properly.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENGLISH LANGUAGE AND INTERACTIVE COMMUNICATION SKILLS LAB(B20EN02)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Understand the nuances of English language through audio-visual experience and groupactivities.			
2	Speak with clarity and confidence which in turn enhances their employability skills.			
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation.			
4	Involve the students in speaking activities in various contexts.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENGINEERING & IT WORKSHOP LAB(B20ME03)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Know the fundamental knowledge of House wiring and soldering and their usage in real time Applications.			
2	Gain knowledge on electronic components and measuring instruments.			
3	Use basic concepts of computer hardware for assembly and disassembly.			
4	Use Microsoft tools for exercise.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DESIGN AND ANALYSIS OF ALGORITHMS(B20CS10)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Expose student's to few known methods of solution processes, build new solution algorithms, analyze the asymptotic performance of algorithms and to write rigorous correctness proofs for algorithms.			
2	Identify appropriate data structures and algorithm design methods for specified classes of applications;			
3	Perceive how the choice of data structures and algorithm design methods would impact the performance of programs and how to compare them.			
4	Design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound			
5	Perceive methods to deal with logarithmic type, polynomial type and non-polynomial type of classesof problems and Synthesis of efficient algorithms in common engineering design situations would bediscussed			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DIGITAL LOGIC DESIGN & MICRO PROCESSORS(B20EC09)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the basic concepts of different Number systems and basic theorems using inBoolean algebra.			
2	Design the logic circuits using basic logic gates by reducing the Boolean expressions with thehelp of Karnaugh Map.			
3	Analyze various types of combinational and sequential circuits.			
4	Analyze various types of sequential circuits.			
5	Understand the internal organization of popular8086 microprocessors			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE(B20CS11)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Evaluate the notions of propositions, predicate formulae, Rules of inference.			
2	Illustrate and describe various types of Relations and Functions.			
3	Apply knowledge of Mathematics, Combinations & Permutations, Binomial Multinomial theorems, Pigeon hole principles			
4	Develop to solve the recurrence relations by using various methods			
5	Perceive the basic concepts of graph theory and apply for real time examples.			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) JAVA PROGRAMMING (B20CS12)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Understand the use of OOP concepts and solve real world problems using OOP techniques.			
2	Solve the inter-disciplinary applications using the concept of inheritance.			
3	Develop robust and faster applications by applying different exception handling mechanisms.			
4	Understand the multithreading concepts and develop efficient applications.			
5	Design GUI based applications and develops applets for web applications.			
Course Outcome	Year / semester III Sem	Subject Name (Subject Code) ENGLISH FOR EFFECTIVE COMMUNICATIONS(B20EN01)	No. of Hours L:2 T:0 P:0	Credits: 2
After the completion of this course, the students should be able to				
1	Skim and scan the digital text to summarize it for future reference.			
2	Read the text to make notes according to their needs.			
3	Use English language effectively in spoken and written forms.			
4	Communicate confidently in various contexts and different cultures			
5	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.			
Course Outcome	Year/semester III Sem	Subject Name (Subject Code) DIGITAL LOGIC DESIGN & MICRO PROCESSORS LAB(B20EC10)	No. of Hours L:0 T:0 P:3	Credits:1 .5
After the completion of this course, the students should be able to				
1	Demonstrate various types of logic gates (AND, OR, NOT, NAND, NOR, XOR,XNOR) and flip flops.			
2	Analyze and design various types of combinational and sequential circuits.			
3	Develop microprocessor based programs for Arithmetic and Logical Operations			
4	Develop microprocessor based programs for various problems.			
Course Outcome	Year / semester III Sem	Subject Name (Subject Code) DESIGN AND ANALYSIS OF ALGORITHMS LAB(B20CS13)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Ability to choose appropriate algorithm design techniques for solving problems.			
2	Design an algorithm in an effective manner			
3	Design and apply iterative and recursive algorithms			
4	Ability to analyze the performance of algorithms.			
Course Outcome	Year / semester III Sem	Subject Name (Subject Code) JAVA PROGRAMMING LAB(B20CS14)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Use the Java SDK environment to create, debug and run simple Java programs.			
2	Write Java programs to implement error handling techniques using exception handling			
3	Develop multithreaded applications with synchronization.			
4	Design simple Graphical User Interface applications and event driven programming.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) OPERATING SYSTEMS (B20CS16)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Compare various Operating Systems architectures, IO structures, Network Structure			
2	Analyze the virtual memory, paging and memory allocation techniques for variousapplications			
3	Apply Deadlock prevention and Deadlock Detection algorithms and perceive the working of an operating system as a File manager, I/O manager, Process manager.			
4	Understand the overview of Disk Storage Structure.			
5	Analyze assess access controls to protect files.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) FORMAL LANGUAGES AND AUTOMATA THEORY(B20CS17)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Explain basic concepts in formal language theory, grammars, automata theory(DFA&NFA), computability theory, and complexity theory.			
2	Know the production rules of regular expressions and grammars, including context:free and context: sensitive grammar			
3	Construct a pushdown automata and context free, regular, normal form grammars todesign computer languages			
4	Evaluate solution for various problems using a theoretical computer (Turing machine)for a computer language			
5	Explain the relationship among language classes and grammars with the help of Chomsky Hierarchy, and Distinguish between decidability and undecidability.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) COMPUTER ORGANIZATION & ARCHITECTURE(B20CS18)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the structure, function of various functional units of computer.			
2	Understand the basic design of Computer, and its organization			
3	Perceive control unit operations and Micro Program example.			
4	Understand different computer arithmetic algorithms for various arithmetic operation			
5	Identity and compare different methods of input-output.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS(B20CS19)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Perceive the fundamental concepts of database management.			
2	Analyze database models & Entity Relationship models and to draw the E-R diagram forthe given case study.			
3	Apply relational Database Theory, and be able to write relational algebra expressions forqueries			
4	Apply Normalization Process to construct the database and explain Basic Issues ofTransaction processing			
5	Compare the basic Database storage structures and access techniques: File Organizationindexing methods including B- Tree and Hashing			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) PROBABILITY AND STATISTICS(B20MA07)	No. of Hours L:3 T:0 P:3	Credits:3
After the completion of this course, the students should be able to				
1	Use probability theory and deals with modeling uncertainty in order to evaluateThe probability of real world events.			
2	Develop discrete probability distributions and its applications, and use the techniques togenerate data from Binomial and Poisson Distributions.			
3	Use the techniques of continuous probability distributions to generate data from Normal Distributions.			
4	Perform correlation and regression analysis, in order to estimate the nature and thestrength of the linear relationship between two variables.			
5	Construct confidence interval to estimates population parameters to test the hypothesis.			
Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) OPERATING SYSTEMS LAB(B20CS20)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Apply CPU scheduling algorithms, Page replacement algorithms.			
2	Explain Bankers Algorithm for Dead Lock Avoidance & Dead Lock Prevention			
3	Describe the concepts of paging and segmentation.			
4	Make use of Linux commands			
Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS LAB(B20CS21)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Design database schema for given Application.			
2	Transform ER Model to Relational Model.			
3	Apply the normalization techniques for development of application software to realisticproblems.			
4	Construct SQL queries to retrieve information from database			
Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) WEB TECHNOLOGIES LAB(B20CS22)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's			
2	Understand, analyze and apply the role of languages like HTML, CSS, XML, JavaScript, PHPand protocols in the workings of the web and web applications			
3	Create dynamic web pages using JavaScript			
4	Build web applications using PHP			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) SOFTWARE ENGINEERING(B20CS29)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Define Software Engineering and list core principles of software engineering and understand various process models			
2	Develop an understanding of software requirements and be able to prepare SRS document.			
3	Understand software design engineering process using structural and object oriented approaches and be able to model			
4	Differentiate the techniques of verification and validation in the process of softwaredevelopment, Apply the testing strategies on different level of implementation (unit,integration,…)			
5	Understand and able to compute quality measures and develop a software quality assurance plan for a software development.			

Course Outcome	Year / semester V Sem	Subject Name (Subject Code) DATA COMMUNICATIONS AND COMPUTER NETWORKS(B20CS30)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Illustrate basic computer network technology, functions of each layer in the OSI and TCP/IP reference model.			
2	Gain the knowledge on error control and flow control mechanisms.			
3	Obtain the skills of subnetting and routing mechanisms.			
4	Analyze the features and Operations of TCP/UDP, congestion control and QoS Techniques.			
5	Familiarity with the essential protocols of application layer, and how they can be used in network design and implementation.			
Course Outcome	**Year / semester V Sem**	**Subject Name (Subject Code)** DATA WAREHOUSING AND DATA MINING(B20CS24)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Develop an understanding of data warehouse, designing and using data in data warehouse using various operations.			
2	Introduce data mining concepts and develops understanding of data mining application.			
3	Develop an outlook of Association rule mining, association rule mining methods and their application on some sample data sets, evaluate these methods based on need.			
4	Develop an understanding of classification and prediction, classification methods and their application on some sample data sets, evaluate these methods based on need			
5	Develop conceptual understanding of clustering, various clustering methods and their application on some sample data sets, evaluate these methods based on need.			
Course Outcome	**Year / semester VSem**	**Subject Name (Subject Code)** ARTIFICIAL INTELLIGENCE (B20AI03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Possess the ability to formulate an efficient problem space for a problem expressed in English.			
2	Possess the ability to select a search algorithm for a problem.			
3	Possess the skill for representing knowledge using the appropriate technique			
4	Possess the ability to apply AI techniques to solve problems of Game Playing.			
5	Possess the Expert Systems, Machine Learning and Natural Language Processing			
Course Outcome	**Year / semester VSem**	**Subject Name (Subject Code)** COMPILER DESIGN(B20CS31) (PROFESSIONAL ELECTIVE-I)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Apply the knowledge of modern phases of compiler and its features.			
2	Identify the similarities and differences among varies parsing techniques.			
3	Explain semantic analysis in the context of the compilation process.			
4	Design a symbol table format for the language defined by a grammar			
5	Analyze the code generation algorithm			
Course Outcome	**Year / semester V Sem**	**Subject Name (Subject Code)** PRINCIPLES OF PROGRAMMING LANGUAGES (B20CS32) (PROFESSIONAL ELECTIVE-I)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Able to analyze syntax-related concepts including context-free grammars, parse trees, semantic issues associated with function implementations.			
2	Summarize the design issues of various reference types and its implementation related to these types.			
3	Able to understand the concepts of Abstraction and Encapsulation constructs of classes, interfaces, packages of various Language Examples.			
4	Ability to understand the nature and implementation of object-oriented languages.			
5	Able to Compare the Functional Programming Languages and Logic Programming Languages.			

Course Outcome	Year / semester V Sem	Subject Name (Subject Code) NETWORK PROGRAMMING (B20CS33) (PROFESSIONAL ELECTIVE-I)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Demonstrate advanced knowledge of OSI layers, TCP & UDP concepts			
2	Networking. Summarize the TCP socket functions and Byte Ordering.			
3	Make use of TCP client server applications and analyze I/O Multiplexing and socket options.			
4	Define about the Elementary UDP sockets and Address conversions.			
5	Explain DNS, other networking information, Pseudo -Terminals, Terminal modes, Control Terminals.			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) DATA COMMUNICATIONS AND COMPUTER NETWORKS LAB(B20CS34)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Implement data link layer farming methods.			
2	Analyze error detection and error correction codes.			
3	Implement and analyze routing and congestion issues in network design.			
4	Implement Encoding and Decoding techniques used in presentation layer.			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) ARTIFICIAL INTELLIGENCE LAB (B20AI04)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Demonstrate Knowledge of the building blocks of AI as presented in terms of intelligent agents.			
2	Analyze and formalize the problem as a state space, graph and design heuristics			
3	Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systemsfor game playing.			
4	Attain the capability to represent various real life problem domains using logicbased techniques anduse this to perform inference or planning.			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) INDIAN CONSTITUTION(B20MC03)	No. of Hours L:2 T:0 P:0	Credits:0
After the completion of this course, the students should be able to				
1	Demonstrate the fundamental rights and duties of a citizen			
2	Classify the administrative structure of the Indian union			
3	Identify the power of state government and make use of positions			
4	Categorize the various department and local administrations responsibilities			
5	Functions of election commission and its roles			
Course Outcome	Year / semester VSem	Subject Name (Subject Code) MACHINE LEARNING (B20AI06)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course the students should be able to :				
1	Explain the theory underlying machine learning			
2	Learn beyond binary classification.			
3	Recognize and implement various genetic algorithms.			
4	Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models.			
5	Able to analyze the data using R Programming			

Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) CLOUD COMPUTING (B20CS36)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Ability to understand various service delivery models of a cloud computing architecture.			
2	Ability to understand the ways in which the cloud can be programmed and deployed			
3	Understanding Cloud Computing Architecture and Management			
4	Understanding cloud service Models			
5	Understanding cloud service providers.			
Course Outcome	**Year / semester VI Sem**	**Subject Name (Subject Code)** INTERNET OF THINGS(B20CS37)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Interpret the vision of IoT from global context.			
2	Perceive building blocks of Internet of Things and its characteristics.			
3	Learn the basic concepts of Python. Implement the python programming using Raspberry.			
4	Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud &Sensor Networks			
5	Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.			
Course Outcome	**Year / semester VI Sem**	**Subject Name (Subject Code)** SOFTWARE PROJECT MANAGEMENT (PROFESSIONAL ELECTIVE-II) (B20CS38)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Gain knowledge of software economics, phases in the life cycle of software development, project organization, and project control and process instrumentation.			
2	Summarize software economics, software development life cycle, artifacts of the process, workflows, checkpoints, project organization and responsibilities, project control and process instrumentation			
3	Choose the right software development approach. Compare various project organizations and responsibilities.			
4	Analyze the major and minor milestones, artifacts and metrics for management and technical perspective.			
5	Design software product using conventional and modern principles of software project management.			
Course Outcome	**Year / semester VI Sem**	**Subject Name (Subject Code)** NETWORK SECURITY AND CRYPTOGRAPHY (B20CS39) (PROFESSIONAL ELECTIVE-II)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Identifies various types of vulnerabilities, attacks, mechanisms and security services.			
2	Compare and contrast symmetric and asymmetric encryption algorithms.			
3	Implementation of message authentication, hashing algorithms and able to understand kerberos.			
4	Explore the attacks and controls associated with IP, transport level, web and E-mail security.			
5	Develop intrusion detection system, solutions for wireless networks and designing of varioustypes of firewalls.			

Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) WEB SERVICES (B20CS40) (PROFESSIONAL ELECTIVE-II)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Implement Web service client and server with interoperable systems like core distributed computing,J2EE, SOA, WSDL, UDDI and EBXML			
2	Perceive and analyze the principles of SOAP.			
3	Perceive the implement Web Services life cycle, Anatomy ofWSDL definition document.			
4	How to utilize the semantics of web services. Working with UDDI, programming with UDDI, UDDIdata structures			
5	Explore interoperability between different frameworks. Design web based applications that use webservices			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) MACHINE LEARNING LAB (B20AI08)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Discuss different application on Machine Learning problems.			
2	Describe various algorithms on Machine Learning mentioning its strengths andweaknesses.			
3	Improve the performance of Machine Learning algorithms with different parameters			
4	Understand the latest issues raised by current researchers.			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) CLOUD COMPUTING LAB(B20CS41)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Analyze Cloud Computing fundamentals, technologies, applications and implementation of virtualization with Oracle VM Virtual box.			
2	Development knowledge of cloud computing using Amazon Web Services like Compute, Storage and Networking.			
3	Providing Security to the Cloud System using Identity Access Management**(IAM).**			
4	Attain the Capability of design, development of agile and highly available systems usingAmazon Web Services.			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) INTERNET OF THINGS LAB(B20CS42)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Improve the quality of life of humans through IoT technology for that student closer interaction between the experiment and the society.			
2	Identify the Components that forms part of IoT specific Application.			
3	Determine the most appropriate IoT Devices and Sensors based on IoT application.			
4	Improve the Python programming skills for writing IoT Application			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) LOGICAL REASONING AND QUANTITATIVE APTITUDE(B20MC05)	No. of Hours L:2 T:0 P:0	Credits:0
After the completion of this course, the students should be able to				
1	Apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.			
2	Apply quantitative correctly arrive at meaningful conclusions regarding their answers and manipulate equations and formulas in order to solve for the desired variable			
3	Interpret given information correctly, determine which mathematical model best describes the data,and apply the model correctly.			
4	Correctly apply mathematical language and notation to explain the reasoning underlying their conclusions when solving problems using mathematical or statistical techniques.			
5	Improve their mathematical skills in various general aspects to solve real time problems.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) DEEP LEARNING(B20AI10)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the basics of Artificial Neural Networks.			
2	Describe the various Learning Networks and Special Networks.			
3	Understand the Deep Neural Network.			
4	Develop different parameters for Regularization for Deep Learning.			
5	Design Optimized for training Deep Models			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS(B20MB01)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the nature, scope and importance of Managerial Economics.			
2	Know what demand is, analyze demand and how elasticity of demand is used for pricingdecisions and to evaluate methods for forecasting demand.			
3	Know how production function is carried out to achieve least cost combination of Inputsand how to analyze cost.			
4	Understand the characteristics of different kinds of markets and outline different form ofbusiness organization and analyze how capital budgeting techniques are used for investment decisions.			
5	Know how to prepare final accounts and how to interpret them, analyze and interpretfinancial statements using ratio analysis.			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) SOFTWARE TESTING(B20CS44) (PROFESSIONAL ELECTIVE – III)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Design test cases suitable for a software development for different domains.			
2	Prepare test planning based on the document.			
3	Identify suitable tests to be carried out.			
4	Validate test plan and test cases designed.			
5	Use of automatic testing tools.			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) SOFTWARE ORIENTED ARCHITECTURE (PROFESSIONAL ELECTIVE – III) (B20CS45)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Design various service layers			
2	Model service candidate derived from existing business documentation.			
3	Design the composition of SOA.			
4	Design application services for technology abstraction.			
5	Principles of Service-Orientation.			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) SCRIPTING LANGUAGES (B20CS46) (PROFESSIONAL ELECTIVE – III)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Perceive of scripting and the contributions of scripting languages.			
2	Develop simple scripts to automate system administration.			
3	Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.			
4	Acquire programming skills in scripting language			
5	Develop simple applications by various tools and expose to create advanced applications on web applications.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) BUSINESS INTELLIGENCE & BIG DATA (PROFESSIONAL ELECTIVE – IV) (B20CS47)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Explain the foundations, definitions and capabilities of Bigdata.			
2	List the definitions, concepts, architectures and challenges in Big data environment. Outline the definitions, concepts, and enabling technologies of big data analytics.			
3	Understand concepts on Handoop Ecosystem in Big data.			
4	Analyze the Map reduce programming in Big data Analytics.			
5	Apply Security big data technologies in business intelligence using geospatialλ data, location-based analytics, social networking, Web 2.0, reality mining, and cloud computing.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) REINFORCEMENT LEARNING (B20AI15) (PROFESSIONAL ELECTIVE – IV)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the key features of Reinforcement Learning.			
2	Apply the different algorithms and define the policy.			
3	Analyze multiple criteria for analyzing RL algorithms and evaluate algorithms on these metrics.			
4	Evaluate the eligibility traces, Eligibility traces used for sampling.			
5	Create Function Approximation Methods.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) CYBER SECURITY & ETHICAL HACKING (B20CS48) (PROFESSIONAL ELECTIVE – IV)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Outline key terms and concepts in cyber law, intellectual property and cybercrimes.			
2	Explore the vulnerabilities, threats and cybercrimes posed by criminals.			
3	Identify various security challenges phased by mobile devices.			
4	Identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection			
5	Analyze the cyber security risk management policies in order to adequately protect an organization's critical information and assets.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) MINI PROJECT & INTERNSHIP (B20CS49)	No. of Hours L:0 T:0 P:0	Credits:2
1	Enhance students' knowledge in current technology			
2	Develop leadership ability and responsibility to execute the given task			
3	Enhance their employability skills along with real corporate exposure			
4	Elaborate the completed task and compile the report.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) DEEP LEARNING LAB (B20AI13)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Understand the basics of Artificial Neural Networks.			
2	Describe the various Learning Networks and Special Networks			
3	Understand the Deep Neural Network.			
4	Develop different parameters for Regularization for Deep Learning.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) MAJOR PROJECT PHASE-I (B20CS50)	No. of Hours L:0 T:0 P:8	Credits:4
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) HUMAN VALUES AND PROFESSIONAL ETHICS(B20MC05)	No. of Hours L:2 T:0 P:0	Credits:0
After the completion of this course, the students should be able to				
1	Perceive the importance of ethics and values in life and society.			
2	Develop moral responsibility and mould them as best professionals.			
3	Create ethical vision and achieve harmony in life.			
4	Provide a critical perspective on the socialization of men and women			
5	Perceive the important issues related to gender in contemporary India			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) DESIGN PATTERNS (B20CS51) (PROFESSIONAL ELECTIVE – V)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Identify the appropriate design patterns to solve object oriented design problems.			
2	Identify and implement appropriate solutions to recurring programming problems by consulting technical documentation and specifications, including design pattern catalogs and existing source code.			
3	Understand basic elements of structural patterns and their implementation.			
4	Understand basic elements of creational patterns and their implementations.			
5	Understand basic elements of behavioral patterns and their implementation along with growth in the field of using design patterns			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) BLOCK CHAIN TECHNOLOGIES (B20CS52) (PROFESSIONAL ELECTIVE – V)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Introduce the fundamentals of blockchain, history, technology and decentralization.			
2	Revise cryptographic concepts and its use in blockchain.			
3	Define bitcoin and understand structure of blockchain, alternatives to proof of work.			
4	Introduce smart contracts, solidity and Web3 to implement blockchain			
5	Understand applications of blockchain and its challenges			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) PRINCIPLES OF ROBOTICS(B20AI24) (PROFESSIONAL ELECTIVE – V)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand Robotic Process Automation & Bot Creation.			
2	Apply methods for Bots Upload and Credentials.			
3	Analyze devices to Develop and Runtime Clients and Device Pools.			
4	Develop Bot creator using XML commands.			
5	Create work flow designer			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) COMPUTER VISION (B20AI26) (PROFESSIONAL ELECTIVE – VI)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Elaborate development of algorithms and techniques.			
2	Analyze and interpret the visible world around us with real time problems.			
3	Apply the fundamental concepts on multi-dimensional signal processing, feature extraction, pattern analysis visual geometric modeling, stochastic optimization etc.			
4	Take part to makeup and contribute in research developments in the field of computer vision.			
5	Explain different applications ranging from Biometrics, Medical diagnosis, document processing, mining of visual content, to surveillance, advanced rendering etc.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) DATA PRIVACY & SECURITY(B20DS21) (PROFESSIONAL ELECTIVE – VI)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understands various types of Substitution ciphers.			
2	Explore various techniques to break the ciphers and understands transposition techniques.			
3	Compare and contrast block cipher and stream cipher algorithms			
4	Implementation of asymmetric key cryptographic algorithms and understand key management in public key cryptography.			
5	Explore different types of steganography techniques to hide the data in text and images.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) NATURAL LANGUAGE PROCESSING (PROFESSIONAL ELECTIVE – VI) (B20AI19)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.			
2	Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems			
3	Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.			
4	Able to design, implement, and analyze NLP algorithms			
5	Able to design different language modelling Techniques.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) TECHNICAL SEMINAR(B20CS53)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Identify recent technical topics from interested domains.			
2	Analyze the applicability of modern tools and technology.			
3	Discuss and justify the technical aspects of the chosen topic in a systematic approach			
4	Develop Presentation and Communication skills.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) MAJOR PROJECT PHASE-II(B20CS54)	No. of Hours L:0 T:0P:16	Credits:8
After the completion of this course, the students should be able to				
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

Vaagdevi College of Engineering-Autonomous
Bollikunta, Warangal-506005
Department Of MBA
MBA R20 COURSE OUTCOMES

I/I SEM				
Course out come	**Year/ semester: I/I Sem.**	**Subject name code: Business Environment (M20MB01)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Explains the concept of BE and different techniques of environmental scanning process.			
2	Describes economic systems, GATT, WTO, Fiscal and monitory policies			
3	Emphasizes on Industrial Policy and regulatory structure			
4	Explains socio political environment.			
5	Interprets India trade policy, EXIM Policies and FEMA.			
Course out come	**Year/ Semester: I/I Sem**	**Subject name code: Managerial Economics (M20MB02)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	solve problems faced by the business organization			
2	apply the tools and techniques in real business situations.			
3	determine the production factors and returns			
4	Analyse 31 the different costs			
5	formulate different pricing strategies and profit policies			
Course out come	**Year/ semester: I/I Sem.**	**Subject name code: Management and Organization Behaviour (M20MB03)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Show the significance of fundamentals of Management and its contributions.			
2	Outline the planning process and types of plans in dynamic environment, develop the decision making styles in various situations in organization.			
3	Demonstrate the organization structures with its merits and demerits, Contrast between authority, power and influence, Asses the significance of controlling in an organization.			
4	Examine individual and group behavior in an organization using personality theories			
5	Identify how managers apply different leadership styles and motivation theories in an organization.			
Course out come	**Year/ semester: I/I Sem.**	**Subject name code: Accounting for Management (M20MB04)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Explain the importance of Accounting.			
2	Explain Accounting cycle in preparing financial statements of the company.			

3	Plan the process of issue of shares and debentures for raising capital by the company.			
4	Analyze and interpret financial position of the company using ratio analysis, Vertical and Horizontal analysis.			
5	Make use of funds flow statements in the company.			
Course out come	**Year/semester: I/I Sem.**	**Subject name code: Statistics for Management (M20MB05)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Explain the role of statistics and statistical techniques in management decision making and choose appropriate measures of central tendency and dispersion.			
2	Define correlation and also measure the degree of correlation between variables and estimate the relationship between independent and dependent variables using regression lines.			
3	Distinguish between parametric and non-parametric test.			
4	Classify Null- hypothesis and alternative Hypothesis, hypothesis testing for making decisions using student's t test.			
5	Categorize one-way and two-way classification of ANOVA and examine goodness of fit by using Chi-square test.			
Course out come	**Year/ semester: I/I sem**	**Subject name code: Business Communication (M20MB06)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Explain the importance of written communication skills appropriate for business situations.			
2	Demonstrate the student effectively deliver on oral presentations.			
3	Examine the students report writing skills and develop the positive writing skills.			
4	Identify the barriers of communication			
5	Minimize the student negative attitudes towards the verbal and nonverbal communication			
Course out come	**Year/ semester: I/I sem**	**Subject name code: Information Technology Lab (M20MB07)**	**No. of Hours L:0 T:0 P:3**	**Credits:3**
On successful completion of this course, student should be able to:				
1	To create awareness about MS-word, creation of document and mail merge.			
2	To construct the spreadsheets and data analysis with statistical tools.			
3	Create and manage Database & data mining.			
4	List out the procedure of mail merge and build the presentation graphics through power point creation			
I/II Sem				
Course out come	**Year/ semester: I/II Sem.**	**Subject name code: Marketing Management (M20MB08)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Outline the role and functions of marketing.			
2	Identify and demonstrate the nature of marketing environment.			

3	Explain the Market research project/process.			
4	Make use of PLC for framing marketing strategies and appraise the importance of promotion mix.			
5	Utilize the different pricing strategies for profit maximization.			
Course out come	**Year/ semester: I/II Sem.**	**Subject name code: Human Resource Management (M20MB09)**	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
On successful completion of this course, student should be able to:				
1	Define the basic concepts of HRM, Its model.			
2	Demonstrate HRP process and Job Analysis.			
3	Illustrate the techniques and tools for training and Development, performance appraisal.			
4	Infer Industrial Relations System Grievance redressal mechanism and dispute settlements.			
5	Recommend and appraise the contemporary issues related to HR practices in Global perspective.			
Course out come	**Year/ semester: I/II sem**	**Subject name code: Financial Management (M20MB10)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Identify the importance of profit maximization and wealth maximization			
2	Apply different techniques for investment decision process and measuring the cost of capital			
3	Analyze the capital structure theories			
4	Examine the factors determining dividend and its valuation			
5	Assess the needs and planning of working capital			
Course out come	**Year/ semester: I/II sem**	**Subject name code: Business Research Methods (M20MB11)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	What is research methodology and why it is useful.			
2	Explain the research problem and research design			
3	Make use of questionnaire and methods of data collection			
4	Importance of research structure			
5	Influence of research reference			
Course out come	**Year/ semester: I/II Sem.**	**Subject name code: Quantitative Analysis for Business Decisions (M20MB12)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Define OR and OR Model.			
2	Construct the structure of LPP.			
3	Compare Two-phase method and Big-M method.			
4	Build the mathematical model of transportation problem.			
5	How to solve the Assignment problem.			

Course out come	Year/ semester: I/II sem	Subject name code: Cost & Management Accounting (M20MB13)	No. of Hours L:4 T:0 P:0	Credits:4
On successful completion of this course, student should be able to:				
1	Distinguish Financial Accounting, Cost accounting & Management Accounting			
2	Analyze Costing for specific industries.			
3	Apply Break Even analysis for various business problems			
4	Classify and evaluate budgets.			
5	Compare and contrast standard cost ,estimated cost & marginal cost			
Course out come	**Year/ semester: I/II sem**	**Subject name code: Soft Skills Lab (M20MB14)**	**No. of Hours L:0 T:0 P:4**	**Credits:3**
On successful completion of this course, student should be able to:				
1	show how to overcome fear of facing interviews			
2	Improve communication skills and able to convince their view point to the superior, peers and subordinates.			
3	Adopt Time management skills to efficiently manage time in meeting deadlines.			
4	Compare Traits of positive thinking and high achievers..			
5	Improve General knowledge and current information.			

II/I Sem

Course out come	Year/ semester: II/I Sem.	Subject name code: Strategic Management (M20MB15)	No. of Hours L:4 T:0 P:0	Credits: 4
On successful completion of this course, student should be able to:				
1	Formulate organizational objectives, policies, vision and mission and outline the concepts in strategic management.			
2	Define the role of strategist in an organization.			
3	Evaluate the performance by using qualitative and quantitative benchmarking technique.			
4	Identify diversifying strategies and define why firms diversify?			
5	Propose strategies for competing in global markets.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Entrepreneurship (M20MB16)**	**No. of Hours L:4 T:0 P:0**	**Credits:4**
On successful completion of this course, student should be able to:				
1	Explains characteristics, Qualities, Skill and Functions of Entrepreneur.			
2	Infers financial Institutions assistance to promote Entrepreneurship.			
3	Relates Technological competitiveness, legal regulatory systems, patents, trademarks and intellectual property rights to Entrepreneurship.			
4	Summarizes necessity for business ethics and ethical guidelines in business.			
5	Recalls corporate governance and its History and theoretical basis of corporate Governance.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Intellectual Property Rights (M20MB17A)**	**No. of Hours L:4 T:0 P:0**	**Credits: 3**
On successful completion of this course, student should be able to:				
1	Outline the increasing importance of intellectual property rights			
2	Utilize post registration procedures and trade mark registration process			
3	Explain the copyright principles and rights			

4	Prioritize the law of patents and patent ownership.			
5	Develop the trade secret and maintenance.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Stress Management (M20MB17B)**	**No. of Hours L:4 T:0 P:0**	**Credits:3**
On successful completion of this course, student should be able to:				
1	Define the stress and Symptoms of stress			
2	Identify various issues in crisis management			
3	Develop the relationship between the teams			
4	Improve the organization personality of employee			
5	Discuss the skills required for personality development			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Data Analytics (M20MB17C)**	**No. of Hours L:4 T:0 P:0**	**Credits:3**
On successful completion of this course, student should be able to:				
1	Explain basic Data concepts such as Data Analytics concepts to include Importance of data analytics, data visualization tools, Descriptive Statistical Measures, Predictive Analytics, Data Mining, and Simulation			
2	Apply knowledge to solve simple tasks using data analytics techniques with computer (MS Excel).			
3	Identify the advantages and disadvantages of simulation, risk analysis and decision tree analysis			
4	Measure the data analytics parameters (descriptive analytics, diagnostic analytics, predictive analytics and prescriptive analytics).			
5	Choose the data analytics techniques for solving practical problems in business.			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Tourism and Hospitality Management (M20MB17D)**	**No. of Hours L:4 T:0 P:0**	**Credits: 3**
On successful completion of this course, student should be able to:				
1	List out the different concepts of Tourism management			
2	Identify the factors affecting hospitality and tourism industry			
3	Improve the employment opportunities in Hospitality			
4	Develop the eco system and ecotourism activities			
5	Solve the various problems in tourism and Hospitality management			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Indian Constitution (M20MB17E)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define Indian constitution and constitutional history			
2	Explain federalism and centre-state relationship			
3	Make use of state secretariat and it structure			
4	Determine the importance of election commission			
5	Improve the welfare of SC/ST/BC and women			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Consumer Behavior (M20MB18M1)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**

On successful completion of this course, student should be able to:				
1	Understand consumer behavior research process and rural consumer behavior.			
2	Understand the environmental influences on consumer behavior and able to appreciate the importance of cultural adaptation of consumer behavior.			
3	Analyze Individual personality and self-concept, consumer perception, changing attitudes of consumers, consumer learning and information processing.			
4	Establish the relevance of consumer behavior models in decision making.			
5	Makeup role of consumerism, consumer safety, and consumer information at market place.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Sales and Distribution Management (M20MB19M2)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Explain the fundamentals of sales management.			
2	Define and formulate the strategies to effectively manage company's sales operations and identify the roles and responsibilities of the sales manager.			
3	Develop the sales force productivity and control.			
4	Analyze and implement distribution channel strategy.			
5	Examine the channels efficiency and effectiveness in wholesaling and retailing.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Supply Chain Management (M20MB20M3)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Conceptual framework and essentials of Supply Chain Management.			
2	Emerging trends in logistics management.			
3	Factors influencing selection of transportation and warehousing management.			
4	Strategic issues in supply chain management.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Security Analysis and Portfolio Management (M20MB18F1)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Analyze investment alternatives and make investment policy recommendation including the determination of an optimal asset allocation.			
2	Examine various types of bonds in the stock markets			
3	To define equity analysis and valuation			
4	Construct optimal portfolios following the tenets of modern portfolio theory			
5	Discuss various types of mutual funds schemes			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Financial Institutions, Markets and Services (M20MB19F2)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the financial Institutions markets and services, Explain the financial Reforms after 1991, Regulations and promotional Institutions.			
2	Outline the Banking and non-Banking Institutions.			
3	Distinguish the structure and functioning of money market & capital market.			

4	Evaluate of lease finance and Hire Purchase.			
5	Elaborate functions and activities of Investment bankers.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: International Financial Management (M20MB20F3)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	To determine different international Business Methods			
2	To evaluate Balance of payments and International Monetary system			
3	To Make use of foreign exchange market movements.			
4	To make experiment with exchange rate movements			
5	To find the opportunities in International financial markets			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Leadership and Change Management (M20MB18H1)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define leadership roles and functions.			
2	How to become an effective leader and his/her leadership styles.			
3	Explains leadership styles in organizational work settings.			
4	Solve the various problems while inviting change in organization.			
5	Distinguish the relationship between power, politics and conflicts.			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Management of Industrial Relations (M20MB19H2)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Demonstrate industrial relation and Indian IR system			
2	Outline the trade union, types and their recognition			
3	Analysis dispute settlement missionary and its instruments			
4	Develop grievance handling procedure			
5	Analyze collective bargaining levels and legal frameworks			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Compensation Management (M20`MB20H3)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the compensation management and its objectives			
2	Explain issues and models of executive compensation			
3	Explain the components of pay structure and its strategy			
4	Determine international compensation system and managing variations in international pay			
5	Plan employee stock ownership plans and broad based option plans			
Course out come	**Year/ semester: II/I sem**	**Subject name code: Internship and Seminar (M20MB21)**	**No. of Hours L:0 T:0 P:0**	**Credits: 02**
On successful completion of this course, student should be able to:				
1	Improve their practical knowledge by working in any organization			
2	Apply their conceptual learning to practical business problems			

3	List out organizational working teams and dynamics of organization			
4	Develop his competencies for future job requirement			
II/II Sem				
Course out come	**Year/ semester: II/II sem**	**Subject name code: Business Laws and Ethics (M20MB22)**	**No. of Hours L:4 T:0 P:0**	**Credits: 04**
On successful completion of this course, student should be able to:				
1	Outline the various laws affecting the business concern. Define the procedure for incorporation and winding up of company			
2	Categorize contracts and define essential elements of Indian contract act and its remedies for breach. Explain the general principles, conditions and warranties in contract of sale.			
3	Choose the appropriate negotiable instrument under the negotiable instrument act. Determine the rules and regulations of GST in India.			
4	Asses the ethical issues in business.			
5	Identify the issues and challenges in cybercrime and its need in Indian context.			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Production and Operations Management (M20MB23)**	**No. of Hours L:4 T:0 P:0**	**Credits: 04**
On successful completion of this course, student should be able to:				
1	Determine optimum production methods. Compare and contrast production methods			
2	Illustrate the product and process design.			
3	Choose the appropriate facilities location and Plant layout.			
4	Choose and apply the techniques of sequencing and scheduling in production control. Asses the concepts of quality control.			
5	Apply materials management techniques for inventory controlling			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Health Care Management (M20MB24B)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Identify the prevailing health care system in India			
2	Avail the facility provided by the health policies			
3	Adopt the benefits from different programs introduced by government			
4	Utilize different healthcare schemes and funds offered by WHO and UNICEF			
5	Outline the trends in the health insurance sector			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Disaster Management (M20MB24C)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define concept of Environmental Hazards & Disasters.			
2	Identify causes of earthquakes.			
3	Discuss about the disasters and their impact on the environment.			
4	Estimate sedimentation & Environmental problems			
5	Formulate corrective measures of Erosion & Sedimentation.			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Agri-Business Management (M20MB24D)**	**No. of Hours L:4 T:0 P:0**	**Credits:3**

On successful completion of this course, student should be able to:				
1	Define the role of agriculture in economic development			
2	Make use of marketing of agriculture produce and agencies through which agriculture produce is marketed			
3	Identify and eliminate the defects of agricultural marketing			
4	Inspect the agricultural prices and price policy			
5	Plan the duties and responsibilities of marketing functionaries.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Sustainability Management (M20MB24F)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	List out the History and emergence of sustainable development			
2	Explain the Indian Judiciary system and Sustainability development			
3	Develop the quality of life, equation of poverty population and pollution			
4	Prioritize biodiversity conservation and ecosystem integrity			
5	Design the sustainable development strategies			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Customer Relationship Management (M20MB25M4)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define the various concepts in customer relationship management			
2	Determine the importance of customer relationship management			
3	Explain the recent trends in customer relationship management			
4	Build the customer relations and customer profile			
5	Develop strategies for customer, retention and development			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Services Marketing (M20MB26M5)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Differentiate Marketing services Vs. Physical services, analyze services marketing mix and Gaps model of service quality.			
2	Understand consumer requirements and extend customer relationships with regard to services.			
3	Identify critical issues in service design, service blue printing, plan new service development process and service standards.			
4	Explain the Employee's and Customer's roles in service delivery.			
5	Integrate services marketing communications and five categories of strategies, and creates an environment that achieves excellence in customer service. Design the key issues in pricing of services.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: International Marketing (M20MB27M6)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define international marketing and its environment			
2	Understand world trade, features and opportunities			
3	Compare the domestic market with international market			

4	Discuss the various factors influencing pricing decisions			
5	Develop the global marketing program and segmentation of product and services			
Course out come	**Year/ semester: II/I Sem**	**Subject name code: Financial Derivatives (M20MB25F4)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define significance of derivatives in stock in commodity market.			
2	Explain players in Derivative market			
3	Differentiate forward and future contract			
4	Analyze Trading with option			
5	Explain strategies involving option			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Strategic Investment & Financing Decisions (M20MB26F5)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define investment decisions under conditions of risk and uncertainty			
2	Make use of discounted payback, post payback, return on investment and surplus payback			
3	Maximize the advantages of leasing and leasing decisions			
4	Develop the various strategies for financing decisions			
5	Solve various problems on mergers and acquisitions			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Corporate Taxation and Planning (M20MB27F6)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Express Basic concepts of direct & Indirect taxes and able to compute Residential Status and Scope of Total Income of a Company and exempted Incomes of company.			
2	Compute total Income of corporate.			
3	Identify the importance of Tax planning, Tax Management and able to use Tax planning techniques towards Capital Structure decisions.			
4	Use the tax planning with reference to setting up of a new business.			
6	Perform tax planning in respect of mergers and Amalgamations.			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: International HRM (M20MB25H4)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define nature, scope and components of IHRM.			
2	Compare IHRM and domestic HRM			
3	Tell transfer policies and compensation management			
4	Identify IHRM practices in selected countries			
5	Classify workers and cadres			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Performance Management Systems (M20MB26H5)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Define performance management and methods of performance appraisal			
2	Measure the employee performance towards the predetermine standards			

3	Examine the performance management system and appraisal practices in Asian countries			
4	Improve the employee performance through performance related concepts			
5	Identify the Legal issues involved in performance management and reward systems			
Course out come	**Year/ semester: II/II Sem**	**Subject name code: Strategic HRM (M20MB27H6)**	**No. of Hours L:4 T:0 P:0**	**Credits: 03**
On successful completion of this course, student should be able to:				
1	Find linkage between strategic business planning (SBP) and strategic HR development (SHRD)			
2	Discuss about trends in utilization of HR and relocation of work			
3	Identify managerial issues in strategic formulation.			
4	Compare Results Oriented vs Process oriented measures.			
5	Evaluate strategic contribution of traditional areas such as selection , training and compensation			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Comprehensive Subject Viva-Voce (M20MB28)**	**No. of Hours L:0 T:0 P:0**	**Credits: 02**
On successful completion of this course, student should be able to:				
1	Appraise and strengthen the students' conceptual knowledge in all the subjects of the semester.			
2	Maximize the competencies regarding subjects.			
Course out come	**Year/ semester: II/II sem**	**Subject name code: Main project and viva-voce (M20MB29)**	**No. of Hours L:0 T:0 P:0**	**Credits: 04**
On successful completion of this course, student should be able to:				
1	Gain knowledge on real time working environment.			
2	Develop skills in report writing through data collection, data analysis, data extraction, presentation and interpretation.			
3	Analyze best practices, system, processes, procedures and policies of a company/industry in different functional areas.			
4	Improve research knowledge on business problems			
5	Recommend suggestions in scope of the organization			

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOMES FOR B.TECH-EEE R20 FOR THE YEAR 2020-2021

Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	I Sem	**Linear Algebra and Complex Variable**	**B20MA03**	**L/T/P :3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods				
2	Determine Eigen values, Eigenvectors of matrices				
3	Calculate Partial derivatives, extreme of functions of multiple variables				
4	Analyze the complex function with reference to their analyticity and evaluate using integral theorems				
5	Expand the complex function using power series				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	I Sem	**Programming For Problem Solving**	**B20CS01**	**L/T/P : 3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Understanding how problems are posed and how they can be analyzed for obtaining solutions				
2	Understanding the fundamentals of C programming				
3	Learning of sequencing, branching, looping and decision-making statements to solve scientific and engineering problems.				
4	Implementing different operations on arrays and creating and using of functions to solve problems				
5	Design and implement different types of file structures using standard methodology.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	I Sem	**Fundamentals of Mechanical Engineering**	**B20ME06**	**L/T/P : 3/0 /0**	
By the end of the course, students will be able to					
1	To understand the various sources of energy and basic terminology of Mechanical systems				
2	To understand the various types of automobile engines				
3	To understand and appreciate significance of mechanical engineering in different fields of engineering				
4	To understand power transmission elements, and applications of various engineering materials				

5	To understand various manufacturing processes.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	I Sem	**Chemistry**	**B20CH02**	**L/T/P :3/0 /0**	**3**
The basic concepts included in this course will help the student to gain:					
1	The knowledge of electrochemical cells, different batteries				
2	The required principles and concepts of corrosion, control methods.				
3	The knowledge of water treatment.				
4	The knowledge of polymers and their importance in day to day life				
5	The required principles and concepts of passive devices.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	I Sem	**English Language and Interactive Communication Skills Lab**	**B20EN02**	**L/T/P :0/0 /3**	**1.5**
After learning the contents of this subject, the student must be able to					
1	Understand the nuances of English language through audio-visual experience and group activities.				
2	speak with clarity and confidence which in turn enhances their employability skills				
3	develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation				
4	Involve the students in speaking activities in various contexts.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	I Sem	**Programming for Problem Solving Lab**	**B20CS02**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Understand basic structure of the C Programming, data types, declaration and usage of variables, control structures and all related concepts.				
2	Understand any algorithm and Write the C programming code in executable form				
3	Implement Programs using functions, pointers and arrays				
4	Use the pre-processors to solve real time problems				
5	Use file structures and implement programs on files				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	I Sem	**Engineering and IT Workshop**	**B20ME03**	**L/T/P :0/0 /3**	**1.5**
After learning the contents of this subject, the student must be able to					
1	Know the fundamental knowledge of House wiring and soldering and their usage in real time Applications.				
2	Gain knowledge on electronic components and measuring instruments				
3	Use basic concepts of computer hardware for assembly and disassembly.				
4	Use Microsoft tools for exercise				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	II Sem	Differential Calculus and Numerical Methods	B20MA05	L/T/P :3/1 /0	4
After learning the contents of this subject, the student must be able to					
1	Apply the fundamental concepts of ordinary differential equations to real time problems.				
2	Find the complete solution of a non-homogeneous differential equations and applying its concepts in solving physical problems of Engineering				
3	Analyse line, surface and volume integrals using fundamental theorems.				
4	Find a better approximate root of a given equation.				
5	Compute the differential equation using numerical techniques.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Electrical Circuits-I**	**B20EE04**	**L/T/P :3/1 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Learn basics of electrical circuits such as laws, transformation and network reduction techniques.				
2	Explore the basic principles and concepts involved in AC circuits and analyze power in series and parallel AC circuits				
3	Learn the concepts of resonance and the importance of locus diagrams.				
4	Understand various network theorems and its applications in electrical circuits.				
5	Analyze the series and parallel magnetic circuits with basic magnetic principles and laws of electromagnetic induction.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Basic Electronic devices**	**B20EC01**	**L/T/P :3/1 /0**	**4**
After learning the contents of this subject, the student must be able to					
1	Analyze the characteristics of the PN junction diode and Zener diode				
2	Design the rectifiers with and without filters for specified DC voltage.				
3	Illustrate the voltage- current characteristics of Junction Transistor and different configurations of transistor				
4	Design and analyze the different biasing circuits and amplifier circuits				
5	Acquire knowledge about the construction, theory and characteristics of FET and MOSFET				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Physics**	**B20PH02**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understands the materials on the basis of energy band gap and its device applications				
2	Describes the characteristics and working of lasers and their use in various fields				
3	Analyse and apply the concepts of Electric Fields for accurate determination of				

	Electric flux, Electric flux density, energy stored in electric fields etc				
4	Apply the concepts of the light propagation in optical fibres in optical communication systems				
5	Classify and enumerate the properties of magnetic and Dielectric materials and identifies their role in specific engineering applications				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Electrical Engineering Practice Lab**	**B20EE05**	**L/T/P :0/0 /3**	**1.5**
After learning the contents of this subject, the student must be able to					
1	Identify and find the various components and equipment used for electrical engineering applications				
2	Understand the staircase wiring and ceiling fan wiring				
3	Develop the simple electric circuits on bread board and PCB.				
4	Understand the earthing connections and DOL starter connection				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Physics Lab**	**B20PH05**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Estimate the frequency of tuning for and AC supply with the help of stretched strings				
2	Analyze as well as compare the intensity distribution of interference and diffraction patterns				
3	Draw the characteristics of electrical and electronic circuits and evaluate the dependent parameters				
4	Explore and understand the applications of semiconducting devices				
5	Evaluates the wavelength and radius of curvature of Plano convex lens by Newton‘s rings				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Engineering Drawing**	**B20ME01**	**L/T/P :0/0 /4**	**2**
After learning the contents of this subject, the student must be able to					
1	Understand various commands, object properties in AUTOCAD				
2	Analyse the Projections of Points.				
3	Understand the projections of solids				
4	Estimate the use of drawings, dimensioning, scales and conic sections				
5	Modify the applications of this knowledge in computer graphics.				
6	Compare the Conversion of Isometric views to Orthographic views				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	II Sem	**Basic Electronic devices Lab**	**B20EC02**	**L/T/P :0/0 /3**	**1.5**
1	Demonstrate the characteristics and operation of Semiconductor diodes.				
2	Analyze different rectifier circuits				

3	Demonstrate V-I characteristics of BJT, FET and UJT				
4	Design simple electronic circuits				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Electrical Circuits – II**	**B20EE05**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the basics of network representation, method of analyzing the network and duality of network.				
2	Analyze balanced and unbalanced three phase circuits and measure voltage, current and power in three phase star and delta connections				
3	Study the transient response of series and parallel RLC circuits for DC and sinusoidal excitations. Analyze the response for step, ramp, impulse etc., using Laplace transformation				
4	Study different types of network functions and evaluate the network parameters in two port network using transformed variables				
5	Learn about different types of filters and Fourier analysis applied to AC circuits				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Signals and Systems**	**B20EC03**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Analyze the spectral characteristics of continuous-time periodic signals using Fourier series				
2	Demonstrate and apply Fourier transform on various signals.				
3	Apply the Laplace transform and Fourier transform for the analysis of continuous-time signal				
4	Analyse systems based on their properties and determine the response of LTI system.				
5	Understand the concepts of convolution and correlation of signals.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Electrical Machines-I**	**B20EE07**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Evaluate the stored and converted energy and also exerted force in electromechanical energy conversion devices.				
2	Able to analyze and design the types of dc generators				
3	Able to select appropriate D.C Generator to meet the requirements of the application in industry				
4	To understand the characteristics and concept s of speed control.				
5	Able to Test the performance and select appropriate D.C machine to meet the requirements of the application in industry.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Electromagnetic Fields**	**B20EE08**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					

1	Analyze the relation between the electric field and the magnetic field, about the various laws such as EFI, Potential and other concepts of these fields				
2	Understand the behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics.				
3	Understand the magnetic field concepts using Biot-Savart law and Ampere's law				
4	Analyze the relation between two or more conductors when subjected to magnetic fields				
5	Understand the concepts of time varying fields in both electric and magnetic fields and their relationship in evaluating power				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Python Programming**	**B20CS03**	**L/T/P :2/0 /0**	**2**
After learning the contents of this subject, the student must be able to					
1	Defining the fundamentals of writing Python scripts.				
2	Expressing the Core Python scripting elements such as variables and flow control structures.				
3	Apply Python functions to facilitate code reuse.				
4	Extending how to work with lists and sequence data				
5	Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**English for Effective Communication**	**B20EN01**	**L/T/P :2/0 /0**	**2**
After learning the contents of this subject, the student must be able to					
1	Skim and scan the digital text to summarize it for future reference.				
2	Read the text to make notes according to their needs				
3	Use English language effectively in spoken and written forms.				
4	Communicate confidently in various contexts and different cultures.				
5	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Electrical Circuits Lab**	**B20EE09**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Explain the concept of circuit laws				
2	Verify network theorems				
3	Determine Z, Y and ABCD parameters for a given two port network.				
4	Evaluate the time response and frequency response characteristics of RLC series circuit and their resonance conditions.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	III Sem	**Python Programming**	**B20CS07**	**L/T/P :0/0 /2**	**1**

		Lab			
After learning the contents of this subject, the student must be able to					
1	Expressing the Core Python scripting elements such as variables and flow control structures.				
2	Apply Python functions to facilitate code reuse				
3	Extending how to work with lists and sequence data.				
4	Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Power Systems – I**	**B20EE06**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Gain the knowledge on operation of Hydro Electric generation.				
2	Acquire and interpret fundamental concepts Thermal generation				
3	Understand various economic aspects of the Power system and tariff				
4	Acquire knowledge on power system distribution systems and substation				
5	Understand design of underground cables				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Electrical Machines-II**	**B20EE12**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the concepts and performance of single phase transformer.				
2	Test the performance of single phase Transformer				
3	Choose a suitable three phase transformer based on its application and also convert three phase to two phases or vice versa.				
4	Understand the concepts of Construction, operation characteristics, testing (concept of circle diagram) and speed.				
5	Analyze speed torque characteristics and control the speed of induction motors				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Electrical Measurements and Instrumentation**	**B20EE13**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Different types of measuring instruments their construction operation and characteristics				
2	Resistance voltage current measurements through potentiometers, voltage current measurements through instruments transformers.				
3	Power and energy measurements through watt and energy meters with examples				
4	Resistance measurements through DC bridges, capacitance and inductance measurements through AC bridges, different types of transducers.				
5	Measurement of frequency and phase through CRO, range extension of measuring instruments and different types of errors & their reduction methods in measuring				

	instruments.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**OOPS through JAVA**	**B20CS27**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the use of OOP concepts and solve real world problems using OOP techniques.				
2	Solve the inter-disciplinary applications using the concept of inheritance.				
3	Develop robust and faster applications by applying different exception handling mechanisms.				
4	Understand the multithreading concepts and develop efficient applications				
5	Design GUI based applications and develops applets for web applications.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Analog and Digital Electronics**	**B20EC21**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Construct and analyze the single stage transistor amplifier.				
2	Design and construct the negative feedback amplifiers and oscillators according to the required specifications.				
3	Understand the Op Amp and its applications.				
4	Design different combinational circuits using minimization techniques				
5	Analyze basic sequential circuits and also able to understand various ADC and DAC techniques.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	IV Sem	**Analog and Digital Electronics Lab**	**B20EC22**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Understand the applications of diode as integrator, differentiator, clipper and clamper circuits.				
2	Design circuits using operational amplifiers for various applications.				
3	Analyze the VCO circuit.				
4	Understand and implement DAC conversions using OP-AMP.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits : 1.5**
	IV Sem	**Electrical Machines Lab-I**	**B20EE15**	**L/T/P :0/0 /3**	
After learning the contents of this subject, the student must be able to					
1	Select range of apparatus based on the ratings of DC Machines.				
2	Determine Characteristics of DC machines by conducting tests				
3	Evaluate the efficiency of the machine by analyzing test results.				
4	Study speed control methods for dc machines				
Course	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**

Outcome	IV Sem	OOPS through JAVA Lab	B20CS28	L/T/P :0/0 /3	1.5
After learning the contents of this subject, the student must be able to					
1	Use the Java SDK environment to create, debug and run simple Java programs.				
2	Write Java programs to implement error handling techniques using exception handling				
3	Develop multithreaded applications with synchronization.				
4	Design simple Graphical User Interface applications and event driven programming				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits
	V Sem	Electrical Machines-III	B20EE15	L/T/P :3/0/0	: 3
After learning the contents of this subject, the student must be able to					
1	Demonstrate basic concepts of AC machines.				
2	Analyze the concepts of regulation of synchronous generators				
3	Evaluate performance characteristics of synchronous machines.				
4	Analyze the operating characteristics of synchronous motors				
5	Identify the Construction, operation and characteristics of single-phase motor and special machines				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	V Sem	Power Electronics	B20EE16	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Understand the differences between signal level and power level devices				
2	Examine single phase-controlled rectifier circuits.				
3	Understand three phase-controlled rectifier circuits.				
4	Learn the operation of DC-DC choppers				
5	Study the operation of DC-AC converters and AC-AC voltage regulators				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	V Sem	Control Systems	B20EE17	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Understand the concept of feedback and analyze the control system components by their Mathematical modeling				
2	Estimate the time domain specifications and steady state error				
3	Apply various time domain and frequency domain techniques to assess the system performance.				
4	Improve the system performance by designing a suitable controller and/or a compensator for a specific application				
5	Test system Controllability and Observability using state space representation and applications of state space representation to various systems.				

