VAAGDEVI COLLEGE OF ENGINEERING

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Date: 25-03-2023.

BOARD OF STUDIES MEETING

Minutes of the meeting of Board of Studies for Electrical and Electronics Engineering department held on **25-03-2023 at 2:00 P.M.**

Ref: In-Continuation with Departmental BOS Meeting held on **15-03-2023.**

Sl.No.	Name of the Address	Designation	Signature
1	Dr. P. Sadanandam Associate Professor, Department of EEE, VCE, Warangal.	Chairperson	
2	Dr. A. Jayalaxmi Professor of EEE Department, JNTUH,CEH	Member (University Nominee)	25/3/23
3	Dr. G. Yesurathnam Professor, EE Department, Osmania University, Hyderabad.	Member (Subject Expert)	
4	Dr. Ch. Ramulu Assistant Professor, EE Department, NIT, Warangal.	Member (Subject Expert)	
5	Sri Murali Mohan Gade Scientist 'F', Directorate of Systems, DRDL, Hyderabad.	Member (Representative from Industry)	
6	Dr. K. Prakash Professor, Department of EEE, VCE, Warangal.	Member (Faculty)	
7	Mr. P. Purna Chander Rao Associate Professor, Department of EEE, VCE, Warangal.	Member (Faculty)	
8	Dr. K. Ranjith Kumar Assistant Professor, Department of EEE, VCE, Warangal.	Member (Faculty)	
9	Mr. N. Mahender A.E, TS NPDCL, Warangal.	Member (Representative from Alumni)	

The following decisions are taken:

1. Approved the course structure and syllabi of B.Tech (R22-Regulations) for II-Year (I and II Semesters).
2. Approved the syllabi of II-Year B.Tech courses, namely Basic Electrical and Electronics Engineering and Basic Electrical and Electronics Engineering Laboratory, offered to Civil and Mechanical branches in II -Year II-Semester.
3. Approved the syllabi of II-Year B. Tech course, namely Network Analysis and Synthesis, offered to the Electronics and Communication Engineering branch in II-Year, I-Semester.
4. Approved the substitute subjects for the students who have been readmitted from R15 regulation into R18 regulation, R15 regulation into R20 regulation, R18 regulation into R20 regulation, R18 regulation into R22 regulation, and R20 regulation into R22 regulation.
5. Approved the list of external faculty for paper setting for semester end examinations.
6. Internal Department BOS meeting minutes are approved.

Dr. P. Sadanandam

(BOS- Chairperson)

VAAGDEVI COLLEGE OF ENGINEERING, WARANGAL

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE STRUCTURE & SYLLABUS (R22 Regulations)

Applicable from AY 2022-23 Batch

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Numerical Methods and Complex variables	3	1	0	4
2		Electrical Machines-I	3	1	0	4
3		Analog Electronic Circuits	3	0	0	3
4		Power System-I	3	0	0	3
5		Electro Magnetic Fields	3	0	0	3
6		Electrical Machines Laboratory-I	0	0	2	1
7		Analog Electronic Circuits Laboratory	0	0	2	1
8		Electrical Simulation tools Laboratory	0	0	2	1
9	*MC	Gender Sensitization Laboratory	0	0	2	0
		Total Credits	**15**	**2**	**08**	**20**

II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Solid Mechanics & Hydraulic Machines	3	1	0	4
2		Measurements and Instrumentation	3	0	0	3
3		Electrical Machines–II	3	0	0	3
4		Digital Electronics	2	0	0	2
5		Power System-II	3	0	0	3
6		Digital Electronics Laboratory	0	0	2	1
7		Measurements and Instrumentation Laboratory	0	0	2	1
8		Electrical Machines Laboratory-II	0	0	2	1
9		Real-time Research Project/ Field Based Project	0	0	4	2
10	*MC	Logical Reasoning & Quantative Aptitude	3	0	0	0
		Total Credits	**17**	**1**	**10**	**20**

1. 2. 3.

4. 5. 6.

7. 8. 9.

VAAGDEVI COLLEGE OF ENGINEERING

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ELECTRICAL MACHINES - I

B.Tech. II Year I Sem.

L	T	P	C
3	1	0	4

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2

Course Objectives:

- To study and understand different types of DC machines and their performance evaluationthrough various testing methods.
- To understand the operation of single and ploy-phase Transformers
- To analyze the performance of transformers through various testing methods.

Course Outcomes: After learning the contents of this paper the student must be able to

- Identify different parts of a DC machines & understand their operation. with various excitation
- Learn various methods of starting, speed control of dc motors
- Analyze the performance of DC machines with various methods of testing.
- Understand the construction, operation and performance of single phase transformer
- Learn the methods of testing of single phase transformers and explore the polyphase connections of transformer.

UNIT-I:

D.C. GENERATORS: Principle of operation – Action of commutator – constructional features – armature windings – lap and wave windings – simplex and multiplex windings – use of laminated armature – E. M.F Equation.

Armature reaction – Cross magnetizing and de-magnetizing AT/pole – compensating winding – commutation – reactance voltage – methods of improving commutation.

Methods of Excitation – separately excited and self-excited generators – build-up of E.M.F - critical field resistance and critical speed - causes for failure to self-excited and remedial measures. Load characteristics and applications of shunt, series and compound generators.

UNIT-II:

D.C MOTORS: Principle of operation – Back E.M.F. - Torque equation – characteristics andapplication of shunt, series and compound motors – Armature reaction and commutation.

Speed control of D.C. Motors - Armature voltage and field flux control methods