Course Outcome	Semester	Subject Name	Subject Code	No. of Hours	Credits:
	V Sem	Power Systems-II	B20EE18	L/T/P :3/0 /0	3

After learning the contents of this subject, the student must be able to					
1	Gain knowledge on computing transmission line parameters like inductance and capacitance				
2	Evaluate performance of short, medium transmission lines				
3	Evaluate performance of long transmission lines and describe travelling wave and transients in power system				
4	Describe various effects on transmission system and compute sag on overhead transmission system				
5	Gain knowledge on power factor and voltage control in transmission system				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Renewable Energy Systems**	**B20EE19**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Apply the technology to capture the energy from the renewable sources like sun, wind, ocean, biomass, geothermal.				
2	Use different renewable energy sources to produce electrical power.				
3	Minimize the use of conventional energy sources to produce electrical energy.				
4	Identify the fact that the conventional energy resources are depleted.				
5	Explore the direct energy sources.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Industrial Instrumentation**	**B20EE20**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Get knowledge on transducers				
2	Understand the strain gauge and strain measurement.				
3	Know the displacement measurement techniques.				
4	Understand the temperature measurement				
5	Gains knowledge on digital acquisition systems and control				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Computer Organization**	**B20EC16**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Describe the fundamental organization of a computer system				
2	Understand the concepts of register transfer logic and arithmetic operations.				
3	Understand the concepts of Hardwired control and micro programmed control.				
4	Explain the I/O and memory organization in depth				
5	Understand the concepts of parallel processing, pipelining and inter processor communication				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Electrical Machines Lab-**	**B20EE21**	**L/T/P :0/0 /2**	**1**

		II			
After learning the contents of this subject, the student must be able to					
1	Select range of apparatus based on the ratings.				
2	Draw the Equivalent circuits and analyze various AC machines				
3	Determine performance and Characteristics of AC machinery				
4	Evaluate the efficiency of the machine by analyzing test results				
5	Evaluate the performance of transformers.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Electrical Measurements and Instrumentation Lab**	**B20EE22**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Compare performance of MC, MI and Dynamometer types of measurements, Energy meter.				
2	Determine the circuit parameters using AC and Dc bridges.				
3	Compute the errors CT‘s and PT‘s.				
4	Understand the performance of industrial instruments.				
5	Determine the LVDT characteristics				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Electrical Simulation Lab**	**B20EE23**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Get the knowledge simulation of electrical circuits				
2	Observe the time response analysis in simulation				
3	Know the transmission line parameters using Simulink				
4	Know the simulation power electronic converters				
5	Get the knowledge on different simulation software				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	V Sem	**Human Values and Professional Ethics**	**B20MC04**	**L/T/P :2/0 /0**	**0**
After learning the contents of this subject, the student must be able to					
1	It ensures students sustained happiness through identifying the essentials of human values and skills.				
2	It facilitates a correct understanding between profession and happiness				
3	It helps students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature				
4	Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Computer Methods in Power Systems**	**B20EE25**	**L/T/P :3/0 /0**	**3**

After learning the contents of this subject, the student must be able to					
1	Determine the bus impedance and admittance matrices for power system network				
2	Calculate various parameters at different buses using load flow studies				
3	Discuss per unit system representation and symmetrical component theory.				
4	Discuss fault analysis on power system				
5	Understand the steady state stability of power system and analyse the transient stability of power system.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Power Semiconductor Drives**	**B20EE26**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Analyze the operation of converter fed dc motors and four quadrant operations of dc motors using dual converters				
2	Describe the chopper fed dc motors in various quadrants of operation				
3	Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.				
4	Differentiate the stator side control and rotor side control of three phase induction motor.				
5	Explain the speed control mechanism of synchronous motors.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Managerial Economics and Financial Analysis**	**B20MB01**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the nature, scope and importance of Managerial Economics.				
2	Know what is demand, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand				
3	Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.				
4	Understand the characteristics of different kinds of markets and outline different form of business organization and analyze how capital budgeting techniques are used for investment decisions.				
5	Know how to prepare final accounts and how to interpret them, analyze and interpret financial statements using ratio analysis				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Electrical Distribution Systems**	**B20EE27**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand design of various load				
2	Analyze the need of substations and there erection and site selection				
3	Understand protection of distribution system				

4	Acquire knowledge of power factor improvement.				
5	Calculate the distribution voltage drop calculations				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Electrical Engineering Materials**	**B20EE28**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Impart the knowledge on electrical engineering materials classification and their applications				
2	Study the performance characteristics of various semiconducting, dielectric and insulation materials and their applications in design of electrical and electronic devices.				
3	Identify various magnetic materials and their classification				
4	Learn various special purpose of materials				
5	Design various electronic components				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Digital Signal Processing**	**B20EC24**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Identify the different types of the discrete signals and systems				
2	Understand the inter relationship between DFT and various transforms and fast computation of DFTand appreciate the FFT processing				
3	Understand the characteristics of FIR filters and classify the different types of windowing techniques.				
4	Design a IIR digital filters for a given specifications and Apply the knowledge to real world processing applications.				
5	Understand different types of signal processing architectures				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Power Electronics Lab**	**B20EE29**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Study Characteristics of various Power Semiconductor devices				
2	Analyze AC/AC and AC/DC Converters				
3	Analyze the behavior of various DC/DC and DC/AC converters				
4	Understand types of Power Electronic converters and identify their applications				
5	Know the PWM techniques used for power converters				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Control Systems Lab**	**B20EE30**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Analyze the time & Frequency response of control systems				
2	Evaluate the performance of feedback control systems				
3	Examine the response of PID controllers.				

4	Identify the Performance of AC & DC servo motors				
5	Know the magnetic amplifier				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Electronics Design Lab**	**B20EE31**	**L/T/P :0/0 /2**	**1**
After learning the contents of this subject, the student must be able to					
1	Design the various regulated power supplies for control boards				
2	Gain knowledge on designing of various triggering circuits for SCR.				
3	Develop scaling and conditioning circuits for various sensors.				
4	Develop PWM control and gate driver circuits for various power electronic applications				
5	Develop the zero-crossing detector.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VI Sem	**Logical Reasoning and Quantitative Aptitude**	**B20MC05**	**L/T/P :2/0/0**	**0**
After learning the contents of this subject, the student must be able to					
1	Apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.				
2	Apply quantitative correctly arrive at meaningful conclusions regarding their answers and manipulate equations and formulas in order to solve for the desired variable				
3	Interpret given information correctly, determine which mathematical model best describes the data, and apply the model correctly				
4	Correctly apply mathematical language and notation to explain the reasoning underlying their conclusions when solving problems using mathematical or statistical techniques				
5	Improve their mathematical skills in various general aspects to solve real time problems.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Power System Operation And Control**	**B20EE33**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Analyse economic operation of power system.				
2	Understand the working of hydrothermal coordination.				
3	Analyse load frequency control of Single area and Two area power system.				
4	Acquire knowledge on reactive power control				
5	Understand the working of deregulated electricity markets				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Power System Protection**	**B20EE35**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					

1	Understand the basic construction and principle of arc interruptions in Circuit Breaker and its types.				
2	Understand the basic principle of electromagnetic Relay Operation and its various types to different applications.				
3	Explore the various schemes of protecting generator and transformers.				
4	Explore various relaying operation in protecting the transmission line and bus bar.				
5	Learn the necessity of neutral grounding and protection against overvoltage.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VII Sem	**Microprocessors and Microcontrollers**	**B20EC32**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Illustrate the internal organization of popular 8086/8051 microprocessors/microcontrollers. Contrast hardware and software interaction and integration.				
2	Design microprocessors and microcontrollers-based systems and develop microcontroller based systems for real time applications.				
3	Understand microcontroller 8051 and its programming.				
4	Explain the Memory organization, classification and their applications and				
5	Assess programming, interfacing etc of various devices with microprocessors and external world.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VII Sem	**High Voltage Engineering**	**B20EE35**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand Transients in power system.				
2	Acquire the knowledge on breakdown in solid, Liquid and gaseous dielectrics				
3	Understand the generation of high voltage and current.				
4	Identify the measurement of high voltage and current.				
5	Analyze power apparatus and insulation coordination				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VII Sem	**Advanced Power Electronics**	**B20EE36**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Classify driver circuits for various power semiconductor devices.				
2	Analyze the operation of multi-pulse converters.				
3	Understand the operation of resonant converters.				
4	Know the differences between VSI and CSI.				
5	Gain knowledge on the operation of multilevel inverters.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VII Sem	**Advanced Control**	**B20EE37**	**L/T/P :3/0 /0**	

		Systems			
After learning the contents of this subject, the student must be able to					
1	Understand different non linearities and their describing functions.				
2	Describe the methods of Phase-plane trajectory of nonlinear control systems.				
3	Apply various theorems for stability analysis of linear and nonlinear systems.				
4	Implement modal control and calculus of variations				
5	Formulate and solve optimal control problems				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Electrical Machine Design**	**B20EE38**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Understand the basic design consideration, standards. Study the heat dissipation, cooling characteristics and electrical characteristics of various dielectric materials.				
2	Understand the design, choice of materials and specifications in DC machines				
3	Understand and design the main dimensions of each part of a transformers				
4	Design the constructional features of induction motors and estimate their currents and reactance				
5	Design the constructional features of synchronous motors				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Advanced Electrical Drives**	**B20EE39**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Analyse the operation of three phase converter fed dc motors				
2	Describe the VSI and CSI fed induction motor operation.				
3	Know the concept of vector control of induction motor drive.				
4	Understand the concept of direct torque control for three phase induction motor.				
5	Gain knowledge on vector control of PMSM drives and introduction to BLDC drives.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**AI Techniques in Electrical Engineering**	**B20EE40**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Identify and describe AI techniques and their roles in building intelligent machines.				
2	Understand the working of multilayer neural networks.				
3	Explore fuzzy logic and reasoning.				
4	Learn genetic algorithms to optimization problems				
5	Evaluate and compare solutions by AI approaches for a given problem in matlab simulink				
Course	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**

Outcome	VII Sem	Utilization of Electrical Energy	B20EE41	L/T/P :3/0 /0	3
After learning the contents of this subject, the student must be able to					
1	Choose a right drive for a particular application.				
2	Identify Heating and welding schemes for given application.				
3	Explain the basics of lighting and methods of illumination and its parameters				
4	Understand the different schemes of traction systems, its characteristics and its main components.				
5	Analyze electrical energy consumption for traction system				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VII Sem	**High Voltage DC Transmission**	**B20EE42**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Know the basic concepts of HVDC transmission.				
2	Understand the complete operation of HVDC Converter stations				
3	Understand the power flow control on HVDC Transmission system				
4	Understand the Operation of the controller for HVDC in worst and normal operations				
5	Design the Various filters.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	VII Sem	**Microprocessors and Microcontrollers Lab**	**B20EC42**	**L/T/P :0/0 /2**	
After learning the contents of this subject, the student must be able to					
1	Demonstrate experimentally basic programming of Microprocessor.				
2	Recall the microprocessor interfacing with various peripherals for various applications				
3	Apply the basic programming of microcontroller.				
4	Examine microprocessor interfacing with various peripherals for various applications				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	VII Sem	**Power Systems Lab**	**B20EE43**	**L/T/P :0/0 /2**	
After learning the contents of this subject, the student must be able to					
1	Calculate Transmission line parameters, efficiency and regulation.				
2	Evaluate the Performance analysis of Over/Under Voltage Relay.				
3	Understand the Analysis and performance testing of Feeder Protection System				
4	Calculate Sequence Reactance of 3-Φ Transformer				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	VII Sem	**Mini Project & Internship**	**B20EE44**	**L/T/P :0/0 /0**	

After learning the contents of this subject, the student must be able to					
1	Students will be able to practice acquired knowledge within the chosen area of technology for project development				
2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.				
3	Reproduce, improve and refine technical aspects for engineering projects				
4	Work as an individual or in a team in development of technical projects & Communicate and report effectively project related activities and findings.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VII Sem	**Major Project Phase-1**	**B20EE45**	**L/T/P :0/0 /8**	**4**
After learning the contents of this subject, the student must be able to					
1	Identify the problem by applying acquired knowledge.				
2	Ability to plan and implement an investigative or developmental project.				
3	In-depth skill to use some laboratory, modern tools and techniques				
4	Ability to communicate results, concepts, analyses and ideas in written and oral form & Conduct an extended independent investigation that results in the production of a research thesis.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Soft Computing Techniques**	**B20EE46**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	To know basic idea of modern engineering techniques which are useful for solving non-linear and complex functions that may come across dissertation/research work				
2	To understand optimization problem				
3	Understand the concept of multi-objective optimization problems (MOOPs) and issues of solving it.				
4	Knowing Adaptive Neuro-Fuzzy Inference Systems				
5	Evaluate and compare solutions by soft computing techniques for a given problem in matlab Simulink				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Digital Control Systems**	**B20EE47**	**L/T/P :3/0 /0**	**3**
After learning the contents of this subject, the student must be able to					
1	Acquire a strong foundation in sampling and reconstruction Z-transforms				
2	Apply knowledge of Mathematics, Z-plane analysis to discrete time control systems.				
3	Replace the conventional control system with Digital control system.				
4	Evaluate and apply Z-plane analysis of discrete time control systems				
5	Apply state feedback controllers and observers				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**
	VIII Sem	**Flexible AC**	**B20EE48**	**L/T/P :3/0 /0**	**3**

		Transmission Systems			
After learning the contents of this subject, the student must be able to					
1	Know the concept of flexible AC transmission systems.				
2	Understand the voltage source converters used in FACTS				
3	Get the exposure on static shunt compensation.				
4	Understand the SVC and STATCOM.				
5	Get the exposure on static series compensation.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VIII Sem	**VLSI Design**	**B20EC33**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Design digital applications using Verilog HDL				
2	Understand IC technology and basic electrical properties of MOS and BiCMOS				
3	Design the layout of circuits using various design rules. Develop and design the gate level circuits				
4	Gain the knowledge to design data path subsystems like Adders, Shifters, and ALUs etc.				
5	Illustrate different programmable logic devices and CMOS testing.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VIII Sem	**Power Quality**	**B20EE49**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Know the terminology, definitions, causes, effects and analysis of various power quality problems				
2	Define and understand the components of current/power in sinusoidal/non-sinusoidal singlephase supply/load systems				
3	Define and understand the components of current/power in sinusoidal/non-sinusoidal three phase supply/load systems				
4	Know design, operation and Analysis of passive shunt and series compensators				
5	Know design, operation and analysis of passive shunt/series power filters				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VII Sem	**Electric and Hybrid Vehicles**	**B20EE50**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Know the fundamentals of Electric Vehicles.				
2	Gain the knowledge on battery technology used in EVs.				
3	Understand the AC DC motor requirements for EVs				
4	Know the drive train components				
5	Get the exposure on fundamentals of Hybrid EVs design.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VIII Sem	**Smart Grids**	**B20EE51**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					

1	Understand technologies for smart grid and features of Smart Grid in the context of Indian Grid.				
2	Assess the role of automation in Transmission/Distribution/substation.				
3	Know various communication technologies involved in smart grids and importance of PMUs, EMS, WAMS, SCADA				
4	Classify various Smart Distribution Technologies				
5	Clarify the regulations and market models for smart grid and various tariffs				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	VIII Sem	**Embedded Systems**	**B20EC45**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand and design embedded systems.				
2	Understand the architecture of Arm processors				
3	Develop a system using IO devices and interfacing to external world				
4	Understand types of memory				
5	Understand embedded firmware design approaches				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	VIII Sem	**Technical Seminar**	**B20EE52**	**L/T/P :0/0 /2**	
1	Identify and analyze the real time Electrical Engineering problems				
2	Acquire awareness on latest technology and current trends in the field of Electrical Engineering.				
3	Participate in discussions for enhancement of knowledge				
4	Apply communication skills & Document and present technical reports following professional ethics.				
Course Outcome	**Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 8**
	VII Sem	**Project Stage – II**	**B20EE53**	**L/T/P :0/0 /16**	
1	Identify the problem by applying acquired knowledge.				
2	Ability to plan and implement an investigative or developmental project.				
3	In-depth skill to use some laboratory, modern tools and techniques				
4	Ability to communicate results, concepts, analyses and ideas in written and oral form & Conduct an extended independent investigation that results in the production of a research thesis.				

COURSE OUTCOMES FOR M.TECH Artificial Intelligence R20 FOR THE YEAR 2020-2021

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Introduction to Artificial Intelligence and Applications(M20AI01)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1				
2				
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4				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code) Soft Computing Techniques (M20CS14)	No. of Hours L:3 T:0 P:0	Credits:3
On successful completion of this course, students are able to:				
1	Understand the fuzzy logic, concepts of fuzziness involved in fuzzy settheory			
2	Explain the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic.			
3	Build the fundamental theory, concepts of neuralnetworks			
4	Identify different neural network architectures, algorithms, applications along their limitations.			
5	Classify different learning rules, architectures to learn several neural network paradigms along with itsapplications.			
6	Deploy different applications of these models to solve engineering			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Cloud computing (M20CS03)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Discuss main concepts, key strengths, and limitations for cloud computing.			
2	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.			
3	Explain the issues on cloud computing along with security, privacy, and interoperability			
4	Choose and use the appropriate technology, methods on these issues			
5	Identify problems, and explain, analyze, and evaluate various cloud computing solutions			
6	Provide the appropriate solutions on cloud computing based on the application.			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Robotic Operating System and Simulation (M20AI02)	No. of Hours L:3 T:0 P:0	Credits: 3
1	Acquire basic Knowledge on Robots			

2	Ability to process end effectors and robotic controls.
3	Analyse Robot Transformations and Sensors
4	Able to understand Robot cell design and applications

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Internet of Things (M20CS05 I)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Describe the basic terminology, latest technology along with its applications			
2	Discuss the protocols based on the concepts such as machine to machine.			
3	Illustrate the IOT devices using Python Scripting Language			
4	Develop an application with Raspberry PI platform which can be widely used in many applications of IoT devices			
5	Implement it widely that can be used in many applications of IoT devices			
6	Design a web application framework on REST ful web API.			

Course Outcome	Year /SemesterI Sem	Subject Name (Subject Code) Genetic Algorithms and Applications(M20CS19)	No. of Hours L:3 T:0 P:0	Credits:3
On successful completion of this course, students are able to:				
1	Fundamentals and introduction concepts of genetic algorithms			
2	Basic Concepts and aspects of evolutionary algorithms (EAs), in particular GA, GP, ES			
3	It also concentrates on the basic concepts of representation of operators and overall control. Many examples and applications are dealt on the concepts of genetic programming using python in important applications			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Artificial Neural Networks (M20AI03)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1				
2				

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Network Security and Cryptography (M20CS08)	No. of Hours L:3 T:0 P:0	Credits: 3
1	Identifies various types of vulnerabilities, attacks, mechanisms and security services			
2	Compare and contrast symmetric and asymmetric encryption algorithms			
3	Implementation of message authentication, hashing algorithms and able to understand kerberos			
4	Explore the attacks and controls associated with IP, transport level, web and E-mail security			
5	. Develop intrusion detection system, solutions for wireless networks and designing of various types of firewalls.			

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) PythonProgramming Lab (M20CS11)	No. of Hours L:0 T:0 P:4	Credits: 2
On successful completion of this course, students will be able to:				
1	Expressing the Core Python scripting elements such as variables and flow control structures			
2	Apply Python functions to facilitate code reuse			
3	Extending how to work with lists and sequence data			
4	Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly			

Course Outcome	Year /Semester I Sem	Subject Name (Subject Code) Cloud computing Lab(M20CS10)	No. of Hours L:0 T:0 P:04	Credits:2
On successful completion of this course, students are able to:				
1	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud,etc			
2	Explain the issues on cloud computing along with security, privacy,and interoperability.			
3	Identify problems, and explain, analyze, and evaluate various cloud computingsolutions			
4	Provide the appropriate solutions on cloud computing based on theapplication.			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Robotic Operating System and Simulation Lab(M20AI04)	No. of Hours L:0 T:0 P:4	Credits:2
After the completion of this course, the students should be able to				
1	Understand the basic components and specifications used in robotics and automation			
2	Understand and implement the different types of motors and sensors during designing of robotics system.			
3	Use manipulators, Actuators and Grippers and their design considerations in robotics and automation.			
4	Understand the basic concepts of AVR microcontrollers			
5	Implement the programming and interfacing concepts of AVR microcontroller in robotic designing.			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) Internet of Things Lab(M20CS12)	No. of Hours L:0 T:0 P:4	Credits:2
1	Demonstrate the starting of Raspberry Pi and practice Linux commands in command terminal window			
2	Develop and run all basic python programs on RaspberryPi			
3	Build real time applications on Light an LED using Pythonprogramming			
4	Experiment with implementation of intruder system and various sensors like temperature, humidity,smoke.			

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Research Methodology & IPR(M20MC01)	No. of Hours L:2 T:0 P:0	Credits: 2
On successful completion of this course, students will be able to:				
1	. Acquire knowledge on Research Design and statistical methods in research			
2	Analyze the various methods in Data Collection, Data Organization and different approaches of Data Representation.			
3	Understand all the basic concepts required to prepare a. Research synopsis b. Dissertation c. Writing a good research proposal			
4	Interpret the Scope of Patent Rights and Administration of Patent System.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Audit Course-I English for Research Paper Writing(M20AC01)	**No. of Hours L:2 T:0 P:0**	**Credits:0**
On successful completion of this course, students are able to:				
1	Obtain complete knowledge on Definition of a research paper, Purpose of writing any research paper , its Scope and Benefits			
2	Understand the standard English formats .for scripting the best research paper.			
3	Analyze all the Qualitative and Quantitative Research Methodologies and the ethics of plagiarism			
4	Explain the detailed process of writing and publishing any research paper and perform a case study on paper writing.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Advanced in Machine Learning(M20AI05)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Ability to understand the concepts of NeuralNetworks			
2	Ability to select the Learning Networks in modeling real worldsystems			
3	Ability to use an efficient algorithm for DeepModels			
4	Ability to apply optimization strategies for large scaleapplications			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Data Science (M20CS20)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Describe a Data Science, skill sets available for a data scientist			
2	Discuss the terms Statistical Inference, its significance to explore data analysis			
3	Understand Data Science Process and its components interact.			
4	Adapt APIs tools to understand the Web data.			
5	Illustrate EDA and the Data Science as a case study			
6	Plan a effective visualization on given data.			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Data Pre-processing and Analysis(M20AI06)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**

On successful completion of this course, students will be able to:				
1				
2				
3				
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** AI and Speech Processing(M20AI07)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
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Course Outcome	**Year / semester Ⅱ Sem**	**Subject Name (Subject Code)** Digital Forensics (M20CS17)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Discuss digital forensics related to investigative process.			
2	Explain the legal issues to prepare, perform digital forensic analysis based on theinvestigator's position.			
3	Demonstrate the techniques, usage of digital forensics tools.			
4	Elaborate digital forensics in detail			
5	Analyze the state of the practice, gaps in technology, policy, and legal issues			
6	. Develop techniques used on Data Analysis, cybercrime.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Computer Vision(M20AI08)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	To implement fundamental image processing techniques required for computer vision			
2	Understand Image formation process			
3	To perform shape analysis			
4	Extract features form Images and do analysis of Images			
5	Generate 3D model from images			
6	To develop applications using computer vision techniques			
7	Understand video processing, motion computation and 3D vision and geometry			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Block Chain Technology(M20CS18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Introduce the fundamentals of blockchain, history, technology and decentralization.			

2	Revise cryptographic concepts and its use in blockchain			
3	Revise cryptographic concepts and its use in blockchain			
4	Understand alternatives to proof of work			
5	Introduce smart contracts, solidity and Web3 to implement blockchain			
6	Understand applications of blockchain and its challenges			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Software Process and Project Management(M20CS02)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Discuss and plan to execute projects based on required standards			
2	Understand the range of tools used on project management			
3	Analyze the concepts related on project governance and methodologies.			
4	Apply critical analysis on solving problems and planning process.			
5	Describe planning, Risk and issues management			
6	Plan process, pragmatic planning service delivery and quality assurance			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Advances in Machine Learning Lab(M20AI09)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
After the completion of this course, the students should be able to				
1	understand complexity of Machine Learning algorithms and their limitations;			
2	understand modern notions in data analysis-oriented computing;			
3	be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;			
4	Be capable of performing experiments in Machine Learning using real-world data.			
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Digital Forensics Lab(M20CS24)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Understand the methods available for retrieving the lost data.			
2	Classify the various mobile forensic techniques and how to handle them			
3	Identify the different Open-source intelligence techniques			
4	Demonstrate how to develop certification for Cyber Forensic			
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Data Pre-processing and Analysis Lab(M20AI10)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1				

2				
3				
4				
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** AI and Speech Processing Lab(M20AI11)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1				
2				
3				
4				
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Mini Project with seminar(M20AI12)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1				
2				
3				
4				
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Audit Course-II Stress Management(M20AC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
1	Burnout the causes of stress			
2	Control the time management			
3	Identify the right career path			
4	Handle the difficult work situation			
5	Manage the career life without stress			

Course Outcomes: Students will be able to: Develop healthy mind in a healthy body thus improving social health also• Improve efficiency•

III-SEMESTER

Course Outcome	Year/Semester III Sem	Subject Name (Subject Code) Natural Language Processing Techniques (M20CS26)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Understand approaches to syntax and semantics in NLP			
2	Understand approaches to discourse, generation, dialogue and summarization within NLP			
3	Understand current methods for statistical approaches to machine translation.			
4	Understand machine learning techniques used in NLP, including hidden Markov models			
5	Understand the Language model and probabilistic context-free grammars, clustering and unsupervised methods, log-linear and discriminative models			
6	Understand the Machine Translation, multilingual information, multi lingual automatic summerization.			
Course Outcome	Year /Semester III Sem	Subject Name (Subject Code) Cyber Security (M20CS27)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students are able to:				
1	Outline key terms and concepts in cyber law, intellectual property and cyber crimes			
2	Explore the vulnerabilities, threats and cybercrimes posed by criminals.			
3	Identify various security challenges phased by mobile devices.			
4	Identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection			
5	Analyze and evaluate the cyber security needs of an organization			
6	Design operational and strategic cyber security risk management policies in order to adequately protect an organization's critical information and assets			
Course Outcome	Year /Semester III Sem	Subject Name (Subject Code) Deep Learning (M20CS28)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Ability to understand the concepts of Neural Networks			
2	Ability to understand the concepts of Deep Learning			
3	Ability to select the Learning Networks in modeling real world systems			
4	Ability to use an efficient algorithm for Deep Models			
5	Ability to apply optimization strategies for large scale applications			
6	Ability to apply the Deep Learning models for Speech Recognition, NLP and Other Applications			
Course Outcome	Year /Semester III Sem	Subject Name (Subject Code) Advanced Optimization (M20MA01)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Describe problem clearly, identify and analyzetheindividual functions.			
2	Analyze study on solving optimization problem.			

3	Translate verbal formula on optimization problem			
4	Design algorithms, reliably to find an approximate solution			
5	Compare the performance of an algorithm			
6	Discovery, study, understandand solve optimization techniques using algorithms			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Waste Management (M20CE27)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students are able to:				
1	Compare the subject from the technical, legal and economical points.			
2	Learn solid waste management			
3	Describe environment for sound management.			
4	Understand a municipal solid waste management system			
5	Plan a solid waste management system for decision makers			
6	Design an incineration facility			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Embedded System Design (M20VL07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Describe embedded systems, design, technology to explain its metrics or challenges			
2	Designcustomsingle–purposeprocessorsusingcombinationalaswellassequentiallogic			
3	Discuss about optimizing single – purpose processors. Discuss about the basic architecture and operation of general purpose processors.			
4	Define and distinguish between a timer and a counter, various types of timers and UniversalAsynchronousReceiver/Transmitter.ExplaincontrollersforLCD,KeypadandStepper Motor.			
5	Discuss common memory types ROM, RAM, advanced RAM. Explain microprocessor interfacing and arbitration methods, various protocols like serial, parallel			
6	Explain basics of interrupts, architectures like Round Robin, Real – Time Operating System architecture			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Project / Dissertation Phase-I()	**No. of Hours L:0 T:0 P:20**	**Credits: 10**
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing.			
5	Elaborate the completed task and compile the project report.			

IV-SEMESTER

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Project / Dissertation Phase-II (M20AI14)	No. of Hours L:0 T:0 P:32	Credits: 16
On successful completion of this course, students will be able to:				
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing.			
5	Elaborate the completed task and compile the project report.			

COURSE OUTCOMES FOR M.TECH-CSE R20 FOR THE YEAR 2020-2021

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Data Structures and Algorithms(M20CS01)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Define knowledge basic on data structures to store and retrieve an ordered or unordered data. Such as, arrays, linked lists, trees, heaps, and hash tables .			
2	Develop knowledge on applications of data structures having the ability to implement algorithms to perform operation as create, insert, delete, search, and sorting.			
3	Learn to analyze and to compare efficiency of an algorithm.			
4	Understand the basic concepts of latest techniques.			
5	Ability to have concepts on tree and graphs.			
6	Implement various projects on these data structures and plan B-Trees to implement different various operations			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Software Process and Project Management (M20CS02)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Discuss and plan to execute projects based on required standards.			
2	Understand the range of tools used on project management.			
3	Analyze the concepts related on project governance and methodologies.			
4	Apply critical analysis on solving problems and planning process.			
5	Describe planning, Risk and issues management			
6	Plan process, pragmatic planning service delivery and quality assurance			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Cloud computing (M20CS03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Discuss main concepts, key strengths, and limitations for cloud computing.			
2	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.			
3	Explain the issues on cloud computing along with security, privacy, and interoperability			
4	Choose and use the appropriate technology, methods on these issues.			
5	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.			
6	Provide the appropriate solutions on cloud computing based on the application.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Python Programming(M20CS04)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Defining the fundamentals of writing Python scripts			

2	Expressing the Core Python scripting elements such as variables and flow control structures.
3	Apply Python functions to facilitate code reuse.
4	Extending how to work with lists and sequence data.
5	Implement file operations such as read and write
6	Implementing and Adapting the code robust by handling errors and exceptions properly.

Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Internet of Things (M20CS05)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Describe the basic terminology, latest technology along with its applications.			
2	Discuss the protocols based on the concepts such as machine to machine			
3	Illustrate the IOT devices using Python Scripting Language			
4	Develop an application with Raspberry PI platform which can be widely used in many applications of IoT devices			
5	Implement it widely that can be used in many applications of IoT devices.			
6	Design a web application framework on REST ful web API.			

Course Outcome	**Year /SemesterI Sem**	**Subject Name (Subject Code)** Mathematical Foundations of Computer Science (M20CS06)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Evaluate the notions of propositions, predicate formulae, Rules of inference.			
2	Illustrate and describe various types of Relations and Functions.			
3	Apply knowledge of Mathematics, Combinations & Permutations, Binomial Multinomial.			
4	theorems, Pigeon hole principles.			
5	Develop to solve the recurrence relations by using various methods.			
6	Perceive the basic concepts of graph theory and apply for real time examples.			

Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Artificial Intelligence (M20CS07)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Remember various AI concepts like the AI technique, level of models, there underlying assumptions etc			
2	Understand the concepts of AI search techniques			
3	Apply knowledge Representation techniques.			
4	Analyze different structures of representation			
5	Evaluate AI search techniques			

6	Understand the concepts of Natural Language Processing.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Network Security and Cryptography (M20CS08)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Identifies various types of vulnerabilities, attacks, mechanisms and security services.			
2	Compare and contrast symmetric and asymmetric encryption algorithms.			
3	Implementation of message authentication, hashing algorithms and able to understand kerberos			
4	Explore the attacks and controls associated with IP, transport level, web and E-mail security.			
5	Develop intrusion detection system, solutions for wireless networks and designing of various types of firewalls.			
6	Understand the various wireless network vulnerabilities and implements different types of cryptographic techniques to improve wireless network security.			
Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Research Methodology & IPR (M20MC01)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**
On successful completion of this course, students will be able to:				
1	Acquire knowledge on Research Design and statistical methods in research.			
2	Analyze the various methods in Data Collection, Data Organization and different approaches of Data Representation.			
3	Understand all the basic concepts required to prepare a. Research synopsis b. Dissertation c. Writing a good research proposa			
4	Interpret the Scope of Patent Rights and Administration of Patent System.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** English for Research Paper Writing (M20AC01)	**No. of Hours L:2 T:0 P:0**	**Credits:0**
On successful completion of this course, students are able to:				
1	Obtain complete knowledge on Definition of a research paper, Purpose of writing any research paper , its Scope and Benefits.			
2	Understand the standard English formats .for scripting the best research paper.			
3	Analyze all the Qualitative and Quantitative Research Methodologies and the ethics of plagiarism			
4	Explain the detailed process of writing and publishing any research paper and perform a case study on paper writing.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Data Structures and Algorithms Lab (M20CS09)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
After the completion of this course, the students should be able to				

1	Analyze algorithms efficiency .			
2	Summarize and implement various searching and sorting techniques.			
3	Demonstrate stack, queue and linked list with various operations			
4	Implement different trees and graphs concepts.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Cloud computing Lab (M20CS10)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
1	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.			
2	Explain the issues on cloud computing along with security, privacy, and interoperability			
3	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.			
4	Provide the appropriate solutions on cloud computing based on the application.			

Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Python Programming Lab (M20CS11)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
On successful completion of this course, students will be able to:				
1	Expressing the Core Python scripting elements such as variables and flow control structures.			
2	Apply Python functions to facilitate code reuse			
3	Extending how to work with lists and sequence data.			
4	Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Internet of Things Lab (M20CS12)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
On successful completion of this course, students are able to:				
1	Demonstrate the starting of Raspberry Pi and practice Linux commands in command terminal windows			
2	Develop and run all basic python programs on Raspberry Pi			
3	Build real time applications on Light an LED using Python programming			
4	Experiment with implementation of intruder system and various sensors like temperature, humidity, smoke.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Advanced Web Programming (M20CS13)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Apply three-tier architecture concepts and advanced database techniques in web applications.			
2	Use object-oriented techniques in Web programming.			
3	Develop rich interactive environments for the Web.			
4	Create sites that utilize data validation techniques and secure code.			
5	Build sites that use session management.			
6	Creating rich interactive web applications.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) Soft Computing Techniques (M20CS14)	No. of Hours L:3 T:0 P:0	Credits: 3
1	Understand the fuzzy logic, concepts of fuzziness involved in fuzzy set theory.			
2	Explain the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic.			
3	Build the fundamental theory, concepts of neural networks			
4	Identify different neural network architectures, algorithms, applications along their limitations.			
5	Classify different learning rules, architectures to learn several neural network paradigms along with its applications			
6	Deploy different applications of these models to solve engineering.			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Network Programming (M20CS15)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Determine Linux utilities .			
2	Identify file handling techniques and signals.			
3	Explain what is IPC and network programming in Java.			
4	Learn how processes communicate with each other across a Computer Network.			
5	Develop Network programming using TCP/UDP sockets.			
6	Implement Real Time and current trends in client server Application.			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Machine Learning (M20CS16)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Discuss different application on Machine Learning problems.			
2	Describe various algorithms on Machine Learning mentioning its strengths and weaknesses			
3	Illustrate the basic theory focused on Machine Learning.			
4	Improve the performance of Machine Learning algorithms with different parameters.			
5	Analyze current research papers.			
6	Understand the latest issues raised by current researchers.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Digital Forensics (M20CS17)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Discuss digital forensics related to investigative process.			
2	Explain the legal issues to prepare, perform digital forensic analysis based on the investigator's position			
3	Demonstrate the techniques, usage of digital forensics tools.			
4	Elaborate digital forensics in detail.			
5	Analyze the state of the practice, gaps in technology, policy, and legal issues.			

6	Develop techniques used on Data Analysis, cybercrime.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Block Chain Technology(M20CS18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Introduce the fundamentals of blockchain, history, technology and decentralization.			
2	Revise cryptographic concepts and its use in blockchain.			
3	Define bitcoin and understand structure of blockchain			
4	Understand alternatives to proof of work			
5	Introduce smart contracts, solidity and Web3 to implement blockchain			
6	Understand applications of blockchain and its challenges			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Genetic Algorithms and Applications (M20CS18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Explain the principles of Evolutionary Computation and Genetic Algorithms.			
2	Apply the concepts of Evolutionary Computation Methods to find solutions for complex problems.			
3	Describe the applications of Genetic Programming			
4	Analyze with different parameters on Evolutionary Algorithms			
5	Understand the different methods in Machine Learning and Genetic Algorithms			
6	Summarize the current scenario of research and application in Evolutionary Genetic Algorithms and Computing			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Data Science (M20CS20)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Describe a Data Science, skill sets available for a data scientist			
2	Discuss the terms Statistical Inference, its significance to explore data analysis			
3	Understand Data Science Process and its components interact.			
4	Adapt APIs tools to understand the Web data.			
5	Illustrate EDA and the Data Science as a case study.			
6	Plan a effective visualization on given data.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Stress Management (M20AC02)	**No. of Hours L:2 T:0 P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Maintain a stress awareness log. Include identification of causes, symptoms, and analysis of effects			
2	Gather information on current stress management techniques and evaluate personal relevance.			
3	Practice specific techniques, track effectiveness, and revise to meet personal preferences.			

4	Choose an adaptable stress management plan for academic success incorporating selected techniques.			
Course Outcome	**Year / semester** **I I Sem**	**Subject Name (Subject Code)** Advanced Web Programming Lab (M20CS21)	**No. of Hours** **L:0 T:0 P:4**	**Credits: 2**
1	Design and develop static and dynamic web pages with good aesthetic sense of designing and latest technical know-how's.			
2	Understand the Web Application Terminologies, Internet Tools and other web services.			
3	Learn how to link and publish web sites.			
4	Learn Database Connectivity to web applications			
Course Outcome	**Year / semester** **I I Sem**	**Subject Name (Subject Code)** Network Programming Lab (M20CS22)	**No. of Hours** **L:0 T:0 P:4**	**Credits: 2**
1	Understand the concepts of Socket commands.			
2	Implement Connection-Oriented Service using standard ports.			
3	Define Connectionless and Connection Oriented Service.			
4	Plan a case study on client and server and construct a Remote Command Execution using sockets.			
Course Outcome	**Year / semester** **I I Sem**	**Subject Name (Subject Code)** Machine Learning Lab (M20CS23)	**No. of Hours** **L:0 T:0 P:4**	**Credits: 2**
1	Discuss different application on Machine Learning problems.			
2	Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.			
3	Improve the performance of Machine Learning algorithms with different parameters.			
4	Understand the latest issues raised by current researchers.			
Course Outcome	**Year / semester** **I I Sem**	**Subject Name (Subject Code)** Digital Forensics Lab (M20CS24)	**No. of Hours** **L:0 T:0 P:4**	**Credits: 2**
1	Understand the methods available for retrieving the lost data.			
2	Classify the various mobile forensic techniques and how to handle them.			
3	Identify the different Open-source intelligence techniques			
4				
Course Outcome	**Year / semester** **I I Sem**	**Subject Name (Subject Code)** Mini Project with seminar (M20CS25)	**No. of Hours** **L:0 T:0 P:2**	**Credits: 2**
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III-SEMESTER

Course Outcome	**Year/Semester** **III Sem**	**Subject Name (Subject Code)** Natural Language Processing Techniques (M20CS26)	**No. of Hours** **L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Understand approaches to syntax and semantics in NLP.			
2	Understand approaches to discourse, generation, dialogue and summarization within NLP.			
3	Understand current methods for statistical approaches to machine translation.			
4	Understand machine learning techniques used in NLP, including hidden Markov models			
5	Understand the Language model and probabilistic context-free grammars, clustering and unsupervised methods, log-linear and discriminative models.			
6	Understand the Machine Translation, multilingual information, multi lingual automatic summerization			
Course Outcome	**Year /Semester** **III Sem**	**Subject Name (Subject Code)** Cyber Security (M20CS27)	**No. of Hours** **L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students are able to:				
1	Outline key terms and concepts in cyber law, intellectual property and cyber crimes.			
2	Explore the vulnerabilities, threats and cybercrimes posed by criminals			
3	Identify various security challenges phased by mobile devices.			
4	Identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection.			
5	Analyze and evaluate the cyber security needs of an organization			
6	Design operational and strategic cyber security risk management policies in order to adequately protect an organization's critical information and assets.			
Course Outcome	**Year /Semester** **III Sem**	**Subject Name (Subject Code)** Deep Learning (M20CS28)	**No. of Hours** **L:3 T:0 P:0**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Ability to understand the concepts of Neural Networks			
2	Ability to understand the concepts of Deep Learning			
3	Ability to select the Learning Networks in modeling real world systems			
4	Ability to use an efficient algorithm for Deep Models			
5	Ability to apply optimization strategies for large scale applications			
6	Ability to apply the Deep Learning models for Speech Recognition, NLP and Other Applications			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Advanced Optimization (M20MA01)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Describe problem clearly, identify and analyzethe individual functions.			
2	Analyze study on solving optimization problem.			
3	Translate verbal formula on optimization problem.			
4	Design algorithms, reliably to find an approximate solution			
5	Compare the performance of an algorithm.			
6	Discovery, study, understand and solve optimization techniques using algorithms.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Waste Management (M20CE27)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students are able to:				
1	Compare the subject from the technical, legal and economical points.			
2	Learn solid waste management.			
3	Describe environment for sound management			
4	Understand a municipal solid waste management system.			
5	Plan a solid waste management system for decision makers.			
6	Design an incineration facility.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Embedded System Design (M20VL07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Describe embedded systems, design, technology to explain its metrics or challenges.			
2	Designcustomsingle–purposeprocessorsusingcombinationalaswellassequentiallogic.			
3	Discuss about optimizing single – purpose processors. Discuss about the basic architecture and operation of general purpose processors.			
4	Define and distinguish between a timer and a counter, various types of timers and UniversalAsynchronousReceiver/Transmitter.ExplaincontrollersforLCD,Keypad and Stepper Motor.			
5	Discuss common memory types ROM, RAM, advanced RAM. Explain microprocessor interfacing and arbitration methods, various protocols like serial, parallel.			
6	Explain basics of interrupts, architectures like Round Robin, Real – Time Operating System architecture.			

Course Outcome	Year /Semester III Sem	Subject Name (Subject Code) Dissertation Phase-I (M20CS29)	No. of Hours L:0 T:0 P:20	Credits: 10
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IV-SEMESTER

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Dissertation Phase-II (M20CS30)	No. of Hours L:0 T:0 P:32	Credits: 16
On successful completion of this course, students will be able to:				
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COURSE OUTCOMES FOR M.TECH-CYBER SECURITY R20 FOR THE YEAR 2018-2020

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Mathematical Foundation for Cyber Security (M20CY01)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Define the concepts related to the basics of group theory.			
2	Develop understanding of number theory algorithms.			
3	Discover different operations on algebraic structure			
4	Derive the probability density function of transformation of random variables.			
5	Develop understanding of Bayesian framework.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Network Security and Cryptography (M20CS08)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Identifies various types of vulnerabilities, attacks, mechanisms and security services			
2	Compare and contrast symmetric and asymmetric encryption algorithms.			
3	Implementation of message authentication, hashing algorithms and able to understand kerberos			
4	Explore the attacks and controls associated with IP, transport level, web and E-mail security			
5	Develop intrusion detection system, solutions for wireless networks and designing of various types of firewalls.			
6	Understand the various wireless network vulnerabilities and implements different types of cryptographic techniques to improve wireless network security.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Cloud computing (M20CS03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Discuss main concepts, key strengths, and limitations for cloud computing.			
2	. Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.			
3	Explain the issues on cloud computing along with security, privacy, and interoperability			
4	Choose and use the appropriate technology, methods on these issues			
5	Identify problems, and explain, analyze, and evaluate various cloud computing solutions.			
6	Provide the appropriate solutions on cloud computing based on the application.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Python Programming (M20CS04)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Defining the fundamentals of writing Python scripts.			
2	Expressing the Core Python scripting elements such as variables and flow control structures.			

3	Apply Python functions to facilitate code reuse.
4	Extending how to work with lists and sequence data.
5	Implement file operations such as read and write
6	Implementing and Adapting the code robust by handling errors and exceptions properly.

Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Internet of Things (M20CS05)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Describe the basic terminology, latest technology along with its applications.			
2	Discuss the protocols based on the concepts such as machine to machine.			
3	Illustrate the IOT devices using Python Scripting Language.			
4	Develop an application with Raspberry PI platform which can be widely used in many applications of IoT devices.			
5	Implement it widely that can be used in many applications of IoT devices			
6	Design a web application framework on REST ful web API.			
Course Outcome	**Year /SemesterI Sem**	**Subject Name (Subject Code)** Secure Software Design and Development (M20CY02)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Differentiate between various software vulnerabilities.			
2	Explain the Software process vulnerabilities for an organization			
3	Demonstrate the Monitor resources consumption in software			
4	Explain the Interrelate security and software development process.			
5	Discuss the Case study of DNS server, DHCP configuration and SQL injection attack.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Operating System Security(M20CY03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Explain the overview of operating system			
2	Demonstrate the Access control matrix, access control list and Lampson‘s access matrix			
3	Identify the Encryption Techniques, Authentication and Password Security issues			
4	Identify the Encryption Techniques and apply the real time applications•			
5	Know the role and responsibilities of a system administrator and Create and administer user accounts on both a Linux and Windows platform			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Artificial Intelligence (M20CS07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Remember various AI concepts like the AI technique, level of models, there underlying			

	assumptions etc			
2	Understand the concepts of AI search techniques			
3	Apply knowledge Representation techniques			
4	Analyze different structures of representation			
5	Evaluate AI search techniques			
6	Understand the concepts of Natural Language Processing.			
Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Network Security and Cryptography Lab (M20CY04)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
On successful completion of this course, students will be able to:				
1	Implement the cipher techniques.			
2	Apply the mathematical foundation required for various cryptographi c algorithms.			
3	Develop the various security algorithms.			
4	Use different open source tools for network security and analysis			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Cloud computing Lab(M20CS10)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
On successful completion of this course, students are able to:				
1	Develop the architecture along with specific infrastructure on cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud,etc.			
2	Explain the issues on cloud computing along with security, privacy,and interoperability			
3	Identify problems, and explain, analyze, and evaluate various cloud computingsolutions.			
4	Provide the appropriate solutions on cloud computing based on theapplication.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Python Programming Lab (M20CS11)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
After the completion of this course, the students should be able to				
1	Expressing the Core Python scripting elements such as variables and flow control structures.			
2	Apply Python functions to facilitate code reuse			
3	Extending how to work with lists and sequence data.			
4	Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Internet of Things Lab (M20CS12)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
1	Demonstrate the starting of Raspberry Pi and practice Linux commands in command terminal window.			
2	Develop and run all basic python programs on RaspberryPi			
3	Build real time applications on Light an LED using Pythonprogramming			
4	Experiment with implementation of intruder system and various sensors like temperature, humidity,smoke.			

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Research Methodology and IPR(M20MC01)	No. of Hours L:2 T:0 P:0	Credits: 0
On successful completion of this course, students will be able to:				
1	Acquire knowledge on Research Design and statistical methods in research.			
2	Analyze the various methods in Data Collection, Data Organization and different approaches of Data Representation			
3	Understand all the basic concepts required to prepare a. Research synopsis b. Dissertation c. Writing a good research proposal			
4	Interpret the Scope of Patent Rights and Administration of Patent System			
Course Outcome	Year /Semester I Sem	Subject Name (Subject Code) English for Research Paper Writing (M20AC01)	No. of Hours L:2 T:0 P:0	Credits:0
On successful completion of this course, students are able to:				
1	Obtain complete knowledge on Definition of a research paper, Purpose of writing any research paper , its Scope and Benefits.			
2	Understand the standard English formats .for scripting the best research paper.			
3	Analyze all the Qualitative and Quantitative Research Methodologies and the ethics of plagiarism			
4	Explain the detailed process of writing and publishing any research paper and perform a case study on paper writing			
Course Outcome	Year / semester II Sem	Subject Name (Subject Code) Cyber Security (M20CS27)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Outline key terms and concepts in cyber law, intellectual property and cyber crimes.			
2	Explore the vulnerabilities, threats and cybercrimes posed by criminals.			
3	Identify various security challenges phased by mobile devices.			
4	Identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection.			
5	Analyze and evaluate the cyber security needs of an organization.			
6	Design operational and strategic cyber security risk management policies in order to adequately protect an organization's critical information and assets.			
Course Outcome	Year / semester II Sem	Subject Name (Subject Code) Web Application and Penetrating Testing (M20CY05)	No. of Hours L:3 T:0 P:0	Credits: 3
1	Explain threats, vulnerabilities and breaches to design database			
2	Discuss Relational Data Model and concurrency controls and locking, SQL extensions to security			
3	Demonstrate the Browser security principles.			

4	How to provide software centric security and mobile web browser security in real time applications			
5	Construct the penetrating testing workflows with examples.			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Machine Learning (M20CS16)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Discuss different application on Machine Learning problems.			
2	Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.			
3	Illustrate the basic theory focused on Machine Learning.			
4	Improve the performance of Machine Learning algorithms with different parameters.			
5	Analyze current research papers.			
6	Understand the latest issues raised by current researchers.			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Digital Forensics (M20CS17)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Discuss digital forensics related to investigative process.			
2	Explain the legal issues to prepare, perform digital forensic analysis based on theinvestigator's position			
3	Demonstrate the techniques, usage of digital forensics tools.			
4	Elaborate digital forensics in detail.			
5	Analyze the state of the practice, gaps in technology, policy, and legal issues			
6	Develop techniques used on Data Analysis, cybercrime.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Blockchain Technology (M20CS18)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Introduce the fundamentals of blockchain, history, technology and decentralization.			
2	Revise cryptographic concepts and its use in blockchain			
3	Define bitcoin and understand structure of blockchain			
4	Understand alternatives to proof of work			
5	Introduce smart contracts, solidity and Web3 to implement blockchain			
6	Understand applications of blockchain and its challenges			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Ethics and Law of Cyber Security (M20CY06)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft			
2	Determine computer technologies, digital evidence collection, and evidentiary reporting in			

	forensic acquisition.			
3	Secure both clean and corrupted systems, protecting personal data, securing simple computer networks, and safe Internet usage.			
4	Incorporate approaches for incident analysis and response.			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** Firewall and VPN Security (M20CY07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	To show the fundamental knowledge of Firewalls and it types			
2	Construct a VPN to allow Remote Access, Hashing, connections with Cryptography and VPN Authorization			
3	Elaborate the knowledge of depths of Firewalls, Interpreting firewall logs, alerts, Intrusion and Detection			
4	Infer the design of Control Systems of SCAD, DCS, PLC's and ICS's			
5	Evaluate the SCADA protocols like RTU, TCP/IP, DNP3, OPC,DA/HAD			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** Big Data Analytics (M20CY08)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
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Course Outcome	**Year / semester Ⅱ Sem**	**Subject Name (Subject Code)** Ethical Hacking and Cyber Security Lab (M20CY09)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
After the completion of this course, the students should be able to				
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Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Digital Forensics Lab (M20CS24)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Understand the methods available for retrieving the lost data.			
2	Classify the various mobile forensic techniques and how to handle them.			
3	Identify the different Open-source intelligence techniques			

4	Demonstrate how to develop certification for Cyber Forensic.			
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Machine Learning Lab (M20CS23)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Discuss different application on Machine Learning problems			
2	Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.			
3	Improve the performance of Machine Learning algorithms with different parameters			
4	Understand the latest issues raised by current researchers.			
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Block Chain Techology Lab(M20CY10)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Explain design principles of Bitcoin and Ethereum			
2	Explain Nakamoto consensus.			
3	Explain the Simplified Payment Verification protocol.			
4	List and describe differences between proof-of-work and proof-of-stake consensus			
5	Interact with a blockchain system by sending and reading transactions.			
6	Design, build, and deploy a distributed application			
7	Evaluate security, privacy, and efficiency of a given Blockchain system.			
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Mini Project with seminar (M20CY11)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
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Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Stress Management(M20AC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
1	Maintain a stress awareness log. Include identification of causes, symptoms, and analysis of effects			
2	Gather information on current stress management techniques and evaluate personal relevance.			
3	Practice specific techniques, track effectiveness, and revise to meet personal preferences.			
4	Choose an adaptable stress management plan for academic success incorporating selected techniques.			

III-SEMESTER

Course Outcome	Year/Semester III Sem	Subject Name (Subject Code) Information Warfare(M20CY12)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Explain the theory of data, information and knowledge as they pertain to information warfare			
2	Apply strategies of using information as a weapon and a target			
3	Apply the principles of offensive and defensive information warfare for a given context			
4	Discuss the social, legal and ethical implications of information warfare			
5	Evaluate contemporary information warfare concepts for their application in a corporate environment			
Course Outcome	Year /Semester III Sem	Subject Name (Subject Code) Intrusion Detection (M20CY13)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students are able to:				
1	Understating of various types of intruders and intrusion detection systems.			
2	Implementation of Intrusion detection architecture.			
3	Identifying the Security threats and risk assessment.			
4	Exploring tools used for intrusion detection system			
5	Develop the understanding of organizations standards and its legal issues.			
Course Outcome	Year /Semester III Sem	Subject Name (Subject Code) Social, Web and Mobile Analytics (M20CY14)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Apply best practices in Search Engine Optimization			
2	Apply ethical principles to the use of web and social media data			
3	Use different tool for capturing data from various resources			
4	Perform Mobile Application analysis using different tool and techniques			
5	Analysis report generation and presentations.			
Course Outcome	Year /Semester III Sem	Subject Name (Subject Code) Advanced Optimization (M20MA01)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				

1	Describe problem clearly, identify and analyze the individual functions.			
2	Analyze study on solving optimization problem			
3	Translate verbal formula on optimization problem.			
4	Design algorithms, reliably to find an approximate solution			
5	Compare the performance of an algorithm.			
6	Discovery, study, understandand solve optimization techniques using algorithms			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Waste Management (M20CE27)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students are able to:				
1	Compare the subject from the technical, legal and economical points.			
2	Learn solid waste management.			
3	Describe environment for sound management			
4	Understand a municipal solid waste management system.			
5	Plan a solid waste management system for decision makers.			
6	Design an incineration facility.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Embedded System Design (M20CE27)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Describe embedded systems, design, technology to explain its metrics or challenges.			
2	Design custom single–purpose processors using combinational as well as sequential logic.			
3	Discuss about optimizing single – purpose processors. Discuss about the basic architecture and operation of general purpose processors.			
4	Define and distinguish between a timer and a counter, various types of timers and Universal Asynchronous Receiver/Transmitter.Explain controllers for LCD,Keypad and Stepper Motor.			
5	Discuss common memory types ROM, RAM, advanced RAM. Explain microprocessor interfacing and arbitration methods, various protocols like serial, parallel.			
6	Explain basics of interrupts, architectures like Round Robin, Real – Time Operating System architecture.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Project / Dissertation Phase-I (M20CY15)	**No. of Hours L:0 T:0 P:20**	**Credits: 10**
1				
2				
3				
4				
5				

IV-SEMESTER

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Project / Dissertation Phase-II (M20CY16)	No. of Hours L:0 T:0 P:32	Credits: 16
On successful completion of this course, students will be able to:				
1				
2				
3				
4				
5				

VAAGDEVI COLLEGE OF ENGINEERING

Autonomous

Bollikunta, Warangal Urban-506 005 (T.S)

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES (CO's) FOR B.TECH – CIVIL ENGINEERING (R20)

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Linear Algebra and Vector Calculus (B20MA04)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.			
2	Determine Eigen values, Eigenvectors of matrices.			
3	Evaluate limits of single-variable functions graphically and computationally.			
4	Analyze improper integrals using Beta and Gamma functions.			
5	Calculate Partial derivatives, extreme of functions of multiple variables. CO5: Analyse line, surface and volume integrals using fundamental theorems.			

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Applied Physics (B20PH04)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Use the laws of mechanics to determine the equilibrium condition of particles and rigid bodies.			
2	Explain the elastic properties of materials.			
3	Understands the basic concepts in Nondestructive techniques and their applications.			
4	Explain the knowledge of waves and the factors affecting acoustics of buildings and their remedies.			
5	Calculate geometric properties like Centre of gravity moment of inertia and mass			

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Basic Mechanical Engineering (B20ME05)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Identify the Various Energy sources and IC engines systems.			
2	Apply the Metal removal process using Lathe, drilling and Milling operations.			
3	Compare the application and usage of various engineering Materials.			
4	Analyze the Principle of operation of Impulse and reaction turbine.			
5	Discuss the importance of engineering materials.			

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Programming for Problem Solving (B20CS01)	No. of Hours : **L: 4 T: 0 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				

1	Understanding how problems are posed and how they can be analyzed for obtaining solutions.			
2	Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.			
3	Implementing different operations on arrays and creating and using of functions to solve problems.			
4	Understanding and exploring the various methods of memory allocations.			
5	Ability to design and implement different types of file structures using standard methodology.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Physics Lab (B20PH05)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Estimate the frequency of tuning for and AC supply with the help of stretched strings.			
2	Analyze as well as compare the intensity distribution of interference and diffraction patterns.			
3	Draw the characteristics of electrical and electronic circuits and evaluate the dependent parameters.			
4	Explore and understand the applications of semiconducting devices.			
5	Evaluates the wavelength and radius of curvature of Plano convex lens by Newton's rings.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Programming for Problem Solving Lab (B20CS02)	No. of Hours : **L: 0 T:0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Understand basic structure of the C Programming, data types, declaration and usage of variables, control structures and all related concepts.			
2	Ability to understand any algorithm and Write the C programming code in executable form.			
3	Implement Programs using functions, pointers and arrays, and use the pre-processors to solve real time problems.			
4	Ability to use file structures and implement programs on files			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Engineering Workshop (B20ME04)	No. of Hours : **L: 0 T:0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Know the fundamental knowledge of various trades and their usage in real time Applications.			
2	Compare Foundry, Welding, Black smithy, Fitting, Machine shop and house wiring.			
3	Understand the basis for analyzing power tools in construction and wood working, electrical engineeringand mechanical engineering.			
4	Apply basic concepts of computer hardware for assembly and disassembly.			

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Induction Program (B20MC01)	No. of Hours : **L: 0 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	NA			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Differential Calculus and Transforms (B20MA06)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Apply the fundamental concepts of ordinary differential equations toreal time problems.			
2	Find the complete solution of a non homogeneous differential equationsand applying its concepts in solving physical problems of Engineering.			
3	Evaluate initial value problems and boundary value problems using Laplace transforms technique.			
4	Expand the algebraic and transcendental functions by applying Fourier Series.			
5	Apply the concepts of Partial Differential Equations to Engineering problems.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Applied Chemistry (B20CH03)	No. of Hours : **L: 4 T: 0 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	The knowledge of molecular batteries and corrosion			
2	The knowledge of water treatment.			
3	The knowledge of polymers and their uses.			
4	The required knowledge of principles and concepts of phase rule and surface chemistry.			
5	The knowledge of materials and their uses.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Mechanics (B20CE01)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand concepts of resultant force and moment Systems.			
2	Analyze problems related to friction developed in motion of bodies.			
3	Calculate centroid and moment of inertia for simple and composite sections.			
4	Apply concepts of mechanics to solve problems of rigid body motion.			
5	Understand the application of Work Energy method for plane motion problems.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Basic Electrical and Electronics Engineering (B20EE01)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electrical power.			

2	Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance and Power Factor			
3	Learn the working principle of DC motors, Transformers.			
4	Study the characteristics of PN Junction diode and zener diode.			
5	Learn the basic of Amplifiers and Rectifiers.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** English for Effective communication (B20EN01)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Skim and scan the digital text to summarize it for future reference.			
2	Read the text to make notes according to their needs.			
3	Use English language effectively in spoken and written forms.			
4	Communicate confidently in various contexts and different cultures.			
5	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Python Programming Lab (B20CS07)	No. of Hours : **L: 0 T: 1 P: 2**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Expressing the Core Python scripting elements such as variables and flow control structures.			
2	Apply Python functions to facilitate code reuse.			
3	Extending how to work with lists and sequence data.			
4	Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Drawing (B20ME01)	No. of Hours : **L: 0 T: 0 P: 4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand various commands, object properties in AUTOCAD.			
2	Analyse the Projections of Points and solids.			
3	Estimate the use of drawings, dimensioning, scales and conic sections.			
4	Compare the Conversion of Isometric views to Orthographic views.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Probability Distribution and Numerical Methods (B20MA08)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Use probability theory for modelling uncertainty in engineering problems			
2	Develop discrete and continuous probability distribution and its applications.			

3	Construct confidence interval estimates for population parameters to test the hypothesis.			
4	Find a better approximate root of a given equation.			
5	Compute the differential equation using Numerical techniques.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Strength of Materials - 1 (B20CE02)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Determine the stresses and strains in the members.			
2	Draw shear force and Bending moment diagram for determinate beams.			
3	Identify the flexural and shear stresses for various sections.			
4	Evaluate the slope and deflection of determinate beams.			
5	Identify the concept of torsion and spring subjected to loading			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Fluid Mechanics (B20CE03)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Learn the fundamentals of fluids and the principles of manometer.			
2	Compute dimensional flow in a pipe applying continuity equation.			
3	Calculate the flow parameters by Euler's and Bernoulli's equation.			
4	Differentiate laminar and turbulent flow and various losses in pipe flow.			
5	Determine Boundary layer thickness, Drag-Lift forces.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Surveying (B20CE04)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Identify the classification of surveying and instruments used.			
2	Calculate the horizontal and vertical angle using Tacheometric surveying.			
3	Understand the process of control surveying and adjustments.			
4	Know the concept of Hydrographic and Astronomical surveying.			
	Understand the principles of Total station and GPS surveying.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Construction Materials (B20CE05)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Compare the properties of most common and advanced building materials.			
2	Understand the typical and potential applications of lime, cement and aggregates.			
3	Know the Rudiments of production of concrete.			
4	Understand application of timbers and other materials.			

5	Understand the importance of modern material for construction.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Strength of Materials Lab (B20CE06)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Identify the bending behavior of beams using bending test.			
2	Determine the behavior of material under torsion.			
3	Determine the hardness of materials using different tests.			
4	Find out the characteristic of material under compression, impact and shear test.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Surveying Lab (B20CE07)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Calculate area of given plot/points using chain survey.			
2	Determine the angle/distance of given points using compass survey.			
3	Find out the angle, distance and height of the given points using theodolite surveying.			
4	Determine the distance of the given points using Total station.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** English Language and Interactive Communication Skills Lab (B20EN02)	No. of Hours : **L: 0 T: 0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Understand the nuances of English language through audio-visual experience and group activities.			
2	Speak with clarity and confidence which in turn enhances their employability skills.			
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation.			
4	Involve the students in speaking activities in various contexts.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Project Based Learning - 1 (B20CE08)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	NA			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Human Values and Professional Ethics (B20MC04)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				

1	It ensures students sustained happiness through identifying the essentials of human values and skills.			
2	It facilitates a correct understanding between profession and happiness.			
3	It helps students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.			
4	Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Strength Materials - 2 (B20CE09)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyse the fixed and continuous beams.			
2	Evaluate the direct and bending stresses of different structures.			
3	Determine the critical load of columns and stresses developed in thick and thin cylinders.			
4	Understand the concept of principal stresses and strain energy.			
5	Analyze the unsymmetrical bending of beams and shear centre for different section.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Hydraulics and Hydraulic Machinery (B20CE10)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Apply fundamental knowledge in open-channel hydraulics in Civil Engineering.			
2	Describe dimensional analysis and similarity to develop hydraulic model.			
3	Understand about the turbo-machines and its efficiency.			
4	Gain knowledge of hydraulic turbines and their operational design.			
5	Evaluate the performance of centrifugal pump			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Structural Analysis - 1 (B20CE11)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method.			
2	Analyse continuous beams and rigid frames by slope deflection method.			
3	Understand the concept of moment distribution and analyse continuous beams and rigid frames with and without sway.			
4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.			
5	Understand the concept of matrix stiffness method and analyse of continuous beams, pin jointed trusses and rigid plane frames.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Engineering Geology (B20CE12)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 2**

After the completion of this course, the students should be able to				
1	Understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.			
2	Gain basics knowledge on properties of minerals.			
3	Gain knowledge about types of rocks, their distribution and uses.			
4	Understand the methods of study on geological structure.			
5	Understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Construction Techniques And Practices (B20CE13)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know the different construction techniques and structural systems.			
2	Understand various techniques and practices in masonry construction, flooring, and roofing.			
3	Plan the requirements for substructure construction.			
4	Know the methods and techniques involved in construction of various types of super structures.			
5	Select, maintain and operate hand and power tools and equipment used in the building construction sites.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Fluid Mechanics & Hydraulic Machinery Lab (B20CE14)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Calibrate flow measuring devices used in pipes, channels and tank.			
2	Demonstrate practical understanding of the minor and friction losses in pipe flows and characterize laminar and turbulent flows.			
3	Demonstrate practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.			
4	Compare results of analytical models with actual behavior of real fluid flows.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Engineering Geology Lab (B20CE15)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Learn about the ground surface features based on map patterns of contour with emphasis on practical application in civil engineering.			
2	Identify physical and mechanical properties of rocks and minerals and its application in civil engineering uses.			
3	Measure strike and dip of the bedding planes.			
4	Interpret and draw sections for geological maps showing horizontal beds, vertical beds, inclined beds, folds, faults.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Building Drawing Lab - CAD (B20CE16)	No. of Hours : **L: 0 T: 1 P: 2**	**Credits: 2**

After the completion of this course, the students should be able to				
1	Understand the usage of AutoCAD commands.			
2	Able to draw the Plan, Section and elevation of the building structures.			
3	Understand the 2D & 3D building elements.			
4	Detail the building components in Auto CAD drawings.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Project Based Learning - 2 (B20CE17)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	NA			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Design of Steel Structures (B20CE18)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Recognize the design philosophy of steel structures and connections.			
2	Select the suitable section shape and size for tension and compression members.			
3	Able to calculate ultimate load of steel beams and portal frames using plastic analysis.			
4	Able to design beams, Built-up beams and plate girders.			
5	Identify and compute the design trusses on Industrial structures.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Geotechnical Engineering (B20CE19)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Identify the properties and characteristics of soils.			
2	Analyze permeability and seepage through soils.			
3	Ability to analyze the stress distribution and consolidation settlement.			
4	Understand the principles of shear strength of soils.			
5	Able to know site investigation methods and Testing of soils.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Concrete Technology (B20CE20)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Acquire knowledge on the concrete mix proportioning and manufacturing.			
2	Understand the properties of concrete in fresh and hardened state.			
3	Ability to know development of High Strength and High Performance Concrete.			
4	Understand the importance of durability of concrete.			
5	Identify special concrete and Quality Control during construction.			
Course Outcome	Year / Semester : III / V-Sem	**Subject Name (Code):** Hydrology and Water Resource Engineering (B20CE21)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Define the key drivers on water resources and hydrological processes.			
2	Apply the knowledge of hydrological models to surface water problems.			
3	Explain the concept of Flood and Drought and management strategies.			
4	Describe the importance and design water storage reservoirs.			

5	Apply the concepts of groundwater for water resources management.

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DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES (CO's) FOR B.TECH – CIVIL ENGINEERING (R22)

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Matrices and Calculus (B22MA01)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**

After the completion of this course, the students should be able to

1	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
2	Find the Eigen values and Eigen vectors.
3	Reduce the quadratic form to canonical form using orthogonal transformations.
4	Solve the applications on the mean value theorems.
5	Evaluate the improper integrals using Beta and Gamma functions.
6	Find the extreme values of functions of two variables with/ without constraints.
7	Evaluate the multiple integrals and apply the concept to find areas, volumes.

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Applied Physics (B22PH01)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**

After the completion of this course, the students should be able to

1	Understand physical world from fundamental point of view by the concepts of Quantum.
2	Mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
3	Identify the role of semiconductor devices in science and engineering Applications.
4	Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
5	Appreciate the features and applications of Nanomaterials.
6	Understand various aspects of Lasers and Optical fibre and their applications in diverse fields.

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** C Programming and Data Structures (B22CS06)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**

After the completion of this course, the students should be able to

1	Understand the various steps in Program development.
2	Explore the concepts of control statements and functions in C Programming Language.
3	Understand the concepts of pointers and its applications.
4	Ability to design and implement different types of file structures.
5	Apply data structures such as stacks, queues in problem solving and analyze various searching and sorting algorithms.

Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Engineering Workshop (B22ME01)	No. of Hours : **L: 0 T: 1 P: 3**	**Credits: 2.5**
After the completion of this course, the students should be able to				
1	Study and practice on machine tools and their operations			
2	Practice on manufacturing of components using workshop trades including pluming, fitting,			
3	Identify and apply suitable tools for different trades of Engineering processes including			
4	Apply basic electrical engineering knowledge for house wiring practice.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** English for Skill Enhancement (B22EN01)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand the importance of vocabulary and sentence structures.			
2	Choose appropriate vocabulary and sentence structures for their oral and written communication.			
3	Demonstrate their understanding of the rules of functional grammar.			
4	Develop comprehension skills using known and unknown passages.			
5	Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Elements of Civil Engineering (B22CE01)	No. of Hours : **L: 0 T:0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Understand the importance of vocabulary and sentence structures.			
2	Choose appropriate vocabulary and sentence structures for their oral and written communication.			
3	Demonstrate their understanding of the rules of functional grammar.			
4	Develop comprehension skills using known and unknown passages.			
5	Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Applied Physics Laboratory (B22PH02)	No. of Hours : **L: 0 T:0 P: 3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Know the determination of the Planck"s constant using Photo electric effect and identify the			
2	Appreciate quantum physics in semiconductor devices and optoelectronics.			
3	Gain the knowledge of applications of dielectric constant.			
4	Understand the variation of magnetic field and behavior of hysteresis curve.			
5	Gain the knowledge of decay of charge and determine time constant of RC circuit.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** C Programming and Data Structures Laboratory (B22CS07)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**

After the completion of this course, the students should be able to				
1	Develop modular and readable C Programs			
2	Solve problems using strings, functions. Handle data in files.			
3	Implement stacks, queues using arrays.			
4	To understand and analyze various searching and sorting algorithms.			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** English Language and Communication Skills Laboratory (B22EN02)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Understand the nuances of English language through audio- visual experience and group activities.			
2	Neutralize their accent for intelligibility.			
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills of language and improve their pronunciation.			
4	Involve in speaking activities in various contexts.			
5	Speak with clarity and confidence which in turn enhance their employability skills			
Course Outcome	Year / Semester : I / I-Sem	**Subject Name (Code):** Environmental Science (B22CH03)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Ordinary Differential Equations and Vector Calculus (B22MA02)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Identify whether the given differential equation of first order is exact or not.			
2	Solve higher differential equation and apply the concept of differential equation to real world problems.			
3	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
4	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
5	Evaluate the line, surface and volume integrals and converting them from one to another.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Chemistry (B22CH01)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				

1	Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.			
2	The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.			
3	They can learn the fundamentals and general properties of polymers and other engineering materials.			
4	They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Computer Aided Engineering Graphics (B22ME03)	No. of Hours : **L: 1 T: 0 P: 4**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Apply computer aided drafting tools to create 2D and 3D objects sketch conics and different types of solids.			
2	Appreciate the need of Sectional views of solids and Development of surfaces of solids.			
3	Read and interpret engineering drawings.			
4	Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Applied Mechanics (B22CE02)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand concepts of resultant force and moment Systems.			
2	Analyze problems related to friction developed in motion of bodies.			
3	Calculate centroid and moment of inertia for simple and composite sections.			
4	Apply concepts of mechanics to solve problems of rigid body motion.			
5	Understand the application of Work Energy method for plane motion problems.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Surveying (B22CE04)	No. of Hours : **L: 2 T: 0 P: 0**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand the working principles of survey instruments.			
2	Identify data collection methods and prepare field notes.			
3	Calculate angles, distances and levels and compute areas using theodolite.			
4	Calculate the horizontal and vertical angle using Tacheometric surveying.			
5	Understand the principles of Total station and GPS surveying.			

Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Python Programming Laboratory (B22CS04)	No. of Hours : **L: 0 T: 1 P: 2**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Develop the application specific codes using python.			
2	Understand Strings, Lists, Tuples and Dictionaries in Python.			
3	Understand the structure of exception handling for all general purpose exceptions.			
4	Verify programs using modular approach, file I/O, Python standard library. Implement Digital Systems using Python.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Engineering Chemistry Laboratory (B22CH02)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Able to determine the hardness of water			
2	Able to perform methods such as conductometry, and potentiometry in order to find out the			
3	Students are able to prepare polymers like bakelite and nylon-6,6.			
4	Estimations saponification value, and viscosity of lubricant oils.			
Course Outcome	Year / Semester : I / II-Sem	**Subject Name (Code):** Surveying Laboratory - I (B22CE05)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Student will be able to prepare Map and Plan for required site with suitable scale.			
2	Student will be able to prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.			
3	Student will be able to judge which type of instrument to be used for carrying out survey for a Particular Area and estimate the area.			
4	Student will be able to judge the profile of ground by observing the available existing contour map.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Probability and Statistics (B22MA03)	No. of Hours : **L: 3 T: 1 P: 0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	After learning the contents of this paper the student must be able to			
2	Apply the concepts of probability and distributions to some case studies.			
3	Correlate the concepts of one unit to the concepts in other units.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Building Materials, Construction and Planning (B22CE06)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Comprehend different types of construction material.			
2	Understand the manufacturing of Cement and role of Admixtures.			
3	Identify the concept of building components and services.			
4	Know the importance of Masonry and formwork.			
5	Plan a building based on the factors and principles of planning.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Engineering Geology (B22CE07)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the importance of geological knowledge in civil engineering point of view.			
2	Gain basics knowledge on properties of mineralogy and petrology.			
3	Gain knowledge about structural geology.			
4	Understand the effects of earthquakes and importance of geophysical studies.			
5	Understand the application of geological investigation in projects such as dams, Reservoirs and tunnels			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Strength of Materials – I (B22CE08)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Determine the stresses and strains in the members.			
2	Draw shear force and Bending moment diagram for determinate beams.			
3	Identify the flexural and shear stresses for various sections.			
4	Evaluate the slope and deflection of determinate beams.			
5	Identify the concept of principal stresses and theory of failures.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Fluid Mechanics (B22CE09)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the broad principles of fluid statics,			
2	Learn the concept of fluid kinematics and dynamics.			
3	Understand the measurement of flow in pipes and notches.			
4	Understand classifications of flow losses through pipes.			
5	Apply the continuity, momentum and energy principles.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Surveying Laboratory - II (B22CE10)	No. of Hours : **L: 0 T: 1 P: 2**	**Credits: 2**

After the completion of this course, the students should be able to				
1	Calculate area of given plot/points using theodolite survey.			
2	Determine the angle/distance of given points using theodolite survey.			
3	Find out the area, distance and elevation of the given points using total station.			
4	Determine the height and plot curve using Total station.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Strength of Materials Laboratory (B22CE11)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Identify the bending behavior of beams using bending test.			
2	Determine the behavior of material under torsion.			
3	Determine the hardness of materials using different tests.			
4	Find out the characteristic of material under compression, impact and shear test.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Computer Aided Drafting Laboratory (B22CE12)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Plan buildings as per NBC.			
2	Draw brick bonds, Plan, Section and Elevation of buildings.			
3	Develop residential building and public building as per the building by-laws.			
4	Draw Electrical layout, Plumbing layout for buildings.			
Course Outcome	Year / Semester : II / III-Sem	**Subject Name (Code):** Logical Reasoning and Quantitative Aptitude (B22MC08)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	NA			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Basic Electrical and Electronics Engineering (B22EE19)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To analyze and solve electrical circuits using network laws and theorems.			
2	To understand and analyze basic Electric and Magnetic circuits.			
3	To study the working principles of Electrical Machines.			
4	To introduce components of Low Voltage Electrical Installations.			
5	To identify and characterize diodes and various types of transistors.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Concrete Technology (B22CE13)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Acquire knowledge on the testing of aggregates and its properties.			
2	Understand the properties of concrete in fresh state.			
3	Comprehend the properties of concrete in hardened concrete.			
4	Ability to know the concept of Elasticity, Creep and Shrinkage.			
5	Identify different types of admixtures and special concrete.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Strength of Materials – II (B22CE14)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the concept of torsion of circular shafts and springs.			
2	Determine the critical load of columns.			
3	Evaluate the direct and bending stresses of different structures.			
4	Determine the stresses developed in thick and thin cylinders.			
5	Analyze the unsymmetrical bending of beams and shear centre for different section.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Hydraulics and Hydraulics Machinery (B22CE15)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Apply fundamental knowledge in open-channel hydraulics in Civil Engineering.			
2	Describe dimensional analysis and similarity to develop hydraulic model.			
3	Understand about the turbo-machines and its efficiency			
4	Gain knowledge of hydraulic turbines and their operational design.			
5	Evaluate the performance of centrifugal pumps.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Structural Analysis - I (B22CE16)	No. of Hours : **L: 3 T: 0 P: 0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyze pin-jointed plane frames by different methods.			
2	Analyze three hinged arches and understand the concept of energy theorems.			
3	Understand the Indeterminate beams with rotation of a support.			
4	Analyze the beams using three moments and slope deflection method.			
5	Understand the concept of moving loads and influence lines.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Fluid Mechanics and Hydraulics Machinery Laboratory (B22CE17)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Describe the basic measurement techniques of fluid mechanics and its application.			
2	Demonstrate practical understanding of the minor and friction losses in pipe flows.			
3	Discover practical working of Hydraulic machines- different types of Turbines, Pumps and other miscellaneous hydraulics machines.			
4	Compare results of analytical models with actual behavior of real fluid flows.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Basic Electrical and Electronics Engineering Laboratory (B22EE20)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**

After the completion of this course, the students should be able to				
1	To analyze and solve electrical circuits using network laws.			
2	To understand and analyze basic Electric and Magnetic circuits.			
3	To study the working principles of Electrical Machines.			
4	To identify and characterize diodes and various types of transistors.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Concrete Technology Laboratory (B22CE18)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Acquire knowledge on the properties of cement and aggregate.			
2	Evaluate the workability of fresh Concrete.			
3	Determine the strength characteristics of hardened concrete.			
4	Gain knowledge of Non-destructive test on concrete.			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Real-time Research Project/ Field-Based Project (B22CE19)	No. of Hours : **L: 0 T: 0 P: 4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	NA			
Course Outcome	Year / Semester : II / IV-Sem	**Subject Name (Code):** Gender Sensitization Laboratory (B22MC07)	No. of Hours : **L: 0 T: 0 P: 2**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Students will have developed a better understanding of important issues related to gender in contemporary India.			
2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and films.			
3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter them.Students will acquire insights into the gendered division of labour and its relation to politics and economics.			
4	Students will develop a sense of appreciation of women in all walks of life. Men and women students and professionals will be better equipped to work and live in harmony.			
5	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.			

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Course Outcomes for B.Tech – ECE-R20 for the academic year 2020-2021 onwards

Course Outcome	Semester I Sem	(B20MA01) Linear Algebra & Calculus	L: 3 T: 1 P: 0 C: 4
After the completion of this course, the students should be able to			
1	Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.		
2	Determine Eigen values, Eigenvectors of matrices.		
3	Analyse the nature of sequence and series to identify the convergence.		
4	Evaluate limits of single-variable functions graphically and computationally.		
5	Calculate Partial derivatives, extreme of functions of multiple variables.		
Course Outcome	**Semester I Sem**	**(B20CS01) Programming for Problem Solving**	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Understanding how problems are posed and how they can be analyzed for obtaining solutions.		
2	Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.		
3	Implementing different operations on arrays and creating and using of functions to solve problems.		
4	Understanding and exploring the various methods of memory allocations.		
5	Ability to design and implement different types of file structures using standard methodology.		
Course Outcome	**Semester I Sem**	**(B20PH01) Modern Physics**	**L:3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understands the basic principles and hypothesis of quantum mechanics.		
2	Analyse and apply the concepts of wave optics for accurate determination of the interference in thin films, Newton's rings and the diffraction in single slit etc.		
3	Describes the characteristics and working of lasers and their applications in various fields.		
4	Classify the materials on the basis of energy band gap, and evaluates the carrier concentration of given semiconductors for device applications.		
5	Apply the concepts of the light propagation in optical fibres in optical communication systems.		
Course Outcome	**Semester I Sem**	**(B20CH02) Chemistry**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to gain			
1	The knowledge of electrochemical cells, different batteries		
2	The required principles and concepts of corrosion, control methods.		
3	The knowledge of water treatment.		
4	The knowledge of polymers and their importance in day to day life.		
5	The required principles and concepts of passive devices.		

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Course Outcome	Semester I Sem	(B20ME01) Engineering Drawing	L: 0 T: 0 P: 4 C: 2
After the completion of this course, the students should be able to			
1	Understand various commands, modify the applications and object properties in AUTOCAD.		
2	Analyse the Projections of Points and solids.		
3	Estimate the use of drawings, dimensioning, scales and conic sections.		
4	Compare the Conversion of Isometric views to Orthographic views.		
Course Outcome	**Semester I Sem**	**(B20PH05) Physics Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Estimate the frequency of tuning for and AC supply with the help of stretched strings.		
2	Analyze as well as compare the intensity distribution of interference and diffraction Patterns.		
3	Draw the characteristics of electrical and electronic circuits and evaluate the dependent Parameters.		
4	Explore and understand the applications of semiconducting devices.		
5	Evaluates the wavelength and radius of curvature of Plano convex lens by Newton's rings.		
Course Outcome	**Semester I Sem**	**(B20CS02) Programming for Problem Solving Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Understand basic structure of the C Programming, data types, declaration and usage of variables, control structures and all related concepts.		
2	Understand any algorithm and Write the C programming code in executable form.		
3	Implement Programs using functions, pointers and arrays, and use the pre-processors to solve real time problems.		
4	Ability to use file structures and implement programs on files.		
Course Outcome	**Semester II Sem**	**(B20MA02) Differential Equations & Vector Calculus**	**L: 3 T: 1 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Apply the fundamental concepts of ordinary differential equations to real time problems.		
2	Find the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems.		
3	Evaluate the multiple integrals in various coordinate systems.		
4	Apply the concepts of gradient, divergence and curl to formulate Engineering problems.		
5	Analyse line, surface and volume integrals using fundamental theorems.		
Course Outcome	**Semester II Sem**	**(B20EC01) Basic Electronic devices**	**L: 3 T: 1 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Analyze the characteristics of the PN junction diode and Zener diode.		
2	Design the rectifiers with and without filters for specified DC voltage.		
3	Illustrate the voltage-current characteristics of Junction Transistor and different		

	configurations of Transistor.		
4	Design and analyze the different biasing circuits and amplifier circuits.		
5	Acquire knowledge about the construction, theory and characteristics of FET and MOSFET.		
Course Outcome	**Semester II Sem**	**(B20EE03) Electrical Circuits**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn basics of electrical circuits such as laws, transformation and network theorems and network reduction techniques.		
2	Generate voltage and current waveforms for 3 phase AC circuits and study the relationship between Voltage and current in star and delta connections.		
3	Analyze two port networks with ABCD parameters.		
4	Analyze the steady state and transient operation of series and parallel RLC circuits.		
5	Classify various types for filters and attenuators and study their characteristics.		
Course Outcome	**Semester II Sem**	**(B20CS05) Basic Python programming**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Defining the fundamentals of writing Python scripts.		
2	Expressing the Core Python scripting elements such as variables and flow control structures.		
3	Apply Python functions to facilitate code reuse.		
4	Extending how to work with lists and sequence data.		
5	Adapting the code robust by handling errors and exceptions properly.		
Course Outcome	**Semester II Sem**	**(B20EN02) English Language and Interactive Communication Skills Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1.	Understand the nuances of English language through audio-visual experience and group activities.		
2.	Speak with clarity and confidence which in turn enhances their employability skills.		
3.	Develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation.		
4.	Involve the students in speaking activities in various contexts.		
Course Outcome	**Semester II Sem**	**(B20EC02) Basic Electronic Devices Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Demonstrate the characteristics and operation of Semiconductor diodes.		
2	Analyze different rectifier circuits.		
3	Demonstrate V-I characteristics of BJT, FET and UJT.		
4	Design simple electronic circuits.		
Course Outcome	**Semester II Sem**	**(B20CS09) Basic Python programming Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Expressing the Core Python scripting elements such as variables and flow control structures.		
2	Apply Python functions to facilitate code reuse.		
3	Extending how to work with lists and sequence data.		
4	Adapting the code robust by handling errors and exceptions properly.		

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Course Outcome	Semester II Sem	(B20ME03) Engineering & IT Workshop	L: 0 T: 0 P: 3 C: 1.5
After the completion of this course, the students should be able to			
1	Know the fundamental knowledge of House wiring and soldering and their usage in real time Applications.		
2	Gain knowledge on electronic components and measuring instruments.		
3	Use basic concepts of computer hardware for assembly and disassembly.		
4	Use Microsoft tools for exercise.		
Course Outcome	**Semester III Sem**	**(B20MA09) Numerical Methods and Complex Variables**	**L: 3 T: 1 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Find a better approximate root of a given equation using appropriate iterative method.		
2	Evaluate the integration to solve the differential equations using numerical techniques.		
3	Analyse the complex function with reference to their analyticity.		
4	Expand the complex functions by using Taylor's and Laurent's series.		
5	Evaluate the real integrals and transforms the functions from one plane to another plane.		
Course Outcome	**Semester III Sem**	**(B20EC03) Signals and Systems**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply the knowledge of vectors, orthogonal basis to signals. Analyze the spectral characteristics of Continuous-time periodic signals using Fourier series.		
2	Demonstrate and apply Fourier transform on various signals.		
3	Apply the Laplace transform and Fourier transform for the analysis of continuous-time signals.		
4	Analyse systems based on their properties and determine the response of LTI system.		
5	Understand the concepts of convolution and correlation of signals.		
Course Outcome	**Semester III Sem**	**(B20EC04) Electronic Circuits Analysis**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Construct and analyze the Low frequency model of transistor and evaluate the h-parameters.		
2	Analyze the single and multi stage amplifiers in high frequency region.		
3	Design and construct the negative feedback amplifiers and oscillators according to the required specifications.		
4	Determine the efficiencies of large signal amplifiers.		
5	Compare and contrast various tuned amplifiers.		
Course Outcome	**Semester III Sem**	**(B20EC05) Switching Theory and Logic Design**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Utilize and explain the functionality of logic gates (AND, NAND, OR, NOR, XOR, XNOR, NOT).		
2	Design different combinational circuits using minimization techniques.		
3	Explain various flip flops and design various registers.		
4	Analyze and design basic sequential circuits and counters.		
5	Analyze and minimize completely specified and incompletely specified sequential machines.		
Course Outcome	**Semester III Sem**	**(B20EE10) Electrical Technology**	**L: 3 T: 0 P: 0 C: 3**

After the completion of this course, the students should be able to			
1	Study the basics of magnetic circuits and its analysis.		
2	Understand the principle of operation of DC machines and their applications.		
3	Analyze the construction, types, performance and its applications		
4	Understand the rotating magnetic field, operation and characteristics.		
5	Understand the operation of AC machines.		
Course Outcome	**Semester III Sem**	**(B20EN01) English for Effective Communication**	**L: 2 T: 0 P: 0 C: 2**
After the completion of this course, the students should be able to			
1	Skim and scan the digital text to summarize it for future reference.		
2	Read the text to make notes according to their needs.		
3	Use English language effectively in spoken and written forms.		
4	Communicate confidently in various contexts and different cultures.		
5	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.		
Course Outcome	**Semester III Sem**	**(B20EC06) Electronic Circuits Analysis Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Understand the concept of multistage amplifiers, analysis of multistage amplifier and plot frequency response.		
2	Design, construct and test amplifier circuits and interpret the results.		
3	Operate electronic test equipment and hardware/software tools to characterize the behaviour		
4	Synthesize and evaluate single stage and multi stage amplifiers.		
Course Outcome	**Semester III Sem**	**(B20EC07) Electronic Simulation EDA Tools Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Illustrate different types of signals and methods of generating them using MATLAB.		
2	Demonstrate the importance of convolution and correlation for different applications.		
3	Simulate various digital circuits.		
4	Design and develop functional analysis of combinational & sequential circuits.		
Course Outcome	**Semester III Sem**	**(B20EC08) Project Based Learning-1**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Apply the fundamental and engineering concepts in projects.		
2	Develop the skills that include critical thinking, communication and creativity.		
3	Identify meaningful connections across content of the course.		
4	Design and develop learning concept models for societal perceptive.		
5	Develop team work among multidisciplinary environment and engages lifelong learning.		
Course Outcome	**Semester IV Sem**	**(B20EC12) Pulse and Digital Circuits**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Design the circuits for generating desired wave shapes (non-sinusoidal) for different applications like computers, control systems and counting and timing systems.		
2	Analyze the applications of diode as Integrator, differentiator, clippers and clamper circuits.		
3	Analyze the switching characteristics and applications of diode and transistor.		
4	Analyze and design multivibrators for various applications and sweep circuits.		

5	Design the time base generators and sampling gates with the knowledge of basic principles.		
Course Outcome	**Semester IV Sem**	**(B20EC13) Analog and Digital Communications**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Analyze and simulate the concepts of AM and AM Demodulation in communication.		
2	Interpret with various angle modulation and demodulation systems.		
3	Demonstrate the understanding of various baseband transmission techniques.		
4	Demonstrate the understanding of various digital modulation and demodulation techniques.		
5	Explain different error detection and error correction codes like block codes, cyclic codes and convolution codes.		
Course Outcome	**Semester IV Sem**	**(B20EC14) Electromagnetic Theory and Transmission Lines.**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply vector calculus to electrostatic fields in different engineering situations. Use Gauss's Law, Coulomb's law to find fields and potentials for a variety of situations including charge distributions.		
2	Explain, illustrate &can apply the concept of Magnetostatics in different engineering situations.		
3	Analyze & explain the concept of conductors, dielectrics & capacitance, electromagnetic waves characteristics & terminologies and; be able to compute the Pointing vector and identify the power flow direction.		
4	Study time varying Maxwell's equations and their applications is electromagnetic problems.		
5	Describes the transmission lines with equivalent circuit and explain their characteristics & use its knowledge in different engineering situations.		
Course Outcome	**Semester IV Sem**	**(B20EC15) Probability Theory and Stochastic Process**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basic concepts of probability theory and random processes.		
2	Solve simple engineering problems with the knowledge of two dimensional random variables.		
3	Compare and contrast the various random processes.		
4	Analyze the autocorrelation and cross correlation functions and their properties.		
5	Understand concepts of information theory and Shannon law.		
Course Outcome	**Semester IV Sem**	**(B20EC16) Computer Organization**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Describe the fundamental organization of a computer system.		
2	Understand the concepts of register transfer logic and arithmetic operations.		
3	Understand the concepts of Hardwired control and micro programmed control.		
4	Explain the I/O and memory organization in depth.		
5	Understand the concepts of parallel processing, pipelining and inter processor communication.		
Course Outcome	**Semester IV Sem**	**(B20EC17) Pulse and Digital Circuits Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Understand the applications of diode as integrator, differentiator, clippers and clamper circuits.		
2	Demonstrate basic logic gates and sampling gates		
3	Design and analyze various multivibrator circuits and Schmitt trigger circuit.		

4	Design and analyze UJT relaxation oscillator and boot-strap sweep circuits		
Course Outcome	**Semester IV Sem**	**(B20EC18) Analog and Digital Communications lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Understand the different types of modulation techniques.		
2	Understanding the multiplexing and coding schemes.		
3	Assess different digital modulation and demodulation techniques.		
4	Apply suitable modulation schemes and coding for various applications.		
Course Outcome	**Semester IV Sem**	**(B20EC19) Hardware Design Lab**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Design their own projects on PCB up to industrial grade.		
2	Understand the Design concepts of various Analog circuits and their applications.		
3	Design and analyze the different Digital logic circuits.		
4	Understand the Arduino Uno board and to interface various real time application circuits.		
Course Outcome	**Semester IV Sem**	**(B20EC20) Project Based Learning-2**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Apply the fundamental and engineering concepts in projects.		
2	Develop the skills that include critical thinking, communication and creativity.		
3	Identify meaningful connections across content of the course.		
4	Design and develop learning concept models for societal perceptive.		
5	Develop team work among multidisciplinary environment and engages lifelong learning.		
Course Outcome	**Semester V Sem**	**(B20EC23) Linear & Digital IC Applications**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the operational amplifiers with linear integrated circuits.		
2	Classify various active filter configurations based on frequency response and construct using 741 Op-Amp.		
3	Design and describe the concepts of timer using IC 555, basic principle of PLL.		
4	Understand various ADC and DAC techniques		
5	Design Combinational and Sequential circuits using ICs.		
Course Outcome	**Semester V Sem**	**(B20EC24) Digital Signal Processing**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Identify the different types of the discrete signals and systems.		
2	Understand the DFT, FFT and interrelation between DFT and various transforms.		
3	Understand the characteristics of FIR filters and classify the different types of windowing techniques.		
4	Design a I IR digital filters for a given specifications and Apply the knowledge to real world		
5	Understand different types of signal processing architectures.		
Course Outcome	**Semester V Sem**	**(B20EC25) Control Systems**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the concept of feedback and analyze the control system components by their		

	Mathematical modeling.		
2	Estimate the time domain specifications and steady state error.		
3	Apply various time domain techniques to assess the system performance.		
4	Formulate different types of analysis in frequency domain to explain the nature of stability of the		
5	Test system Controllability and Observability using state space representation and applications of state space representation to various systems.		
Course Outcome	**Semester V Sem**	**(B20EC26) Electronic Measurements and Instrumentation (Professional Elective – I)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Describe the fundamental concepts, different terminology related to measurements and principles of instrumentation.		
2	Explain the operations of the various instruments required in measurements.		
3	Apply the measurement techniques for different types of tests.		
4	Select specific instrument for various parameters measurement.		
5	Apply knowledge of different oscilloscopes like CRO, DSO and display devices.		
Course Outcome	**Semester V Sem**	**(B20EC27) Computer Networks (Professional Elective – I)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Will be in a position to understand World Wide internet concepts.		
2	Should be able to demonstrate and explore the basics of Computer Networks and various protocols.		
3	Will be in position to administrate a network and flow of information.		
4	Able to contrast different internetworking protocols.		
5	Able to demonstrate different Internet Transport Protocols.		
Course Outcome	**Semester V Sem**	**(B20EC28) Basic JAVA Programming (Professional Elective – I)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the use of OOP concepts and solve real world problems using OOP techniques.		
2	Solve the inter-disciplinary applications using the concept of inheritance.		
3	Understand the multithreading concepts and develop efficient applications.		
4	Design GUI based applications and develops applets for web applications.		
5	Develop program using JDBC connectivity to access data from database and execute different queries to		
Course Outcome	**Semester V Sem**	**(B20MB01) Managerial Economics & Financial Analysis**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the nature, scope and importance of Managerial Economics.		
2	Know what is demand, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand.		
3	Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.		
4	Understand the characteristics of different kinds of markets and outline different form of business		
5	Organization and analyze how capital budgeting techniques are used for investment decisions.		

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Course Outcome	**Semester V Sem**	**(B20EC29) Linear & Digital IC Applications Lab**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Design circuits using operational amplifiers for various applications.		
2	Understand the different logical gates & decoders, flip-flops.		
3	Apply the knowledge of OP-AMPS to design various analog circuits.		
4	Compare linear and digital integrated IC's.		
Course Outcome	**Semester V Sem**	**(B20EC30) Digital Signal Processing Lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Analyze signals using the discrete Fourier transform (DFT).		
2	Understand Convolution process.		
3	Understand FFT algorithm for efficient computation of DFT.		
4	Design IIR & FIR filters.		
Course Outcome	**Semester V Sem**	**(B20EN03) Advanced English Communication skills lab**	**L: 0 T: 0 P: 3 C: 1.5**
After the completion of this course, the students should be able to			
1	Participate in group discussion to present their viewpoints briefly and effectively.		
2	Inculcate flair for writing and felicity in written expression in Résumé / Curriculum Vitae / reports.		
3	Participate confidently with appropriate body language in interviews.		
4	Enhance their team building skills and capabilities for effective decision making.		
Course Outcome	**Semester V Sem**	**(B20EC31) Project Based Learning-3**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Apply the fundamental and engineering concepts in projects.		
2	Develop the skills that include critical thinking, communication and creativity.		
3	Identify meaningful connections across content of the course.		
4	Design and develop learning concept models for societal perceptive.		
5	Develop team work among multidisciplinary environment and engages lifelong learning.		
Course Outcome	**Semester VI Sem**	**(B20EC32) Microprocessors & Microcontrollers**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Illustrate the internal organization of popular 8086/8051 microprocessors/microcontrollers. Contrast hardware and software interaction and integration.		
2	Design microprocessors and microcontrollers based systems and develop microcontroller based systems for real time applications.		
3	Understand microcontroller 8051 and its programming.		
4	Explain the Memory organization classification and their applications.		
5	Assess programming interfacing etc of various devices with microprocessors and external world.		
Course Outcome	**Semester VI Sem**	**(B20EC33) VLSI Design**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Design digital applications using Verilog HDL		
2	Understand IC technology and basic electrical properties of MOS and BiCMOS.		

3	Design the layout of circuits using various design rules. Develop and design the gate level circuits		
4	Gain the knowledge to design data path subsystems like Adders, Shifters, and ALUs etc.		
5	Illustrate different programmable logic devices and CMOS testing.		
Course Outcome	**Semester VI Sem**	**(B20EC34) Antennas & Wave Propagation**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Define the parameters like antenna efficiency, beam efficiency, radiation resistance etc. in the design of an antenna.		
2	Explain antenna arrays, illustrate antenna measurements and arrange a setup to carry out the antenna pattern measurements in the laboratory.		
3	Understand the design issues and operation of fundamental antennas like Yagi-Uda, Frequency independent and Aperture antennas.		
4	Classify the different wave propagation mechanisms, determine their characteristic features and estimate the parameters involved.		
5	Analyze the structure of Ionosphere for the wave propagation and Solve problems on Critical frequency, Maximum usable frequency and Skip distance.		
Course Outcome	**Semester VI Sem**	**(B20EC35) Design of Fault Tolerant Systems (Professional Elective – II)**	**L: 3 T: 0 P: 0 C:3**
After the completion of this course, the students should be able to			
1	Understand various concepts of Fault modeling, fault diagnosis, and test Pattern Generation.		
2	Design fault tolerant systems based on modular redundancy techniques.		
3	Gain knowledge of Basic concepts of self checking circuits and able to design fault safe circuits.		
4	Understand the concepts of Design for Testability with various testability measures including BIST technique.		
5	Study the various Standard IEEE Test Access Methods required for testing the digital circuits.		
Course Outcome	**Semester VI Sem**	**(B20EC36) Fiber Optical Communications (Professional Elective – II)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand and analyze the constructional parameters of opticalfibres.		
2	Design an optical system.		
3	Estimate the losses due to attenuation, absorption, scattering and bending.		
4	Compare various optical detectors and choose suitable one for different applications.		
5	Develop the concepts of optical system design.		
Course Outcome	**Semester VI Sem**	**(B20EC37) Digital Image Processing (Professional Elective – II)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain the knowledge of digital image fundamentals and image transforms.		
2	Understand image enhancement in spatial and frequency domain.		
3	Understand the different methods to restore an image.		
4	Analyze image segmentation techniques and morphological image processing techniques.		

5	Analyze the different image compression techniques.		
Course Outcome	**Semester VI Sem**	**(B20EC38) Radar Systems (Professional Elective – III)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Illustrate the importance of radar fundamentals and analysis of the radar equation.		
2	Understand the working principle of CW and FM-CW radar and its applications.		
3	Understand the working principle of MTI and pulse Doppler radar.		
4	Understand the different radar tracking methods.		
5	Understand the radar receivers and also extraction of radar signal from noisy signal.		
Course Outcome	**Semester VI Sem**	**(B20EC39) Speech Processing (Professional Elective – III)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the fundamentals of digital speech processing.		
2	Demonstrate the different time domain models of speech processing.		
3	Understand the concepts of linear predictive coding for speech processing.		
4	Analyze the different techniques of speech processing		
5	Make use of different speech and speaker recognition techniques and Hidden Markov.		
Course Outcome	**Semester VI Sem**	**(B20EC40) Machine learning (Professional Elective – III)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Discuss different application on Machine Learning problems.		
2	Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.		
3	Illustrate the basic theory focused on Machine Learning models and Learning Techniques.		
4	Improve the performance of Machine Learning algorithms with different parameters.		
5	Analyze Probabilistic models and features of Machine Learning.		
Course Outcome	**Semester VI Sem**	**(B20EC41) VLSI & e-CAD Lab**	**L: 0 T: 0 P:2 C:1**
After the completion of this course, the students should be able to			
1	Acquire knowledge on High end Simulation tools like Mentor Graphics, Tanner EDA etc.		
2	Design digital circuits at different levels using programming concepts.		
3	Implement any type of digital systems.		
4	Program any available FPGA and CPLD using implementation tool.		
Course Outcome	**Semester VI Sem**	**(B20EC42) Microprocessors & Microcontrollers Lab**	**L: 0 T: 0 P:2 C:1**
After the completion of this course, the students should be able to			
1	Demonstrate experimentally basic programming of Microprocessor.		
2	Recall the microprocessor interfacing with various peripherals for various applications.		
3	Apply the basic programming of microcontroller.		
4	Examine microprocessor interfacing with various peripherals for various applications.		
Course Outcome	**Semester VI Sem**	**(B20EC43) Project Based Learning-4**	**L: 0 T: 0 P: 2 C:1**
After the completion of this course, the students should be able to			

1	Apply the fundamental and engineering concepts in projects.		
2	Develop the skills that include critical thinking, communication and creativity.		
3	Identify meaningful connections across content of the course.		
4	Design and develop learning concept models for societal perceptive.		
5	Develop team work among multidisciplinary environment and engages lifelong learning.		
Course Outcome	**Semester VI Sem**	**(B20MC05) Logical Reasoning and Quantitative Aptitude**	**L: 2 T: 0 P: 0 C: 0**
After the completion of this course, the students should be able to			
1	Apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.		
2	Apply quantitative correctly arrive at meaningful conclusions regarding their answers and manipulate equations and formulas in order to solve for the desired variable.		
3	Interpret given information correctly, determine which mathematical model best describes the data, and apply the model correctly.		
4	Correctly apply mathematical language and notation to explain the reasoning underlying their conclusions when solving problems using mathematical or statistical techniques.		
5	Improve their mathematical skills in various general aspects to solve real time problems.		
Course Outcome	**Semester VII Sem**	**(B20EC44) Microwave Engineering**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the significance of microwaves and microwave transmission lines.		
2	Identify the different wave guide components and applications		
3	Analyze the characteristics of various microwave tubes.		
4	Learn the different types of microwave solid state devices.		
5	Gain knowledge of microwave Measurement.		
Course Outcome	**Semester VII Sem**	**(B20EC45) Embedded Systems**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand and design embedded systems.		
2	Understand the architecture of Arm processors.		
3	Develop a system using IO devices and interfacing to external world.		
4	Understand types of memory.		
5	Understand embedded firmware design approaches.		
Course Outcome	**Semester VII Sem**	**(B20EC46) Wireless and Mobile Communication (Professional Elective – IV)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Estimate the impairments due to multi path fading channel.		
2	Explain an Importance of the fundamental techniques to overcome the different fading effects.		
3	Distinguish the co-channel and Non co-channel interference.		
4	Inspect cell coverage for signal and traffic, diversity techniques and mobile antennas.		
5	Relate and explain the functioning of frequency management, Channel assignment and types of handoff.		
Course	**Semester**		**L: 3 T: 0 P: 0 C: 3**

Outcome	**VII Sem**	**(B20EC47) CMOS Circuit Design (Professional Elective – IV)**	
After the completion of this course, the students should be able to			
1	Understand the fundamentals of VLSI design flow & interchange formats of VLSI design tools.		
2	Develop the understanding to analyze circuit characterization & its performance estimation.		
3	Develop the understanding to analyze the combinational circuit design using various circuit families In VLSI.		
4	Apply the knowledge of sequential circuit design in VLSI for various design applications.		
5	Analyze low power design strategies suitable for various design applications in VLSI.		
Course Outcome	**Semester VII Sem**	**(B20EC48) Artificial Intelligence (Professional Elective – IV)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Remember various AI concepts like the AI technique, level of models, there underlying assumptions etc		
2	Understand the concepts of AI search techniques		
3	Apply knowledge Representation techniques		
4	Analyze different structures of representation		
5	Evaluate AI search techniques, Create Expert systems		
Course Outcome	**Semester VII Sem**	**(B20EC49) Sensor Networks (Professional Elective – V)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the overview of sensor &networks.		
2	Explore the various architectures of sensors & network		
3	Understand the various protocols in sensor networks.		
4	Identify the infrastructure and establishment of sensor networks.		
5	Explore various sensor network platforms and tools.		
Course Outcome	**Semester VII Sem**	**(B20EC50) Satellite Communication (Professional Elective – V)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the historical background, basic concepts and frequency allocations for satellite communication		
2	Understand the satellite sub systems like Telemetry, tracking, command and monitoring power system.etc.		
3	Understand various Satellite Multiple Access techniques		
4	Understand the earth station technology and terrestrial interface networks.		
5	Understand the applications of Satellites and GPS system.		
Course Outcome	**Semester VII Sem**	**(B20EC51) Robotics and Automation (Professional Elective – V)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the basic components and specifications used in robotics and automation.		
2	Understand and implement the different types of motors and sensors during designing of robotics system.		

3	Use manipulators, Actuators and Grippers and their design considerations in robotics and automation.		
4	Understand the basic concepts of AVR microcontrollers.		
5	Implement the programming and interfacing concepts of AVR microcontroller in robotic designing.		
Course Outcome	**Semester VII Sem**	**(B20EC52) MICROWAVE ENGINEERING LAB**	**L: 0 T: 0 P:2 C: 1**
1	Demonstrate a microwave bench for measuring microwave parameters.		
2	Measure parameters like attenuation, VSWR, etc.,		
3	Gain knowledge about Various components used for Microwave communication and their applications		
4	Analyze the characteristics of all microwaves engineering component		
Course Outcome	**Semester VII Sem**	**(B20EC53) EMBEDDED SYSTEMS LAB**	**L: 0 T: 0 P: 2 C: 1**
1	Develop the programming concepts of 8bit, 16bit, and 32 bit micro controllers.		
2	Understand working principle and programming concepts of ARM processor		
3	Understand types of memory, interacting to external world and		
4	Analyze the different I/O devices and their interfacing concepts, understand the concepts of real time applications.		
Course Outcome	**Semester VII Sem**	**(B20EC54) MINI PROJECT AND INTERNSHIP**	**L: 0 T: 0 P: 0 C: 2**
1	Demonstrate a sound technical knowledge of their selected project topic.		
2	Identify and summarize an appropriate list of literature review, analyze previous researchers' work and relate them to current project.		
3	Present the project outlining the approach and expected results using good oral and written presentation skills.		
4	Apply critical and creative thinking in the design of engineering projects not only limited to electronics and communication engineering domain but if possible to other interdisciplinary domains as well.		
5	Design and develop a functional product prototype while working in a team		
6	Communicate with engineers and the community at large in written and oral forms.		
7	Consider the business context and commercial positioning of designed devices or systems		
Course Outcome	**Semester VII Sem**	**(B20EC55) PROJECT PHASE – I**	**L: 0 T: 0 P: 8 C: 4**
1	Demonstrate a sound technical knowledge of their selected project topic.		
2	Identify and summarize an appropriate list of literature review, analyze previous researchers' work and relate them to current project.		
3	Formulate clearly a work plan and procedures.		
4	Present the project outlining the approach and expected results using good oral and written presentation skills.		
5	Undertake problem identification, formulation and solution.		
6	Apply critical and creative thinking in the design of engineering projects not only limited to electronics and communication engineering domain but if possible to other interdisciplinary		

	domains as well.		
7	Design and develop a functional product prototype while working in a team		
8	Demonstrate the knowledge, skills and attitudes of a professional engineer when working in a team or working as a team leader.		
9	Communicate with engineers and the community at large in written and oral forms.		
10	Consider the business context and commercial positioning of designed devices or systems		
Course Outcome	**Semester VIII Sem**	**(B20EC56) Digital Signal Processor & Architecture (Professional Elective – VI)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the DFT, FFT, DSP system and Explain the DSP computational building blocks and addressing capabilities.		
2	Distinguish between the architectural features of General purpose processors and DSP processors.		
3	Discuss and understand the TMS320C54xx Processor.		
4	Understand the Analog devices family of DSP devices.		
5	Analyze the interface of various devices to DSP Processors.		
Course Outcome	**Semester VIII Sem**	**(B20EC57) FPGA Architecture & Applications (Professional Elective – VI)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand PLDs & its use depending on application or design		
2	Understand FPGAs & its use depending on application		
3	Develop the understanding to analyzes RAM programmable Xilinx & Anti-Fuse Programmable Actel FPGAs architectures for applications		
4	Develop the understanding to analyze PROM programmable Altera FPGAs& other commercially		
5	Apply the knowledge of FPGAs for various design applications		
Course Outcome	**Semester VIII Sem**	**(B20EC58) Internet of Things (Professional Elective – VI)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Interpret the vision of IOT from a global context.		
2	Perceive building blocks of Internet of Things and its characteristics		
3	Learn the basic concepts of Python		
4	Implement the python programming using Raspberry.		
5	Develop Python web applications and cloud servers for IOT.		
Course Outcome	**Semester VIII Sem**	**(B20EC59) TECHNICAL SEMINAR**	**L: 0 T: 0 P: 2 C: 1**
After the completion of this course, the students should be able to			
1	Write technical documents and give oral presentations related to the work completed.		
2	Demonstrate the ability to collaborate with others as they work on intellectual projects (reading, writing, speaking, researching...).		
3	Explain the role of self-efficacy, personal goals, and motivation in improving academic life		
4	Describe the behaviors and characteristics of an effective learner		
5	Gain knowledge of fast and rapidly changing by self learning		
6	Develop the interpersonal skills, soft skills and creativity.		

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Course Outcome	Semester VIII Sem	(B20EC60) PROJECT PHASE - II	L: 0 T: 0 P: 16 C: 8
After the completion of this course, the students should be able to			
1	Demonstrate a sound technical knowledge of their selected project topic.		
2	Identify and summarize an appropriate list of literature review, analyze previous researchers' work and relate them to current project.		
3	Formulate clearly a work plan and procedures.		
4	Present the project outlining the approach and expected results using good oral and written presentation skills.		
5	Undertake problem identification, formulation and solution.		
6	Apply critical and creative thinking in the design of engineering projects not only limited to electronics and communication engineering domain but if possible to other interdisciplinary domains as well.		
7	Design and develop a functional product prototype while working in a team		
8	Demonstrate the knowledge, skills and attitudes of a professional engineer when working in a team or working as a team leader.		
9	Communicate with engineers and the community at large in written and oral forms.		
10	Consider the business context and commercial positioning of designed devices or systems		
Course Outcome	**Semester VII or VIII Sem**	**(B20CE55) Disaster Preparedness & Planning Management (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Attain knowledge on various types, stages, phases in disaster management		
2	Recognize various types of natural disaster, Mitigation and Management Systems		
3	Know the different types of manmade disasters and its effects		
4	Explain Remote sensing technology and GIS in disaster mitigation and management.		
5	Know the concepts of risk, warning and forecasting methods in disaster management		
Course Outcome	**Semester VII or VIII Sem**	**(B20CE56) Environmental Management (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Comprehend the need for Environmental Management		
2	Identify the attributes of Environment Management system and standards		
3	Apply different methodologies for impact assessment		
4	To understand the various Environment management plan		
5	Identify the techniques and control measures for Environment management		
Course Outcome	**Semester VII or VIII Sem**	**(B20CE57) Urban Planning (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Describe the importance of proper urban planning for a healthy city		
2	Apply basic methods for urban planning		
3	Describe housing development schemes		
4	Design public transport and non-motorized transport facilities for a city		
5	Describe smart city developments in India and abroad and its various elements		

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Course Outcome	**Semester VII or VIII Sem**	**(B20EE54) Electrical Power Utilisation and Safety (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Know about the electric heating and welding		
2	Gain the knowledge on illumination system.		
3	Understand the electrical installation, estimation and costing.		
4	Understand the importance of power factor.		
5	Gain the knowledge on safety and protection.		
Course Outcome	**Semester VII or VIII Sem**	**(B20EE55) Concepts of Control systems (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the basic concept control systems.		
2	Know the mathematical model of the systems.		
3	Estimate the time domain specifications and steady state error.		
4	Know the frequency response analysis.		
5	Understand concept of stability.		
Course Outcome	**Semester VII or VIII Sem**	**(B20EE56) Renewable Energy Sources (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Know about the global and national energy scenario.		
2	Understand the concept of solar energy.		
3	Know the basics of wind energy.		
4	Differentiate the hydel and tidal power plants.		
5	Explore the bio-mass, geothermal and ocean energy.		
Course Outcome	**Semester VII or VIII Sem**	**(B20ME59) Non-Conventional Energy Sources (Open Elective)**	**C:3 L: 3 T: 0 P: 0**
1	Apply the technology to capture the energy from the renewable sources like sun, Wind, ocean, biomass, geothermal.		
2	Use different renewable energy sources to produce electrical power minimize the Use of conventional energy sources to produce electrical energy		
3	Identify the fact that the conventional energy resources are depleted		
4	Understand direct energy conversion		
5	Learn different methods in solar energy system.		
Course Outcome	**Semester VII or VIII Sem**	**(B20ME45) Robotics (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Apply the knowledge of robotics in real time human life applications.		
2	Analyze the concept of CAD/CAM and automation to the robotics.		
3	Compare knowledge of robot applications in manufacturing like, material handling, loading and unloading etc.		
4	Experiment the robotics to the spot and continuous arc welding and spray painting.		
5	Relate the Robot Application in Manufacturing.		
Course Outcome	**Semester VII or VIII Sem**	**(B20ME33) Mechatronics**	**L: 3 T: 0 P: 0 C: 3**
1	Use the control system, mechatronics design systems and measurement systems.		

2	Work on various actuating systems.		
3	Convert the signals from one form to another form.		
4	Estimate the micro controllers and micro processors.		
5	Develop the simple programming code for PLC's.		
Course Outcome	**Semester VII or VIII Sem**	**(B20EC37) Digital Image Processing (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Gain the knowledge of digital image fundamentals and image transforms.		
2	Understand image enhancement in spatial and frequency domain.		
3	Understand the different methods to restore an image.		
4	Analyze image segmentation techniques and morphological image processing.		
5	Analyze the different image compression techniques.		
Course Outcome	**Semester VII or VIII Sem**	**(B20EC46) Wireless and Mobile Communication (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Estimate the impairments due to multi path fading channel.		
2	Explain an Importance of the fundamental techniques to overcome the different fading effects.		
3	Distinguish the co-channel and Non co-channel interference.		
4	Inspect cell coverage for signal and traffic, diversity techniques and mobile antennas.		
5	Relate and explain the functioning of frequency management, Channel assignment and types of handoff.		
Course Outcome	**Semester VII or VIII Sem**	**(B20EC49) Sensor Networks (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the overview of sensor &networks.		
2	Explore the various architectures of sensors & network		
3	Understand the various protocols in sensor networks.		
4	Identify the infrastructure and establishment of sensor networks.		
5	Explore various sensor network platforms and tools.		
Course Outcome	**Semester VII or VIII Sem**	**(B20EC61) Biomedical Instrumentation (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the functions of bio amplifiers, characteristics of medical instruments and bio signals.		
2	Discuss the various internal, external Bio electrodes and relations between electrical and mechanical activities of heart.		
3	Compare various concepts of Cardiac Instrumentation and gain the knowledge about		
4	Analyze the Therapeutic Equipment and their operation.		
5	Acquires knowledge about neuro-muscular Instrumentation like ECG EMG and EEG.		
Course Outcome	**Semester VII or VIII Sem**	**(B20CS19) Data base Management Systems (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Perceive the fundamental concepts of database management.		
2	Analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.		
3	Apply relational Database Theory, and be able to write relational algebra expressions for queries.		
4	Apply Normalization Process to construct the database and explain Basic Issues of Transaction		

5	Compare the basic Database storage structures and access techniques: File Organization indexing methods including B- Tree and Hashing.		
Course Outcome	**Semester VII or VIII Sem**	**(B20CS12) Java Programming (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the use of OOP concepts and solve real world problems using OOP techniques.		
2	Solve the inter-disciplinary applications using the concept of inheritance.		
3	Develop robust and faster applications by applying different exception handling mechanisms.		
4	Understand the multithreading concepts and develop efficient applications.		
5	Design GUI based applications and develops applets for web applications.		
Course Outcome	**Semester VII or VIII Sem**	**(B20CS55) Introduction to Network Security (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Identifies various types of vulnerabilities, attacks, mechanisms and security services.		
2	Compare and contrast symmetric and asymmetric encryption algorithms.		
3	Implementation of message authentication, hashing algorithms.		
4	Explore E-Mail security, S/MIME Functionality.		
5	Develop intrusion detection system and designing of various types of firewalls.		
Course Outcome	**Semester VII or VIII Sem**	**(B20CS56) Introduction to Cloud Computing (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Ability to understand various service delivery models of a cloud computing architecture.		
2	Ability to understand the ways in which the cloud can be programmed and deployed.		
3	Understanding Cloud Computing Architecture and Management		
4	Understanding cloud service Models.		
5	Understanding cloud service providers.		
Course Outcome	**Semester VII or VIII Sem**	**(B20CS37) Internet of Things (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Interpret the vision of IoT from global context.		
2	Perceive building blocks of Internet of Things and its characteristics.		
3	Learn the basic concepts of Python. Implement the python programming using Raspberry.		
4	Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.		
5	Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.		
Course Outcome	**Semester VII or VIII Sem**	**(B20CS04) Data Structures and Algorithms (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Define the basic techniques of algorithm analysis		
2	Examine the linear and non linear data structures.		
3	Develop Priority Queues and Balanced Trees.		
4	Understand Hashing Techniques and Graph applications.		
5	Apply suitable algorithms for sorting Technique.		
Course Outcome	**Semester VII or VIII Sem**	**(B20AI03) Artificial Intelligence**	**L: 3 T: 0 P: 0 C: 3**

		(Open Elective)	
1	Possess the ability to formulate an efficient problem space for a problem expressed in English.		
2	Possess the ability to select a search algorithm for a problem.		
3	Possess the skill for representing knowledge using the appropriate technique.		
4	Possess the ability to apply AI techniques to solve problems of Game Playing.		
5	Possess the Expert Systems, Machine Learning and Natural Language Processing.		
Course Outcome	**Semester VII or VIII Sem**	**(B20AI29) Introduction to Machine Learning (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Explain the theory underlying machine learning.		
2	Learn beyond binary classification.		
3	Recognize and implement various genetic algorithms.		
4	Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models.		
5	Able to analyze the data.		
Course Outcome	**Semester VII or VIII Sem**	**(B20AI30) Neural Networks (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Describe different neural networks of various architectures		
2	Understand the feed forward and feed backward.		
3	Design the training of neural networks.		
4	Learn various learning rules.		
5	Develop the testing of neural networks and do the perform analysis of these networks for various pattern recognition application.		
Course Outcome	**Semester VII or VIII Sem**	**(B20AI31) Introduction to Cyber Security (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Outline key terms and concepts in cyber law, intellectual property and cybercrimes.		
2	Understand basic cryptography and stenography.		
3	Explore the vulnerabilities, threats and cybercrimes posed by criminals.		
4	Identify various security challenges phased by mobile devices and identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection.		
Course Outcome	**Semester VII or VIII Sem**	**(B20DS24) Introduction to Data science (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the basic concepts of Data Science.		
2	Learn about types of data and data pre processing.		
3	Understand the techniques for data analytics.		
4	Learn the statistical fundamentals related to Data Science.		
5	Understand the concepts of Machine Learning for Data Science.		
Course Outcome	**Semester VII or VIII Sem**	**(B20DS25) Data Handling and Visualization (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the fundamentals of Data Visualization.		

2	Learn the concepts of Visualizing Distributions.		
3	Understand how to Visualizing Proportions and Nested Proportions.		
4	Learn the concepts of Visualizing Associations and Time series data.		
5	Understand the different Visualizing Trends.		
Course Outcome	**Semester VII or VIII Sem**	**(B20DS26) Introduction to Big Data (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the importance of Big Data.		
2	Learn about the types of data and Big Data Analytics.		
3	Understand the Big Data technology components and applications.		
4	Learn the basics of Hadoop Eco system.		
5	Understand the map reduce fundamentals.		
Course Outcome	**Semester VII or VIII Sem**	**(B20DS27) Introduction to Computer Forensics (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the definition of computer forensics fundamentals.		
2	Describe the types of computer forensics technology. Analyze various computer forensics systems.		
3	Illustrate the methods for data recovery, evidence collection and data seizure.		
4	Summarize duplication and preservation of digital evidence. Evaluate the effectiveness of available digital forensics tools.		
5	Employ fundamental computer theory in the context of computer forensics practices.		
Course Outcome	**Semester VII or VIII Sem**	**(B20MB02) Management Science (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Outline the fundamentals of management and contributions to management.		
2	Define the social Responsibilities of an organization towards stakeholders and build the suitable organization structure and to identify factors influencing plant location and layout decisions.		
3	Know importance of materials management, evaluate quality of products using SQC techniques and Identify the basic concepts of marketing mix and Human Resource concepts.		
4	Know how PERT and CPM different and to construct network by proper planning organizing an managing the efforts to accomplish a successful project.		
5	Appraise all contemporary management practices and analyze how these contemporary management practices one applicable in modern business and service organizations.		
Course Outcome	**Semester VII or VIII Sem**	**(B20MB03) Entrepreneurship Development (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Explain characteristics, Qualities, Skills and Functions of Entrepreneur.		
2	Demonstrates Entrepreneur Scenario in India and abroad.		
3	Summarizes necessity for business ethics and ethical guidelines in business.		
4	Interprets about Government Grants and subsides and Entrepreneurship promotion schemes.		
5	Prioritizes corporate social responsibility and professional ethics by company secretaries.		
Course Outcome	**Semester VII or VIII Sem**	**(B20MB06) Intellectual Property Rights (Open Elective)**	**L: 3 T: 0 P: 0 C: 3**
1	Outline the increasing importance of Intellectual Property Rights		

2	Utilize post registration procedures and trade mark registration process
3	Explain the copyright principles and rights
4	Prioritize the law of patents and patent ownership
5	Develop the trade secret and maintenance

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Course Outcomes for M.Tech – Power Electronics (43) for the year 2015-16

Course Outcome	**Year/Semester I/I Sem**	**Subject Name (Subject Code)** Machine Modelling and Analysis(A943101)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Identify the methods and assumptions in modeling of machines.			
2	Recognize the different frames for modeling of AC machines.			
3	Illustrate the voltage and torque equations in state space form for different machines			
4	Develop the mathematical models of various DC machines and derive the transfer function of the DC motor.			
5	Study various transformations adopted in 3 phase machines and explore its starting methods			
6	Analyze the developed models in various reference frames through simulation study			
7	Assess the machine dynamics in various operating conditions			
8	Perform short circuits analysis with d-q model of machines.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Modern Control Theory (A943102)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Learn various terms of basic and modern control system for the real time analysis and design of control systems.			
2	Learn the basic mathematical preliminaries for modeling a control system			
3	Perform state variables analysis for any real time system			
4	Linearize the non-linear system model using various techniques			
5	Apply the concept of optimal control to any system.			
6	Examine a system for its stability, controllability and observability.			
7	Implement basic principles and techniques in designing linear control systems.			
8	Formulate and solve deterministic optimal control problems in terms of performance indices.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Electronic Devices and Circuits (A943103)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the characteristics and principle of operation of modern power electronics devices.			
2	Compare the features of various power electronic devices			
3	Comprehend the concepts of different power converters and their application			
4	Explore various driver circuits and its heat management system			
5	Study the effect of source and load inductance on the controller operation			
6	Analyse and design the switched mode regulator for various industrial application			
7	Explore various power factor improvement controllers			
8	Use power electronic simulation packages for analysing and designing power converters			
Course	**Year / semester**	**Subject Name (Subject Code)**	**L: 4 T: 0 P: 0**	**Credits: 4**

Outcome	**I/I Sem**	Special Machines (A943104)	**Total: 4**	
After the completion of this course, the students should be able to				
1	Learn the constructional features, principle of operation and methods of control of stepper motor.			
2	Realize the need for stepper motors and the various applications in industries.			
	Explore various hybrid stepping motor			
3	Get a clear picture of the operational characteristics and the applications of Switched Reluctance Motor.			
4	Know the various types of PMBLDC motors, rotor position sensors, methods of control and their applications			
5	Get a clear idea of the features, control and the applications of PMSM			
6	Explore the concept of linear induction motor and develop a double sided LIM from rotory induction motor			
7	Study the constructional details of permanent magnet axial flux machines (PMAF)			
8	Explore the applications of various special machines in day to day applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A943105)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the basic power handling capabilities of HVDC lines			
2	Explore various configurations and conversion principles of static power converters			
3	Learn the rectifier and inverter operations, commutation process at converter stations.			
4	Apply AC/DC filters for harmonic elimination in HVDC link			
5	Explore various controls adapted in HVDC converters			
6	Identify various instability problems in HV AC and DC system			
7	Study various over voltage problems in multi-terminal DC system			
8	Comprehend various converter faults and protection circuits .			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Programmable Logic Controllers and their Applications (A943106)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Gain Comprehensive knowledge of using advanced controllers in measurement and control instrumentation.			
2	Illustrate about data acquisition - process of collecting information from field instruments.			
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.			
4	Comprehend Programming in Ladder Logic, addressing of I/O.			
5	Apply PID and its Tuning.			
6	Develop ladder logic programming for simple process			
7	Execute , debug and test programs developed for digital and analog operations			
8	Reproduce block diagram representation on industrial applications using PLC			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Microcontrollers and Applications (A943107)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				

1	Relate the basic architecture and addressing modes of a microcontroller.			
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development			
3	Demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE			
4	Analyze a typical I/O interface and to discuss timing issues			
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.			
6	Translate Hardware applications using Microcontrollers.			
7	Gain working knowledge of ports and interrupts			
8	Introduce the need and use of interrupt structure, timers in respective applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A943108)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the basics of an embedded system			
2	Explore various issues in embedded software development and applications			
3	Learn the method of designing an embedded system for any type of applications			
4	Understand the operating systems concepts, types and choosing RTOS			
5	Design, implement and test an embedded system			
6	Understand types of memory and interacting to external world			
7	Learn embedded firmware design approaches			
8	Use ICE and software tools to address the issues in embedded systems			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital Control Systems (A943109)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Deduce the control system to block diagram for various analysis			
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.			
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.			
4	Know sampling and reconstruction, Z -transforms.			
5	Replace the conventional control system with Digital control system.			
6	Evaluate to Apply Z-plane analysis of discrete time control systems			
7	Apply state feedback controllers and observers			
8	Analyse the system stability using root locus , bode and Nyquist plots			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Optimization Techniques (A943110)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the need of optimisation in electrical engineering problems			
2	Learn the conventional or classical optimisation techniques			
3	Learn to formulate the problem with constrained and unconstrained cases			
4	Explore various modern intelligent optimisation techniques			
5	Apply these techniques to real world problems such as transportation problem, travelling salesman problem			
6	Study various limitations in these techniques			

7	Apply methods of sensitivity analysis and validate post processing results			
8	Explore various real time optimization problems.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital control systems (A943111)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Deduce the control system to block diagram for various analysis			
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.			
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.			
4	Know sampling and reconstruction, Z -transforms.			
5	Replace the conventional control system with Digital control system.			
6	Evaluate to Apply Z-plane analysis of discrete time control systems			
7	Apply state feedback controllers and observers			
8	Analyse the system stability using root locus , bode and Nyquist plots			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Renewable energy systems (A943112)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Explore various renewable energy sources to produce electrical energy			
2	Study the characteristics of PV cell- photo voltaic modules and its applications			
3	Learn the basics of wind energy conversion systems and bio-mass energy generation			
4	Explore various Wave energy conversion machines - Ocean Thermal Energy conversion schemes			
5	Know the need of hybrid energy systems such as geothermal and fuel cells			
6	Study the impact of various renewable energy sources on environment.			
7	Arrange storage energy and to avoid the environmental pollution			
8	Detect the environmental effects of energy conversion			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A943113)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the basic power handling capabilities of HVDC lines			
2	Explore various configurations and conversion principles of static power converters			
3	Learn the rectifier and inverter operations, commutation process at converter stations.			
4	Apply AC/DC filters for harmonic elimination in HVDC link			
5	Explore various controls adapted in HVDC converters			
6	Identify various instability problems in HV AC and DC system			
7	Study various over voltage problems in multi-terminal DC system			
8	Comprehend various converter faults and protection circuits .			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Analysis of Power Electronic Converters (A943114)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the characteristics and principle of operation of modern power semiconductor devices.			

2	Comprehend the concepts of different power converters and their applications			
3	Describe the importance of AC voltage controllers and cyclo-converters for various industrial applications			
4	Analyze and design switched mode power electronic converters for various industrial applications			
5	Analyze pulse width modulated inverters which are used in variable speed drives			
6	Choose appropriate device for a particular converter topology.			
7	Use power electronic simulation packages for analyzing and designing power converters.			
8	Choose appropriate power converter topologies and design the power stage and feedback controllers for various applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A943115)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the basics of an embedded system			
2	Explore various issues in embedded software development and applications			
3	Learn the method of designing an embedded system for any type of applications			
4	Understand the operating systems concepts, types and choosing RTOS			
5	Design, implement and test an embedded system			
6	Understand types of memory and interacting to external world			
7	Learn embedded firmware design approaches			
8	Use ICE and software tools to address the issues in embedded systems			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Converters Simulation Lab (A943116)	**L: 0 T: 0 P: 4 Total:4**	**Credits:4**
After the completion of this course, the students should be able to				
1	Able to simulate full converter circuits for various types of loading			
2	Acquire programming knowledge to study the systems dynamics in state space model			
3	Able to assess the frequency response of the system			
4	Analyse the system stability and PID controller application for steady state system operation.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Seminar-I (A943117)	**L: 0 T: 0 P: 4 Total:4**	**Credits:4**
Course Outcome	**Year/Semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Converters (A943201)	**L: 4 T: 0 P: 0 C: 4**	
After the completion of this course, the students should be able to				
1	Understand various advanced power electronics devices.			
2	Explore various advanced modulation techniques and its applications			
3	Describe the operation of multi-level inverters with switching strategies for high power applications.			
4	Comprehend the design of resonant converters and switched mode power supplies.			
5	Gain knowledge on various topologies converter circuits			
6	Develop and analyze various converter topologies.			
7	Design AC or DC switched mode power supplies.			
8	Explore various power conditioning devices			

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Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Control of DC Drives (A943202)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Learn basic preliminary requirements for operating DC drives		
2	Explore various rectifier fed DC drives		
3	Study the continuous and discontinuous modes of operation of single phase semi and full converter for DC drives		
4	Study the continuous and discontinuous modes of operation of three phase semi and full converter for DC drives		
5	Perform steady state analysis of three phase converter controlled DC motor drive		
6	Explore various current and speed controllers		
7	Perform steady state analysis of chopper controlled DC motor drive		
8	Simulate the dynamics of speed controlled DC motor drives		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Control of AC Drives (A943203)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Learn the speed torque characteristics variable voltage and variable frequency operation		
2	Study the operation of induction motor in constant torque and field weakening regions		
3	Understand the stator side controls employed for induction drives		
4	Employ speed and flux control in current fed inverter drive		
5	Evaluate the efficiency of the drive by applying optimization control		
6	Study the principles of vector control methods in rotor of induction drives		
7	Implement various speed control schemes in synchronous motor drives		
8	Study the characteristics and control of variable reluctance motor drive		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Quality (A943204)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Know the different terms and concepts of electric power quality in power systems.		
2	Learn about the applications of non-linear load.		
3	Identify and study the difference between system failures, outage and interruptions		
4	Predict various short and long interruptions		
5	Characterize and calculate the magnitude the single and three phases Voltage sag in the system		
6	Learn how to mitigate the power quality problems		
7	Learn about the application of FACTS device on DG side.		
8	Know the different characteristics of electric power quality in power systems.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Advanced Digital Signal Processing (A943205)	**L: 3 T: 0 P: 0 C:3**
After the completion of this course, the students should be able to			
1	Provide fundamental knowledge of analysing and processing of digital systems		
2	Study the relationship between continuous time and discrete time signals and systems		

3	Study the fundamentals of time , frequency and Z-Plane analysis and their interrelationships.		
4	Study and design digital filters form analysis to synthesis		
5	Explore few real world signal processing applications		
6	Get acquainted with FFT algorithms, multi-rate signal processing techniques.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Switched Mode Power Supplies (SMPS) (A943206)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply the basic concepts of power electronics for designing converters.		
2	Explore various design considerations.		
3	Explore various control circuits.		
4	Design and implement practical circuits for UPS, SMPS.		
5	Understand the effect of Electromagnetic interference (EMI).		
6	Understand the various protection aspects for the converters.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Flexible AC Transmission Systems (A943207)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the concepts and types of FACTS controllers		
2	Learn various converters employed for FACTS controllers		
3	Study the impact of FACTS devices in the power flow in the AC system		
4	Learn various shunt compensation using SVC and STATCOM		
5	Learn various series compensators such as TCSC, TSSC		
6	Explore the concept of UPFC and its application.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** High-Frequency Magnetic Components (A943208)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the fundamentals of magnetic devices		
2	Explore the properties of magnetic core materials		
3	Study the various effects that exists the round conductor carrying AC currents		
4	Evaluate the energy stored in coupled inductors of transformers		
5	Design of transformers for fly-back converters in CCM		
6	Design the integrated inductors and self capacitance for high frequency applications		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Dynamics of Electrical Machines (A943209)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Basics of machine theory of all types of machines		
2	Learn generalized modeling of all electrical machines		
3	Apply of Lagrange's equation solution of Electro dynamical equations.		
4	Understand the basic mathematical analysis of electrical machines and its characteristics.		
5	Understand behavior of electrical machines under steady state and transient state.		
6	Understand dynamic modeling of electrical machines		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Instrumentation & Control (A943210)	**L: 3 T: 0 P: 0 C: 3**

After the completion of this course, the students should be able to			
1	Survey various methods of power generation		
2	Understand the importance of instrumentation in power generation		
3	Explore various measuring and supervising systems involved in thermal power plant processes such as boiler and turbine units		
4	Understand various controls employed in boiler		
5	Explore the temperature and pressure controls in turbine		
6	Study the nuclear power plant instrumentation		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Intelligent Control (A943211)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the architecture of Intelligent control		
2	Learn the basic artificial neural network and its mathematical model		
3	Train and test the neural network with various configurations.		
4	Apply genetic algorithm for various optimisation problems		
5	Model and control different system with fuzzy logic controller		
6	Explore various power system problem and apply GA, NN and Fuzzy controller		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Smart grid technologies (A943212)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
2	Understand the advantages of DC distribution and developing technologies in distribution		
3	Discriminate the trade-off between economics and reliability of an electric power system.		
4	Differentiate various investment options (e.g. generation capacities, transmission, renewable, demand-side resources, etc) in electricity markets.		
5	Analyze the development of smart and intelligent domestic systems.		
6	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** AI Techniques in Electrical Engineering (A943213)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on soft computing techniques such as artificial neural networks, Fuzzy logic and genetic Algorithms.		
2	Learn the concepts of feed forward neural networks and feedback neural networks.		
3	Get the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy rules		
4	Acquire complete knowledge on genetic algorithm including three genetic operators		
5	Explore various power system problems which can utilize these AI techniques		
6	Assess system stability using AI techniques		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reliability Engineering (A943214)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			

1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Energy Auditing, Conservation & Management (A943215)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the necessity of conservation of energy		
2	Generalize the methods of energy management		
3	Illustrate the factors to increase the efficiency of electrical equipment		
4	Detect the benefits of carrying out energy audits.		
5	Analyze the power factor and to design a good illumination system		
6	Determine pay back periods for energy saving equipment.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Converters and Drives Lab (A943216)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Learn basic speed measurement and implement closed loop control in PMDC motor		
2	Experience the improved control of thyristor drive for PMDC motor over conventional control		
3	Learn to generate PWM signals using DSP		
4	Explore the inverter controls for solar PV systems		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Seminar-II (A943217)	**L: 0 T: 0 P: 4 C:2**
Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code)** Comprehensive Viva-Voce (A943301)	**L: 0 T: 0 P: 0 C:4**

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course outcomes for M.Tech – Power System Automation and Control (45) for the year 2015-16

Course Outcome	**Year/Semester I/I Sem**	**Subject Name (Subject Code)** Advanced Power System Analysis (A953101)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Identify the methods and assumptions in modeling of machines.		
2	Recognize the different frames for modeling of AC machines.		
3	Illustrate the voltage and torque equations in state space form for different machines		
4	Develop the mathematical models of various machines like, induction motor and Synchronous machines using modeling equations.		
5	Analyze the developed models in various reference frames		
6	Assess the machine dynamics in various operating conditions		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Advanced Power System Protection (A953102)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basic function of a circuit breaker, all kinds of circuit breakers and relays		
2	Differentiate fuse and circuit breakers under fault condition		
3	Learn constructional details of static relays and importance of duality of comparators in them.		
4	Study the operation of static relay applied for over current protection		
5	Able to apply static relay for transformer and transmission line protection		
6	Basic principle of operation and application of microprocessor based relaying.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Modern Control Theory (A953103)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Various terms of basic and modern control system for the real time analysis and design of control systems.		
2	To perform state variables analysis for any real time system.		
3	Apply the concept of optimal control to any system.		
4	Able to examine a system for its stability, controllability and observability.		
5	Implement basic principles and techniques in designing linear control systems.		
6	Formulate and solve deterministic optimal control problems in terms of performance indices.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** EHV AC Transmission (A953104)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Identify the different aspects of Extra High Voltage A.C and D.C Transmission		
2	Demonstrate EHV AC transmission system components, protection and insulation level for over voltages		
3	Estimate the Statistical procedures for line designs, scientific and engineering Principles in power systems.		
4	Power Frequency Voltage control and over-voltages in EHV lines		

5	Study the concept of Corona in E.H.V. lines and impact of RI in EHV lines		
6	Design the EHV cables and study their charcteristics		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** High Voltage Engineering (A953105)	**L: 3 T: 0 P: 0 C:3**
After the completion of this course, the students should be able to			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Advanced Digital Signal Processing (A953106)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Comprehensive understanding of using advanced controllers in measurement and control instrumentation.		
2	Illustrate about data acquisition - process of collecting information from field instruments.		
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.		
4	Comprehend Programming in Ladder Logic, addressing of I/O.		
5	Apply PID and its Tuning.		
6	Development of ladder logic programming for simple process		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Quality (A953107)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	To relate the basic architecture and addressing modes of a microcontroller.		
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development		
3	demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE		
4	analyze a typical I/O interface and to discuss timing issues		
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.		
6	Translate Hardware applications using Microcontrollers.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Microcontrollers and applications (A953108)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To relate the basic architecture and addressing modes of a microcontroller.		
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development		
3	demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE		
4	analyze a typical I/O interface and to discuss timing issues		
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.		
6	Translate Hardware applications using Microcontrollers.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Distribution Automation (A953109)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the need of structure of power system automation and its evolution.		

2	Classify various power system automation schemes		
3	Learn to implement power system automation and protection using SCADA.		
4	Learn the importance of EMS in power system operation.		
5	Learn the architecture of PLC and its application in power system automation		
6	Know the control schemes of distribution automation and substation automation		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Optimization Techniques (A953110)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Study the need of optimisation in electrical engineering problems		
2	Learn the conventional or classical optimisation techniques		
3	Learn to formulate the problem with constrained and unconstrained cases		
4	Explore various modern intelligent optimisation techniques		
5	Apply these techniques to real world problems such as transportation problem, travelling salesman problem		
6	Study various limitations in these techniques		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital control systems (A953111)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Deduce the control system to block diagram for various analysis		
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.		
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.		
4	Know sampling and reconstruction, Z -transforms.		
5	Replace the conventional control system with Digital control system.		
6	Evaluate to Apply Z-plane analysis of discrete time control systems		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Renewable energy systems (A953112)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Explore various renewable energy sources to produce electrical energy		
2	Study the characteristics of PV cell- photo voltaic modules and its applications		
3	Learn the basics of wind energy conversion systems and bio-mass energy generation		
4	Explore various Wave energy conversion machines - Ocean Thermal Energy conversion schemes		
5	Know the need of hybrid energy systems such as geothermal and fuel cells		
6	Study the impact of various renewable energy sources on environment.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A953113)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Study the basic power handling capabilities of HVDC lines		
2	Explore various configurations and conversion principles of static power converters		
3	Learn the rectifier and inverter operations, commutation process at converter stations.		
4	Apply AC/DC filters for harmonic elimination in HVDC link		
5	Explore various controls adapted in HVDC converters		
6	Identify various instability problems in HV AC and DC system		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Analysis of power Electronic converters (A953114)	**L: 3 T: 0 P: 0 C: 3**

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After the completion of this course, the students should be able to			
1	Understand the characteristics and principle of operation of modern power semiconductor devices.		
2	Comprehend the concepts of different power converters and their applications		
3	Analyze and design switched mode regulators for various industrial applications		
4	Knowledge on various converter topologies		
5	Choose appropriate device for a particular converter topology.		
6	Use power electronic simulation packages for analyzing and designing power converters.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A953115)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basics of an embedded system		
2	Learn the method of designing an embedded system for any type of applications		
3	Understand the operating systems concepts, types and choosing RTOS		
4	Design, implement and test an embedded system		
5	Understand types of memory and interacting to external world		
6	Learn embedded firmware design approaches		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Systems Lab-I (A953116)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Able to demonstrate the symmetrical and unsymmetrical fault in the generator.		
2	Realise the Ferranti effect in the transmission line and implement feeder protection under over current operation by constructing the circuits		
3	Study the operation various static relays for over current and over voltage condition		
4	Visualise the differential protection of transformer for external and internal faults		
Course Outcome	**Year/Semester I/II Sem**	**Subject Name (Subject Code)** Power System Dynamics (A953201)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the basics of system dynamics and able to analyse steady state stability and transient stability		
2	Able to model synchronous machine to analyse steady state operation analyse its dynamics of operation.		
3	Model the excitation system analyse the dynamics of the synchronous machine connected to infinite bus.		
4	Examine the small signal stability of the system using Routh's Hurwitz criterion		
5	Know the need of PSS in control signals		
6	Dynamic compensator analysis of single machine infinite bus system with and without PSS.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Flexible AC Transmission Systems (FACTS) (A953202)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Know the concepts and types of FACTS controllers		
2	Learn various converters employed for FACTS controllers		
3	Study the impact of FACTS devices in the power flow in the AC system		

4	Learn various shunt compensation using SVC and STATCOM		
5	Learn various series compensators such as TCSC, TSSC		
6	Explore the concept of UPFC and its application.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power System Operation and Deregulation (A953203)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Acquire basic knowledge on restructuring of power industry and market models.		
2	Impart knowledge on fundamental concepts of congestion management		
3	Knowledge on various ancillary service providers		
4	Illustrate various international Transmission pricing paradigms		
5	Idea on framework of Indian power sector and its initiatives		
6	The reforms in Indian power sector		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Gas Insulated Systems(GIS) (A953204)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Programmable Logic Controllers and their Applications (A953205)	**L: 4 T: 0 P: 0 C:4**
After the completion of this course, the students should be able to			
1	Gain Comprehensive knowledge of using advanced controllers in measurement and control instrumentation.		
2	Illustrate about data acquisition - process of collecting information from field instruments.		
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.		
4	Comprehend Programming in Ladder Logic, addressing of I/O.		
5	Apply PID and its Tuning.		
6	Develop ladder logic programming for simple process		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** High frequency magnetic components (A953206)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the fundamentals of magnetic devices		
2	Explore the properties of magnetic core materials		
3	Study the various effects that exists the round conductor carrying AC currents		
4	Evaluate the energy stored in coupled inductors of transformers		
5	Design of transformers for fly-back converters in CCM		
6	Design the integrated inductors and self capacitance for high frequency applications		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reactive Power Compensation and Management (A953207)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Identify the necessity of reactive power compensation		
2	Describe load compensation		
3	Select various types of reactive power compensation in transmission systems		
4	Characterize distribution side and utility side reactive power.		
5	Understand issues related to power system stability and control.		

6	Detect reactive power compensation techniques & their practical importance		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power System Reliability (A953208)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Voltage Stability (A953209)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Identify the necessity of reactive power compensation		
2	Describe load compensation		
3	Select various types of reactive power compensation in transmission systems		
4	Characterize distribution side and utility side reactive power.		
5	Understand issues related to power system stability and control.		
6	Detect reactive power compensation techniques & their practical importance		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Instrumentation & Control (A953210)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Survey various methods of power generation		
2	Understand the importance of instrumentation in power generation		
3	Explore various measuring and supervising systems involved in thermal power plant processes such as boiler and turbine units		
4	Understand various controls employed in boiler		
5	Explore the temperature and pressure controls in turbine		
6	Study the nuclear power plant instrumentation		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Intelligent Control (A953211)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the architecture of Intelligent control		
2	Learn the basic artificial neural network and its mathematical model		
3	Train and test the neural network with various configurations.		
4	Apply genetic algorithm for various optimisation problems		
5	Model and control different system with fuzzy logic controller		
6	Explore various power system problem and apply GA, NN and Fuzzy controller		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Smart grid technologies (A953212)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Recite the structure of an electricity market in either regulated or deregulated market		

	conditions.		
2	Understand the advantages of DC distribution and developing technologies in distribution		
3	Discriminate the trade-off between economics and reliability of an electric power system.		
4	Differentiate various investment options (e.g. generation capacities, transmission, renewable, demand-side resources, etc) in electricity markets.		
5	Analyze the development of smart and intelligent domestic systems.		
6	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** AI Techniques in Electrical Engineering (A953213)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on soft computing techniques such as artificial neural networks, Fuzzy logic and genetic Algorithms.		
2	Learn the concepts of feed forward neural networks and feedback neural networks.		
3	Get the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy rules		
4	Acquire complete knowledge on genetic algorithm including three genetic operators		
5	Explore various power system problems which can utilize these AI techniques		
6	Assess system stability using AI techniques		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reliability Engineering (A953214)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Energy Auditing, Conservation & Management (A953215)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the necessity of conservation of energy		
2	Generalize the methods of energy management		
3	Illustrate the factors to increase the efficiency of electrical equipment		
4	Detect the benefits of carrying out energy audits.		
5	Analyze the power factor and to design a good illumination system		
6	Determine pay back periods for energy saving equipment.		
Course	**Year / semester**	**Subject Name (Subject Code)** Power Systems Lab-II (A953216)	**L: 0 T: 0 P: 4 C:**

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Outcome	**I/II Sem**		**2**
After the completion of this course, the students should be able to			
1	Study the characteristics of microprocessor based relays		
2	Able to protect the feeder from faulty condition using over current relay operation		
3	Study the Characteristics of IDMT Electromagnetic Over Current Relay		
4	Study the phase failure and phase reversal protection with static negative sequence relay		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Seminar-II (A953217)	**L: 0 T: 0 P: 4 C:2**

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Course Outcomes for M.Tech – VLSI SYSTEM DESIGN (R20) for the academic year 2020-2021 onwards

Course Outcome	**Semester I Sem**	**CMOS Digital Integrated Circuit Design (M20VL01)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Define the basic of CMOS technology.		
2	Relate, compare, interpret and make the use of the best CMOS design techniques for implementation, analysis & design of Combinational& Sequential MOS logic circuits.		
3	Know & tell different types of memories and compare performance evaluation of each memory modules so they can be able to think & justify how to improve performance by taking different structures.		
4	Define, simplify & justify which dynamic logic circuit can be used investigate CMOS circuits.		
5	Recommend various CMOS techniques and also other device technologies based on circuit constraints requirement.		
Course Outcome	**Semester I Sem**	**CMOS Analog Integrated Circuit Design (M20VL02)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Define the parameters of MOS Devices & can predict the performance or behavior of Analog VLSI circuit.		
2	Analyze & characterize analog devices and systems to achieve performance specifications.		
3	Understand the different topologies involved in the CMOS amplifier design.		
4	Understand design issues & measurement techniques related to CMOS operational amplifier design.		
5	Design & analyze the comparator for different topologies to achieve performance Specifications.		
Course Outcome	**Semester I Sem**	**(Program Elective-I) Digital System Design using HDL (M20VL03)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basic concepts of Verilog HDL, digital system design flow, timing, and synthesis and FPGA implementation issues.		
2	Understand the basics of MOS transistors required for MOS based circuit & layout design.		
3	Know the different design technique for CMOS Combinational Circuit Design & able to select suitable design technique for given performance specification.		
4	Get an idea of the different design technique for CMOS Sequential Circuit Design & able to select suitable design technique for given performance specification.		
5	Understand the design flow from simulation to synthesizable / implementation level for VLSI based system design.		
Course Outcome	**Semester I Sem**	**(Program Elective-I) VLSI Signal Processing (M20VL04)**	**L: 3 T: 0 P: 0 C: 3**

After the completion of this course, the students should be able to			
1	Understand the overview of DSP concepts.		
2	Apply the concepts of iteration bound, pipelining& parallel processing for FIR filter design.		
3	Understand techniques of fast convolution & algorithmic strength reduction in the filter structures.		
4	Perform pipelining & parallel processing on recursive filter structures to achieve high speed & low power.		
5	Use of proper techniques for parallel processing design for scaling and round off noise.		
Course Outcome	**Semester I Sem**	**(Program Elective-I) VLSI Technology (M20VL05)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the different MOS technologies.		
2	Appreciate the various techniques involved in the VLSI fabrication process.		
3	Analyze the concepts, transistor structures, interconnects & design rules related to layout design in VLSI.		
4	Understand the different doping & diffusion mechanism.		
5	Understand the nuances of design rules, scaling, transistors, resistors, capacitors & packaging of VLSI devices.		
12	**Semester I Sem**	**(Program Elective-II) Algorithms For VLSI Design Automation (M20VL06)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the preliminaries required for VLSI system design.		
2	Apply the general purpose methods for combinational optimization.		
3	Understand the concept of Layout Compaction, Placement, Floor planning& Routing, modeling & simulation involved in VLSI system design.		
4	Analyze the concept related to synthesis & verification in VLSI system design.		
5	Analyze the design cycle of for FPGA and partitioning-routing concepts related to it.		
6	Explain the algorithms for partitioning, floor planning, placement and routing the MCM modules.		
Course Outcome	**Semester I Sem**	**(Program Elective-II) Embedded System Design (M20VL07)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the Basic Concept of Embedded Systems.		
2	Understand the core of typical embedded system.		
3	Know the embedded firmware.		
4	Get introduced to RTOS based Embedded system design & related mechanism.		
5	Appreciate the methods for task communication for the development of a typical embedded.		
Course Outcome	**Semester I Sem**	**(Program Elective-II) Device Modeling (M20VL08)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			

1	Understand the physics of and design elements of silicon MOSFETs.		
2	Understand & study the physics behind the operation of integrated diodes & integrated bipolar transistor.		
3	Analyze& study the physics behind the operation of integrated diodes & integrated bipolar transistor.		
4	Understand the VLSI fabrication techniques.		
5	To design circuits using Hetero Junction Devices with physical insight of their functional.		
Course Outcome	**Semester I Sem**	**English For Research Paper Writing (M20AC01)**	**L: 2 T: 0 P: 0 C: 0**
After the completion of this course, the students should be able to			
1	Develop the content, structure and format of writing a research paper.		
2	Understand the research methodology in research paper writing.		
3	Analyze and practice writing a Research Paper.		
4	Know how to & where to get published the research work.		
Course Outcome	**Semester I Sem**	**Research Methodology (M20MC01)**	**L: 2 T: 0 P: 0 C: 2**
After the completion of this course, the students should be able to			
1	Appreciate the flow of research methodologies in the research work.		
2	Design Important Concepts Related to Research Design.		
3	Learn better report writing skills and Patenting.		
4	To write a Research Proposal and Research Report & Research Grant Proposal.		
5	Understand the importance of Intellectual Property.		
Course Outcome	**Semester I Sem**	**HDL Programming Laboratory (M20VL09)**	**L: 0 T: 0 P: 4 C: 2**
1	Apply the knowledge in Simulation and Synthesis of Digital Circuits.		
2	DesignVariousCombinationalandSequentialcircuitsusingVerilogHDL&HDL.		
3	Explain the System Modeling with Tasks and Functions.		
4	Design of digital circuits using FPGA/CPLD boards.		
Course Outcome	**Semester I Sem**	**Digital IC Design Laboratory (M20VL10)**	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Design CMOS inverters, logic circuits and transmission gates to specifications.		
2	Design latches and flip-flops as the basic circuit for Random-Access- Memory (RAM) and Read-Only-Memory (ROM) cells.		
3	Understand the Design of Bi-CMOS Inverter, logic circuits.		
4	Design post Layout of Different logic circuits.		
Course Outcome	**Semester II Sem**	**CMOS Mixed Signal Circuit Design (M20VL11)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Build mixed signal circuits like DAC, ADC, PLL etc &Gain knowledge on filter design in mixed signal mode &To acquire knowledge on design different architectures in mixed		

	signal mode.		
2	Analyze digital test and linear test engineers to the mixed signal world by teaching the basics of analog and mixed signal test methods. Sampling Theory, Frequency Domain Testing, and Digital Signal Processing.		
3	Apply these fundamental concepts to different test methods and data validation for mixed signal parameters together with debugging, noise reduction and device interface techniques.		
4	Deal with the theory and design skills of CMOS op-amps, voltage reference circuits, switched capacitor circuits, sample-and- hold circuits, and A/D & D/A converters used in modern communication systems and consumer electronic products.		
5	Design of core mixed-signal IC blocks: comparators and data converters & System level design flow: top-down and bottom-up design methodologies.		
Course Outcome	**Semester II Sem**	**VLSI Design Verification and Testing (M20VL12)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the need for testing in VLSI & different testing issues.		
2	Gain the knowledge of testing and verification in VLSI design process, ATPG concepts for combinational and sequential circuits.		
3	Apply knowledge of testability measures for testing of digital systems.		
4	Apply knowledge of test-pattern generation & Design for testability techniques for testing of digital systems.		
5	Understanding boundary scan standards & testing techniques for CMOS IC's.		
Course Outcome	**Semester II Sem**	**(Program Elective-III) Low Power VLSI Design (M20VL13)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the need for low power circuit design & sources of power dissipation in VLSI system.		
2	Appreciate the concept of Low-Power Design Approaches in VLSI system design.		
3	Design low voltage low power adders for given performance specification.		
4	Optimize the power of multiplier using different strategies at different levels of design.		
5	Design low-power CMOS memories using various strategies at different design level.		
Course Outcome	**Semester II Sem**	**(Program Elective-III) Optimization Technique In VLSI Design (M20VL14)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on Optimization techniques involved in VLSI circuits.		
2	Analyze methods of optimization to engineering students, including linear programming, nonlinear programming, and heuristic methods.		
3	Understand balance between theory, numerical computation, problem setup for solution by optimization software, and applications to engineering systems.		
4	Studies General optimization algorithm; necessary and sufficient conditions for optimality.		
5	Demonstrate the Concept of Genetic Algorithms and Routing Procedures.		

Course Outcome	**Semester II Sem**	**(Program Elective-III) High Speed VLSI Design (M20VL15)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Appreciate the different clocking logic styles in VLSI system design as per specification.		
2	Understand circuit design margining & design variability for VLSI circuit.		
3	Appreciate the concept of latching strategies to optimize the speed of the system.		
4	GainknowledgeoninterfacetechniquesinvolvedinhighspeedVLSIcircuits.		
5	Analyze the clocking styles in design to optimize the timing issues to support high speed processing.		
Course Outcome	**Semester II Sem**	**(Program Elective-IV) ASIC Design (M20VL16)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To learn the fundamentals of ASIC and its design methods.		
2	To gain knowledge on programmable architectures for ASICs & physical design of ASIC.		
3	Understand the programmable ASIC Logic Cells & selection of suitable ASIC Logic cells for design.		
4	Analyze ASIC floor planning, placement and routing in VLSI Design.		
5	Appreciate concept of optimization algorithms in the design of an efficient layout.		
Course Outcome	**Semester II Sem**	**(Program Elective-IV) System On Chip Architecture (M20VL17)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply the knowledge of SoC architecture & organization.		
2	Analyze various processor microarchitecture & design trade-off for SoC.		
3	Understand the memory design for SoC.		
4	Evaluate interconnect structure for different topologies.		
5	Design Soc based Embedded system on FPGA.		
Course Outcome	**Semester II Sem**	**(Program Elective-IV) Semiconductor Memory Design & Testing (M20VL18)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the design of MOS memories and the various precautionary methods to be used in their design.		
2	Learn overview of memory chip design, DRAM circuits, voltage generators, performance analysis and design issues of ultra-low voltage memory circuits.		
3	Acquire knowledge about High-Performance Subsystem Memories & Analyze RAM and DRAM Design.		
4	Demonstrate Advanced Memory Technologies and High-density Memory Packing Technologies & Gains knowledge on various testing methods of semiconductor memories.		
5	Get an overview on reliability of semiconductors and their testing.		
Course Outcome	**Semester II Sem**	**Stress Management (M20AC02)**	**L: 2 T: 0 P: 0 C: 0**

After the completion of this course, the students should be able to			
1	Enhance of Physical strength and flexibility.		
2	Learn to relax and focus.		
3	Relieve physical and mental tension.		
4	Improve work performance/ efficiency.		
Course Outcome	**Semester II Sem**	**Analog IC Design Laboratory (M20VL19)**	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Design Various Characteristics of MOS Logic.		
2	Design Various Amplifier circuits using CMOS Logic.		
3	Design Various circuits using Different Logic Styles.		
4	Design Layout of Different logic circuits.		
Course Outcome	**Semester II Sem**	**Mixed Signal VLSI Laboratory (M20VL20)**	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Design Various Amplifier circuits using CMOS Logic.		
2	Design Various Complex circuits using Different Logic Styles.		
3	Design Layout of Different logic circuits.		
4	Digital/analog circuits are to be designed and implemented using CAD tools.		
Course Outcome	**Semester II Sem**	**Mini Project (M20VL21)**	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Use fundamental knowledge and skills in engineering and apply it effectively on a project.		
2	UnderstandtheProductDevelopmentProcessincludingbudgetingthroughMiniProject.		
3	Plan for various activities of the Miniproject.		
4	Inculcate electronic hardware and software implementation skills.		
5	Manage any disputes and conflicts within and outside individually.		
6	Prepare a technical report based on the Miniproject.		
7	Deliver technical seminar based on the Mini Project work carried out.		
Course Outcome	**Semester III Sem**	**(Program Elective-V) High Speed VLSI Architectures for DSP Applications (M20VL22)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply the concept of unfolding for optimization of critical paths in the VLSI system design.		
2	Design Multiplier architectures in optimized way for given specification in VLSI Design.		
3	Apply the redundant arithmetic for optimization of adder & multiplier block generally used in digital signal processing application.		
4	Analyze the use of synchronous & asynchronous pipelining in to optimize the		

	performance of High Speed VLSI Design.		
5	Understand the low power VLSI DSP system.		
Course Outcome	**Semester III Sem**	**(Program Elective-V) Nano materials & Nano Technology (M20VL23)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the limitations of the MOSFETs & potential of nanoelectronics.		
2	Show a deeper understanding of the relation between novel behavior of nanoelectronics devices and quantum behavior of the matter at the nano scale as well as the breakdown of received scaling wisdom.		
3	Understand structures of carbon nanotubes & its applications.		
4	Appreciate the concept of molecular electronics in nanoscale fabrication technologies understand the principle of spintronic.		
Course Outcome	**Semester III Sem**	**(Program Elective-V) RF Circuit Design (M20VL24)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the performance parameters / specifications of the RF Circuits.		
2	Design & analyze the filter design.		
3	Understand & evaluate the performance of various specifications of high frequency amplifier design, Mixer, Oscillators & Power Amplifiers.		
4	Understand the source of nonlinearity, noise, process technology & its impact on the parameters of individual blocks of receiver & on receiver performance.		
5	Demonstrate the tools & techniques to evaluate the performance specifications of the RF building blocks.		
Course Outcome	**Semester III Sem**	**(Open Elective) Soft Computing Techniques (M20CS12)**	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the Fundamentals of Neural Networks & Feed Forward Networks.		
2	Design & analyze the Associative Memories & ART Neural Networks.		
3	Understand & evaluate the performance of Fuzzy Logic & Systems.		
4	Understand the Genetic Algorithms.		
5	Design & analyze Hybrid Systems.		
6	Understand Soft Computing concepts, technologies, and applications.		
7	Understand the underlying principle of soft computing with its usage in various application.		
Course Outcome	**Semester III Sem**	**(Open Elective) Graph Theory & Optimization Techniques (M20MA02)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand the various types of graph Algorithms and graph theory properties.		
2	Analyze the NP – complete problems.		
3	Distinguish the features of the various tree and matching algorithms.		
4	Appreciate the applications of digraphs and graph flow.		
5	Understand the linear programming principles and its conversion.		
6	Design and employ appropriate method for solving computing problems.		

Course Outcome	**Semester III Sem**	**(Open Elective) Waste Management (M20SE27)**	**L: 3 T: 0 P: 0 C: 3**
1	Understand how waste management practices protect environmental health and safety.		
2	Apply physical and chemical analysis on municipal solid wastes.		
3	Enhance the route for solid waste collection and transport system.		
4	Develop a method to use energy from solid wastes.		
5	Explain different methods of disposal of hazardous solid waste.		
Course Outcome	**Semester III Sem**	**Dissertation Phase-I (M20VL25)**	**L: 0 T: 0 P: 20 C:10**
After the completion of this course, the students should be able to			
1	In Master's Project Phase-I, the students should select a recent topic from a reputed International Journal, preferably IEEE, ACM, Springer in the field that has direct or indirect relation to the area of specialization.		
2	After conducting a detailed literature survey, they should compare and analyze research work done and review recent developments in the area and prepare an initial design of the work to be carried out as Master's Project.		
3	It is mandatory that the students should refer National and International Journals and conference proceedings while selecting a topic for their Project.		
4	Emphasis should be given for introduction to the topic, literature survey, and scope of the proposed work along with some preliminary work carried out on the Project topic.		
5	Students should submit a copy of Phase-I Project report covering the content discussed above and highlighting the features of work to be carried out in Phase-II of the Project.		
Course Outcome	**Semester IV Sem**	**Dissertation Phase-II (M20VL26)**	**L: 0 T: 0 P: 32 C:16**
After the completion of this course, the students should be able to			
1	Use specialized knowledge and skills in engineering and apply it effectively on a project.		
2	Apply knowledge of the 'real world' situations that a professional engineer can encounter.		
3	Apply critical and creative thinking in the design of VLSI System Design projects.		
4	Demonstrate a sound technical knowledge of selected project topic.		
5	Demonstrate the skills and attitude of a professional engineer.		
6	Summarize an appropriate list of literature review, analyze previous work and relate them to current project.		
7	Deliver technical seminar based on the Project work carried out.		
8	Publish the conducted research work in a National / International Conference or Journal preferably IEEE, ACM, Springer and Scopus indexed/SCI indexed/ESCI.		

Viswambhara Educational Society

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

Department of Mechanical Engineering

COURSE OUTCOMES FOR B.TECH - ME R20 FOR THE YEAR 2020-2021

Course Outcome	Semester I Sem	Subject Name (Subject Code) LINEAR ALGEBRA AND CALCULUS (B20MA01)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Understand the principles of matrix to calculate the characteristics of system of linearalgebraic equations using multiple methods.			
2	Determine eigen values, eigen vectors and orthogonally diagonalize symmetric matrices.			
3	Analyze the nature of sequence and series to identify the convergence.			
4	Evaluate limits of single-variable functions graphically and computationally. Analyzeimproper integrals using Beta and Gamma functions.			
5	Calculate Partial derivatives, Jacobian and extrema of functions of multiple variableswith or without constraints.			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** Engineering Chemistry (B20CH01)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	The knowledge of batteries and corrosion			
2	The knowledge of water treatment and			
3	The knowledge of polymers and their us			
4	The required knowledge of principles and concepts of phase rule and surface chemistry			
5	The knowledge of combustion and fuel			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ENGINEERING GRAPHICS (B20ME02)	**No. of Hours L:1 T:0 P:4**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Analyze the Projections of points.			
2	Understand the Projections of solids.			
3	Estimate the use of Drawings, dimensioning, scales and conic sections.			
4	Modify the Applications of this knowledge in Computer Graphics.			
5	Compare the conversion of isometric views to Orthographic views.			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING(B20CS01)	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understanding how problems are posed and how they can be analyzed for obtaining solution.			
2	Understanding the fundamentals of C programming.			

3	Learning of sequencing, branching, looping and decision making statements to solve Scientific and engineering problems.			
4	Implementing different operations on arrays and creating and using of functions to solve problems			
5	Ability to design and implement different types of file structures using standard Methodology			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ENGLISH LANGUAGE AND INTERACTIVE COMMUNICATION SKILLS LAB (B20EN02)	**No. of Hours L:0 T:0 P:3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Understand their strengths and weaknesses in English usage in formal and informal contexts.			
2	Use English comfortably in their individualized contexts			
3	Use IT skills and research skills in English speaking and writing			
4	Improve their vocabulary, pronunciation, receptive and expressive skills in English			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING LAB (B20CS02)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	To provide the necessary knowledge on general engineering problem solving methodologies.			
2	To provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language.			
3	To prepare the students to write modular and readable C Programs.			
4	The Course introduces the essential concepts like abstract data types, user defined data types.			
5	To analyze the performance of algorithms and how to use such knowledge for later processing with the help of files.			
6	Aims to train the students to write working programs to solve problems			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ENGINEERING WORKSHOP (B20ME04)	**No. of Hours L:0 T:0 P:2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Know the fundamental knowledge of various trades and their usage in real time Applications			
2	Compare Foundry, Welding, Black smithy, Fitting, Machine shop and house wiring			
3	Understand the basis for analyzing power tools in construction and wood working, electrical engineering and mechanical engineering			
4	Apply basic concepts of computer hardware for assembly and disassembly			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (B20MA02)	**No. of Hours L:3 T:1 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Apply the fundamental concepts of ordinary differential equations to real time problems.			
2	Find the complete solution of a non homogeneous differential equations and applying itsconcepts in solving physical problems of Engineering.			

3	Evaluate the multiple integrals in various coordinate systems.			
4	Apply the concepts of gradient, divergence and curl to formulate Engineering problems.			
5	Analyze line, surface and volume integrals using fundamental theorems.			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ENGINEERING PHYSICS (B20PH03)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Learns about transformation concepts in Mechancis			
2	Gains knowledge on basics of rigid body dynamics and lasers which leads to new innovations and improvements			
3	The knowledge of physics relevant to engineering is critical for converting ideas into technology			
4	An understanding of Physics also helps engineers understand the working and limitations of existing devices and techniques, which eventually leads to newinnovations and improvements			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ENGINEERING MECHANICS (B20CE01)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Understand the basic concepts of engineering mechanics and force Systems			
2	Calculate the friction developed in motion of bodies			
3	Calculate centroid and moment of inertia for simple and composite bodies			
4	Apply the concepts of mechanics for solving problems of particles and rigid body motion			
5	Understand the Work Energy method for plane motion			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** INTRODUCTION TO PYTHON PROGRAMMING (B20CS06)	**No. of Hours L:1 T:0 P:2**	**Credits:2**
After completion of this course, the student shall be/shall				
1	Defining the fundamentals of writing Python scripts			
2	Expressing the Core Python scripting elements such as variables and conditional control structures			
3	Implement the Python scripting using looping statements.			
4	Apply Python functions to facilitate code reuse			
5	Extending how to work with modules and packages			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (B20EE01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electrical power			
2	Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance and Power Factor			
3	Learn the working principle of DC motors, Transformers			
4	Study the characteristics of PN Junction diode and zener diode			
5	Learn the basic of Amplifiers and Rectifiers			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL AND	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**

		ELECTRONICS ENGINEERING LAB (B20EE02)		
After completion of this course, the student shall be/shall				
1	Learn to simplify complex electric and electronic circuits by applying the KVL and KCL laws			
2	Identify the optimal loading onmachines			
3	Analyze the performance of DC machines			
4	Identify and analyze the performance and operation of semi conducting devices			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** PHYSICS LAB (B20PH05)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	The laboratory course helps the student how to operate different equipments related to engineering. It also allows the student to develop experimental skills to design new experiments in engineering			
2	The course enlightens the student about modern equipment like Solar cell, Optical fibres etc			
3	With the exposure to these experiments, the student can compare the theory and correlate with experiment			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** METALLURGY AND MATERIAL SCIENCE (B20ME07)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the bond formation, grains and grain boundaries in crystalline metals			
2	Apply lever rule in calculating the liquid and solid percentage			
3	Apply heat treatment processes to different materials to get required properties			
4	Gain knowledge about advanced materials like composites & ceramics.			
5	Analyze the applications and the properties of cast irons and steels			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** MECHANICS OF SOLIDS (B20ME08)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the concepts of stress and strain in mechanics of solids and material properties.			
2	Apply the fundamental concepts of shear force & bending moment for Cantilever beam, simply supported beam & overhanging beam with point loads, UDL, gradually varying loads & their combination			
3	Apply the fundamental concepts of Bending stresses & shear stresses for different Beams			
4	Apply the different methods to determine the deflection & slope of different beams like double integration method, Area moment method & Macaulay's method			
5	Apply the Lame's equation to determine stresses in Thick cylinders and to understand the concept of torsion and its application to circular shafts.			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** THERMODYNAMICS (B20ME09)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the basic thermodynamic principles and their applications			
2	Apply the laws of thermodynamics for different thermal systems.			
3	Use mollier diagram and steam tables to find the properties of pure substances			
4	Calculate different properties of perfect gases, real gases and mixtures of perfect			

5	Analyse different power cycles			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** MACHINE DRAWING (B20ME10)	**No. of Hours L:2 T:0 P:2**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand various conventions used in machine drawing			
2	Identify the design and use of various machine components			
3	Interpret and make conclusions about a given drawing			
4	Prepare the assembly and part drawings for various machine components			
5	Apply the First angle projection to machine parts			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** BASICS OF ARTIFICIAL INTELLIGENCE (B20CS26)	**No. of Hours L:2 T:0 P:0**	**Credits:2**
After completion of this course, the student shall be/shall				
1	Possess the ability to formulate an efficient problem space for a problem expressed in English			
2	Possess the ability to select a search algorithm for a problem			
3	Possess the characterization time and space complexities			
4	Possess the skill for representing knowledge using the appropriate technique			
5	Possess the ability to apply AI techniques to solve problems of Game Playing			
6	Possess the Expert Systems, Machine Learning and Natural Language Processing			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ENGLISH FOR EFFECTIVE COMMUNICATION (B20EN01)	**No. of Hours L:2 T:0 P:0**	**Credits:2**
After completion of this course, the student shall be/shall				
1	Skim and scan the digital text to summarize it for future reference			
2	Read the text tomake notes according to their n			
3	Use English language effectively in spoken and written forms			
4	Communicate confidently in various contexts and different cultures			
5	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** HUMAN VALUES & PROFESSIONAL ETHICS (B20MC04)	**No. of Hours L:2 T:0 P:0**	**Credits:0**
After completion of this course, the student shall be/shall				
1	It ensures students sustained happiness through identifying the essentials of human values and skills.			
2	It facilitates a correct understanding between profession and happiness			
3	It helps students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature			
4	Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** MECHANICS OF SOLIDS LAB (B20ME12)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Perform material testing and analyze various material properties			
2	Understand the Impact load effect on various Beams			

3	Perform Hardness test to find hardness of components			
4	Find the stiffness of springs with all parameters			
5	Perform Deflection test on Beams and can analyze the Beams			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** METALLURGY LAB (B20ME13)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After completion of this course, the student shall be/shall				
1	Understand the Basic Crystal structures of various materials			
2	Identify Grain and grain boundary, crystal structure of different materials			
3	Study the microstructure of various materials			
4	Analyze Metallurgical properties of various Metals and Non-Metals			
5	Analyze Metallurgical properties of ferrous and Nonferrous alloys			
Course Outcome	**Semester IV Sem**	**Subject Name (Subject Code)** PROBABILITY AND STATISTICS (B20MA07)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After completion of this course, the student shall be/shall				
1	Use probability theory and deals with modelling uncertainty in order to evaluate the probability of real world events			
2	Develop discrete probability distributions and its applications, and use these techniques to generate data from Binomial and Poisson Distributions			
3	Use the techniques of continuous probability distributions to generate data from Normal Distributions			
4	Perform correlation and regression analysis, in order to estimate the nature and the strength of the linear relationship between two variables			
5	Construct confidence interval to estimates population parameters to test the hypothesis			
Course Outcome	**Semester IV Sem**	**Subject Name (Subject Code)** FLUID MECHANICS AND HYDRAULIC MACHINERY (B20ME14)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Apply mathematics and basic sciences and translates this knowledge to understand fluid flow principles and their applications			
2	Understand fundamental knowledge of the mechanics of fluid at rest and in motion			
3	Observe fluid phenomena by developing and using the principles, laws			
4	Analyze fluid interactions with natural and constructed systems			
5	Associate fundamental knowledge & performance of different turbines & pumps			
Course Outcome	**Semester IV Sem**	**Subject Name (Subject Code)** THERMAL ENGINEERING-I (B20ME15)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After completion of this course, the student shall be/shall				
1	Understand the concept and working of two and four strokes I.C. engines			
2	Analyse the normal and abnormal condition for the combustion of SI and CI engines also the parameters which effect the combustion characteristics			
3	Able to calculate the performance of the engine with different parameters			
4	Get knowledge about compressors and their classifications			
5	Differentiate various compressor on the basis of their working and requirement and can use suitable one.			

Course Outcome	Semester IV Sem	Subject Name (Subject Code) KINEMATICS OF MACHINES (B20ME16)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Identify the basic mechanisms involved in machines			
2	Develop familiarity with application of kinematics theories to real-world machines			
3	Identify the basic relations between distance, time, velocity and acceleration			
4	Understand analytical linkage analysis, determine cam profiles			
5	Analyze gear trains and gear profiles, speed regulation methods			
Course Outcome	Semester IV Sem	Subject Name (Subject Code) PRODUCTION TECHNOLOGY (B20ME17)	No. of Hours L:3 T:0 P:0	Credits:3
After completion of this course, the student shall be/shall				
1	Apply the knowledge of casting, welding joints and forces and power requirements in metal forming processes			
2	Relate the melting, solidification, pattern allowances, gating and riser design of mold cavity, aspects of casting.			
3	Understand basic calculations of forces and power requirements in the metal forming operations			
4	Differentiate the application of welding using the arc welding, gas welding, resistance welding, soldering and brazing.			
5	Survey the defects occurring in forging operation			
Course Outcome	Semester IV Sem	Subject Name (Subject Code) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB (B20ME19)	No. of Hours L:0 T:0 P:3	Credits:1.5
After completion of this course, the student shall be/shall				
1	Apply knowledge of fluid mechanics and hydraulic machines and translates this knowledge for understanding fluid flow principles and their application to experiments.			
2	Practical exposure by using components vacuum gauge, pressure gauge, manometers, pipes, motors, pumps & turbines.			
3	Use comparison of theoretical values with the real parameters			
4	Know and understand the experimental analysis in turbines and pumps with parameters such as discharge, head of water, speed of brake drum.			
Course Outcome	Semester IV Sem	Subject Name (Subject Code) PRODUCTION TECHNOLOGY LAB (B20ME20)	No. of Hours L:0 T:0 P:3	Credits:1.5
After completion of this course, the student shall be/shall				
1	Understand basic knowledge and concepts of various experiments			
2	Perform joining of materials (similar/dissimilar) using welding			
3	Analyze the concepts of extrusion and design of die			
4	Operate injection molding and blow molding machines			
Course Outcome	Semester IV Sem	Subject Name (Subject Code) FUELS & LUBRICANTS LAB (B20ME21)	No. of Hours L:0 T:0 P:2	Credits:1
After completion of this course, the student shall be/shall				
1	Analyze the flash point & fire point of liquid fuels			
2	Observe the carbon percentage for liquid fuels			
3	Illustrate the viscosity of Liquid lubricants			

4	Apply different methods to determine the calorific value of fuels
5	Compare the depth of penetration for different lubricants

Viswambhara Educational Society

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

Department of Mechanical Engineering

COURSE OUTCOMES FOR M.TECH – THERMAL ENGINEERING R20 FOR THE YEAR 2020-2021

Course Outcome	Semester I Sem	Subject Name (Subject Code) ADVANCED THERMODYNAMICS (M20TE01)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Emphasize the relevance of Evaluation of thermodynamic properties of working substance			
2	Know the applications of Energy properties of real gases, Vapour pressure, Clausius			
3	Apply Psychometric mixture properties and psychometric chart, Air conditioning processes, cooling towers			
4	Analyse Combustion Reactions, Enthalpy of formation. Entropy of formation, Reference levels of tables. Energy of formation, Heat reaction			
5	Select a problem in Review binary vapour cycle, co generation and combined cycles, Second law analysts of cycles and Refrigeration cycles			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code) ADVANCED FLUID MECHANICS (M20TE02)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Relate Applications Of In Viscid Flow Of Incompressible Fluids			
2	Apply Basic Laws Of Fluid Flow			
3	Understanding The Viscous Flow			
4	Contrast Boundary Layer Concepts			
5	Tabulate Fundamental Concept Of Turbulence			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code) ADVANCED REFRIGERATION AND AIR CONDITIONING (M20TE03)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Deal with Components of Vapor Compression System			
2	Develop the study skills on Production of Low Temperature.			
3	Develop the study skills on Steam Jet refrigeration system,Representation on T-s and h-s diagrams – limitations and applications.			
4	Enable students on Construction of Psychometric chart, Requirements of Comfort Air – conditioning ,Thermodynamics of human body			
5	Equip students with Parameters influencing the Effective Temperature. Summer, winter and year round air – conditioning systems			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code) TURBO MACHINES (M20TE04)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				

1	Understand the Fundamentals of turbo machines and their applications			
2	Applicability of steam nozzle and steam turbine in power plant and the relation of their flow on performance of plant.			
3	To equip students with the fundamental of thermodynamics concepts for gas dynamics.			
4	Get Knowledge about type and working principle of centrifugal compressors.			
5	Deal with Fundamental concept of Axial flow compressors and different type of cascade systems			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ENERGY MANAGEMENT (M20TE05)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand The Need Of Energy Management And Its Principles.			
2	Analyze The Requirement Of Energy Audit And Its Concepts.			
3	Applythe Concepts Of Economic Analysis And Its Scope.			
4	Select Methods Of Evaluation Of Projects.			
5	Survey Fundamental Concept Energy Audit			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** GAS TURBINES (M20TE06)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Explain the Applications and classifications of gas turbines			
2	Applicability of different processes for improving the performance of the plant.			
3	Analysis of Ideal and Real cycle gas turbines and concept of improving the efficiency.			
4	Get Knowledge about fundamental equations and laws of rotating machines			
5	Learn the basic and advanced concepts and working principles of different type of compressors			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** NON CONVENTIONAL ENERGY SOURCES (M20TE07)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know About Solar Energy Applications: Solar Water Heating. Space Heating, Active And Passive Heating Energy			
2	Group Structure Of Earth, Geothermal Regions, Hot Springs. Hot Rocks			
3	Illustrate A Problem In Thermionic & Thermoelectric Generation, MHD Generator.			
4	Compare Fusion, Fusion Reaction, P-P Cycle, Carbon Cycle, Deuterium Cycle, Condition For Controlled Fusion, Fuel Cells And Photovoltaic.			
5	Relate Energy Sources. Plant Productivity, Biomass Wastes, Aerobic And Anaerobic Bioconversion Processed			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** EQUIPMENT DESIGN FOR THERMAL SYSTEMS (M20TE08)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Get details about heat exchanger and its classifications.			
2	Determine the effect of increasing pipes in performance of heat exchanger and get idea about double pipe heat exchanger.			

3	Understand the working principle of steam condenser and explore the condensation of single vapors.			
4	Get Knowledge about processes like vaporization, evaporation and reboiling and study about the equipments used for these processes			
5	To understand the working principle of cooling tower			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** ADVANCED THERMAL ENGINEERING LAB (M20TE09)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand the Analysis of air conditioning unit.			
2	Understand the Analysis of heat pipe.			
3	Know about Performance analysis of flat plate collector.			
4	Know about Performance analysis of evacuative tube concentrator			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** MODELING AND ANALYSIS LAB-I (M20TE10)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand the Analysis of flow profile on the designed nozzle.			
2	Understand the Designing the diffuser and Analysis of flow profile on the designed diffuser.			
3	Understand the Analysis of fluid flow on over curved surface.			
4	Understand the Analysis of force exerted by the fluid jet on fixed flat plate			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** RESEARCH METHODOLOGY (M20MC01)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand about Intellectual Property Right			
2	Compose and write quality research reports and attain familiarity with intellectual property rights.			
3	Estimate research problem formulation.			
4	Analyze research related information.			
5	Discuss new and better products for economic growth and social benefits.			
Course Outcome	**Semester I Sem**	**Subject Name (Subject Code)** STRESS MANAGEMENT (M20AC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 0**
After the completion of this course, the students should be able to				
1	Understand The Need Of Energy Management And Its Principles.			
2	Analyze The Requirement Of Energy Audit And Its Concepts.			
3	Apply The Concepts Of Economic Analysis And Its Scope.			
4	Discuss The Methods Of Evaluation Of Projects.			
5	Compare The Enhancing Creativity By Self Development Program Like Yoga.			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED HEAT TRANSFER (M20TE11)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Emphasize the General heat Conduction equation.			

2	Know the Lumped system analysis			
3	Know about Equations of fluid flow			
4	To understand the concept of free convection, boiling and condensation			
5	Get the knowledge about transfer of heat in the space and at higher temperat			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED I.C. ENGINES (M20TE12)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Design and operating Parameters			
2	Applicability of Thermo-chemistry of Fuel-Air mixtures.			
3	Understanding the effect of Volumetric Efficiency on the performance of the engines.			
4	Get Knowledge on Mean velocity and turbulent characteristics.			
5	Deal with Abnormal combustion Fuel factors, MPFI			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** CRYOGENIC ENGINEERING (M20TE13)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the main concept of cryogenic systems.			
2	To know the importance and applications of gas liquefaction			
3	Understand the working of liquefaction systems for various types of gases			
4	Equip students with the knowledge of gas separation systems and purification systems.			
5	To impart knowledge on cryogenic refrigeration systems			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** JET PROPULSION AND ROCKET ENGINEERING (M20TE14)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	To understand the concept of turbo jet propulsion system and performance of flight.			
2	Enable students to learn the concept of rocketry and its fundamentals.			
3	To impart knowledge on the effect of nozzle design on the performance of jet propulsion.			
4	Get idea about the combustion chemistry of fuels used in rocketry.			
5	Equip students with the knowledge of advanced rocket engines.			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ALTERNATE FUELS (M20TE15)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about Availability and properties of alternate fuels, general use of Alcohols, LPG, hydrogen, and ammonia.			
2	Deal with Properties as engine fuel, alcohols and gasoline blends.			
3	Deal with to solve a problem in performance in SI & CI Engines.			
4	Deal with performance and emission characteristics, bio diesel and its characteristics			
5	To enable students on Layout of an electric vehicle, advantage and Limitations, specifications, system components.			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED COMPUTATIONAL FLUID DYNAMICS (M20TE16)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**

After the completion of this course, the students should be able to				
1	Understand Finite Difference Method, Finite Volume Method, Finite Element Method			
2	Consider Solution Methods Of Elliptical Equations			
3	Understand Boundary Layer Equations For Laminar, Turbulent Flow			
4	Solve Numerical On Burgers Equations: Explicit And Implicit Schemes, Runge- Kutta Method.			
5	Apply Knowledge On Formulations Of Incompressible Viscous Flows By Finite Difference Methods.			
Course Outcome	**Semester II Sem**	Subject Name (Subject Code) THERMAL AND NUCLEAR POWER PLANTS (M20TE17)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the Type of Power plants, Direct energy conversion system.			
2	Analysis and Understand Recent developments in power generation.			
3	Know about Feed water heaters.			
4	To impart knowledge on Combined cycle power plant and its importance.			
5	To understand the concepts of Nuclear Reactor and its Classification			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** THERMAL MEASUREMENTS & PROCESS CONTROLS (M20TE18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the fundamental principles of measuring instruments.			
2	Identify the working principle of all the instruments used to determine the flow.			
3	Develop the advanced thermometers for different type of operations.			
4	Measure the level by direct or indirect methods.			
5	Impart knowledge on principles used for process control			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** ADVANCED INTERNAL COMBUSTION ENGINES LAB (M20TE19)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Understand the effect of change in compression ratio on the performance of diesel& petrol engine.			
2	Analyze the effect of change in fuel injection timing on the performance of diesel engine.			
3	Understand and analysis Flame propagation analysis of gaseous fuels.			
4	Use different type of fuels and analyze its effect on the performance of diesel and petrol			
Course Outcome	**Semester II Sem**	**Subject Name (Subject Code)** MODELING AND ANALYSIS LAB-II (M20TE20)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
After the completion of this course, the students should be able to				
1	Aware of Thermal stress analysis of piston head of diesel engine for real condition.			
2	Design of intake and exhaust valve for diesel engine.			
3	Analyze the thermal stress of crank rod of diesel engine for real operating conditions.			
4	Understand effect of thermal stress on the intake and outlet valve of IC engines			

Course Outcome	Semester II Sem	Subject Name (Subject Code) ENGLISH FOR RESEARCH PAPER WRITING (M20AC01)	No. of Hours L:0 T:0 P:4	Credits: 2
After the completion of this course, the students should be able to				
1	To understand the nuances of language and vocabulary in writing a Research Paper.			
2	To develop the content, structure and format of writing a research paper.			
3	To give the practice of writinga Research Paper.			
4	To enable the students to evolve original research papers without subjected to plagiarism			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED MATERIALS FOR THERMAL SYSTEMS (M20TE22)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the fundamentals of different type of testing methods.			
2	Analyse Impact Behavior Heat Treatment of Steels and Cast Irons.			
3	Impart knowledge on fundamentals of Nuclear Power Plant and Their Materials			
4	survey about materials in Fuel cells and Solar Cells Electro catalyst.			
5	Compare the Materials in Thermal Power Generation.			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** COMPUTER SIMULATION OF SI & CI ENGINES (M20TE23)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Impart knowledge on importance of computer simulation of IC engines.			
2	To understand the concept of Wiebe's function in SI engine modeling.			
3	Determine the importance of Watsons and White house and Way models in CI engines.			
4	Understand the basics of gas exchange processes.			
5	Equip students with knowledge of heat transfer to the surrounding from the IC engines			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED FINITE ELEMENT ANALYSIS (M20TE24)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand The Basic Concepts, Historical Back Ground, Applications Of FEM.			
2	Analysis And Understand Virtual Energy Principle			
3	Observe 1-D Structural Problems.			
4	Impart Knowledge On Hermite Shape Functions, Stiffness Matrix, And Load Vector.			
5	Apply Finite element modeling of Axi-symmetric solids			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code)** ADVANCED OPTIMIZATION TECHNIQUES & APPLICATIONS (M20MA01)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Know about the basics of one dimensional Optimization methods.			
2	Choose the ways to use Direct search method			
3	Calculate dynamic programming.			
4	Construct linear programming			
5	Analyze integer programming			

Course Outcome	Semester III Sem	Subject Name (Subject Code) BUSINESS LAW AND ETHICS (M20MB23)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Know the Business Laws related to incorporating a company			
2	Identify the Importance of Ethics in Business			
3	Categorize Cyber Crime and Legal Aspects.			
4	Analyze Business Ethics.			
5	Understand Negotiable Instruments Act – 1881			
Course Outcome	**Semester III Sem**	**Subject Name (Subject Code) PROJECT MANAGEMENT (M20MB30)**	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Importance of Project Management.			
2	Project Planning. Execution and implementation.			
3	Significance of teams in projects.			
4	Project evaluate techniques.			
5	Role of Scheduling and Network Analysis in Project Planning			

COURSE OUTCOMES FOR B.TECH-CSE R20 FOR THE YEAR 2020-2021

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) LINEAR ALGEBRA AND CALCULUS (B20MA01)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
1	Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.			
2	Determine Eigen values, Eigenvectors of matrices.			
3	Analyse the nature of sequence and series to identify the convergence.			
4	Evaluate limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions.			
5	Calculate Partial derivatives, extreme of functions of multiple variables.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** MODERN PHYSICS (B20PH01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Understands the basic concepts and hypothesis of quantum mechanics			
2	Describes the characteristics and working of lasers and their use in various fields.			
3	Analyze and apply the concepts of wave optics for accurate determination of theinterference in thin films, Newton's rings and the diffraction in single slit etc.			
4	Classify the materials on the basis of energy band gap, and evaluates the carrierconcentration of given semiconductors for device applications			
5	Apply the concepts of the light propagation in optical fibres in opticalcommunication systems			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL AND ELECTRONICS ENGINEERING(B20EE01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electricalpower.			
2	Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance andPower Factor			
3	Learn the working principle of DC motors, Transformers			
4	Study the characteristics of PN Junction diode and zener diode			
5	Learn the basic of Amplifiers and Rectifiers.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING(B20CS01)	**No. of Hours L:4 T:0 P:0**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understanding how problems are posed and how they can be analyzed for obtainingsolutions.			
2	Learning of sequencing, branching, looping and decision making statements tosolve scientific and engineering problems.			
3	Implementing different operations on arrays and creating and using of functionsto solve problems			
4	Understanding and exploring the various methods of memory allocations.			
5	Ability to design and implement different types of file structures using standardmethodology.			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) ENGINEERING DRAWING (B20ME01)	No. of Hours L:0 T:0 P:4	Credits: 2
After the completion of this course, the students should be able to				
1	Understand various commands, modify the applications and object properties in AUTOCAD			
2	Analyse the Projections of Points and solids			
3	Estimate the use of drawings, dimensioning, scales and conic sections			
4	Compare the Conversion of Isometric views to Orthographic view			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) PHYSICS LAB (B20PH05)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Estimate the frequency of tuning for and AC supply with the help of stretched strings			
2	Analyze as well as compare the intensity distribution of interference and diffraction patterns			
3	Draw the characteristics of electrical and electronic circuits and evaluate the dependent parameter			
4	Explore and understand the applications of semiconducting devices			
5	Evaluates the wavelength and radius of curvature of Plano convex lens by Newton's rings			

Course Outcome	Year / semester I Sem	Subject Name (Subject Code) PROGRAMMING FOR PROBLEM SOLVING LAB(B20CS02)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Understand basic structure of the C Programming, data types, declaration and usage ofvariables, control structures and all related concepts.			
2	Ability to understand any algorithm and Write the C programming code in executable form			
3	Implement Programs using functions, pointers and arrays, and use the pre-processors to solvereal time problems			
4	Ability to use file structures and implement programs on files.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS(B20MA02)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Apply the fundamental concepts of ordinary differential equations to real time problems			
2	Find the complete solution of a non homogeneous differential equations and applying its concepts inEngineering problems			
3	Evaluate the multiple integrals in various coordinate systems.			
4	Apply the concepts of gradient, divergence and curl to formulate Engineering problem			
5	Analyse line, surface and volume integrals using fundamental theorems.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) MODERN CHEMISTRY (B20CH04)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	The knowledge of electro chemical cells, different batteries			
2	The knowledge of principles and concepts in corrosion & it's control methods.			
3	The knowledge of Water treatment.			
4	The knowledge of Amino acids, Proteins and Nucleic acids			
5	The knowledge of principles and concepts in Forensic drug chemistry and it's analysis.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) DATA STRUCTURES AND ALGORITHMS(B20CS04)	No. of Hours L:4 T:0 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Define the basic techniques of algorithm analysis			
2	Examine the linear and non linear data structures.			
3	Develop Priority Queues and Balanced Trees			
4	Understand Hashing Techniques and Graph applications			
5	Apply suitable algorithms for sorting Technique			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) PYTHON PROGRAMMING(B20CS03)	No. of Hours L:4 T:0 P:0	Credits:4
After the completion of this course, the students should be able to				
1	Defining the fundamentals of writing Python scripts.			
2	Expressing the Core Python scripting elements such as variables and flow control structures.			
3	Apply Python functions to facilitate code reuse.			
4	Extending how to work with lists and sequence data.			
5	Implement file operations such as read and write and Adapting the code robust byhandling errors and exceptions properly.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) DATA STRUCTURES AND ALGORITHMS LAB(B20CS08)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Explaining the linear data structures such as List, Stack, Queue and its applications			
2	Implement non-linear data structure such as Trees, Graphs and its applications			
3	Apply suitable algorithms for sorting Techniques			
4	Choose appropriate algorithm for Searching and Hashing			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) PYTHON PROGRAMMING LAB(B20CS07)	No. of Hours L:0 T:0 P:3	Credits:1 .5
After the completion of this course, the students should be able to				
1	Expressing the Core Python scripting elements such as variables and flow control structures.			
2	Apply Python functions to facilitate code reuse			
3	Extending how to work with lists and sequence data.			
4	Implement file operations such as read and write and Adapting the code robust byhandling errors and exceptions properly.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENGLISH LANGUAGE AND INTERACTIVE COMMUNICATION SKILLS LAB(B20EN02)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Understand the nuances of English language through audio-visual experience and groupactivities.			
2	Speak with clarity and confidence which in turn enhances their employability skills.			
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation.			
4	Involve the students in speaking activities in various contexts.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENGINEERING & IT WORKSHOP LAB(B20ME03)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Know the fundamental knowledge of House wiring and soldering and their usage in real time Applications.			
2	Gain knowledge on electronic components and measuring instruments.			
3	Use basic concepts of computer hardware for assembly and disassembly.			
4	Use Microsoft tools for exercise.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DESIGN AND ANALYSIS OF ALGORITHMS(B20CS10)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Expose student's to few known methods of solution processes, build new solution algorithms, analyze the asymptotic performance of algorithms and to write rigorous correctness proofs for algorithms.			
2	Identify appropriate data structures and algorithm design methods for specified classes of applications;			
3	Perceive how the choice of data structures and algorithm design methods would impact the performance of programs and how to compare them.			
4	Design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound			
5	Perceive methods to deal with logarithmic type, polynomial type and non-polynomial type of classesof problems and Synthesis of efficient algorithms in common engineering design situations would bediscussed			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DIGITAL LOGIC DESIGN & MICRO PROCESSORS(B20EC09)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand the basic concepts of different Number systems and basic theorems using inBoolean algebra.			
2	Design the logic circuits using basic logic gates by reducing the Boolean expressions with thehelp of Karnaugh Map.			
3	Analyze various types of combinational and sequential circuits.			
4	Analyze various types of sequential circuits.			
5	Understand the internal organization of popular8086 microprocessors			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE(B20CS11)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Evaluate the notions of propositions, predicate formulae, Rules of inference.			
2	Illustrate and describe various types of Relations and Functions.			
3	Apply knowledge of Mathematics, Combinations & Permutations, Binomial Multinomial theorems, Pigeon hole principles			
4	Develop to solve the recurrence relations by using various methods			
5	Perceive the basic concepts of graph theory and apply for real time examples.			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) JAVA PROGRAMMING (B20CS12)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Understand the use of OOP concepts and solve real world problems using OOP techniques.			
2	Solve the inter-disciplinary applications using the concept of inheritance.			
3	Develop robust and faster applications by applying different exception handling mechanisms.			
4	Understand the multithreading concepts and develop efficient applications.			
5	Design GUI based applications and develops applets for web applications.			
Course Outcome	Year / semester III Sem	Subject Name (Subject Code) ENGLISH FOR EFFECTIVE COMMUNICATIONS(B20EN01)	No. of Hours L:2 T:0 P:0	Credits: 2
After the completion of this course, the students should be able to				
1	Skim and scan the digital text to summarize it for future reference.			
2	Read the text to make notes according to their needs.			
3	Use English language effectively in spoken and written forms.			
4	Communicate confidently in various contexts and different cultures			
5	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.			
Course Outcome	Year/semester III Sem	Subject Name (Subject Code) DIGITAL LOGIC DESIGN & MICRO PROCESSORS LAB(B20EC10)	No. of Hours L:0 T:0 P:3	Credits:1 .5
After the completion of this course, the students should be able to				
1	Demonstrate various types of logic gates (AND, OR, NOT, NAND, NOR, XOR,XNOR) and flip flops.			
2	Analyze and design various types of combinational and sequential circuits.			
3	Develop microprocessor based programs for Arithmetic and Logical Operations			
4	Develop microprocessor based programs for various problems.			
Course Outcome	Year / semester III Sem	Subject Name (Subject Code) DESIGN AND ANALYSIS OF ALGORITHMS LAB(B20CS13)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Ability to choose appropriate algorithm design techniques for solving problems.			
2	Design an algorithm in an effective manner			
3	Design and apply iterative and recursive algorithms			
4	Ability to analyze the performance of algorithms.			
Course Outcome	Year / semester III Sem	Subject Name (Subject Code) JAVA PROGRAMMING LAB(B20CS14)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Use the Java SDK environment to create, debug and run simple Java programs.			
2	Write Java programs to implement error handling techniques using exception handling			
3	Develop multithreaded applications with synchronization.			
4	Design simple Graphical User Interface applications and event driven programming.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) OPERATING SYSTEMS (B20CS16)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Compare various Operating Systems architectures, IO structures, Network Structure			
2	Analyze the virtual memory, paging and memory allocation techniques for variousapplications			
3	Apply Deadlock prevention and Deadlock Detection algorithms and perceive the working of an operating system as a File manager, I/O manager, Process manager.			
4	Understand the overview of Disk Storage Structure.			
5	Analyze assess access controls to protect files.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) FORMAL LANGUAGES AND AUTOMATA THEORY(B20CS17)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Explain basic concepts in formal language theory, grammars, automata theory(DFA&NFA), computability theory, and complexity theory.			
2	Know the production rules of regular expressions and grammars, including context:free and context: sensitive grammar			
3	Construct a pushdown automata and context free, regular, normal form grammars todesign computer languages			
4	Evaluate solution for various problems using a theoretical computer (Turing machine)for a computer language			
5	Explain the relationship among language classes and grammars with the help of Chomsky Hierarchy, and Distinguish between decidability and undecidability.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) COMPUTER ORGANIZATION & ARCHITECTURE(B20CS18)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the structure, function of various functional units of computer.			
2	Understand the basic design of Computer, and its organization			
3	Perceive control unit operations and Micro Program example.			
4	Understand different computer arithmetic algorithms for various arithmetic operation			
5	Identity and compare different methods of input-output.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS(B20CS19)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Perceive the fundamental concepts of database management.			
2	Analyze database models & Entity Relationship models and to draw the E-R diagram forthe given case study.			
3	Apply relational Database Theory, and be able to write relational algebra expressions forqueries			
4	Apply Normalization Process to construct the database and explain Basic Issues ofTransaction processing			
5	Compare the basic Database storage structures and access techniques: File Organizationindexing methods including B- Tree and Hashing			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) PROBABILITY AND STATISTICS(B20MA07)	No. of Hours L:3 T:0 P:3	Credits:3
After the completion of this course, the students should be able to				
1	Use probability theory and deals with modeling uncertainty in order to evaluateThe probability of real world events.			
2	Develop discrete probability distributions and its applications, and use the techniques togenerate data from Binomial and Poisson Distributions.			
3	Use the techniques of continuous probability distributions to generate data from Normal Distributions.			
4	Perform correlation and regression analysis, in order to estimate the nature and thestrength of the linear relationship between two variables.			
5	Construct confidence interval to estimates population parameters to test the hypothesis.			
Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) OPERATING SYSTEMS LAB(B20CS20)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Apply CPU scheduling algorithms, Page replacement algorithms.			
2	Explain Bankers Algorithm for Dead Lock Avoidance & Dead Lock Prevention			
3	Describe the concepts of paging and segmentation.			
4	Make use of Linux commands			
Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS LAB(B20CS21)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Design database schema for given Application.			
2	Transform ER Model to Relational Model.			
3	Apply the normalization techniques for development of application software to realisticproblems.			
4	Construct SQL queries to retrieve information from database			
Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) WEB TECHNOLOGIES LAB(B20CS22)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's			
2	Understand, analyze and apply the role of languages like HTML, CSS, XML, JavaScript, PHPand protocols in the workings of the web and web applications			
3	Create dynamic web pages using JavaScript			
4	Build web applications using PHP			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) SOFTWARE ENGINEERING(B20CS29)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Define Software Engineering and list core principles of software engineering and understand various process models			
2	Develop an understanding of software requirements and be able to prepare SRS document.			
3	Understand software design engineering process using structural and object oriented approaches and be able to model			
4	Differentiate the techniques of verification and validation in the process of softwaredevelopment, Apply the testing strategies on different level of implementation (unit,integration,…)			
5	Understand and able to compute quality measures and develop a software quality assurance plan for a software development.			

Course Outcome	Year / semester V Sem	Subject Name (Subject Code) DATA COMMUNICATIONS AND COMPUTER NETWORKS(B20CS30)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Illustrate basic computer network technology, functions of each layer in the OSI and TCP/IP reference model.			
2	Gain the knowledge on error control and flow control mechanisms.			
3	Obtain the skills of subnetting and routing mechanisms.			
4	Analyze the features and Operations of TCP/UDP, congestion control and QoS Techniques.			
5	Familiarity with the essential protocols of application layer, and how they can be used in network design and implementation.			
Course Outcome	**Year / semester V Sem**	**Subject Name (Subject Code)** DATA WAREHOUSING AND DATA MINING(B20CS24)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Develop an understanding of data warehouse, designing and using data in data warehouse using various operations.			
2	Introduce data mining concepts and develops understanding of data mining application.			
3	Develop an outlook of Association rule mining, association rule mining methods and their application on some sample data sets, evaluate these methods based on need.			
4	Develop an understanding of classification and prediction, classification methods and their application on some sample data sets, evaluate these methods based on need			
5	Develop conceptual understanding of clustering, various clustering methods and their application on some sample data sets, evaluate these methods based on need.			
Course Outcome	**Year / semester VSem**	**Subject Name (Subject Code)** ARTIFICIAL INTELLIGENCE (B20AI03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Possess the ability to formulate an efficient problem space for a problem expressed in English.			
2	Possess the ability to select a search algorithm for a problem.			
3	Possess the skill for representing knowledge using the appropriate technique			
4	Possess the ability to apply AI techniques to solve problems of Game Playing.			
5	Possess the Expert Systems, Machine Learning and Natural Language Processing			
Course Outcome	**Year / semester VSem**	**Subject Name (Subject Code)** COMPILER DESIGN(B20CS31) (PROFESSIONAL ELECTIVE-I)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Apply the knowledge of modern phases of compiler and its features.			
2	Identify the similarities and differences among varies parsing techniques.			
3	Explain semantic analysis in the context of the compilation process.			
4	Design a symbol table format for the language defined by a grammar			
5	Analyze the code generation algorithm			
Course Outcome	**Year / semester V Sem**	**Subject Name (Subject Code)** PRINCIPLES OF PROGRAMMING LANGUAGES (B20CS32) (PROFESSIONAL ELECTIVE-I)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Able to analyze syntax-related concepts including context-free grammars, parse trees, semantic issues associated with function implementations.			
2	Summarize the design issues of various reference types and its implementation related to these types.			
3	Able to understand the concepts of Abstraction and Encapsulation constructs of classes, interfaces, packages of various Language Examples.			
4	Ability to understand the nature and implementation of object-oriented languages.			
5	Able to Compare the Functional Programming Languages and Logic Programming Languages.			

Course Outcome	Year / semester V Sem	Subject Name (Subject Code) NETWORK PROGRAMMING (B20CS33) (PROFESSIONAL ELECTIVE-I)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Demonstrate advanced knowledge of OSI layers, TCP & UDP concepts			
2	Networking. Summarize the TCP socket functions and Byte Ordering.			
3	Make use of TCP client server applications and analyze I/O Multiplexing and socket options.			
4	Define about the Elementary UDP sockets and Address conversions.			
5	Explain DNS, other networking information, Pseudo -Terminals, Terminal modes, Control Terminals.			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) DATA COMMUNICATIONS AND COMPUTER NETWORKS LAB(B20CS34)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Implement data link layer farming methods.			
2	Analyze error detection and error correction codes.			
3	Implement and analyze routing and congestion issues in network design.			
4	Implement Encoding and Decoding techniques used in presentation layer.			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) ARTIFICIAL INTELLIGENCE LAB (B20AI04)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Demonstrate Knowledge of the building blocks of AI as presented in terms of intelligent agents.			
2	Analyze and formalize the problem as a state space, graph and design heuristics			
3	Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systemsfor game playing.			
4	Attain the capability to represent various real life problem domains using logicbased techniques anduse this to perform inference or planning.			
Course Outcome	Year / semester V Sem	Subject Name (Subject Code) INDIAN CONSTITUTION(B20MC03)	No. of Hours L:2 T:0 P:0	Credits:0
After the completion of this course, the students should be able to				
1	Demonstrate the fundamental rights and duties of a citizen			
2	Classify the administrative structure of the Indian union			
3	Identify the power of state government and make use of positions			
4	Categorize the various department and local administrations responsibilities			
5	Functions of election commission and its roles			
Course Outcome	Year / semester VSem	Subject Name (Subject Code) MACHINE LEARNING (B20AI06)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course the students should be able to :				
1	Explain the theory underlying machine learning			
2	Learn beyond binary classification.			
3	Recognize and implement various genetic algorithms.			
4	Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models.			
5	Able to analyze the data using R Programming			

Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) CLOUD COMPUTING (B20CS36)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Ability to understand various service delivery models of a cloud computing architecture.			
2	Ability to understand the ways in which the cloud can be programmed and deployed			
3	Understanding Cloud Computing Architecture and Management			
4	Understanding cloud service Models			
5	Understanding cloud service providers.			
Course Outcome	**Year / semester VI Sem**	**Subject Name (Subject Code)** INTERNET OF THINGS(B20CS37)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Interpret the vision of IoT from global context.			
2	Perceive building blocks of Internet of Things and its characteristics.			
3	Learn the basic concepts of Python. Implement the python programming using Raspberry.			
4	Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud &Sensor Networks			
5	Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.			
Course Outcome	**Year / semester VI Sem**	**Subject Name (Subject Code)** SOFTWARE PROJECT MANAGEMENT (PROFESSIONAL ELECTIVE-II) (B20CS38)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Gain knowledge of software economics, phases in the life cycle of software development, project organization, and project control and process instrumentation.			
2	Summarize software economics, software development life cycle, artifacts of the process, workflows, checkpoints, project organization and responsibilities, project control and process instrumentation			
3	Choose the right software development approach. Compare various project organizations and responsibilities.			
4	Analyze the major and minor milestones, artifacts and metrics for management and technical perspective.			
5	Design software product using conventional and modern principles of software project management.			
Course Outcome	**Year / semester VI Sem**	**Subject Name (Subject Code)** NETWORK SECURITY AND CRYPTOGRAPHY (B20CS39) (PROFESSIONAL ELECTIVE-II)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Identifies various types of vulnerabilities, attacks, mechanisms and security services.			
2	Compare and contrast symmetric and asymmetric encryption algorithms.			
3	Implementation of message authentication, hashing algorithms and able to understand kerberos.			
4	Explore the attacks and controls associated with IP, transport level, web and E-mail security.			
5	Develop intrusion detection system, solutions for wireless networks and designing of varioustypes of firewalls.			

Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) WEB SERVICES (B20CS40) (PROFESSIONAL ELECTIVE-II)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Implement Web service client and server with interoperable systems like core distributed computing,J2EE, SOA, WSDL, UDDI and EBXML			
2	Perceive and analyze the principles of SOAP.			
3	Perceive the implement Web Services life cycle, Anatomy ofWSDL definition document.			
4	How to utilize the semantics of web services. Working with UDDI, programming with UDDI, UDDIdata structures			
5	Explore interoperability between different frameworks. Design web based applications that use webservices			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) MACHINE LEARNING LAB (B20AI08)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Discuss different application on Machine Learning problems.			
2	Describe various algorithms on Machine Learning mentioning its strengths andweaknesses.			
3	Improve the performance of Machine Learning algorithms with different parameters			
4	Understand the latest issues raised by current researchers.			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) CLOUD COMPUTING LAB(B20CS41)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Analyze Cloud Computing fundamentals, technologies, applications and implementation of virtualization with Oracle VM Virtual box.			
2	Development knowledge of cloud computing using Amazon Web Services like Compute, Storage and Networking.			
3	Providing Security to the Cloud System using Identity Access Management**(IAM).**			
4	Attain the Capability of design, development of agile and highly available systems usingAmazon Web Services.			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) INTERNET OF THINGS LAB(B20CS42)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Improve the quality of life of humans through IoT technology for that student closer interaction between the experiment and the society.			
2	Identify the Components that forms part of IoT specific Application.			
3	Determine the most appropriate IoT Devices and Sensors based on IoT application.			
4	Improve the Python programming skills for writing IoT Application			
Course Outcome	Year / semester VI Sem	Subject Name (Subject Code) LOGICAL REASONING AND QUANTITATIVE APTITUDE(B20MC05)	No. of Hours L:2 T:0 P:0	Credits:0
After the completion of this course, the students should be able to				
1	Apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.			
2	Apply quantitative correctly arrive at meaningful conclusions regarding their answers and manipulate equations and formulas in order to solve for the desired variable			
3	Interpret given information correctly, determine which mathematical model best describes the data,and apply the model correctly.			
4	Correctly apply mathematical language and notation to explain the reasoning underlying their conclusions when solving problems using mathematical or statistical techniques.			
5	Improve their mathematical skills in various general aspects to solve real time problems.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) DEEP LEARNING(B20AI10)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the basics of Artificial Neural Networks.			
2	Describe the various Learning Networks and Special Networks.			
3	Understand the Deep Neural Network.			
4	Develop different parameters for Regularization for Deep Learning.			
5	Design Optimized for training Deep Models			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS(B20MB01)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the nature, scope and importance of Managerial Economics.			
2	Know what demand is, analyze demand and how elasticity of demand is used for pricingdecisions and to evaluate methods for forecasting demand.			
3	Know how production function is carried out to achieve least cost combination of Inputsand how to analyze cost.			
4	Understand the characteristics of different kinds of markets and outline different form ofbusiness organization and analyze how capital budgeting techniques are used for investment decisions.			
5	Know how to prepare final accounts and how to interpret them, analyze and interpretfinancial statements using ratio analysis.			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) SOFTWARE TESTING(B20CS44) (PROFESSIONAL ELECTIVE – III)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Design test cases suitable for a software development for different domains.			
2	Prepare test planning based on the document.			
3	Identify suitable tests to be carried out.			
4	Validate test plan and test cases designed.			
5	Use of automatic testing tools.			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) SOFTWARE ORIENTED ARCHITECTURE (PROFESSIONAL ELECTIVE – III) (B20CS45)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Design various service layers			
2	Model service candidate derived from existing business documentation.			
3	Design the composition of SOA.			
4	Design application services for technology abstraction.			
5	Principles of Service-Orientation.			
Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) SCRIPTING LANGUAGES (B20CS46) (PROFESSIONAL ELECTIVE – III)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Perceive of scripting and the contributions of scripting languages.			
2	Develop simple scripts to automate system administration.			
3	Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.			
4	Acquire programming skills in scripting language			
5	Develop simple applications by various tools and expose to create advanced applications on web applications.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) BUSINESS INTELLIGENCE & BIG DATA (PROFESSIONAL ELECTIVE – IV) (B20CS47)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Explain the foundations, definitions and capabilities of Bigdata.			
2	List the definitions, concepts, architectures and challenges in Big data environment. Outline the definitions, concepts, and enabling technologies of big data analytics.			
3	Understand concepts on Handoop Ecosystem in Big data.			
4	Analyze the Map reduce programming in Big data Analytics.			
5	Apply Security big data technologies in business intelligence using geospatialλ data, location-based analytics, social networking, Web 2.0, reality mining, and cloud computing.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) REINFORCEMENT LEARNING (B20AI15) (PROFESSIONAL ELECTIVE – IV)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand the key features of Reinforcement Learning.			
2	Apply the different algorithms and define the policy.			
3	Analyze multiple criteria for analyzing RL algorithms and evaluate algorithms on these metrics.			
4	Evaluate the eligibility traces, Eligibility traces used for sampling.			
5	Create Function Approximation Methods.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) CYBER SECURITY & ETHICAL HACKING (B20CS48) (PROFESSIONAL ELECTIVE – IV)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Outline key terms and concepts in cyber law, intellectual property and cybercrimes.			
2	Explore the vulnerabilities, threats and cybercrimes posed by criminals.			
3	Identify various security challenges phased by mobile devices.			
4	Identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection			
5	Analyze the cyber security risk management policies in order to adequately protect an organization's critical information and assets.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) MINI PROJECT & INTERNSHIP (B20CS49)	No. of Hours L:0 T:0 P:0	Credits:2
1	Enhance students' knowledge in current technology			
2	Develop leadership ability and responsibility to execute the given task			
3	Enhance their employability skills along with real corporate exposure			
4	Elaborate the completed task and compile the report.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) DEEP LEARNING LAB (B20AI13)	No. of Hours L:0 T:0 P:3	Credits:1.5
After the completion of this course, the students should be able to				
1	Understand the basics of Artificial Neural Networks.			
2	Describe the various Learning Networks and Special Networks			
3	Understand the Deep Neural Network.			
4	Develop different parameters for Regularization for Deep Learning.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) MAJOR PROJECT PHASE-I (B20CS50)	No. of Hours L:0 T:0 P:8	Credits:4
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

Course Outcome	Year / semester VII Sem	Subject Name (Subject Code) HUMAN VALUES AND PROFESSIONAL ETHICS(B20MC05)	No. of Hours L:2 T:0 P:0	Credits:0
After the completion of this course, the students should be able to				
1	Perceive the importance of ethics and values in life and society.			
2	Develop moral responsibility and mould them as best professionals.			
3	Create ethical vision and achieve harmony in life.			
4	Provide a critical perspective on the socialization of men and women			
5	Perceive the important issues related to gender in contemporary India			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) DESIGN PATTERNS (B20CS51) (PROFESSIONAL ELECTIVE – V)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Identify the appropriate design patterns to solve object oriented design problems.			
2	Identify and implement appropriate solutions to recurring programming problems by consulting technical documentation and specifications, including design pattern catalogs and existing source code.			
3	Understand basic elements of structural patterns and their implementation.			
4	Understand basic elements of creational patterns and their implementations.			
5	Understand basic elements of behavioral patterns and their implementation along with growth in the field of using design patterns			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) BLOCK CHAIN TECHNOLOGIES (B20CS52) (PROFESSIONAL ELECTIVE – V)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Introduce the fundamentals of blockchain, history, technology and decentralization.			
2	Revise cryptographic concepts and its use in blockchain.			
3	Define bitcoin and understand structure of blockchain, alternatives to proof of work.			
4	Introduce smart contracts, solidity and Web3 to implement blockchain			
5	Understand applications of blockchain and its challenges			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) PRINCIPLES OF ROBOTICS(B20AI24) (PROFESSIONAL ELECTIVE – V)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand Robotic Process Automation & Bot Creation.			
2	Apply methods for Bots Upload and Credentials.			
3	Analyze devices to Develop and Runtime Clients and Device Pools.			
4	Develop Bot creator using XML commands.			
5	Create work flow designer			

Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) COMPUTER VISION (B20AI26) (PROFESSIONAL ELECTIVE – VI)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Elaborate development of algorithms and techniques.			
2	Analyze and interpret the visible world around us with real time problems.			
3	Apply the fundamental concepts on multi-dimensional signal processing, feature extraction, pattern analysis visual geometric modeling, stochastic optimization etc.			
4	Take part to makeup and contribute in research developments in the field of computer vision.			
5	Explain different applications ranging from Biometrics, Medical diagnosis, document processing, mining of visual content, to surveillance, advanced rendering etc.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) DATA PRIVACY & SECURITY(B20DS21) (PROFESSIONAL ELECTIVE – VI)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understands various types of Substitution ciphers.			
2	Explore various techniques to break the ciphers and understands transposition techniques.			
3	Compare and contrast block cipher and stream cipher algorithms			
4	Implementation of asymmetric key cryptographic algorithms and understand key management in public key cryptography.			
5	Explore different types of steganography techniques to hide the data in text and images.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) NATURAL LANGUAGE PROCESSING (PROFESSIONAL ELECTIVE – VI) (B20AI19)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.			
2	Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems			
3	Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.			
4	Able to design, implement, and analyze NLP algorithms			
5	Able to design different language modelling Techniques.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) TECHNICAL SEMINAR(B20CS53)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Identify recent technical topics from interested domains.			
2	Analyze the applicability of modern tools and technology.			
3	Discuss and justify the technical aspects of the chosen topic in a systematic approach			
4	Develop Presentation and Communication skills.			
Course Outcome	Year / semester VIII Sem	Subject Name (Subject Code) MAJOR PROJECT PHASE-II(B20CS54)	No. of Hours L:0 T:0P:16	Credits:8
After the completion of this course, the students should be able to				
1	Identify the problem by applying acquired knowledge.			
2	Analyze and categorize executable project modules.			
3	Choose efficient tools for designing project modules.			
4	Combine all the modules through effective team work after efficient testing			
5	Elaborate the completed task and compile the project report.			

COURSE OUTCOMES FOR M.TECH-CSE R18 FOR THE YEAR 2018-2020

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)**	**No. of Hours L:3 T:1 P:0**	**Credits:4**
On successful completion of this course, students are able to:				
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Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
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Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)**	**No. of Hours L:2 T:0 P:0**	**Credits: 2**

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

COURSE OUTCOMES FOR B.TECH-CSE R22 FOR THE YEAR 2022-2023

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) MATRICES AND CALCULUS(B22MA01)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
1	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations			
2	Find the Eigen values and Eigen vectors. Reduce the quadratic form to canonical form using orthogonal transformations.			
3	Solve the applications on the mean value theorems.			
4	Evaluate the improper integrals using Beta and Gamma functions			
5	Find the extreme values of functions of two variables with/ without constraints. Evaluate the multiple integrals and apply the concept to find areas, volumes.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** ENGINEERING CHEMISTRY (B22CH01)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
On successful completion of this course, students are able to:				
1	Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.			
2	The students are able to understand the basic properties of water and its usage in domestic and industrial purposes			
3	They can learn the fundamentals and general properties of polymers and other engineering materials.			
4	They can predict potential applications of chemistry and practical utility in order to becomegood engineers and entrepreneurs.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING(B22CS01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	To write algorithms and to draw flowcharts for solving problems. To convert the algorithms/flowcharts to C programs.			
2	To use arrays, pointers, strings and structures to write C programs.			
3	Ability to design and implement different types of file structures using standard methodology. To decompose a problem into functions and to develop modular reusable code. Searching and sorting problems			
4	To decompose a problem into functions and to develop modular reusable code.			
5	Searching and sorting problems.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL ENGINEERING(B22EE03)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**

After the completion of this course, the students should be able to				
1	Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electrical power			
2	Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance and Power Factor			
3	Learn the working principle of DC motors, Transformers			
4	Understand the construction and performance characteristics of Electrical Machines			
5	Introduce components of Low Voltage Electrical Installations			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** COMPUTER AIDED ENGINEERING GRAPHICS(B22ME03)	**No. of Hours L:1 T:0 P:4**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Apply computer aided drafting tools to create 2D and 3D objects sketch conics and different types of solids			
2	Appreciate the need of Sectional views of solids and Development of surfaces of solids			
3	Read and interpret engineering drawings			
4	Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING(B22CS02)	**No. of Hours L:0 T:0 P:2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Know the working principles of functional units of a basic Computer			
2	Understand program development, the use of data structures and algorithms in problem solving.			
3	Know the need and types of operating system, database systems.			
4	Understand the significance of networks, internet, WWW and cyber security.			
5	Understand Autonomous systems, the application of artificial intelligence.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** ENGINEERING CHEMISTRY LABORATORY(B22CH02)	**No. of Hours L:0 T:0 P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Able to determine the hardness of water			
2	Able to perform methods such as conductometry, and potentiometry in order find out the concentrations or equivalence points of acid, and P^H of unknown solutions.			
3	Students are able to prepare polymers like bakelite and nylon-6,6.			
4	Estimations saponification value, and viscosity of lubricant oils.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING LABORATORY(B22CS03)	**No. of Hours L:0 T:0 P:2**	**Credits: 1**
After the completion of this course, the students should be able to				

1	Understand basic structure of the C Programming, data types, declaration and usage of variables,control structures and all related concept.
2	Ability to understand any algorithm and Write the C programming code in executable form.
3	Implement Programs using functions, pointers and arrays, and use the pre- processors to solve realtime problems.
4	Ability to use file structures and implement programs on files and Implement programs on sortingand searching techniques.

Course Outcome	**Year / semester**	**Subject Name (Subject Code)** BASIC ELECTRICAL ENGINEERING LABORATORY(B22EE04)	**No. of Hours**	**Credits: 1**
	I Sem		**L:0 T:0 P:2**	

After the completion of this course, the students should be able to	
1	Verify the basic electrical circuits through different laws and theorems
2	Analyse the transient responses of R, L and C circuits for DC excitation
3	Create resonance condition in series R-L-C circuit
4	Analyze the performance of DC shunt motor, single phase transformer and Three-phase Induction Motor.

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (B22MA02)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Identify whether the given differential equation of first order is exact or not.			
2	Solve higher differential equation and apply the concept of differential equation to real world problems.			
3	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
4	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
5	Evaluate the line, surface and volume integrals and converting them from one to another.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** APPLIED PHYSICS(B22PH01)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Understand physical world from fundamental point of view by the concepts of Quantum Mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.			
2	Identify the role of semiconductor devices in science and engineering Applications			
3	Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.			
4	Appreciate the features and applications of Nano materials.			
5	Understand various aspects of Lasers and Optical fibre and their applications in diverse Fields.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** ENGINEERING WORKSHOP(B22ME01)	**No. of Hours L:0 T:1 P:3**	**Credits:2.5**
After the completion of this course, the students should be able to				
1	Study and practice on machine tools and their operations.			
2	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.			
3	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.			
4	Apply basic electrical engineering knowledge for house wiring practice.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** ENGLISH FOR SKILL ENHANCEMENT (B22EN01)	**No. of Hours L:2 T:0 P:0**	**Credits:2**
After the completion of this course, the students should be able to				
1	Understand the importance of vocabulary and sentence structures.			
2	Choose appropriate vocabulary and sentence structures for their oral andwritten communication.			
3	Demonstrate their understanding of the rules of functional grammar.			
4	Develop comprehension skills using known and unknown passages.			
5	Take an active part in drafting paragraphs, letters, essays, abstracts, précis andreports in various contexts			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** ELECTRONIC DEVICES AND CIRCUITS (B22EC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**

After the completion of this course, the students should be able to	
1	Acquire the knowledge of PN diode and its characteristics.
2	Design the rectifiers with and without filters for specified DC voltage.
3	Illustrate the voltage- current characteristics of Junction Transistor and different configurations of transistor
4	Acquire knowledge about the construction, theory and characteristics of FET and MOSFET.
5	Acquire the knowledge about the role of special purpose devices and their applications.

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) APPLIED PHYSICS LABORATORY (B22PH02)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.			
2	Appreciate quantum physics in semiconductor devices and optoelectronics.			
3	Gain the knowledge of applications of dielectric constant.			
4	Understand the variation of magnetic field and behavior of hysteresis curve.			
	Gain the knowledge of decay of chargeand determine time constant of RC circuit			

Course Outcome	Year / semester: II Sem	Subject Name(Subject Code) PYTHON PROGRAMMING LABORATORY(B22CS04)	No. of Hours L:0 T:1 P:2	Credits:2
1	Develop the application specific codes using python.			
2	Understand Strings, Lists, Tuples and Dictionaries in Python.			
3	Understand the structure of exception handling for all general purpose exceptions.			
4	Verify programs using modular approach, file I/O, Python standard library. Implement DigitalSystems using Python.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY(B22EN02)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Understand the nuances of English language through audio- visual experience and groupactivities.			
2	Neutralize their accent for intelligibility.			
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills oflanguage and improve their pronunciation.			
4	Involve in speaking activities in various contexts.			
5	Speak with clarity and confidence which in turn enhance their employability skills.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) IT WORKSHOP(B22CS05)	No. of Hours L:0 T:0 P:2	Credits: 1
After the completion of this course, the students should be able to				
1	Perform Hardware troubleshooting. Understand Hardware components and inter dependencies			
2	Safeguard computer systems from viruses/worms			
3	Perform calculations using spreadsheets.			
4	Document/ Presentation preparation			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENVIRONMENTAL SCIENCE(B22CH03)	No. of Hours L:3 T:0 P:0	Credits: 0
After the completion of this course, the students should be able to				
1	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) DIGITAL ELECTRONICS(B22EC12)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Acquire the knowledge on numerical information in different forms and Boolean Algebra theorems for Combinational function minimization.			
2	Design logic circuits by applying minimization techniques and also able to characterize the various logic families for their AC and DC parameter's.			
3	Design and analyze various combination logic circuits and understand the fundamental's of sequential circuits .			
4	Design and analyze sequential circuits for various cyclic functions.			
5	Acquire the knowledge on concepts of Memories and PLA			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) DATA STRUCTURES(B22CS11)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Ability to select the data structures that efficiently model the information in a problem.			
2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.			
3	Implement and know the application of algorithms for sorting and pattern matching.			
4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.			

Course Outcome	Year/semester III Sem	Subject Name (Subject Code) COMPUTER ORIENTED STATISTICAL METHODS(B22MA04)	No. of Hours L:3 T:1 P:0	Credits:4
After the completion of this course, the students should be able to				
1	Apply the concepts of probability and distributions to case studies.			
2	Formulate and solve problems involving random variables and apply statistical methods foranalyzing experimental data.			
3	Apply concept of estimation and testing of hypothesis to case studies.			
4	Correlate the concepts of one unit to the concepts in other units.			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) COMPUTER ORGANIZATION AND ARCHITECTURE(B22CS12)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Understand the basics of instruction sets and their impact on processor design.			
2	Demonstrate an understanding of the design of the functional units of a digital computer			

	system.			
3	Evaluate cost performance and design trade-offs in designing and constructing a computerprocessor including memory.			
4	Design a pipeline for consistent execution of instructions with minimum hazards.			
5	Recognize and manipulate representations of numbers stored in digital computers.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** OBJECT ORIENTED PROGRAMMING THROUGH JAVA(B22CS13)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Demonstrate the behavior of programs involving the basic programming constructs like controlstructures, constructors, string handling and garbage collection.			
2	Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by usingextend and implement keywords			
3	Use multithreading concepts to develop inter process communication.			
4	Understand the process of graphical user interface design and implementation using AWT orswings.			
5	Develop applets that interact abundantly with the client environment and deploy on the server.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DATA STRUCTURES LAB(B22CS14)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.			
2	Ability to Implement searching and sorting algorithms			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB(B22CS15)	**No. of Hours L:0 T:0 P:3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Able to write programs for solving real world problems using the java collection framework.			
2	Able to write programs using abstract classes.			
3	Able to write multithreaded programs			
4	Able to write GUI programs using swing controls in Java.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DATA VISUALIZATION - R PROGRAMMING/ POWER BI(B22DS01)	**No. of Hours L:0T:0 P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Understand How to import data into Tableau.			
2	Understand Tableau concepts of Dimensions and Measures.			
3	Develop Programs and understand how to map Visual Layouts and Graphical Properties.			
4	Create a Dashboard that links multiple visualizations.			
5	Use graphical user interfaces to create Frames for providing solutions to real world problems.			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) GENDER SENSITIZATION LAB(B22MC07)	No. of Hours L:0 T:0 P:2	Credits:0
After the completion of this course, the students should be able to				
1	Students will have developed a better understanding of important issues related to gender in contemporary India.			
2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.			
3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.			
4	Students will acquire insight into the gendered division of labor and its relation to politics and economics.			
5	Men and women students and professionals will be better equipped to work and live together as equals.			
6	Students will develop a sense of appreciation of women in all walks of life.			
7	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DISCRETE MATHEMATICS(B22CS16)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand and construct precise mathematical proofs			
2	Apply logic and set theory to formulate precise statements			
3	Analyze and solve counting problems on finite and discrete structures			
4	Describe and manipulate sequences			
5	Apply graph theory in solving computing problems			

Course Outcome	Year / semesterIV Sem	Subject Name (Subject Code) BUSINESS ECONOMICS AND FINANCIAL ANALYSIS(B22MB01)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricingaspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) OPERATING SYSTEMS(B22CS17)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Will be able to control access to a computer and the files that may be shared			
2	Demonstrate the knowledge of the components of computers and their respective roles incomputing.			
3	Ability to recognize and resolve user problems with standard operating environments.			
4	Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS (B22CS18)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Gain knowledge of fundamentals of DBMS, database design and normal forms			
2	Master the basics of SQL for retrieval and management of data.			
3	Be acquainted with the basics of transaction processing and concurrency control.			
4	Familiarity with database storage structures and access techniques			
Course Outcome	Year / semester Ⅳ Sem	Subject Name (Subject Code) SOFTWARE ENGINEERING (B22CS19)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Ability to translate end-user requirements into system and software requirements, using e.g.UML, and structure the requirements in a Software Requirements Document (SRD).			
2	Identify and apply appropriate software architectures and patterns to carry out high level designof a system and be able to critically compare alternative choices.			
3	Will have experience and/or awareness of testing problems and will be able to develop a simpletesting report			
Course Outcome	Year / semester ⅣSem	Subject Name (Subject Code) OPERATING SYSTEMS LAB(B22CS20)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.			
2	Able to implement C programs using Unix system calls			
Course Outcome	Year / semester Ⅳ Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS LAB(B22CS21)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Design database schema for a given application and apply normalization			
2	Acquire skills in using SQL commands for data definition and data manipulation			
3	Develop solutions for database applications using procedures, cursors and triggers			
Course Outcome	Year / semester ⅣSem	Subject Name (Subject Code) NODE JS/ REACT JS/ DJANGO(B22CS23)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.			
2	Demonstrate Advanced features of JavaScript and learn about JDBC			
3	Develop Server – side implementation using Java technologies lik			
4	Develop the server – side implementation using Node JS.			
5	Design a Single Page Application using React.			
Course Outcome	Year / semester ⅣSem	Subject Name (Subject Code) CONSTITUTION OF INDIA (B22MB10)	No. of Hours L:3 T:0 P:0	Credits:0

After the completion of this course, the students should be able to	
1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP]under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
4	Discuss the passage of the Hindu Code Bill of 1956.

COURSE OUTCOMES FOR B.TECH-CSE R22 FOR THE YEAR 2022-2023

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) MATRICES AND CALCULUS(B22MA01)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
1	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations			
2	Find the Eigen values and Eigen vectors. Reduce the quadratic form to canonical form using orthogonal transformations.			
3	Solve the applications on the mean value theorems.			
4	Evaluate the improper integrals using Beta and Gamma functions			
5	Find the extreme values of functions of two variables with/ without constraints. Evaluate the multiple integrals and apply the concept to find areas, volumes.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** ENGINEERING CHEMISTRY (B22CH01)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
On successful completion of this course, students are able to:				
1	Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.			
2	The students are able to understand the basic properties of water and its usage in domestic and industrial purposes			
3	They can learn the fundamentals and general properties of polymers and other engineering materials.			
4	They can predict potential applications of chemistry and practical utility in order to becomegood engineers and entrepreneurs.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING(B22CS01)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	To write algorithms and to draw flowcharts for solving problems. To convert the algorithms/flowcharts to C programs.			
2	To use arrays, pointers, strings and structures to write C programs.			
3	Ability to design and implement different types of file structures using standard methodology. To decompose a problem into functions and to develop modular reusable code. Searching and sorting problems			
4	To decompose a problem into functions and to develop modular reusable code.			
5	Searching and sorting problems.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** BASIC ELECTRICAL ENGINEERING(B22EE03)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**

After the completion of this course, the students should be able to				
1	Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electrical power			
2	Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance and Power Factor			
3	Learn the working principle of DC motors, Transformers			
4	Understand the construction and performance characteristics of Electrical Machines			
5	Introduce components of Low Voltage Electrical Installations			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** COMPUTER AIDED ENGINEERING GRAPHICS(B22ME03)	**No. of Hours L:1 T:0 P:4**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Apply computer aided drafting tools to create 2D and 3D objects sketch conics and different types of solids			
2	Appreciate the need of Sectional views of solids and Development of surfaces of solids			
3	Read and interpret engineering drawings			
4	Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING(B22CS02)	**No. of Hours L:0 T:0 P:2**	**Credits: 1**
After the completion of this course, the students should be able to				
1	Know the working principles of functional units of a basic Computer			
2	Understand program development, the use of data structures and algorithms in problem solving.			
3	Know the need and types of operating system, database systems.			
4	Understand the significance of networks, internet, WWW and cyber security.			
5	Understand Autonomous systems, the application of artificial intelligence.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** ENGINEERING CHEMISTRY LABORATORY(B22CH02)	**No. of Hours L:0 T:0 P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Able to determine the hardness of water			
2	Able to perform methods such as conductometry, and potentiometry in order find out the concentrations or equivalence points of acid, and P^H of unknown solutions.			
3	Students are able to prepare polymers like bakelite and nylon-6,6.			
4	Estimations saponification value, and viscosity of lubricant oils.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** PROGRAMMING FOR PROBLEM SOLVING LABORATORY(B22CS03)	**No. of Hours L:0 T:0 P:2**	**Credits: 1**
After the completion of this course, the students should be able to				

1	Understand basic structure of the C Programming, data types, declaration and usage of variables,control structures and all related concept.
2	Ability to understand any algorithm and Write the C programming code in executable form.
3	Implement Programs using functions, pointers and arrays, and use the pre- processors to solve realtime problems.
4	Ability to use file structures and implement programs on files and Implement programs on sortingand searching techniques.

Course Outcome	**Year / semester**	**Subject Name (Subject Code)** BASIC ELECTRICAL ENGINEERING LABORATORY(B22EE04)	**No. of Hours**	**Credits: 1**
	I Sem		**L:0 T:0 P:2**	

After the completion of this course, the students should be able to	
1	Verify the basic electrical circuits through different laws and theorems
2	Analyse the transient responses of R, L and C circuits for DC excitation
3	Create resonance condition in series R-L-C circuit
4	Analyze the performance of DC shunt motor, single phase transformer and Three-phase Induction Motor.

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (B22MA02)	No. of Hours L:3 T:1 P:0	Credits: 4
After the completion of this course, the students should be able to				
1	Identify whether the given differential equation of first order is exact or not.			
2	Solve higher differential equation and apply the concept of differential equation to real world problems.			
3	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
4	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
5	Evaluate the line, surface and volume integrals and converting them from one to another.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** APPLIED PHYSICS(B22PH01)	**No. of Hours L:3 T:1 P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Understand physical world from fundamental point of view by the concepts of Quantum Mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.			
2	Identify the role of semiconductor devices in science and engineering Applications			
3	Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.			
4	Appreciate the features and applications of Nano materials.			
5	Understand various aspects of Lasers and Optical fibre and their applications in diverse Fields.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** ENGINEERING WORKSHOP(B22ME01)	**No. of Hours L:0 T:1 P:3**	**Credits:2.5**
After the completion of this course, the students should be able to				
1	Study and practice on machine tools and their operations.			
2	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.			
3	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.			
4	Apply basic electrical engineering knowledge for house wiring practice.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** ENGLISH FOR SKILL ENHANCEMENT (B22EN01)	**No. of Hours L:2 T:0 P:0**	**Credits:2**
After the completion of this course, the students should be able to				
1	Understand the importance of vocabulary and sentence structures.			
2	Choose appropriate vocabulary and sentence structures for their oral andwritten communication.			
3	Demonstrate their understanding of the rules of functional grammar.			
4	Develop comprehension skills using known and unknown passages.			
5	Take an active part in drafting paragraphs, letters, essays, abstracts, précis andreports in various contexts			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** ELECTRONIC DEVICES AND CIRCUITS (B22EC02)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**

After the completion of this course, the students should be able to	
1	Acquire the knowledge of PN diode and its characteristics.
2	Design the rectifiers with and without filters for specified DC voltage.
3	Illustrate the voltage- current characteristics of Junction Transistor and different configurations of transistor
4	Acquire knowledge about the construction, theory and characteristics of FET and MOSFET.
5	Acquire the knowledge about the role of special purpose devices and their applications.

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) APPLIED PHYSICS LABORATORY (B22PH02)	No. of Hours L:0 T:0 P:3	Credits: 1.5
After the completion of this course, the students should be able to				
1	Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.			
2	Appreciate quantum physics in semiconductor devices and optoelectronics.			
3	Gain the knowledge of applications of dielectric constant.			
4	Understand the variation of magnetic field and behavior of hysteresis curve.			
	Gain the knowledge of decay of chargeand determine time constant of RC circuit			

Course Outcome	Year / semester: II Sem	Subject Name(Subject Code) PYTHON PROGRAMMING LABORATORY(B22CS04)	No. of Hours L:0 T:1 P:2	Credits:2
1	Develop the application specific codes using python.			
2	Understand Strings, Lists, Tuples and Dictionaries in Python.			
3	Understand the structure of exception handling for all general purpose exceptions.			
4	Verify programs using modular approach, file I/O, Python standard library. Implement DigitalSystems using Python.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY(B22EN02)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Understand the nuances of English language through audio- visual experience and groupactivities.			
2	Neutralize their accent for intelligibility.			
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills oflanguage and improve their pronunciation.			
4	Involve in speaking activities in various contexts.			
5	Speak with clarity and confidence which in turn enhance their employability skills.			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) IT WORKSHOP(B22CS05)	No. of Hours L:0 T:0 P:2	Credits: 1
After the completion of this course, the students should be able to				
1	Perform Hardware troubleshooting. Understand Hardware components and inter dependencies			
2	Safeguard computer systems from viruses/worms			
3	Perform calculations using spreadsheets.			
4	Document/ Presentation preparation			

Course Outcome	Year / semester II Sem	Subject Name (Subject Code) ENVIRONMENTAL SCIENCE(B22CH03)	No. of Hours L:3 T:0 P:0	Credits: 0
After the completion of this course, the students should be able to				
1	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) DIGITAL ELECTRONICS(B22EC12)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Acquire the knowledge on numerical information in different forms and Boolean Algebra theorems for Combinational function minimization.			
2	Design logic circuits by applying minimization techniques and also able to characterize the various logic families for their AC and DC parameter's.			
3	Design and analyze various combination logic circuits and understand the fundamental's of sequential circuits .			
4	Design and analyze sequential circuits for various cyclic functions.			
5	Acquire the knowledge on concepts of Memories and PLA			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) DATA STRUCTURES(B22CS11)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Ability to select the data structures that efficiently model the information in a problem.			
2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.			
3	Implement and know the application of algorithms for sorting and pattern matching.			
4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.			

Course Outcome	Year/semester III Sem	Subject Name (Subject Code) COMPUTER ORIENTED STATISTICAL METHODS(B22MA04)	No. of Hours L:3 T:1 P:0	Credits:4
After the completion of this course, the students should be able to				
1	Apply the concepts of probability and distributions to case studies.			
2	Formulate and solve problems involving random variables and apply statistical methods foranalyzing experimental data.			
3	Apply concept of estimation and testing of hypothesis to case studies.			
4	Correlate the concepts of one unit to the concepts in other units.			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) COMPUTER ORGANIZATION AND ARCHITECTURE(B22CS12)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Understand the basics of instruction sets and their impact on processor design.			
2	Demonstrate an understanding of the design of the functional units of a digital computer			

	system.			
3	Evaluate cost performance and design trade-offs in designing and constructing a computerprocessor including memory.			
4	Design a pipeline for consistent execution of instructions with minimum hazards.			
5	Recognize and manipulate representations of numbers stored in digital computers.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** OBJECT ORIENTED PROGRAMMING THROUGH JAVA(B22CS13)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Demonstrate the behavior of programs involving the basic programming constructs like controlstructures, constructors, string handling and garbage collection.			
2	Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by usingextend and implement keywords			
3	Use multithreading concepts to develop inter process communication.			
4	Understand the process of graphical user interface design and implementation using AWT orswings.			
5	Develop applets that interact abundantly with the client environment and deploy on the server.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DATA STRUCTURES LAB(B22CS14)	**No. of Hours L:0 T:0 P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.			
2	Ability to Implement searching and sorting algorithms			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB(B22CS15)	**No. of Hours L:0 T:0 P:3**	**Credits: 1.5**
After the completion of this course, the students should be able to				
1	Able to write programs for solving real world problems using the java collection framework.			
2	Able to write programs using abstract classes.			
3	Able to write multithreaded programs			
4	Able to write GUI programs using swing controls in Java.			
Course Outcome	**Year / semester III Sem**	**Subject Name (Subject Code)** DATA VISUALIZATION - R PROGRAMMING/ POWER BI(B22DS01)	**No. of Hours L:0T:0 P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Understand How to import data into Tableau.			
2	Understand Tableau concepts of Dimensions and Measures.			
3	Develop Programs and understand how to map Visual Layouts and Graphical Properties.			
4	Create a Dashboard that links multiple visualizations.			
5	Use graphical user interfaces to create Frames for providing solutions to real world problems.			

Course Outcome	Year / semester III Sem	Subject Name (Subject Code) GENDER SENSITIZATION LAB(B22MC07)	No. of Hours L:0 T:0 P:2	Credits:0
After the completion of this course, the students should be able to				
1	Students will have developed a better understanding of important issues related to gender in contemporary India.			
2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.			
3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.			
4	Students will acquire insight into the gendered division of labor and its relation to politics and economics.			
5	Men and women students and professionals will be better equipped to work and live together as equals.			
6	Students will develop a sense of appreciation of women in all walks of life.			
7	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DISCRETE MATHEMATICS(B22CS16)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Understand and construct precise mathematical proofs			
2	Apply logic and set theory to formulate precise statements			
3	Analyze and solve counting problems on finite and discrete structures			
4	Describe and manipulate sequences			
5	Apply graph theory in solving computing problems			

Course Outcome	Year / semesterIV Sem	Subject Name (Subject Code) BUSINESS ECONOMICS AND FINANCIAL ANALYSIS(B22MB01)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricingaspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) OPERATING SYSTEMS(B22CS17)	No. of Hours L:3 T:0 P:0	Credits: 3
After the completion of this course, the students should be able to				
1	Will be able to control access to a computer and the files that may be shared			
2	Demonstrate the knowledge of the components of computers and their respective roles incomputing.			
3	Ability to recognize and resolve user problems with standard operating environments.			
4	Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.			

Course Outcome	Year / semester IV Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS (B22CS18)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Gain knowledge of fundamentals of DBMS, database design and normal forms			
2	Master the basics of SQL for retrieval and management of data.			
3	Be acquainted with the basics of transaction processing and concurrency control.			
4	Familiarity with database storage structures and access techniques			
Course Outcome	Year / semester Ⅳ Sem	Subject Name (Subject Code) SOFTWARE ENGINEERING (B22CS19)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
1	Ability to translate end-user requirements into system and software requirements, using e.g.UML, and structure the requirements in a Software Requirements Document (SRD).			
2	Identify and apply appropriate software architectures and patterns to carry out high level designof a system and be able to critically compare alternative choices.			
3	Will have experience and/or awareness of testing problems and will be able to develop a simpletesting report			
Course Outcome	Year / semester ⅣSem	Subject Name (Subject Code) OPERATING SYSTEMS LAB(B22CS20)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.			
2	Able to implement C programs using Unix system calls			
Course Outcome	Year / semester Ⅳ Sem	Subject Name (Subject Code) DATABASE MANAGEMENT SYSTEMS LAB(B22CS21)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Design database schema for a given application and apply normalization			
2	Acquire skills in using SQL commands for data definition and data manipulation			
3	Develop solutions for database applications using procedures, cursors and triggers			
Course Outcome	Year / semester ⅣSem	Subject Name (Subject Code) NODE JS/ REACT JS/ DJANGO(B22CS23)	No. of Hours L:0 T:0 P:2	Credits:1
After the completion of this course, the students should be able to				
1	Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.			
2	Demonstrate Advanced features of JavaScript and learn about JDBC			
3	Develop Server – side implementation using Java technologies lik			
4	Develop the server – side implementation using Node JS.			
5	Design a Single Page Application using React.			
Course Outcome	Year / semester ⅣSem	Subject Name (Subject Code) CONSTITUTION OF INDIA (B22MB10)	No. of Hours L:3 T:0 P:0	Credits:0

After the completion of this course, the students should be able to	
1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP]under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
4	Discuss the passage of the Hindu Code Bill of 1956.

COURSE OUTCOMES FOR M.TECH-CSE R18 FOR THE YEAR 2018-2020

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)**	**No. of Hours L:3 T:1 P:0**	**Credits:4**
On successful completion of this course, students are able to:				
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Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)**	**No. of Hours L:3 T:0 P:0**	**Credits:3**
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Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)**	**No. of Hours L:2 T:0 P:0**	**Credits: 2**

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits: 4
On successful completion of this course, students will be able to:				
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Course Outcome	Year /Semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:1 P:0	Credits:4
On successful completion of this course, students are able to:				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:3 T:0 P:0	Credits:3
After the completion of this course, the students should be able to				
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Course Outcome	Year / semester I Sem	Subject Name (Subject Code)	No. of Hours L:2 T:0 P:0	Credits: 2

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE OUTCOMES FOR B.TECH-EEE R22

Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	I Year I Sem	**Matrices and Calculus**	**B22MA01**	**L/T/P :3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations				
2	Find the Eigen values and Eigen vectors				
3	Reduce the quadratic form to canonical form using orthogonal transformations.				
4	Solve the applications on the mean value theorems.				
5	Evaluate the improper integrals using Beta and Gamma functions				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	I Year I Sem	**Engineering Chemistry**	**B22CH01**	**L/T/P :3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.				
2	The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.				
3	They can learn the fundamentals and general properties of polymers and other engineering materials.				
4	They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	I Year I Sem	**C Programming and Data Structures**	**B22CS01**	**L/T/P :3/0 /0**	
By the end of the course, students will be able to					
1	Understand the various steps in Program development				
2	Explore the concepts of control statements and functions in C Programming Language.				
3	Understand the concepts of pointers and its applications				
4	Ability to design and implement different types of file structures				
5	Apply data structures such as stacks, queues in problem solving and analyze various				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	I Year I	**Electrical Circuit Analysis–I**	**B22EE01**	**L/T/P :3/0 /0**	

	Sem				
The basic concepts included in this course will help the student to:					
1	Understand the basics of electrical circuits such as laws, transformation and network reduction techniques.				
2	Explore the basic principles and concepts involved in AC circuits and analyze power in series and parallel AC circuits				
3	Apply network theorems to analyze electrical circuits				
4	Analyze balanced and unbalanced three phase circuits and measure voltage, current and power in three phase star and delta connections				
5	Explore various network topologies and analyze the networks with cut-set and tie-set				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	I Year I Sem	**Computer Aided Engineering Graphics**	**B22ME03**	**L/T/P :1/0 /4**	
After learning the contents of this subject, the student must be able to					
1	Apply computer aided drafting tools to create 2D and 3D objects sketch Conics and different types of solids				
2	Appreciate the need of Sectional views of solids and Development of Surfaces of solids				
3	Read and interpret engineering drawings				
4	Conversion of orthographic projection into isometric view and vice Versa manually and by using computer aided drafting				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	I Year I Sem	**Elements of Electrical and Electronics Engineering**	**B22EE02**	**L/T/P :0/0 /2**	
After learning the contents of this subject, the student must be able to					
1	Verify the basic electrical circuits through different laws and theorems				
2	Measure voltage, current and power of a single phase transformer				
3	Calculate the impedance of series RL, RC and RLC circuits				
4	Determine the form factor of a non-sinusoidal waveform				
5	Analyse the transient responses of R, L and C circuits for DC excitation				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	I Year I Sem	**Engineering Chemistry Laboratory**	**B22CH02**	**L/T/P :0/0 /2**	
After learning the contents of this subject, the student must be able to					
1	Able to determine the hardness of water				
2	Able to perform methods such as conductometry, and potentiometry in order to find out the concentrations or equivalence points of acid, and PH of unknown solutions..				
3	Students are able to prepare polymers like bakelite and nylon-6,6.				
4	Estimations saponification value, and viscosity of lubricant oils				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	I Year I Sem	**C Programming and Data Structures Laboratory**	**B22CS07**	**L/T/P : 0/0 /2**	

After learning the contents of this subject, the student must be able to					
1	Develop modular and readable C Programs				
2	Solve problems using strings, functions. Handledatain files.				
3	Implement stacks, queues using arrays.				
4	To understand and analyze various searching and sorting algorithms.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	I Year II Sem	**Ordinary Differential Equations and Vector Calculus**	**B22MA02**	**L/T/P :3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Identify whether the given differential equation of first order is exact or not				
2	Solve higher differential equation and apply the concept of differential equation to real world problems.				
3	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.				
4	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.				
5	Evaluate the line, surface and volume integrals and converting them from one to another				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	I Year II Sem	**Applied Physics**	**B22PH01**	**L/T/P : 3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand physical world from fundamental point of view by the concepts of Quantum				
2	Mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.				
3	Identify the role of semiconductor devices in science and engineering Applications.				
4	Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.				
5	Appreciate the features and applications of Nanomaterials.				
6	Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2.5**
	I Year II Sem	**Engineering Workshop**	**B22ME01**	**L/T/P :0/1 /3**	
After learning the contents of this subject, the student must be able to					
1	Study and practice on machine tools and their operations				
2	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding				
3	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling				
4	Apply basic electrical engineering knowledge for house wiring practice				
Course	**Year &**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**

Outcome	Semester				2
	I Year II Sem	English for Skill Enhancement	B22EN01	L/T/P :2/0 /0	
After learning the contents of this subject, the student must be able to					
1	Understand the importance of vocabulary and sentence structures.				
2	Choose appropriate vocabulary and sentence structures for their oral and written communication.				
3	Demonstrate their understanding of the rules of functional grammar.				
4	Develop comprehension skills using known and unknown passages.				
5	Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 2
	I Year II Sem	Electrical Circuit Analysis- II	B22EE05	L/T/P :2/0 /0	
After learning the contents of this subject, the student must be able to					
1	Evaluate the network parameters in two port network				
2	Design the different kinds of two port network filters.				
3	Study the transient response of series and parallel RLC circuits for DC and sinusoidal excitations				
4	Analyze the response of an electrical circuit for step, ramp, impulse etc., using Laplace transformation				
5	Learn the Fourier series and integral to analyze the AC circuits				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 1.5
	I Year II Sem	Applied Physics Laboratory	B22PH02	L/T/P :0/0 /3	
After learning the contents of this subject, the student must be able to					
1	Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.				
2	Appreciate quantum physics in semiconductor devices and optoelectronics.				
3	Gain the knowledge of applications of dielectric constant.				
4	Understand the variation of magnetic field and behavior of hysteresis curve.				
5	Gain the knowledge of decay of charge and determine time constant of RC circuit				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 1
	I Year II Sem	English Language and Communication Skills Laboratory	B22EN02	L/T/P :0/0 /2	
After learning the contents of this subject, the student must be able to					
1	Understand the nuances of English language through audio- visual experience and group activities				
2	Neutralize their accent for intelligibility				
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills of language and improve their pronunciation.				

4	Involve in speaking activities in various contexts.				
5	Speak with clarity and confidence which in turn enhance their employability skills				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	I Year II Sem	**Applied Python Programming Laboratory**	**B22CS10**	**L/T/P :0/1 /2**	
After learning the contents of this subject, the student must be able to					
1	Install Python in linux and windows, Installing O Son Raspberry Pi				
2	Build basic programs using fundamental programming constructs				
3	Write and execute python codes for different applications				
4	Capable to implement to n hard ware boards				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	I Year II Sem	**Electrical Circuit Analysis Laboratory**	**B22EE06**	**L/T/P :0 /0/2**	
After learning the contents of this subject, the student must be able to					
1	Draw locus diagrams for series RLC circuit				
2	Create resonance condition in R-L-C series and parallel circuit and learn how to draw phasor diagram for the circuit.				
3	Determine Z, Y and ABCD parameters for a given two port network				
4	Analyze filters in frequency domain				
5	Measurement of Active Power and Reactive Power for Star and Delta connected balanced loads				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	II Year I Sem	**Numerical Methods and Complex variables**	**B22MA07**	**L/T/P :3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Express any periodic function in terms of sine and cosine				
2	Find the root of a given polynomial and transcendental equations. Estimate the value for the given data using interpolation				
3	Find the numerical solutions for a given first order ODE's				
4	Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems				
5	Taylor's and Laurent's series expansions in complex function				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	II Year I Sem	**Electrical Machines-I**	**B22EE07**	**L/T/P : 3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Identify different parts of a DC machines & understand their operation. with various excitation				
2	Learn various methods of starting, speed control of dc motors				
3	Analyze the performance of DC machines with various methods of testing.				

4	Understand the construction, operation and performance of single phase transformer				
5	Learn the methods of testing of single phase transformers and explore the polyphase connections of transformer.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	II Year I Sem	**Analog Electronic Circuits**	**B22EC10**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Know the characteristics, utilization of various components.				
2	Understand the biasing techniques				
3	Design and analyze various rectifiers, small signal amplifier circuits.				
4	Design sinusoidal and non-sinusoidal oscillators.				
5	Designs OP-AMP based circuits with linear integrated circuits.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	II Year I Sem	**Power Systems-I**	**B22EE08**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the operation of conventional and renewable electrical power generating stations.				
2	Evaluate the power tariff methods and Economics associated with power generation.				
3	Modelling of various parameters of transmission lines and classification of overhead line insulators and evaluation of string efficiency.				
4	Analyze the operations of AIS and GIS				
5	Compare and evaluate various distribution systems				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	II Year I Sem	**Electro Magnetic Fields**	**B22EE09**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the basic laws of electromagnetism and their applications.				
2	Understand the behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics				
3	Analyze the relation between the electric field and magnetic field				
4	Analyze time varying electric and magnetic fields.				
5	Understand the propagation of EM waves				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	II Year I Sem	**Electrical Machines Laboratory-I**	**B22EE10**	**L/T/P :0 /0/2**	
After learning the contents of this subject, the student must be able to					
1	Start and control the Different DC Machines.				
2	Assess the performance of different machines using different testing methods				
3	Evaluate the performance of different Transformers using different testing methods				
Course	**Year &**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**

Outcome	**Semester**				**1**
	II Year I Sem	**Analog Electronic Circuits Laboratory**	**B22EC11**	**L/T/P : 0 /0/2**	
After learning the contents of this subject, the student must be able to					
1	Know the characteristics, utilization of various components.				
2	Understand the biasing techniques				
3	Design and analyze various rectifiers, small signal amplifier circuits.				
4	Design sinusoidal and non-sinusoidal oscillators.				
5	Design OP-AMP based circuits with linear integrated circuits.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	II Year I Sem	**Electrical Simulation tools Laboratory**	**B22EE11**	**L/T/P : 0 /0/2**	
After learning the contents of this subject, the student must be able to					
1	Develop knowledge of software packages to model and program electrical and electronics systems.				
2	Model different electrical and electronic systems and analyze the results.				
3	Articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 0**
	II Year I Sem	**Gender Sensitization Laboratory**	**B22MC07**	**L/T/P :0 /0/2**	
After learning the contents of this subject, the student must be able to					
1	Students will have developed a better understanding of important issues related to gender in contemporary India.				
2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and films.				
3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter them. Students will acquire insights into the gendered division of labour and its relation to politics and economics.				
4	Students will develop a sense of appreciation of women in all walks of life. Men and women students and professionals will be better equipped to work and live in harmony				
5	Through providing accounts of studies and movements as well as the new laws thatprovide protection and relief to women, the textbook will empower students to understand and respond to gender violence.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	II Year II Sem	**Solid Mechanics & Hydraulic Machines**	**B22ME20**	**L/T/P :3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Solve problems dealing with forces, beam and cable problems and understand distributed force systems.				
2	Solve friction problems and determine moments of Inertia and centroid of practical shapes.				
3	Apply knowledge of mechanics in addressing problems in hydraulic machinery and its				

	principles that will be utilized in Hydropower development and for other practical usages.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	II Year II Sem	**Measurements and Instrumentation**	**B22EE13**	**L/T/P :3/0/0**	
After learning the contents of this subject, the student must be able to					
1	Understand different types of measuring instruments, their construction operation and characteristics				
2	Identify the instruments suitable for typical measurements.				
3	Analyze the measurement of voltage, current, Power factor, power, energy, R, L,C and magnetic measurements.				
4	Apply the knowledge about transducers and instrument transformers to use them effectively.				
5	Apply the knowledge of smart and digital metering for industrial applications.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	II Year II Sem	**Electrical Machines–II**	**B22EE14**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the concepts of rotating magnetic fields, operation of ac machines.				
2	Learn the various methods of testing, speed control of induction motors				
3	Understand the construction of synchronous machines, analyze performance characteristics of synchronous generators.				
4	Explore the parallel operation, analyze the performance of synchronous motor.				
5	Analyze\ study the various single-phase induction motors				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	II Year II Sem	**Digital Electronics**	**B22EC22**	**L/T/P :2/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the working of logic families and logic gates.				
2	Design logic circuits by applying various minimization technique to combinational function				
3	Design and implement Combinational and Sequential logic circuits.				
4	Design and implementation various `sequential circuits				
5	Implement the given logical problems using programmable logic devices.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	II Year II Sem	**Power System-II**	**B22EE15**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Design of transmission lines and investigate the concepts of corona and its effects				
2	Apply load compensation techniques to control reactive power				
3	Acquire and apply the knowledge of per unit quantities in power systems.				
4	Investigate the concepts of over voltage protection, insulation coordination lighting surges and switching surges				
5	Determine the fault currents for symmetrical and unbalanced faults				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 1
	II Year II Sem	Digital Electronics Laboratory	B22EC23	L/T/P :0/0/2	
After learning the contents of this subject, the student must be able to					
1	Understand the working of logic families and logic gates.				
2	Design and implement Combinational and Sequential logic circuits.				
3	Analyze different types of semiconductor memories.				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 1
	II Year II Sem	Measurements and Instrumentation Laboratory	B22EE16	L/T/P :0 /0/2	
After learning the contents of this subject, the student must be able to					
1	Choose and test any measuring instruments.				
2	Find the accuracy of any instrument by performing experiments.				
3	Calculate the various parameters using different types of measuring instruments				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 1
	II Year II Sem	Electrical Machines Laboratory-II	B22EE17	L/T/P :0 /0/2	
After learning the contents of this subject, the student must be able to					
1	Assess the performance of different types of AC machines using different testing methods.				
2	Analyze the suitability of AC machines and Transformers for real word applications.				
3	Design the machine models based on the application requirements.				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 0
	II Year II Sem	Logical Reasoning & Quantitative Aptitude	B22MC08	L/T/P :3/0 /0	
After learning the contents of this subject, the student must be able to					
1	Improve their logical thinking in terms of general and mathematical concepts.				
2	Compete in academic as well as competitive levels through which students are able to solve the real world problems.				
3	Analyze the number systems				
4	Make quick decisions to face the critical arithmetic problems.				
5	Analyze the mathematical problems.				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 4
	III Year I Sem	Power Electronics	B22EE21	L/T/P :3/1 /0	
After learning the contents of this subject, the student must be able to					
1	Understand the differences between signal level and power level devices.				
2	Analyze controlled rectifier circuits.				
3	Analyze the operation of DC-DC choppers				
4	Analyze the voltage source inverters.				

5	Describe the behavior and applications of AC-AC converters.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year I Sem	**Control Systems**	**B22EE22**	**L/T/P : 3/0/0**	
After learning the contents of this subject, the student must be able to					
1	Find the transfer function and state-space representation of linear time-invariant dynamical systems.				
2	Estimate the time domain specifications, steady state error and Analyze the performance and				
3	Stability of linear time-invariant systems in the time domain.				
4	Analyze the performance and stability of linear time-invariant systems in frequency domain.				
5	Design classical controllers/compensators to improve the performance and stability of linear				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	III Year I Sem	**Signals and Systems**	**B22EC06**	**L/T/P : 3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Apply the knowledge of various signals, and systems.				
2	Analyze the transform techniques in time and frequency domain.				
3	Identify the conditions for transmission of signals through systems and conditions for physical realization of systems.				
4	Analyze the concept of Region of Convergence for different Transformation techniques.				
5	Use sampling theorem for baseband and band pass signals for various types of sampling and apply the correlation and PSD functions for various applications				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	III Year I Sem	**Renewable Energy Systems**	**B22EE23**	**L/T/P : 3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the principles of wind power and solar photovoltaic power generation				
2	Understand the working principle of fuel cells and different types of fuel cells				
3	Assess the cost of generation for conventional and renewable energy plants				
4	Design suitable power controller for wind and solar applications				
5	Analyze the issues involved in the integration of renewable energy sources to the grid				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	III Year I Sem	**High Voltage Engineering**	**B22EE24**	**L/T/P : 3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the various breakdown processes in solid, liquid and gaseous insulating materials.				
2	Explain the generation of high D. C., A.C., & Impulse voltage				
3	Apply the suitable method to measure high D. C., A.C., & Impulse voltages.				
4	Elaborate the lightning and switching over-voltage and protection against these over-				

	voltages.				
5	Discuss about high voltage testing of electrical apparatus and high voltage laboratories.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year I Sem	**Computer Aided Electrical Machine Designs**	**B22EE25**	**L/T/P : 3/0/0**	
After learning the contents of this subject, the student must be able to					
1	Understand the concepts electrical, magnetic and thermal loading of electrical machines				
2	Understand the design and operating characteristics of Transformers.				
3	To analyze the varies factors in the design and operating characteristics of induction motors				
4	To analyze the varies factors in the design of synchronous motors.				
5	To understand the use of software tools in the design of electrical machines				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year I Sem	**Electrical Engineering Materials**	**B22EE26**	**L/T/P : 3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Impart the knowledge on electrical engineering materials classification and their applications.				
2	Study the performance characteristics of various semiconducting, dielectric and insulation materials and their applications in design of electrical and electronic devices				
3	Identify various magnetic materials and their classification.				
4	Learn various special purpose of materials.				
5	Design various electronic components.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year I Sem	**Power Electronics Laboratory**	**B22MB01**	**L/T/P :3/0/0**	
After learning the contents of this subject, the student must be able to					
1	Study Characteristics of various Power Semiconductor devices.				
2	Analyze AC/AC and AC/DC Converters.				
3	Analyze the behavior of various DC/DC and DC/AC converters.				
4	Know the Simulation tools for analysing power electronics converters				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	III Year I Sem	**Control Systems Laboratory**	**B22EE28**	**L/T/P :4/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Analyze the time & Frequency response of control systems				
2	Identify the Performance of servo motor and synchros				
3	Evaluate the performance of feedback control systems				
4	Analyze the Stability of Linear Time Invariant systems				
Course	**Year &**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**

Outcome	**Semester**				**0**
	III Year I Sem	**Intellectual Property Rights**	**B22MB06**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Distinguish and explain various forms of IPRs.				
2	Identify criteria to fit one's own intellectual work in particular form of IPRs.				
3	Apply statutory provisions to protect particular form of IPRs.				
4	Appraise new developments in IPR laws at national and international level				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year II Sem	**Flexible AC Transmission Systems**	**B22EE29**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand various power electronics based FACTS devices for the control of active and reactive Power in the system				
2	Compare current source converters with voltage source converters				
3	Classify the FACTS devices into Thyristor based and Converter based and Understanding the dynamics of stability of voltage regulation using Shunt compensation.				
4	Understand the SVC and STATCOM				
5	Analyse Transient Stability Enhancement, Power Oscillation Damping, Transient Stability Margin Using series compensation				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year II Sem	**Power Semiconductor Drives**	**B22EE30**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Identify the drawbacks of speed control of the motor by conventional methods.				
2	Differentiate Phase controlled and chopper-controlled DC drives speed-torque characteristics merits and demerits				
3	Understand AC motor drive speed–torque and performance characteristics using different control strategies, its merits and demerits.				
4	Describe the Slip power recovery schemes				
5	Analyze the speed control schemes for synchronous motor drives				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year II Sem	**Digital Signal Processing**	**B22EC30**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Outline the properties of systems and signals				
2	Identify the various important characteristics of different transform techniques used in digital signal processing.				
3	Design IIR filters based on the specifications given				
4	Design FIR filters for given specifications				

5	Demonstrate different realizations of digital filters				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year II Sem	**Advanced Control Systems**	**B22EE31**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand different non linearity's and their describing functions.				
2	Describe the methods of Phase-plane trajectory of nonlinear control systems.				
3	Apply various theorems for stability analysis of linear and nonlinear systems.				
4	Implement modal control and calculus of variations.				
5	Formulate and solve optimal control problems				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year II Sem	**Microprocessors & Microcontrollers**	**B22EC36**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the internal architecture and organization of 8086.				
2	Understand the interfacing techniques to 8086 and 8051.				
3	Understand the communication standards and interfacing with microcontroller.				
4	Understand the internal architecture of 8051 microcontroller.				
5	Develop assembly language programming to design microprocessor/ micro controller-				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year II Sem	**Power System Protection**	**B22EE32**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Ability to comprehend the fundamental requirements for power system protection, the consequences of faults, and the workings of a basic relay				
2	Be able to sketch performance characteristics and prevent faults with distance relays and over-current protective schemes				
3	Capable of implementing bus zone protection, AC machines, and pilot relay schemes.				
4	Competent in controlling both microprocessors and static relays for transmission systems.				
5	Possessing knowledge of the quenching processes utilized in vacuum, oil, and air circuit breakers				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	III Year II Sem	**Power System Operation and Control**	**B22EE33**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Calculate various parameters at different buses using load flow studies.				
2	Analyse economic operation of the power system.				
3	Analyse load frequency control of Single area and Two area power systems.				

4	Understand the Stability of the power system and Apply different techniques to maintain the stability of power system				
5	Interpret the factors involved in load dispatch				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	III Year II Sem	**Power System Laboratory**	**B22EE34**	**L/T/P :0 /0/2**	
After learning the contents of this subject, the student must be able to					
1	Capable of understanding the basic transmission line parameters and protection schemes.				
2	Be able to find the different relay characteristics for the transmission system.				
3	Capable of understanding the effects of faults in power systems.				
4	Capable of simulating the YBUS and ZBUS and performing the load flow analysis				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	III Year II Sem	**Microprocessors & Microcontrollers Laboratory**	**B22EC37**	**L/T/P :0 /0/2**	
After learning the contents of this subject, the student must be able to					
1	Understands the internal architecture and organization of 8086, 8051 and ARM processors/controllers.				
2	Understands the interfacing techniques of 8086 and 8051.				
3	Develop assembly language programming to design microprocessor/ micro controller-based systems.				
4	Develop programs for interfacing various external devices.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 1**
	III Year II Sem	**Electronics Design Laboratory**	**B22EE35**	**L/T/P :0/0/2**	
After learning the contents of this subject, the student must be able to					
1	Design the various regulated power supplies for control boards.				
2	Gain knowledge on designing various triggering circuits for semiconductor devices.				
3	Develop timer circuits for power switching devices				
4	Develop PWM control and gate driver circuits for various power electronic converter applications.				
5	Develop the zero-crossing detector				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	III Year II Sem	**Industry Oriented Mini Project/Internship**	**B22EE36**	**L/T/P :0 /0/4**	
After learning the contents of this subject, the student must be able to					
1	Students will be able to practice acquired knowledge within the chosen area of technology for project development				
2	Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.				
3	Reproduce, improve and refine technical aspects for engineering projects				
4	Work as an individual or in a team in development of technical projects & Communicate and				

	report effectively project related activities and findings.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	IV Year I Sem	**Power Electronic Applications to Renewable Energy Systems**	**B22EE37**	**L/T/P :3/1 /0**	
After learning the contents of this subject, the student must be able to					
1	Proficiently demonstrate various renewable energy technologies utilized for electrical power generation.				
2	Identify suitable converters (AC-DC, DC-DC, AC-AC) for renewable energy systems.				
3	Analyze the operating principles of different types of wind generators				
4	Model and control of a PMSM, Doubly fed Induction Generator, WECS				
5	Interpret and analyze various wind and photovoltaic (PV) systems, including stand-alone, grid- connected, and hybrid configurations.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 4**
	IV Year I Sem	**Advanced Power Electronics**	**B22EE38**	**L/T/P :3/0/0**	
After learning the contents of this subject, the student must be able to					
1	Classify driver circuits for various power semiconductor devices.				
2	Analyze the operation of multi-pulse converters.				
3	Understand the operation of resonant converters.				
4	Know the differences between VSI and CSI.				
5	Gain knowledge on the operation of multilevel inverters				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year I Sem	**HVDC Transmission**	**B22EE39**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Compare EHV AC and HVDC systems and to describe various types of DC links				
2	Analyze various control methodologies and characteristics of converters.				
3	Perform power flow analysis in ac/dc systems				
4	Study and understand the nature of faults happening on both the AC and DC sides of the converters and Formulate protection schemes for the same.				
5	Design the harmonics reduction filters for HVDC transmission				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year I Sem	**Electric and Hybrid Vehicles**	**B22EE40**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the models to describe hybrid vehicles and their performance.				
2	Understand the social and environmental importance of electric and hybrid vehicles.				
3	Understand the various configurations of Electric Drive Trains.				
4	Understand the different strategies related to energy storage systems.				
5	Understand the different strategies of energy management systems and case studies.				

Course Outcome	Year & Semester	Subject Name	Subject Code	No. of Hours	Credits: 3
	IV Year I Sem	Utilization of Electrical Energy	B22EE41	L/T/P :3/0 /0	
After learning the contents of this subject, the student must be able to					
1	Understand basic principles of electric heating				
2	Understand basic principles of electric welding				
3	Determine the lighting requirements for flood lighting, household and industrial needs.				
4	Calculate heat developed in induction furnace and evaluate speed time curves for traction				
5	Analyze the coach wiring				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year I Sem	**Advanced Electrical Drives**	**B22EE42**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Analyse the operation of three phase converter fed dc motors.				
2	Describe the VSI and CSI fed induction motor operation.				
3	Know the concept of vector control of induction motor drive.				
4	Understand the concept of direct torque control for three phase induction motor.				
5	Gain knowledge on vector control of PMSM drives and introduction to BLDC drives				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year I Sem	**Soft Computing Techniques**	**B22EE43**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	To know basic idea of modern engineering techniques which are useful for solving non-linear and complex functions that may come across dissertation/research work				
2	To understand optimization problem				
3	Understand the concept of multi-objective optimization problems (MOOPs) and issues of solving it.				
4	Knowing Adaptive Neuro-Fuzzy Inference Systems				
5	Evaluate and compare solutions by soft computing techniques for a given problem in matlab Simulink				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year I Sem	**VLSI Design**	**B22EC60**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand IC technology and basic electrical properties of MOS and BiCMOS.				
2	Design the layout circuits using various design rules.				
3	Develop and design the gate level circuits				
4	Gain the knowledge to design data path subsystems like Adders, Shifters, ALUs etc.				
5	Illustrate different programmable logic devices and CMOS testing.				
Course	**Year &**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits:**

Outcome	Semester				3
	IV Year I Sem	IOT Applications in Electrical Engineering	B22EE44	L/T/P :3/0 /0	
After learning the contents of this subject, the student must be able to					
1	Select suitable sensors for electrical engineering applications.				
2	Understand about usage of various types of motionless sensors and motion detectors.				
3	Utilize MEMS in developing electrical engineering applications.				
4	Apply IoT in a smart grid.				
5	Discuss the future working environment with Energy internet.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	IV Year I Sem	**Management And Organizational Behavior**	**B22MB02**	**L/T/P :2/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Gain understanding of the Concepts of Management, its Evolution, Functions and the Theories contributed by various Management Thinkers.				
2	Learn the process of planning, goal setting and the process of decision making with the help of various models.				
3	Learn the processes of Organizing and Controlling with the help of various Organizational Structures.				
4	Appreciate the relevance of Individual and group behaviour in an organization and the role of Culture and dynamics				
5	Identify different Leadership Styles, Skills and the Theories of Motivation				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	IV Year I Sem	**Simulation of Renewable Energy Systems Lab**	**B22EE45**	**L/T/P :0/0/4**	
After learning the contents of this subject, the student must be able to					
1	This course provides a foundation in discrete-time linear control system theory.				
2	Analyze digital control systems using transform techniques (frequency response) and state-space methods (pole-placement).				
3	Analyzing and understanding the challenges to interface digital computing devices with the Analog dynamics of most real-world systems.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year I Sem	**Project Stage - I**	**B22EE46**	**L/T/P :0/0 /6**	
After learning the contents of this subject, the student must be able to					
1	Identify the problem by applying acquired knowledge.				
2	Ability to plan and implement an investigative or developmental project.				
3	In-depth skill to use some laboratory, modern tools and techniques				
4	Ability to communicate results, concepts, analyses and ideas in written and oral form & Conduct an extended independent investigation that results in the production of a research				

	thesis.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year II Sem	**Power Quality**	**B22EE47**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Basic concepts of power quality issues				
2	Voltage and current during the fault period of a given power system.				
3	Sags and phase angle jumps in different types of faults				
4	Various equipment behavior with voltage sags.				
5	Various interfacing devices between system and equipment to mitigate the sags and interruptions				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year II Sem	**Solar Power Batteries**	**B22EE48**	**L/T/P : 3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Know operating principles of different types of solar power batteries				
2	Use the batteries for effective storage of solar PV.				
3	Analyze the design and selection criteria of battery system				
4	Know the application of batteries				
5	Gain the knowledge on environmental impacts of solar power batteries				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year II Sem	**AI Techniques In Electrical Engineering**	**B22EE49**	**L/T/P : 3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Get the simulation knowledge				
2	Analyze the concepts based on simulated results in the domain of Electrical Engineering				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year II Sem	**Embedded Systems Applications**	**B22EC61**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Understand the microprocessor architecture and its components used in embedded systems				
2	Understand the architecture of 8051				
3	Write the 8051-assembly language code and Embedded ‘C’ code for interfacing various devices.				
4	Understand the required RTOS for Embedded Systems				
5	Develop simple embedded systems for real time operations				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year II Sem	**Smart Grid Technologies**	**B22EE50**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					

1	Get the knowledge to locate the power grid's elements throughout the context of the Indian grid system.				
2	Prepared to recognize how important automation is to distribution and transmission.				
3	Capable of utilizing evolutionary algorithms in smart grid applications.				
4	Possess an understanding of how WAMs, PDCs, PMUs, and voltage and frequency control work in smart grids.				
5	Able to manage power and voltage for micro and smart grids.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year & II Sem	**Electrical Distribution Systems**	**B22EE51**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Identify various Electrical loads and their characteristics & Design Distribution feeders and Identify Substation location				
2	Interpret voltage drop and power loss calculations for the given Distribution System				
3	Determine the optimal location of a capacitor in distribution system and improve voltage profile				
4	Analyse the different types of PF improvement				
5	Analyse the different types of voltage control				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year & II Sem	**Digital Control Systems**	**B22EE52**	**L/T/P :3/0/0**	
After learning the contents of this subject, the student must be able to					
1	Acquire a strong foundation in sampling and reconstruction Z-transforms.				
2	Apply knowledge of Mathematics, Z-plane analysis to discrete time control systems.				
3	Replace the conventional control system with Digital control system.				
4	Evaluate and apply Z-plane analysis of discrete time control systems				
5	Apply state feedback controllers and observers				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 3**
	IV Year & II Sem	**Machine Learning Applications To Electrical Engineering**	**B22EE53**	**L/T/P :3/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Discuss the types of machine learning.				
2	Demonstrate the fundamentals of electrical engineering relevant to ML.				
3	Explain the data processing concepts.				
4	Apply machine learning algorithms to solve real-world problems in electrical engineering.				
5	Analyze the electrical engineering case studies through machine learning.				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 9**
	IV Year & II Sem	**Project Stage-II**	**B22EE54**	**L/T/P :0/0/22**	
After learning the contents of this subject, the student must be able to					

1	Identify the problem by applying acquired knowledge.				
2	Ability to plan and implement an investigative or developmental project.				
3	In-depth skill to use some laboratory, modern tools and techniques				
4	Ability to communicate results, concepts, analyses and ideas in written and oral form & Conduct an extended independent investigation that results in the production of a research thesis				
Course Outcome	**Year & Semester**	**Subject Name**	**Subject Code**	**No. of Hours**	**Credits: 2**
	IV Year & II Sem	**Technical Seminar**	**B22EE55**	**L/T/P :0/0 /0**	
After learning the contents of this subject, the student must be able to					
1	Identify and analyze the real time Electrical Engineering problems				
2	Acquire awareness on latest technology and current trends in the field of Electrical Engineering.				
3	Participate in discussions for enhancement of knowledge				
4	Apply communication skills and Document and present technical reports following professional ethics				

COURSE OUTCOMES FOR M.TECH-CSE R22 FOR THE YEAR 2020-22

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) Mathematical Foundations of Computer Science (M22CS01)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Ability to understand and construct precise mathematical proofs.			
2	Ability to use logic and set theory to formulate precise statements.			
3	Ability to analyze and solve counting problems on finite and discrete structures			
4	Ability to describe and manipulate sequences.			
5	Ability to apply graph theory in solving computing problems.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Advanced Data Structures(M22CS02)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Ability to select the data structures that efficiently model the information in a problem			
2	Ability to understand how the choice of data structures impact the performance of programs			
3	Design programs using a variety of data structures, including hash tables, search structures and digital search structures			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** 1. Database Programming with PL/SQL (M22CS03)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Understand importance of PL/SQL basics			
2	. Implement functions and procedures using PL/SQL			
3	Understand the importance of triggers in database			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** 2. Deep Learning(M22CS04)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Implement deep learning algorithms, understand neural networks and traverse the layers of data			
2	Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces			
3	Understand applications of Deep Learning to Computer Vision			
4	. Understand and analyze Applications of Deep Learning to NLP			

Course Outcome	Year/Semester I Sem	Subject Name (Subject Code) 3. Python Programming (M22CS05)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				

1	Defining the fundamentals of writing Python scripts.			
2	Expressing the Core Python scripting elements such as variables and flow control structures.			
3	Apply Python functions to facilitate code reuse.			
4	Extending how to work with lists and sequence data.			
5	Implement file operations such as read and write			
6	Implementing and adapting the code robust by handling errors and exceptions properly.			
Course Outcome	**Year /SemesterI Sem**	**Subject Name (Subject Code)** 1. Applied Cryptography (M22CS06)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Understand the various cryptographic protocols			
2	Analyze key length and algorithm types and modes			
3	Illustrate different public key algorithms in cryptosystems			
4	Understand special algorithms for protocols and usage in the real world			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** 2. Software Quality Engineering (M22CS07)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Understand software quality and its perspectives			
2	Analyze defect prevention and defect reduction in software quality assurance			
3	Illustrate software quality engineering activities and its process			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** 3. Artificial Intelligence(M22CS08)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Remember various AI concepts like the AI technique, level of models, there underlying Assumptions etc			
2	Understand the concepts of AI search techniques			
3	Apply knowledge Representation techniques			
4	Analyse different structures of representation			
5	Evaluate AI search techniques			
6	Understand the concepts of Natural Language Processing.problems.			
Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Advanced Data Structures Lab (M22CS09)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
On successful completion of this course, students will be able to:				
1	Ability to select the data structures that efficiently model the information in a problem.			
2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.			
3	Implement and know the application of algorithms for sorting and pattern matching			
4	Design programs using a variety of data structures, including hash tables, binary and general tree			

	structures, search trees, tries, heaps, graphs, and B-trees.			
Course Outcome	**Year /Semester I Sem**	**Subject Name (Subject Code)** Database Programming with PL/SQL Lab (M22CS10)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
On successful completion of this course, students are able to:				
1	Understand importance of PL/SQL basics			
2	Implement functions and procedures using PL/SQL			
3	Understand the importance of triggers in database			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Deep Learning Lab(M22CS11)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
After the completion of this course, the students should be able to				
1	Upon the Successful Completion of the Course, the Students would be able to:			
2	Learn The Fundamental Principles Of Deep Learning.			
3	Identify The Deep Learning Algorithms For Various Types of Learning Tasks in various domains			
4	Implement Deep Learning Algorithms And Solve Real-world problems.			
Course Outcome	**Year / semester I Sem**	**Subject Name (Subject Code)** Python Programming Lab (M22CS12)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
1	Expressing the Core Python scripting elements such as variables and flow control structures.			
2	Apply Python functions to facilitate code reuse			
3	Extending how to work with lists and sequence data.			
4	Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.			

Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Research Methodology & IPR(M22MC01)	**No. of Hours L:2 T:0 P:0**	**Credits: 2**
On successful completion of this course, students will be able to:				
1	Understand research problem formulation.			
2	Analyze research related information			
3	Follow research ethics			
4	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.			
5	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.			
6	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.			

Course Outcome	Year /Semester I Sem	Subject Name (Subject Code) Audit Course- I (M22AC01)	No. of Hours L:2 T:0 P:0	Credits:0
On successful completion of this course, students are able to:				
1				
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Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Advanced Algorithms (M22CS13)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Analyze the complexity/performance of different algorithms.			
2	Determine the appropriate data structure for solving a particular set of problems.			
3	Categorize the different problems in various classes according to their complexity.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Advanced Computer Architecture (M22CS14)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Computational models and Computer Architectures			
2	Concepts of parallel computer models			
3	Scalable Architectures, Pipelining, Superscalar processors			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** 1. Enterprise Cloud Concepts (M22CS15)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Understand importance of cloud architecture			
2	Illustrating the fundamental concepts of cloud security			
3	Analyze various cloud computing mechanisms			
4	Understanding the architecture and working of cloud computing.			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** 2. Advanced Computer Networks (M22CS16)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Understanding of holistic approach to computer networking			
2	Ability to understand the computer network protocols and their applications			
3	Ability to design simulation concepts related to packet forwarding in networks.			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** 3. Edge Analytics (M22CS17)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Understand the concepts of Edge Analytics, both in theory and in practical application.			

2	Demonstrate a comprehensive understanding of different tools used at edge analytics			
3	Formulate, Design and Implement the solutions for real world edge analytics .			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** 1. Bio informatics (M22CS18)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
1	Understand the Central Dogma & XML (Bio XML) for Bioinformatics			
2	Analyze Perl (Bioperl) for Bioinformatics			
3	Illustrate Databases technology, architecture and its interfaces			
4	Understand Sequence Alignment Algorithms, Phylogenetic Analysis			
Course Outcome	**Year/Semester II Sem**	**Subject Name (Subject Code)** 2. Block Chain Technology(M22CS19)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students will be able to:				
1	Able to work in the field of block chain technologies.			
Course Outcome	**Year /Semester II Sem**	**Subject Name (Subject Code)** 3. Robotic Process Automation (M22CS20)	**No. of Hours L:3 T:0 P:0**	**Credits:3**
On successful completion of this course, students are able to:				
1	Describe RPA, where it can be applied and how it's implemented.			
2	Identify and understand Web Control Room and Client Introduction			
3	Understand how to handle various devices and the workload			
4	Understand Bot creators, Web recorders and task editors			
Course Outcome	**Year / semester II Sem**	**Subject Name (Subject Code)** Advanced Algorithms Lab (M22CS21)	**No. of Hours L:0 T:0 P:4**	**Credits:2**
After the completion of this course, the students should be able to				
1	The student can able to analyze the performance of algorithms			
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Enterprise Cloud Concepts Lab(M22CS22)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Understand importance of cloud architecture			
2	Illustrating the fundamental concepts of cloud security			
3	Analyze various cloud computing mechanisms			
4	Understanding the architecture and working of cloud computing.			
Course Outcome	**Year / semester I I Sem**	**Subject Name (Subject Code)** Advanced Computer Networks Lab (M22CS23)	**No. of Hours L:0 T:0 P:4**	**Credits: 2**
1	Ability of acquiring the practical exposure to existing protocols			

Course Outcome	Year / semester I I Sem	Subject Name (Subject Code) Edge Analytics Lab (M22CS24)	No. of Hours L:0 T:0 P:4	Credits: 2
1	Identify the benefits of edge computing			
2	Develop the micro services in iofog			
3	Develop user defined services in the edge			
4	Create use cases in IOT with edge computing			
5	Develop services in MEC			
6	Implement use cases in MEC			

Course Outcome	Year / semester I I Sem	Subject Name (Subject Code) Mini Project with Seminar (M22CS25)	No. of Hours L:0 T:0 P:4	Credits: 2
1				
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Course Outcome	Year / semester I I Sem	Subject Name (Subject Code) Audit Course- II (M22AC02)	No. of Hours L:2 T:0 P:0	Credits: 0
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2				
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4				

III-SEMESTER

Course Outcome	Year/Semester II Sem	Subject Name (Subject Code) 1. Digital Forensics(M22CS26)	No. of Hours L:3 T:0 P:0	Credits: 3
On successful completion of this course, students will be able to:				
1	Understand relevant legislation and codes of ethics.			
2	Computer forensics and digital detective and various processes, policies and procedures.			
3	E-discovery, guidelines and standards, E-evidence, tools and environment.			
4	Email and web forensics and network forensics.			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** 2. High Performance Computing (M22CS27)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
On successful completion of this course, students are able to:				
1	Understanding the concepts in grid computing			
2	Ability to set up cluster and run parallel applications			
3	Ability to understand the cluster projects and cluster OS			
4	Understanding the concepts of pervasive computing & quantum computing			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** 3. Quantum Computing (M22CS28)	**No. of Hours L:3 T:0 P:0**	**Credits: 3**
After the completion of this course, the students should be able to				
1	Understand basics of quantum computing			
2	Understand physical implementation of Qubit			
3	Understand Quantum algorithms and their implementation			
4	Understand The Impact of Quantum Computing on Cryptography			
Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Dissertation Work Review - II (M22CS29)	**No. of Hours L:0 T:0 P:12**	**Credits: 6**
On successful completion of this course, students will be able to:				
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Course Outcome	**Year /Semester III Sem**	**Subject Name (Subject Code)** Dissertation Work Review - III (M22CS30)	**No. of Hours L:0 T:0 P:12**	**Credits: 6**

On successful completion of this course, students are able to:				
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Course Outcome	**Year /Semester IV Sem**	**Subject Name (Subject Code)** Dissertation Work Review – III (M22CS30)	**No. of Hours L:0 T:0 P:12**	**Credits: 6**
After the completion of this course, the students should be able to				
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Course Outcome	**Year /Semester IV Sem**	**Subject Name (Subject Code)** Dissertation Viva-Voce (M22CS31)	**No. of Hours L:0 T:0 P:28**	**Credits: 14**
1				
2				
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5				

IV-SEMESTER

Course Outcome	**Year/Semester I Sem**	**Subject Name (Subject Code)** Dissertation Phase-II (M20CS30)	**No. of Hours L:0 T:0 P:32**	**Credits: 16**
On successful completion of this course, students will be able to:				

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Course Outcomes for B.Tech–ECE (R22) for the academic year 2022-2023 onwards

Course Outcome	Year/Semester I Year/ I Sem	Subject Name (Subject Code) Matrices And Calculus(B22MA01)	No. of Hours L:3 T:1P:0	Credits:4
After the completion of this course, the students should be able to				
1	Write the matrix representation of a set of linear equations and to analyze the solution of the system equations.			
2	Find the Eigen values and Eigen vectors. Reduce the quadratic form to canonical form using orthogonal transformations.			
3	Solve the applications on the mean value theorems.			
4	Evaluate the improper integrals using Beta and Gamma functions.			
5	Find the extreme values of functions of two variables with/ without constraints. Evaluate the multiple integrals and apply the concept to find areas, volumes			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code) Applied Physics (B22PH01)**	**No. of Hours L:3 T:1P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Understand physical world from fundamental point of view by the concepts of Quantum Mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.			
2	Identify the role of semiconductor devices in science and engineering Applications.			
3	Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.			
4	Appreciate the features and applications of Nanomaterials.			
5	Understand various aspects of Lasers and Optical fibre and their applications in diverse fields.			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code)** C Programming for Engineers (B22CS08)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Draw flowcharts for solving arithmetic and logical problems			
2	Explore the concepts of control statements in C Programming			
3	Develop modular reusable code by understanding the concepts of functions.			
4	Understand the concepts of pointers and files.			
5	Analyze various searching and sorting algorithms.			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code)** Engineering Workshop(B22ME01)	**No. of Hours L:0 T:1P:3**	**Credits:2.5**
After the completion of this course, the students should be able to				
1	Study and practice on machine tools and their operations.			
2	Practice on manufacturing of components using workshop trades including pluming fitting, Carpentry, foundry, house wiring and welding.			
3	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiselling.			
4	Apply basic electrical engineering knowledge for house wiring practice.			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code)** English for Skill Enhancement (B22EN01)	**No. of Hours L:2 T:0P:0**	**Credits:2**
After the completion of this course, the students should be able to				
1	Understand the importance of vocabulary and sentence structures.			
2	Choose appropriate vocabulary and sentence structures for their oral andwritten communication.			

3	Demonstrate their understanding of the rules of functional grammar.			
4	Develop comprehension skills using known and unknown passages.			
5	Take an active part in drafting paragraphs, letters, essays, abstracts, précis andreports in various contexts			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** Elements of Electronics and Communication Engineering (B22EC01)	**No. of Hours L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Identify the different components used for electronics applications.			
2	Measure different parameters using various measuring instruments.			
3	Distinguish various signal used for analog and digital communications.			
4	Know the software's to be used in Electronics and communication and engineering			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** Applied Physics Laboratory(B22PH02)	**No. of Hours L:0 T:0P:3**	**Credits:1.5**
After the completion of this course, the students should be able to				
1	Know the determination of the Planck's constant using Photo electric effect and time constant of RC circuit experiment.			
2	Appreciate quantum physics in semiconductor devices and optoelectronics.			
3	Gain the knowledge about frequency of AC power supply.			
4	Understand the variation of magnetic field and behaviour of hysteresis curve.			
5	Able to measure the time Constant of RC Circuit			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** English Language and Communication Skills Laboratory (B22EN02)	**No. of Hours L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Understand the nuances of English language through audio- visual experience and groupactivities.			
2	Neutralize their accent for intelligibility.			
3	Develop their listening skills so that they may appreciate its role in developing LSRW skills of language and improve their pronunciation.			
4	Involve in speaking activities in various contexts.			
5	Speak with clarity and confidence which in turn enhance their employability skills.			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** C Programming for Engineers Laboratory (B22CS09)	**No. of Hours L:0 T:0P:2**	**Credits:1**
1	Write algorithms and to draw flowcharts for solving problems and translate the algorithms/flow charts to programs (in C language).			
2	Use functions to develop modular reusable code.			
3	Use arrays, pointers, strings and structures to formulate algorithms and programs.			
4	Understand Searching and sorting algorithms			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** Environmental Science (B22CH03)	**No. of Hours L:3 T:0P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development			
Course Outcome	**Year/Semester** **I Year/ II Sem**	**Subject Name (Subject Code)** Ordinary Differential Equations and	**No. of Hours L:3 T:1P:0**	**Credits:4**

		Vector Calculus(B22MA02)		
After the completion of this course, the students should be able to				
1	Identify whether the given differential equation of first order is exact or not			
2	Solve higher differential equation and apply the concept of differential equation to real world problems.			
3	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
4	Extend the basic concepts of differential calculus to vector functions in a simple and natural fashion.			
5	Evaluate the line, surface and volume integrals and converting them from one to another			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Engineering Chemistry(B22CH01)	**No. of Hours L:3 T:1P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Students will acquire the basic knowledge of electrochemical procedures related to corrosionand its control.			
2	The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.			
3	They can learn the fundamentals and general properties of polymers and other engineering materials.			
4	They can predict potential applications of chemistry and practical utility in order to becomegood engineers and entrepreneurs.			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Computer Aided Engineering Graphics (B22ME03)	**No. of Hours L:1 T:0P:4**	**Credits:3**
After the completion of this course, the students should be able to				
1	Apply computer aided drafting tools to create 2D and 3D objects sketch conics and different types of solids			
2	Appreciate the need of Sectional views of solids and Development of surfaces of solids			
3	Read and interpret engineering drawings			
4	Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Basic Electrical Engineering(B22EE03)	**No. of Hours L:2 T:0P:0**	**Credits:2**
After the completion of this course, the students should be able to				
1	Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electrical power			
2	Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance and Power Factor			
3	Learn the working principle of DC motors, Transformers			
4	Understand the construction and performance characteristics of Electrical Machines			
5	Introduce components of Low Voltage Electrical Installations			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Electronic Devices and Circuits(B22EC02)	**No. of Hours L:2 T:0P:0**	**Credits:2**
After the completion of this course, the students should be able to				
1	Acquire the knowledge of PN diode and its characteristics.			
2	Design the rectifiers with and without filters for specified DC voltage.			
3	Illustrate the voltage- current characteristics of Junction Transistor and different configurations of transistor			
4	Acquire knowledge about the construction, theory and characteristics of FET and MOSFET			
5	Acquire the knowledge about the role of special purpose devices and their applications			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Applied Python Programming Laboratory(B22CS10)	**No. of Hours L:0 T:1P:2**	**Credits:2**

After the completion of this course, the students should be able to				
1	Install Python in Linux and windows, Installing OS on Raspberry Pi			
2	Build basic programs using fundamental programming constructs			
3	Write and execute python codes for different applications			
4	Capable to implement on hard ware boards			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Engineering Chemistry Laboratory(B22CH02)	**No. of Hours L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Able to determine the hardness of water			
2	Able to perform methods such as conductometry, and potentiometry in order to find out the concentrations or equivalence points of acid, and P^H of unknown solutions..			
3	Students are able to prepare polymers like Bakelite and nylon-6,6.			
4	Estimations saponification value and viscosity of lubricant oils			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Basic Electrical Engineering Laboratory(B22EE04)	**No. of Hours L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Verify the basic electrical circuits through different laws and theorems			
2	Analyze the transient responses of R, L and C circuits for DC excitation			
3	Create resonance condition in series R-L-C circuit			
4	Analyze the performance of DC shunt motor, single phase transformer and three Phase Induction Motor			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code))** Electronic Devices and Circuits Laboratory(B22EC03)	**No. of Hours L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Acquire the knowledge of various semiconductor devices and their use in real life.			
2	Design aspects of biasing and keep them in active region of the device for Functionalcircuits			
3	Acquire the knowledge about the role of special purpose devices and their applications.			
4	Design simple electronic circuits			
Course Outcome	**Year/Semester II Year/ I Sem**	**Subject Name (Subject Code)** Numerical Methods and Complex Variables (B22MA07)	**No. of Hours L:3 T:1P:0**	**Credits:4**
After the completion of this course, the students should be able to				
1	Express any periodic function in terms of sine and cosine			
2	Find the root of a given polynomial and transcendental equations.			
3	Estimate the value for the given data using interpolation			
4	Find the numerical solutions for a given first order ODE's			
5	Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems			
6	Taylor's and Laurent's series expansions in complex function			
Course Outcome	**Year/Semester II Year/ I Sem**	**Subject Name (Subject Code)** Analog Circuits(B22EC04)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Design the amplifiers with various biasing techniques.			
2	Design single stage amplifiers using BJT and FET			
3	Design multistage amplifiers and understand the concepts of High Frequency Analysis of BJT.			
4	Utilize the Concept of negative feedback to improve the characteristics of amplifiers.			
5	Utilize the concept of Barkhausen criterion to design various oscillators			

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Course Outcome	Year/Semester	Subject Name (Subject Code))	No. of Hours	Credits:3
	II Year/ I Sem	Network analysis and Synthesis(B22EE12)	L:3 T:0P:0	
After the completion of this course, the students should be able to				
1	Gain the knowledge on basic RLC circuits behavior.			
2	Analyze the Steady state and transient analysis of RLC Circuits.			
3	Characterization of two port network parameters.			
4	Analyze the Design aspect of various filters and attenuators			
Course Outcome	Year/Semester	Subject Name (Subject Code))	No. of Hours	Credits:3
	II Year/ I Sem	Digital Logic Design(B22EC05)	L:3 T:0P:0	
After the completion of this course, the students should be able to				
1	Acquire the knowledge on numerical information in different forms and Boolean Algebra theorems for Combinational function minimization			
2	Design logic circuits by applying minimization techniques and also able to characterize the various logic families for their AC and DC parameter's			
3	Design and analyze various combination logic circuits and understand the fundamental's of sequential circuits			
4	Design and analyze sequential circuits for various cyclic functions			
5	Acquire the knowledge on concepts of FSM and ASM charts			
Course Outcome	Year/Semester	Subject Name (Subject Code)	No. of Hours	Credits:4
	II Year/ I Sem	Signals and Systems(B22EC06)	L:3 T:1P:0	
After the completion of this course, the students should be able to				
1	Apply the knowledge of various signals, and systems.			
2	Analyze the transform techniques in time and frequency domain.			
3	Identify the conditions for transmission of signals through systems and conditions forphysical realization of systems.			
4	Analyze the concept of Region of Convergence for different Transformation techniques.			
5	Use sampling theorem for baseband and band pass signals for various types of sampling and apply the correlation and PSD functions for various applications			
Course Outcome	Year/Semester	Subject Name (Subject Code)	No. of Hours	Credits:1
	II Year/ I Sem	Analog Circuits Laboratory(B22EC07)	L:0 T:0P:2	
After the completion of this course, the students should be able to				
1	Design amplifiers with required Q point and analyze amplifier characteristics			
2	Examine the effect multistage amplification on frequency response			
3	Investigate various feedback topologies and their frequency responses.			
4	Design various oscillator circuits.			
Course Outcome	Year/Semester	Subject Name (Subject Code)	No. of Hours	Credits:1
	II Year/ I Sem	Digital logic Design Laboratory(B22EC08)	L:0 T:0P:2	
After the completion of this course, the students should be able to				
1	Acquire the knowledge on numerical information in different forms and Boolean algebratheorems.			
2	Define Postulates of Boolean algebra and to minimize combinational functions, and designthe combinational circuits.			
3	Design and analyze sequential circuits for various cyclic functions.			
4	Characterize logic families and analyze them for the purpose of AC and DC parameters			
Course Outcome	Year/Semester	Subject Name (Subject Code)	No. of Hours	Credits:1
	II Year/ I Sem	Basic Simulation Laboratory(B22EC09)	L:0 T:0P:2	
After the completion of this course, the students should be able to				
1	Generate, analyze and perform various operations on Signals/Sequences both in time andFrequency			

	domain			
2	Analyze and Characterize Continuous and Discrete Time Systems both in Time andFrequency domain along with the concept of Sampling			
3	Generate different Random Signals and capable to analyze their Characteristics			
4	Apply the Concepts of Deterministic and Random Signals for Noise removal Applications andon other Real Time Signals			
Course Outcome	**Year/Semester** **II Year/ I Sem**	**Subject Name (Subject Code)** Logical Reasoning & Quantitative Aptitude (B22MC08)	**No. of Hours L:3 T:0P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Improve their logical thinking in terms of general and mathematical concepts.			
2	Compete in academic as well as competitive levels through which students are able to solve the real world problems.			
3	Analyze the number systems			
4	Make quick decisions to face the critical arithmetic problems.			
5	Analyze the mathematical problems			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Probability Theory and Stochastic Processes(B22EC13)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Understand the concepts of Probability, random variables, density and distribution functions			
2	Perform operations on single and multiple Random variables.			
3	Determine the temporal characteristics of Random Signals.			
4	Understand the concepts of spectral characteristics of Random processes and Characterize LTI systems driven by stationary random process by using ACFs and PSDs.			
5	Understand the concepts of Noise and Information theory in Communication systems			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Electromagnetic Fields and Transmission Lines(B22EC14)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Acquire the knowledge of Basic Laws, Concept sand proofs related to Electrostatic Fields			
2	Acquire the knowledge of Basic Laws related to Magneto static Fields..			
3	Characterize the static and time-varying fields; establish the corresponding sets of Maxwell's Equations and Boundary Conditions.			
4	Analyze the Wave Equations and classify conductors, dielectrics and evaluate the UPW Characteristics for several practical media of interest.			
5	Analyze the Design aspect of transmission line parameters and configurations			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Analog and Digital Communications(B22EC15)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Design and analyze various Amplitude Modulation and Demodulation techniques.			
2	Interpret different angle modulation and demodulation systems.			
3	Assess the performance of various transmitters and receivers.			
4	Analyze various pulse modulation and demodulation techniques.			
5	Develop skills in analyzing digital modulation schemes			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Linear and Digital IC Applications(B22EC16)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	A thorough understanding of operational amplifiers with linear integrated circuits.			
2	Attain the knowledge of functional diagrams and design applications of IC555 and IC565.			
3	Acquire the knowledge and design the Data converters.			

4	Choose the proper digital integrated circuits by knowing their characteristics.			
5	Attain the knowledge about 74xx and CMOS 40xx series integrated circuits for sequential logic			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Electronic Circuit Analysis(B22EC17)	**No. of Hours** **L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Design the power amplifiers			
2	Design the tuned amplifiers and analyze is frequency response			
3	Design Multivibrators for various applications.			
4	Analyze different sweep generator circuits.			
5	Utilize the concepts of synchronization, frequency division and sampling gates			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Analog and Digital Communications Laboratory(B22EC18)	**No. of Hours** **L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Design and implement various Analog modulation and demodulation Techniques and observe the time and frequency domain characteristics			
2	Design and implement various Pulse modulation and demodulation Techniques and observe the time and frequency domain characteristics			
3	Apply different types of Sampling with various Sampling rates and duty Cycles			
4	Design and implement various Digital modulation and demodulation Techniques and observe the waveforms of these modulated Signals practically			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Linear and Digital IC Applications Laboratory(B22EC19)	**No. of Hours** **L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Design and implementation of various analog circuits using 741 ICs.			
2	Design and implementation of various Multivibrators using 555 timer.			
3	Design and implement various circuits using digital ICs.			
4	Design and implement ADC, DAC and voltage regulators.			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Electronic Circuit Analysis Laboratory(B22EC20)	**No. of Hours** **L:0 T:0P:2**	**Credits:1**
After the completion of this course, the students should be able to				
1	Design power amplifiers and find its efficiency			
2	Design tuned amplifiers and find its Q-factor			
3	Design various multivibrators and sweep circuits. Understand the necessity of linearity			
4	Design sampling gates.			
Course Outcome	**Year/Semester** **II Year/ II Sem**	**Subject Name (Subject Code)** Gender Sensitization Lab(B22MC07)	**No. of Hours** **L:0 T:0P:2**	**Credits:0**
1	Students will have developed a better understanding of important issues related to gender in contemporary India.			
2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.			
3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter them. Students will acquire insight into the gendered division of labor and its relation to politics and economics.			
4	Students will develop a sense of appreciation of women in all walks of life. Men and women students and professionals will be better equipped to work and live in harmony			
5	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to			

	gender violence.			
Course Outcome	**Year/Semester** **III Year/ I Sem**	**Subject Name (Subject Code)** MICROCONTROLLERS(B22EC24)	**No. of Hours** **L:3 T:1P:0**	**Credits:4**
1	Known the internal architecture, organization and assembly language programming of 8086processors.			
2	Known the internal architecture, organization and assembly language programming of8051/controllers			
3	Learn the interfacing techniques to 8086 and 8051 based systems.			
4	Known the internal architecture of ARM processors			
5	Learn the basic concepts of advanced ARM-processors			
Course Outcome	**Year/Semester** **III Year/ I Sem**	**Subject Name (Subject Code)** IoT Architectures and Protocols (B22EC25)	**No. of Hours** **L:3 T:0P:0**	**Credits:3**
1	Explore the Evolution of IoT, its Growth and Applications.			
2	Know the components of IoT and Compare the various architectures of IoT.			
3	Establish the knowledge on various IoT protocols like Data link, Network etc.,			
4	Establish the knowledge on various IoT protocols like like Transport, Session etc.,			
5	Establish the knowledge on various IoT protocols like Service layers, security etc.,			
Course Outcome	**Year/Semester** **III Year/ I Sem**	**Subject Name (Subject Code)** Control Systems(B22EC26)	**No. of Hours** **L:3 T:1P:0**	**Credits:4**
1	Understand the concept of feedback and analyze the control system components by their Mathematical modeling.			
2	Estimate the time domain specification s and steady state error.			
3	Apply various time domain techniques to assess the system performance.			
4	Formulate different types of analysis in frequency domain to explain the nature of stability of the system for different types of controllers			
5	Test system controllability and observability using state space representation and applications of state space representation to various systems			
Course Outcome	**Year/Semester** **III Year/ I Sem**	**Subject Name (Subject Code)** Business Economics & Financial Analysis(B22MB01)	**No. of Hours** **L:3 T:0P:0**	**Credits:3**
1	Understand the various Forms of Business and the impact of economic variables on the Business.			
2	Know what is Demand, Supply, Production, Cost, Market Structure, Pricing aspects.			
3	Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost			
4	Understand the firm's financial position by analyzing the Financial Statements of a Company			
5	Analyze and interpret financial statements using ratio analysis			
Course Outcome	**Year/Semester** **III Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective-I** Computer Organization & Operating Systems (B22EC42)	**No. of Hours** **L:3 T:0P:0**	**Credits:3**
1	Demonstrate and understanding of the functional units of digital computer, instruction sets and their impact on processor design.			
2	Utilize the micro-level operations to control different units in a computer.			
3	Illustrate the concepts of I/O Organization.			
4	Implement operating systems in a computer.			
5	Apply File Management concepts in operating systems and familiarize the directory structure			
Course Outcome	**Year/Semester** **III Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective-I** Data Communications and Computer Networks(B22EC43)	**No. of Hours** **L:3 T:0P:0**	**Credits:3**
1	Know the Categories and functions of various Data communication Networks			

2	Design and analyze various error detection techniques.			
3	Demonstrate the mechanism of routing the data in network layer			
4	Know the significance of various Flow control and Congestion control Mechanisms			
5	Know the Functioning of various Application layer Protocols			
Course Outcome	**Year/Semester III Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective-I** Electronic Measurements and Instrumentation(B22EC44)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Measure electrical parameters with different meters and understand the basic definition ofmeasuring parameters.			
2	Use various types of signal generators, signal analyzers for generating and analyzing variousreal-time signals.			
3	Select specific Oscilloscope to measure various signals in practical fields.			
4	Explain the operations of various transducers required in measurements.			
5	Measure various physical parameters by appropriately selecting the transducers			
Course Outcome	**Year/Semester III Year/ I Sem**	**Subject Name (Subject Code)** Microcontrollers Laboratory (B22EC27)	**No. of Hours L:0 T:0P:2**	**Credits:1**
1	Write assembly language programs and implement on 8086.			
2	Write assembly language programs and implement on 8051			
3	Interface the I/O devices with 8051 micro controllers			
4	Perform experiments on Cortex-M3 development boards using GNU tool- chain			
Course Outcome	**Year/Semester III Year/ I Sem**	**Subject Name (Subject Code)** IoT Architectures and Protocols Laboratory (B22EC28)	**No. of Hours L:0 T:0P:2**	**Credits:1**
1	Utilize the different sensors like room temperature, DHT, Humidity etc.,			
2	Interface the sensors and processor for transmission of data.			
3	Capture the images and process it on Arduino/NodeMCU/Raspberry Pi.			
4	know the utilization of various protocols like I2c, UART communication etc			
Course Outcome	**Year/Semester III Year/ I Sem**	**Subject Name (Subject Code)** Advanced English Communication Skills Laboratory(B22EN03)	**No. of Hours L:0 T:0P:2**	**Credits:1**
1	Participate in group discussion to present their viewpoints briefly and effectively.			
2	Inculcate flair for writing and felicity in written expression in Resume / Curriculum vVitae/Reports.			
3	Participate confidently with appropriate body language in interviews.			
4	Enhance their team building skills and capabilities for effective decision making			
Course Outcome	**Year/Semester III Year/ I Sem**	**Subject Name (Subject Code)** Intellectual Property Rights(B22MB06)	**No. of Hours L:3 T:0P:0**	**Credits:0**
1	The students get the knowledge about intellectual property, trademarks and copy rights. They also know the rules and regulations related to copy rights. The students will understand the new development in different areas of intellectual property, trade and copy rights.			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** Antennas and Wave Propagation(B22EC29)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Explain the mechanism of radiation, definitions of different antenna characteristic parameters and establish their mathematical relations			
2	Estimate the array factor and characteristics of Linear Arrays, Binomial array and sketch their pattern. Illustrate antenna measurements.			
3	Characterize the antennas based on frequency, configure the geometry and establish the radiation patterns of various Antennas and to acquire the knowledge of their analysis, design and development			

4	Analyze a Microstrip, rectangular patch antenna and a parabolic reflector antenna, identify the requirements and relevant feed structure, carry out the design and establish their patterns			
5	Classify the different wave propagation mechanisms, determine the characteristic features of different wave propagations, and estimate the parameters involved			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** Digital Signal Processing (B22EC30)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Outline the properties of systems and signals			
2	Identify the various important characteristics of different transform techniques used in digital signal processing.			
3	Design IIR filters based on the specifications given			
4	Design FIR filters for given specifications			
5	Demonstrate different realizations of digital filters			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** CMOS VLSI Design(B22EC31)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Understand IC technology and basic electrical properties of MOS and BiCMOS.			
2	Design the layout of circuits using various design rules.			
3	Develop and design the gate level circuits			
4	Gain the knowledge to design data path subsystems like Adders, Shifters, ALUs etc.			
5	Illustrate different programmable logic devices and CMOS testing			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** **Professional Elective – II** Digital Image Processing (B22EC45)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Explore the fundamental relations between pixels and utility of 2-D transforms in imageprocessing.			
2	Inspect image enhancement in both the spatial and frequency domain.			
3	Evaluate various image restoration techniques.			
4	Explain various image segmentation techniques and morphological operations..			
5	Analyze the different image compression techniques.			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** **Professional Elective – II** Mobile Communications and Networks (B22EC46)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Known the evolution of cellular and mobile communication system.			
2	Explore the Co-Channel and Non-Co-Channel interferences.			
3	Known how to overcome the different fading effects?			
4	Familiar with cell coverage for signal and traffic, diversity, techniques, frequency management,Channel assignment and types of handoff.			
5	Demonstrate the difference between cellular and Adhoc Networks and design goals of MACLayer protocol			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** **Professional Elective – II** Embedded System Design (B22EC47)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Familiarize the selection procedure of Processors in the embedded domain.			
2	Understand different components required to develop a embedded systems			
3	Design Procedure for Embedded Firmware.			
4	Visualize the role of Real time Operating Systems in Embedded Systems.			
5	Evaluate the Correlation between task synchronization and latency issues			
Course	**Year/Semester**	**Subject Name (Subject Code)**	**No. of Hours**	**Credits:1**

Outcome	III Year/ II Sem	Digital Signal Processing Laboratory(B22EC32)	L:0 T:0P:2	
1	Analyze signals using the discrete Fourier transform (DFT).			
2	Understand FFT algorithm for efficient computation of DFT.			
3	Design IIR & FIR filters.			
4	Design multi rate signal processing of signals through systems			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** CMOS VLSI Design Laboratory (B22EC33)	**No. of Hours L:0 T:0P:2**	**Credits:1**
1	Acquire knowledge on High end Simulation tools like Mentor Graphics, Tanner EDA etc.			
2	Design digital circuits at different levels using programming concepts.			
3	Implement any type of digital systems.			
4	Program any available FPGA and CPLD using implementation tool			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** Advanced Communication Laboratory (B22EC34)	**No. of Hours L:0 T:0P:2**	**Credits:1**
1	Understand the features of Spectrum Analyzer.			
2	Analyze to select coding techniques for efficient transmission & reception.			
3	Demonstrate and simulate various modulation and demodulation techniques.			
4	Simulate the Multiplexing technique			
Course Outcome	**Year/Semester III Year/ II Sem**	**Subject Name (Subject Code)** Environmental Science (B22CH03)	**No. of Hours L:3 T:0P:0**	**Credits:0**
1	Based on this course, the Engineering graduate will understand/evaluate/develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** Microwave and Optical Communications (B22EC38)	**No. of Hours L:3 T:1P:0**	**Credits:4**
1	Compare the Power generation of Microwave Tubes and derive the performance characteristics.			
2	Illustrate the concepts, principles of microwave solid-state devices.			
3	Distinguish between the different types of waveguide, ferrite components and select proper components for engineering applications			
4	Measure the S-parameters in microwave component design.			
5	Demonstrate the mechanism of light propagation through Optical Fibres			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective – III** Radar Systems (B22EC48)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Illustrate the importance of Radar Fundamentals and analysis of Radar equation.			
2	Compare the functioning of CW and FM-CW Radars.			
3	Distinguish the working principle of MTI with Pulse Doppler Radar.			
4	Evaluate different Radar Tracking Methods.			
5	Perceive detection of Radar signals in Noise and Radar receivers			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective – III** CMOS Analog IC Design (B22EC49)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Understand the basic concepts of MOS devices and their models.			
2	Design basic building blocks of CMOS Analog ICs.			

3	Design various amplifiers like differential, current and operational amplifiers			
4	Carryout the design of single and two stage operational amplifiers.			
5	Understand the characteristics of comparator's and their design.			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective – III** Artificial Neural Networks(B22EC50)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Explore the basic elements of Artificial Neural networks and learning process.			
2	Develop different single layer / multilayer perceptron learning algorithms.			
3	Demonstrate the concepts of back propagation.			
4	Explain the concepts of self organizing maps.			
5	Construct the Hopfield models			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective – IV** Network Security and Cryptography (B22EC51)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Describe network security fundamental concepts and principles			
2	Encrypt and decrypt messages using block ciphers and network security technology andprotocols			
3	Ability to apply cryptographic algorithms, and understand the concepts of number the 27			
4	Analyze key agreement algorithms to identify their weaknesses			
5	Identify and assess different types of threats, malware, spyware, viruses, vulnerabilitie			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective – IV** Satellite Communications (B22EC52)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Explore the basic concepts and frequency allocations for satellite communication, orbitalmechanics and launch vehicles.			
2	Explain the satellite sub systems and satellite Antennas.			
3	Compare various multiple access techniques and design Satellite Link for specified C/N.			
4	Illustrate the earth station technology and Tracking system.			
5	Relate the concepts of LEO and GEO Stationary Satellite Systems, satellite navigation			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** **Professional Elective – IV** Biomedical Instrumentation(B22EC53)	**No. of Hours L:3 T:0P:0**	**Credits:3**
1	Explore bio-systems and medical systems from an engineering perspective.			
2	Identify the techniques to acquire record and primarily understand physiological activity of thehuman body through cell potential, ECG, EEG, BP and blood flow measurement.			
3	Acquires knowledge about Neurological Instrumentation.			
4	Articulate the working of various medical instruments and critical care equipment.			
5	Explain the imaging techniques including CT,PET, SPECT and MRI used in diagnosis of variousmedical conditions.			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** Professional Practice, Law & Ethics (B22MB10)	**No. of Hours L:2 T:0P:0**	**Credits:2**
1	Understand the importance of professional practice			
2	Learn the rights and responsibilities as an employee			
Course Outcome	**Year/Semester IV Year/ I Sem**	**Subject Name (Subject Code)** Microwave and Optical Communications Laboratory(B22EC39)	**No. of Hours L:0 T:0P:4**	**Credits:2**
1	Demonstrate a microwave bench for measuring microwave parameters			
2	Measure parameters like attenuation, VSWR etc.			
3	Analyze the characteristics of all microwave engineering components			
4	Demonstrate the mechanism of light propagation through optical fibres			

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Course Outcome	Year/Semester IV Year/ II Sem	Subject Name (Subject Code) **Professional Elective – V** Artificial Intelligence(B22EC54)	No. of Hours L:3 T:0P:0	Credits:3
1	Understand the basics of the theory and about intelligent agents.			
2	Capable of using heuristic searches, aware of knowledge based systems and expert systems.			
3	Apply AI techniques to real-world problems to develop intelligent systems.			
4	Ability to apply knowledge learning techniques to develop intelligent systems.			
5	Select appropriately from a range of techniques when implementing intelligent systems			
Course Outcome	Year/Semester IV Year/ II Sem	Subject Name (Subject Code) **Professional Elective – V** 5G and beyond Communications (B22EC55)	No. of Hours L:3 T:0P:0	Credits:3
1	Describe the concept of massive MIMO communications			
2	Illustrate mobile wireless technology generations and define SMNAT			
3	Analyze wireless communication channel and channel models for radio wave propagation			
4	Understand device to device (D2D) communication and standardization			
5	Create interference management, mobility management and security issues in 5G			
Course Outcome	Year/Semester IV Year/ II Sem	Subject Name (Subject Code) **Professional Elective – V** Machine learning(B22EC56)	No. of Hours L:3 T:0P:0	Credits:3
1	Ability to understand the concepts of Neural Networks			
2	Ability to select the Learning Networks in modeling real world systems			
3	Ability to use an efficient algorithm for Deep Models			
4	Ability to apply optimization strategies for large scale applications			
5	Ability to apply graphical models & strategies in machine learning			
Course Outcome	Year/Semester IV Year/ II Sem	Subject Name (Subject Code) **Professional Elective – VI** Multimedia Database Management Systems(B22EC57)	No. of Hours L:3 T:0P:0	Credits:3
1	Gain knowledge of fundamentals of DBMS, database design and normal forms.			
2	Apply relational model techniques for relational data.			
3	Master the basics of SQL for retrieval and management of data.			
4	Be acquainted with the basics of transaction processing and concurrency control.			
5	Familiarity with database storage structures and access techniques			
Course Outcome	Year/Semester IVYear/ II Sem	Subject Name (Subject Code) **Professional Elective – VI** System on Chip Architecture (B22EC58)	No. of Hours L:3 T:0P:0	Credits:3
1	Expected to understand SOC Architectural features.			
2	To acquire the knowledge on processor selection criteria and limitations			
3	To acquires the knowledge of memory architectures on SOC.			
4	To understands the interconnection strategies and their customization on SOC.			
5	To learn the different configurations of SOC			
Course Outcome	Year/Semester IV Year/ II Sem	Subject Name (Subject Code) **Professional Elective – VI** Wireless sensor Networks(B22EC59)	No. of Hours L:3 T:0P:0	Credits:3
1	Analyze and compare various architectures of Wireless Sensor Networks.			
2	Understand Design issues and challenges in wireless sensor networks.			

3	Understand various routing protocols and MAC protocols.
4	Analyze and compare various data gathering and data dissemination methods.
5	Design, Simulate and Compare the performance of various routing and MAC protocol

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Course Outcomes for M.Tech–VLSI SYSTEM DESIGN (R22) for the academic year 2022-2023 onwards

Course Outcome	Year/Semester I Year/ I Sem	Subject Name (Subject Code) DIGITAL SYSTEM DESIGN WITH FPGAs (M22VL01)	No. of Hours L:3 T:0P:0	Credits:3
After the completion of this course, the students should be able to				
1	To exposes the design approaches using FPGAs.			
2	To provide in depth understanding of Fault models.			
3	To understands test pattern generation techniques for fault detection.			
4	To design fault diagnosis in sequential circuits.			
5	`			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code)** CMOS ANALOG IC DESIGN (M22VL02)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Design basic building blocks of CMOS analog ICs.			
2	Carry out the design of single and two stage operational amplifiers and voltage references.			
3	Determine the device dimensions of each MOSFETs involved.			
4	Design various amplifiers like differential, current and operational amplifiers			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code)** (Professional Elective I) PATTERN RECOGNITION AND MACHINE LEARNING (M22VL03)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Familiar the basics of pattern classes and functionality.			
2	Construct the various linear models.			
3	Use the different kernel methods.			
4	Design the Markov and Mixed models			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code)** (Professional Elective I) CMOS MIXED SIGNAL DESIGN (M22VL04)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Designing CMOS analog circuits to achieve performance specifications.			
2	Analyzing CMOS based switched capacitor circuits.			
3	Designing data converters and know how to use these in specific applications			
4	Design a mixed-signal circuits with understanding design flow			
Course Outcome	**Year/Semester I Year/ I Sem**	**Subject Name (Subject Code)** (Professional Elective I) MEMORY TECHNOLOGIES (M22VL05)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Select architecture and design semiconductor memory circuits and subsystems.			
2	Identify various fault models, modes and mechanisms in semiconductor memories			

	and theirtesting procedures.			
3	Know, how of the state-of-the-art memory chip design			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** Professional Elective II) COMMUNICATION BUSES AND INTERFACES (M22VL06)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Select a particular serial bus suitable for a particular application.			
2	Develop APIs for configuration, reading and writing data onto serial bus.			
3	Design and develop peripherals that can be interfaced to desired serial bus			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** Professional Elective II) ARM MICRO CONTROLLERS (M22VL07)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Explore the selection criteria of ARM processors by understanding the functional level trade offissues.			
2	Explore the ARM development towards the functional capabilities.			
3	Work with ASM level program using the instruction set.			
4	Programming the ARM Cortex M.			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** Professional Elective II) EMBEDDED REAL TIME OPERATING SYSTEMS (M22VL08)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Be able to explain real			
2	Able describe how a real			
3	Explain how the real			
4	Be able to work with real time operating systems like RT Linux, Vx Works, MicroC /OS			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** DIGITAL SYSTEM DESIGN WITH FPGAs LAB (M22VL09)	**No. of Hours L:0 T:0P:4**	**Credits:2**
1	Given a set of specifications for a digital system, will be able to design the system meeting the specifications.			
2	Write a Verilog HDL code to implement a particular design/block.			
3	Use FPGAs in your design, meeting the area and delay constraints and estimate the power consumption.			
Course Outcome	**Year/Semester** **I Year/ I Sem**	**Subject Name (Subject Code)** CMOS ANALOG IC DESIGN LAB (M22VL10)	**No. of Hours L:0 T:0P:4**	**Credits:2**
After the completion of this course, the students should be able to				
1	Design analog Circuit using CMOS			
2	Use EDA tools like Cadence, Mentor Graphics and other open source software tools likeNg spice			
Course	**Year/Semester**	**Subject Name (Subject Code)** RESEARCH	**No. of Hours**	**Credits:2**

Outcome	**I Year/ I Sem**	METHODOLOGY AND IPR (M22VL11)	**L:2 T:0P:0**	
After the completion of this course, the students should be able to				
1	Understand research problem formulation.			
2	Analyze research related information			
3	Follow research ethics			
4	Understand that today's world is controlled by Computer, Information Technology, but tomorrowworld will be ruled by ideas, concept, and creativity.			
5	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.			
6	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** VLSI ADVANCED PHYSICAL DESIGN (M22VL12)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Design power mesh for given specifications, analyze IR drop and EM issues and fix them.			
2	Implement the low power intent of the design using current industry standard UPF.			
3	Verify whether the design meets the power intent in UPF			
4	Perform physical verification both at LVS & DRC level and fix all issues			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** SYSTEM VERILOG TEST BENCHES USING UVM (M22VL13)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Implement test bench programs using system Verilog.			
2	Develop random stimulus and SVAs using system Verilog.			
3	Develop a UVM test bench with all its features			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Professional Elective III) IOT ARCHITECTURES AND SYSTEM DESIGN (M22VL14)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Integrate the sensors and actuator depending on the applications			
2	Interface the IoT and M2M with value chains			
3	Write Python programming for Arduino, Raspberry Pi devices			
4	Design IoT based systems such as Agricultural IoT, Vehicular IoT etc.,			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Professional Elective III) SOC DESIGN (M22VL15)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Identify and formulate a given problem in the framework of SoC based design approaches			

2	Design SoC based system for engineering applications			
3	Realize impact of SoC on electronic design philosophy and Macro-electronics thereby inclinetowards entrepreneurship & skill development			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Professional Elective III) DESIGN FOR TESTABILITY (M22VL16)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Acquire verification knowledge and test evaluation			
2	Design for testability rules and techniques.			
3	Utilize the scan architectures for different digital circuits.			
4	Acquire the knowledge of design of built-in-self test			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Professional Elective IV) DEVICE MODELLING (M22VL17)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Develop a functional relationship among the terminal electrical variables of the device that is tobe modeled.			
2	Describe the behavior of all components successfully			
3	Perform the simulation and analyze the VLSI circuits			
4	Use the FinFET for various applications			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** Professional Elective IV) RF IC DESIGN (M22VL18)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Analyze the behavior of high frequency components.			
2	Calculate the scattering parameters of various RF components and analyze the various filterparameters.			
3	Implement component modelling and biasing networks.			
4	Design the various RF filters, amplifiers, oscillators and mixers			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code))** (Professional Elective IV) HARDWARE AND SOFTWARE CO-DESIGN (M22VL19)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Acquire the knowledge on various models of Co-design.			
2	Explore the interrelationship between Hardware and software in a embedded system			
3	Acquire the knowledge of firmware development process and tools during Co-design.			
4	Implement validation methods and adaptability			
Course Outcome	**Year/Semester I Year/ II Sem**	**Subject Name (Subject Code)** VLSI ADVANCED PHYSICAL DESIGN LAB (M22VL20)	**No. of Hours L:0 T:0P:4**	**Credits:2**
After the completion of this course, the students should be able to				
1	Perform pre-layout and post-layout analysis of various digital and analog CMOS circuits.			
2	Gain hands on Various EDA tools like Cadence / Mentor Graphics / Synopsys or			

	any other equivalent.			
3	Understand the importance of Layout design rules and their impact in achieving the desired specifications.			
4	Understand the importance of various analyses required in integrated circuit design process			
Course Outcome	**Year/Semester** **I Year/ II Sem**	**Subject Name (Subject Code)** SYSTEM VERILOG TEST BENCHES USING UVM LAB (M22VL21)	**No. of Hours L:0 T:0P:4**	**Credits:2**
After the completion of this course, the students should be able to				
1	Perform testing and verification using System Verilog.			
2	Use UVM methodologies for performing digital circuit logic verification.			
3	Gain hands on EDA playground Simulator			
Course Outcome	**Year/Semester** **II Year/ I Sem**	**Subject Name (Subject Code))** (Professional Elective V) ADVANCED COMPUTER ARCHITECTURE (M22VL23)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Familiarize the instruction set, memory addressing of Computer			
2	Handle the issues in pipelining and parallelism			
3	Familiarize the practical issues in inter network			
Course Outcome	**Year/Semester** **II Year/ I Sem**	**Subject Name (Subject Code))** (Professional Elective V) NANO MATERIALS AND NANOTECHNOLOGY (M22VL24)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Formulate new engineering solutions for current problems and competing technologies forfuture applications.			
2	Made inter disciplinary projects applicable to wide areas by clearing and fixing the boundariesin system development.			
3	Gather detailed knowledge of the operation of fabrication and characterization devices toachieve precisely designed systems			
Course Outcome	**Year/Semester** **II Year/ I Sem**	**Subject Name (Subject Code)** (Professional Elective V) HARDWARE SECURITY (M22VL25)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Design a more secure systems by knowing countermeasures of various hardware attacks			
2	Experiment the impressive efficiency of hardware attacks			
3	Monitor computation time or power consumption to reveal secrets			
4	Design a secure systems which lead to privilege escalation and compromise			
Course Outcome	**Year/Semester** **II Year/ I Sem**	**Subject Name (Subject Code)** (Open Elective) BUSINESS ANALYTICS (M22C01)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Demonstrate knowledge of data analytics.			
2	Demonstrate the ability of think critically in making decisions based on data and			

	deep analytics.			
3	Demonstrate the ability to use technical skills in predicative and prescriptive modeling to supportbusiness decision-making.			
4	Demonstrate the ability to translate data into clear, actionable insights			
Course Outcome	**Year/Semester** **II Year/ I Sem**	**Subject Name (Subject Code)** (Open Elective) OPERATIONS RESEARCH (M22ME03)	**No. of Hours L:3 T:0P:0**	**Credits:3**
After the completion of this course, the students should be able to				
1	Apply the dynamic programming to solve problems of discreet and continuous variables.			
2	Apply the concept of non-linear programming			
3	Carry out sensitivity analysis			
4	Model the real-world problem and simulate it			
Course Outcome	**Year/Semester**	**Subject Name (Subject Code)** (Audit Course) SANSKRIT FOR TECHNICAL KNOWLEDGE (M22AC03)	**No. of Hours L:2 T:0P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Understanding basic Sanskrit language			
2	Ancient Sanskrit literature about science & technology can be understood			
3	Being a logical language will help to develop logic in students			
Course Outcome	**Year/Semester**	**Subject Name (Subject Code)** (Audit Course) VALUE EDUCATION (M22AC04)	**No. of Hours L:2 T:0P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Knowledge of self-development			
2	Learn the importance of Human values			
3	Developing the overall personality			
Course Outcome	**Year/Semester**	**Subject Name (Subject Code)** (Audit Course) CONSTITUTION OF INDIA (M22AC05)	**No. of Hours L:2 T:0P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrivalof Gandhi in Indian politics.			
2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.			
3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.			
4	Discuss the passage of the Hindu Code Bill of 1956.			
Course Outcome	**Year/Semester**	**Subject Name (Subject Code)** (Audit Course) PEDAGOGY STUDIES (M22AC06)	**No. of Hours L:2**	**Credits:0**

			T:0P:0	
After the completion of this course, the students should be able to				
1	What pedagogical practices are being used by teachers in formal and informal classrooms indeveloping countries?			
2	What is the evidence on the effectiveness of these pedagogical practices, in what conditions,and with what population of learners?			
3	How can teacher education (curriculum and practicum) and the school curriculum and guidancematerials best support effective pedagogy?			
4	What pedagogical practices are being used by teachers in formal and informal classrooms indeveloping countries?			
Course Outcome	**Year/Semester**	**Subject Name (Subject Code)** (Audit Course) STRESS MANAGEMENT BY YOGA (M22AC07)	**No. of Hours L:2 T:0P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Demonstrate knowledge of data analytics.			
2	Demonstrate the ability of think critically in making decisions based on data and deep analytics.			
3	Demonstrate the ability to use technical skills in predicative and prescriptive modeling to supportbusiness decision-making.			
4	Demonstrate the ability to translate data into clear, actionable insights			
Course Outcome	**Year/Semester**	**Subject Name (Subject Code)** (Audit Course) PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS (M22AC08)	**No. of Hours L:2 T:0P:0**	**Credits:0**
After the completion of this course, the students should be able to				
1	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality andachieve the highest goal in life			
2	The person who has studied Geeta will lead the nation and mankind to peace and prosperity			
3	Study of Neetishatakam will help in developing versatile personality of students			
4	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality andachieve the highest goal in life			

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Course Outcomes for M.Tech – Power Electronics (43) for the year 2015-16

Course Outcome	**Year/Semester I/I Sem**	**Subject Name (Subject Code)** Machine Modelling and Analysis(A943101)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Identify the methods and assumptions in modeling of machines.			
2	Recognize the different frames for modeling of AC machines.			
3	Illustrate the voltage and torque equations in state space form for different machines			
4	Develop the mathematical models of various DC machines and derive the transfer function of the DC motor.			
5	Study various transformations adopted in 3 phase machines and explore its starting methods			
6	Analyze the developed models in various reference frames through simulation study			
7	Assess the machine dynamics in various operating conditions			
8	Perform short circuits analysis with d-q model of machines.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Modern Control Theory (A943102)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Learn various terms of basic and modern control system for the real time analysis and design of control systems.			
2	Learn the basic mathematical preliminaries for modeling a control system			
3	Perform state variables analysis for any real time system			
4	Linearize the non-linear system model using various techniques			
5	Apply the concept of optimal control to any system.			
6	Examine a system for its stability, controllability and observability.			
7	Implement basic principles and techniques in designing linear control systems.			
8	Formulate and solve deterministic optimal control problems in terms of performance indices.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Electronic Devices and Circuits (A943103)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the characteristics and principle of operation of modern power electronics devices.			
2	Compare the features of various power electronic devices			
3	Comprehend the concepts of different power converters and their application			
4	Explore various driver circuits and its heat management system			
5	Study the effect of source and load inductance on the controller operation			
6	Analyse and design the switched mode regulator for various industrial application			
7	Explore various power factor improvement controllers			
8	Use power electronic simulation packages for analysing and designing power converters			
Course	**Year / semester**	**Subject Name (Subject Code)**	**L: 4 T: 0 P: 0**	**Credits: 4**

Outcome	**I/I Sem**	Special Machines (A943104)	**Total: 4**	
After the completion of this course, the students should be able to				
1	Learn the constructional features, principle of operation and methods of control of stepper motor.			
2	Realize the need for stepper motors and the various applications in industries.			
	Explore various hybrid stepping motor			
3	Get a clear picture of the operational characteristics and the applications of Switched Reluctance Motor.			
4	Know the various types of PMBLDC motors, rotor position sensors, methods of control and their applications			
5	Get a clear idea of the features, control and the applications of PMSM			
6	Explore the concept of linear induction motor and develop a double sided LIM from rotory induction motor			
7	Study the constructional details of permanent magnet axial flux machines (PMAF)			
8	Explore the applications of various special machines in day to day applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A943105)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the basic power handling capabilities of HVDC lines			
2	Explore various configurations and conversion principles of static power converters			
3	Learn the rectifier and inverter operations, commutation process at converter stations.			
4	Apply AC/DC filters for harmonic elimination in HVDC link			
5	Explore various controls adapted in HVDC converters			
6	Identify various instability problems in HV AC and DC system			
7	Study various over voltage problems in multi-terminal DC system			
8	Comprehend various converter faults and protection circuits .			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Programmable Logic Controllers and their Applications (A943106)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Gain Comprehensive knowledge of using advanced controllers in measurement and control instrumentation.			
2	Illustrate about data acquisition - process of collecting information from field instruments.			
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.			
4	Comprehend Programming in Ladder Logic, addressing of I/O.			
5	Apply PID and its Tuning.			
6	Develop ladder logic programming for simple process			
7	Execute , debug and test programs developed for digital and analog operations			
8	Reproduce block diagram representation on industrial applications using PLC			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Microcontrollers and Applications (A943107)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				

1	Relate the basic architecture and addressing modes of a microcontroller.			
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development			
3	Demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE			
4	Analyze a typical I/O interface and to discuss timing issues			
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.			
6	Translate Hardware applications using Microcontrollers.			
7	Gain working knowledge of ports and interrupts			
8	Introduce the need and use of interrupt structure, timers in respective applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A943108)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the basics of an embedded system			
2	Explore various issues in embedded software development and applications			
3	Learn the method of designing an embedded system for any type of applications			
4	Understand the operating systems concepts, types and choosing RTOS			
5	Design, implement and test an embedded system			
6	Understand types of memory and interacting to external world			
7	Learn embedded firmware design approaches			
8	Use ICE and software tools to address the issues in embedded systems			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital Control Systems (A943109)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Deduce the control system to block diagram for various analysis			
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.			
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.			
4	Know sampling and reconstruction, Z -transforms.			
5	Replace the conventional control system with Digital control system.			
6	Evaluate to Apply Z-plane analysis of discrete time control systems			
7	Apply state feedback controllers and observers			
8	Analyse the system stability using root locus , bode and Nyquist plots			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Optimization Techniques (A943110)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the need of optimisation in electrical engineering problems			
2	Learn the conventional or classical optimisation techniques			
3	Learn to formulate the problem with constrained and unconstrained cases			
4	Explore various modern intelligent optimisation techniques			
5	Apply these techniques to real world problems such as transportation problem, travelling salesman problem			
6	Study various limitations in these techniques			

7	Apply methods of sensitivity analysis and validate post processing results			
8	Explore various real time optimization problems.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital control systems (A943111)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Deduce the control system to block diagram for various analysis			
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.			
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.			
4	Know sampling and reconstruction, Z -transforms.			
5	Replace the conventional control system with Digital control system.			
6	Evaluate to Apply Z-plane analysis of discrete time control systems			
7	Apply state feedback controllers and observers			
8	Analyse the system stability using root locus , bode and Nyquist plots			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Renewable energy systems (A943112)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Explore various renewable energy sources to produce electrical energy			
2	Study the characteristics of PV cell- photo voltaic modules and its applications			
3	Learn the basics of wind energy conversion systems and bio-mass energy generation			
4	Explore various Wave energy conversion machines - Ocean Thermal Energy conversion schemes			
5	Know the need of hybrid energy systems such as geothermal and fuel cells			
6	Study the impact of various renewable energy sources on environment.			
7	Arrange storage energy and to avoid the environmental pollution			
8	Detect the environmental effects of energy conversion			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A943113)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Study the basic power handling capabilities of HVDC lines			
2	Explore various configurations and conversion principles of static power converters			
3	Learn the rectifier and inverter operations, commutation process at converter stations.			
4	Apply AC/DC filters for harmonic elimination in HVDC link			
5	Explore various controls adapted in HVDC converters			
6	Identify various instability problems in HV AC and DC system			
7	Study various over voltage problems in multi-terminal DC system			
8	Comprehend various converter faults and protection circuits .			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Analysis of Power Electronic Converters (A943114)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the characteristics and principle of operation of modern power semiconductor devices.			

2	Comprehend the concepts of different power converters and their applications			
3	Describe the importance of AC voltage controllers and cyclo-converters for various industrial applications			
4	Analyze and design switched mode power electronic converters for various industrial applications			
5	Analyze pulse width modulated inverters which are used in variable speed drives			
6	Choose appropriate device for a particular converter topology.			
7	Use power electronic simulation packages for analyzing and designing power converters.			
8	Choose appropriate power converter topologies and design the power stage and feedback controllers for various applications			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A943115)	**L: 4 T: 0 P: 0 Total: 4**	**Credits: 4**
After the completion of this course, the students should be able to				
1	Understand the basics of an embedded system			
2	Explore various issues in embedded software development and applications			
3	Learn the method of designing an embedded system for any type of applications			
4	Understand the operating systems concepts, types and choosing RTOS			
5	Design, implement and test an embedded system			
6	Understand types of memory and interacting to external world			
7	Learn embedded firmware design approaches			
8	Use ICE and software tools to address the issues in embedded systems			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Converters Simulation Lab (A943116)	**L: 0 T: 0 P: 4 Total:4**	**Credits:4**
After the completion of this course, the students should be able to				
1	Able to simulate full converter circuits for various types of loading			
2	Acquire programming knowledge to study the systems dynamics in state space model			
3	Able to assess the frequency response of the system			
4	Analyse the system stability and PID controller application for steady state system operation.			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Seminar-I (A943117)	**L: 0 T: 0 P: 4 Total:4**	**Credits:4**
Course Outcome	**Year/Semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Converters (A943201)	**L: 4 T: 0 P: 0 C: 4**	
After the completion of this course, the students should be able to				
1	Understand various advanced power electronics devices.			
2	Explore various advanced modulation techniques and its applications			
3	Describe the operation of multi-level inverters with switching strategies for high power applications.			
4	Comprehend the design of resonant converters and switched mode power supplies.			
5	Gain knowledge on various topologies converter circuits			
6	Develop and analyze various converter topologies.			
7	Design AC or DC switched mode power supplies.			
8	Explore various power conditioning devices			

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Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Control of DC Drives (A943202)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Learn basic preliminary requirements for operating DC drives		
2	Explore various rectifier fed DC drives		
3	Study the continuous and discontinuous modes of operation of single phase semi and full converter for DC drives		
4	Study the continuous and discontinuous modes of operation of three phase semi and full converter for DC drives		
5	Perform steady state analysis of three phase converter controlled DC motor drive		
6	Explore various current and speed controllers		
7	Perform steady state analysis of chopper controlled DC motor drive		
8	Simulate the dynamics of speed controlled DC motor drives		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Electronic Control of AC Drives (A943203)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Learn the speed torque characteristics variable voltage and variable frequency operation		
2	Study the operation of induction motor in constant torque and field weakening regions		
3	Understand the stator side controls employed for induction drives		
4	Employ speed and flux control in current fed inverter drive		
5	Evaluate the efficiency of the drive by applying optimization control		
6	Study the principles of vector control methods in rotor of induction drives		
7	Implement various speed control schemes in synchronous motor drives		
8	Study the characteristics and control of variable reluctance motor drive		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Quality (A943204)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Know the different terms and concepts of electric power quality in power systems.		
2	Learn about the applications of non-linear load.		
3	Identify and study the difference between system failures, outage and interruptions		
4	Predict various short and long interruptions		
5	Characterize and calculate the magnitude the single and three phases Voltage sag in the system		
6	Learn how to mitigate the power quality problems		
7	Learn about the application of FACTS device on DG side.		
8	Know the different characteristics of electric power quality in power systems.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Advanced Digital Signal Processing (A943205)	**L: 3 T: 0 P: 0 C:3**
After the completion of this course, the students should be able to			
1	Provide fundamental knowledge of analysing and processing of digital systems		
2	Study the relationship between continuous time and discrete time signals and systems		

3	Study the fundamentals of time , frequency and Z-Plane analysis and their interrelationships.		
4	Study and design digital filters form analysis to synthesis		
5	Explore few real world signal processing applications		
6	Get acquainted with FFT algorithms, multi-rate signal processing techniques.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Switched Mode Power Supplies (SMPS) (A943206)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Apply the basic concepts of power electronics for designing converters.		
2	Explore various design considerations.		
3	Explore various control circuits.		
4	Design and implement practical circuits for UPS, SMPS.		
5	Understand the effect of Electromagnetic interference (EMI).		
6	Understand the various protection aspects for the converters.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Flexible AC Transmission Systems (A943207)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the concepts and types of FACTS controllers		
2	Learn various converters employed for FACTS controllers		
3	Study the impact of FACTS devices in the power flow in the AC system		
4	Learn various shunt compensation using SVC and STATCOM		
5	Learn various series compensators such as TCSC, TSSC		
6	Explore the concept of UPFC and its application.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** High-Frequency Magnetic Components (A943208)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the fundamentals of magnetic devices		
2	Explore the properties of magnetic core materials		
3	Study the various effects that exists the round conductor carrying AC currents		
4	Evaluate the energy stored in coupled inductors of transformers		
5	Design of transformers for fly-back converters in CCM		
6	Design the integrated inductors and self capacitance for high frequency applications		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Dynamics of Electrical Machines (A943209)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Basics of machine theory of all types of machines		
2	Learn generalized modeling of all electrical machines		
3	Apply of Lagrange's equation solution of Electro dynamical equations.		
4	Understand the basic mathematical analysis of electrical machines and its characteristics.		
5	Understand behavior of electrical machines under steady state and transient state.		
6	Understand dynamic modeling of electrical machines		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Instrumentation & Control (A943210)	**L: 3 T: 0 P: 0 C: 3**

After the completion of this course, the students should be able to			
1	Survey various methods of power generation		
2	Understand the importance of instrumentation in power generation		
3	Explore various measuring and supervising systems involved in thermal power plant processes such as boiler and turbine units		
4	Understand various controls employed in boiler		
5	Explore the temperature and pressure controls in turbine		
6	Study the nuclear power plant instrumentation		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Intelligent Control (A943211)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the architecture of Intelligent control		
2	Learn the basic artificial neural network and its mathematical model		
3	Train and test the neural network with various configurations.		
4	Apply genetic algorithm for various optimisation problems		
5	Model and control different system with fuzzy logic controller		
6	Explore various power system problem and apply GA, NN and Fuzzy controller		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Smart grid technologies (A943212)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
2	Understand the advantages of DC distribution and developing technologies in distribution		
3	Discriminate the trade-off between economics and reliability of an electric power system.		
4	Differentiate various investment options (e.g. generation capacities, transmission, renewable, demand-side resources, etc) in electricity markets.		
5	Analyze the development of smart and intelligent domestic systems.		
6	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** AI Techniques in Electrical Engineering (A943213)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on soft computing techniques such as artificial neural networks, Fuzzy logic and genetic Algorithms.		
2	Learn the concepts of feed forward neural networks and feedback neural networks.		
3	Get the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy rules		
4	Acquire complete knowledge on genetic algorithm including three genetic operators		
5	Explore various power system problems which can utilize these AI techniques		
6	Assess system stability using AI techniques		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reliability Engineering (A943214)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			

1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Energy Auditing, Conservation & Management (A943215)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the necessity of conservation of energy		
2	Generalize the methods of energy management		
3	Illustrate the factors to increase the efficiency of electrical equipment		
4	Detect the benefits of carrying out energy audits.		
5	Analyze the power factor and to design a good illumination system		
6	Determine pay back periods for energy saving equipment.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power Converters and Drives Lab (A943216)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Learn basic speed measurement and implement closed loop control in PMDC motor		
2	Experience the improved control of thyristor drive for PMDC motor over conventional control		
3	Learn to generate PWM signals using DSP		
4	Explore the inverter controls for solar PV systems		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Seminar-II (A943217)	**L: 0 T: 0 P: 4 C:2**
Course Outcome	**Year / semester II/I Sem**	**Subject Name (Subject Code)** Comprehensive Viva-Voce (A943301)	**L: 0 T: 0 P: 0 C:4**

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Course outcomes for M.Tech – Power System Automation and Control (45) for the year 2015-16

Course Outcome	**Year/Semester I/I Sem**	**Subject Name (Subject Code)** Advanced Power System Analysis (A953101)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Identify the methods and assumptions in modeling of machines.		
2	Recognize the different frames for modeling of AC machines.		
3	Illustrate the voltage and torque equations in state space form for different machines		
4	Develop the mathematical models of various machines like, induction motor and Synchronous machines using modeling equations.		
5	Analyze the developed models in various reference frames		
6	Assess the machine dynamics in various operating conditions		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Advanced Power System Protection (A953102)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basic function of a circuit breaker, all kinds of circuit breakers and relays		
2	Differentiate fuse and circuit breakers under fault condition		
3	Learn constructional details of static relays and importance of duality of comparators in them.		
4	Study the operation of static relay applied for over current protection		
5	Able to apply static relay for transformer and transmission line protection		
6	Basic principle of operation and application of microprocessor based relaying.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Modern Control Theory (A953103)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Various terms of basic and modern control system for the real time analysis and design of control systems.		
2	To perform state variables analysis for any real time system.		
3	Apply the concept of optimal control to any system.		
4	Able to examine a system for its stability, controllability and observability.		
5	Implement basic principles and techniques in designing linear control systems.		
6	Formulate and solve deterministic optimal control problems in terms of performance indices.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** EHV AC Transmission (A953104)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Identify the different aspects of Extra High Voltage A.C and D.C Transmission		
2	Demonstrate EHV AC transmission system components, protection and insulation level for over voltages		
3	Estimate the Statistical procedures for line designs, scientific and engineering Principles in power systems.		
4	Power Frequency Voltage control and over-voltages in EHV lines		

5	Study the concept of Corona in E.H.V. lines and impact of RI in EHV lines		
6	Design the EHV cables and study their charcteristics		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** High Voltage Engineering (A953105)	**L: 3 T: 0 P: 0 C:3**
After the completion of this course, the students should be able to			
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Advanced Digital Signal Processing (A953106)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Comprehensive understanding of using advanced controllers in measurement and control instrumentation.		
2	Illustrate about data acquisition - process of collecting information from field instruments.		
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.		
4	Comprehend Programming in Ladder Logic, addressing of I/O.		
5	Apply PID and its Tuning.		
6	Development of ladder logic programming for simple process		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Quality (A953107)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	To relate the basic architecture and addressing modes of a microcontroller.		
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development		
3	demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE		
4	analyze a typical I/O interface and to discuss timing issues		
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.		
6	Translate Hardware applications using Microcontrollers.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Microcontrollers and applications (A953108)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To relate the basic architecture and addressing modes of a microcontroller.		
2	Distinguish types of computers & microcontrollers and explain the principles of top down design to microcontroller software development		
3	demonstrate assembly language programs for the 8-bit, 16-bit and 32-bit Microcontroller , assembly language code for high-level language structures such as IF-THENELSE and DO-WHILE		
4	analyze a typical I/O interface and to discuss timing issues		
5	Develop Real time Applications of Microcontrollers & Demonstrate RTOS for Microcontrollers.		
6	Translate Hardware applications using Microcontrollers.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Distribution Automation (A953109)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the need of structure of power system automation and its evolution.		

2	Classify various power system automation schemes		
3	Learn to implement power system automation and protection using SCADA.		
4	Learn the importance of EMS in power system operation.		
5	Learn the architecture of PLC and its application in power system automation		
6	Know the control schemes of distribution automation and substation automation		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Optimization Techniques (A953110)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Study the need of optimisation in electrical engineering problems		
2	Learn the conventional or classical optimisation techniques		
3	Learn to formulate the problem with constrained and unconstrained cases		
4	Explore various modern intelligent optimisation techniques		
5	Apply these techniques to real world problems such as transportation problem, travelling salesman problem		
6	Study various limitations in these techniques		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Digital control systems (A953111)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Deduce the control system to block diagram for various analysis		
2	Acquire a strong foundation in sampling and reconstruction Z-transforms.		
3	Apply knowledge of mathematics, Z-plane analysis to discrete time control systems.		
4	Know sampling and reconstruction, Z -transforms.		
5	Replace the conventional control system with Digital control system.		
6	Evaluate to Apply Z-plane analysis of discrete time control systems		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Renewable energy systems (A953112)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Explore various renewable energy sources to produce electrical energy		
2	Study the characteristics of PV cell- photo voltaic modules and its applications		
3	Learn the basics of wind energy conversion systems and bio-mass energy generation		
4	Explore various Wave energy conversion machines - Ocean Thermal Energy conversion schemes		
5	Know the need of hybrid energy systems such as geothermal and fuel cells		
6	Study the impact of various renewable energy sources on environment.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** HVDC Transmission (A953113)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Study the basic power handling capabilities of HVDC lines		
2	Explore various configurations and conversion principles of static power converters		
3	Learn the rectifier and inverter operations, commutation process at converter stations.		
4	Apply AC/DC filters for harmonic elimination in HVDC link		
5	Explore various controls adapted in HVDC converters		
6	Identify various instability problems in HV AC and DC system		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Analysis of power Electronic converters (A953114)	**L: 3 T: 0 P: 0 C: 3**

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After the completion of this course, the students should be able to			
1	Understand the characteristics and principle of operation of modern power semiconductor devices.		
2	Comprehend the concepts of different power converters and their applications		
3	Analyze and design switched mode regulators for various industrial applications		
4	Knowledge on various converter topologies		
5	Choose appropriate device for a particular converter topology.		
6	Use power electronic simulation packages for analyzing and designing power converters.		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Embedded Systems (A953115)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Understand the basics of an embedded system		
2	Learn the method of designing an embedded system for any type of applications		
3	Understand the operating systems concepts, types and choosing RTOS		
4	Design, implement and test an embedded system		
5	Understand types of memory and interacting to external world		
6	Learn embedded firmware design approaches		
Course Outcome	**Year / semester I/I Sem**	**Subject Name (Subject Code)** Power Systems Lab-I (A953116)	**L: 0 T: 0 P: 4 C: 2**
After the completion of this course, the students should be able to			
1	Able to demonstrate the symmetrical and unsymmetrical fault in the generator.		
2	Realise the Ferranti effect in the transmission line and implement feeder protection under over current operation by constructing the circuits		
3	Study the operation various static relays for over current and over voltage condition		
4	Visualise the differential protection of transformer for external and internal faults		
Course Outcome	**Year/Semester I/II Sem**	**Subject Name (Subject Code)** Power System Dynamics (A953201)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the basics of system dynamics and able to analyse steady state stability and transient stability		
2	Able to model synchronous machine to analyse steady state operation analyse its dynamics of operation.		
3	Model the excitation system analyse the dynamics of the synchronous machine connected to infinite bus.		
4	Examine the small signal stability of the system using Routh's Hurwitz criterion		
5	Know the need of PSS in control signals		
6	Dynamic compensator analysis of single machine infinite bus system with and without PSS.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Flexible AC Transmission Systems (FACTS) (A953202)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Know the concepts and types of FACTS controllers		
2	Learn various converters employed for FACTS controllers		
3	Study the impact of FACTS devices in the power flow in the AC system		

4	Learn various shunt compensation using SVC and STATCOM		
5	Learn various series compensators such as TCSC, TSSC		
6	Explore the concept of UPFC and its application.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power System Operation and Deregulation (A953203)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Acquire basic knowledge on restructuring of power industry and market models.		
2	Impart knowledge on fundamental concepts of congestion management		
3	Knowledge on various ancillary service providers		
4	Illustrate various international Transmission pricing paradigms		
5	Idea on framework of Indian power sector and its initiatives		
6	The reforms in Indian power sector		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Gas Insulated Systems(GIS) (A953204)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Programmable Logic Controllers and their Applications (A953205)	**L: 4 T: 0 P: 0 C:4**
After the completion of this course, the students should be able to			
1	Gain Comprehensive knowledge of using advanced controllers in measurement and control instrumentation.		
2	Illustrate about data acquisition - process of collecting information from field instruments.		
3	Analyze Programmable Logic Controller (PLC), IO Modules and internal features.		
4	Comprehend Programming in Ladder Logic, addressing of I/O.		
5	Apply PID and its Tuning.		
6	Develop ladder logic programming for simple process		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** High frequency magnetic components (A953206)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the fundamentals of magnetic devices		
2	Explore the properties of magnetic core materials		
3	Study the various effects that exists the round conductor carrying AC currents		
4	Evaluate the energy stored in coupled inductors of transformers		
5	Design of transformers for fly-back converters in CCM		
6	Design the integrated inductors and self capacitance for high frequency applications		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reactive Power Compensation and Management (A953207)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Identify the necessity of reactive power compensation		
2	Describe load compensation		
3	Select various types of reactive power compensation in transmission systems		
4	Characterize distribution side and utility side reactive power.		
5	Understand issues related to power system stability and control.		

6	Detect reactive power compensation techniques & their practical importance		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Power System Reliability (A953208)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Voltage Stability (A953209)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Identify the necessity of reactive power compensation		
2	Describe load compensation		
3	Select various types of reactive power compensation in transmission systems		
4	Characterize distribution side and utility side reactive power.		
5	Understand issues related to power system stability and control.		
6	Detect reactive power compensation techniques & their practical importance		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Instrumentation & Control (A953210)	**L: 4 T: 0 P: 0 C: 4**
After the completion of this course, the students should be able to			
1	Survey various methods of power generation		
2	Understand the importance of instrumentation in power generation		
3	Explore various measuring and supervising systems involved in thermal power plant processes such as boiler and turbine units		
4	Understand various controls employed in boiler		
5	Explore the temperature and pressure controls in turbine		
6	Study the nuclear power plant instrumentation		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Intelligent Control (A953211)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Learn the architecture of Intelligent control		
2	Learn the basic artificial neural network and its mathematical model		
3	Train and test the neural network with various configurations.		
4	Apply genetic algorithm for various optimisation problems		
5	Model and control different system with fuzzy logic controller		
6	Explore various power system problem and apply GA, NN and Fuzzy controller		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Smart grid technologies (A953212)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Recite the structure of an electricity market in either regulated or deregulated market		

	conditions.		
2	Understand the advantages of DC distribution and developing technologies in distribution		
3	Discriminate the trade-off between economics and reliability of an electric power system.		
4	Differentiate various investment options (e.g. generation capacities, transmission, renewable, demand-side resources, etc) in electricity markets.		
5	Analyze the development of smart and intelligent domestic systems.		
6	Recite the structure of an electricity market in either regulated or deregulated market conditions.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** AI Techniques in Electrical Engineering (A953213)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Gain knowledge on soft computing techniques such as artificial neural networks, Fuzzy logic and genetic Algorithms.		
2	Learn the concepts of feed forward neural networks and feedback neural networks.		
3	Get the concept of fuzziness involved in various systems and comprehensive knowledge of fuzzy logic control and to design the fuzzy rules		
4	Acquire complete knowledge on genetic algorithm including three genetic operators		
5	Explore various power system problems which can utilize these AI techniques		
6	Assess system stability using AI techniques		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Reliability Engineering (A953214)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	To identify the generation system model and recursive relation for capacitive model building		
2	calculate the equivalent transitional rates, cumulative probability and cumulative frequency		
3	Evaluate cumulative probability and cumulative frequency of non-identical generating units and merging generation and load		
4	Distinguish various approaches to evaluate operating reserves and bulk power generation reserve		
5	Analyse the reliability indices on radial and weakly meshed distribution networks		
6	Study the effect of short circuits in substation and switching stations.		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Energy Auditing, Conservation & Management (A953215)	**L: 3 T: 0 P: 0 C: 3**
After the completion of this course, the students should be able to			
1	Know the necessity of conservation of energy		
2	Generalize the methods of energy management		
3	Illustrate the factors to increase the efficiency of electrical equipment		
4	Detect the benefits of carrying out energy audits.		
5	Analyze the power factor and to design a good illumination system		
6	Determine pay back periods for energy saving equipment.		
Course	**Year / semester**	**Subject Name (Subject Code)** Power Systems Lab-II (A953216)	**L: 0 T: 0 P: 4 C:**

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Outcome	**I/II Sem**		**2**
After the completion of this course, the students should be able to			
1	Study the characteristics of microprocessor based relays		
2	Able to protect the feeder from faulty condition using over current relay operation		
3	Study the Characteristics of IDMT Electromagnetic Over Current Relay		
4	Study the phase failure and phase reversal protection with static negative sequence relay		
Course Outcome	**Year / semester I/II Sem**	**Subject Name (Subject Code)** Seminar-II (A953217)	**L: 0 T: 0 P: 4 C:2**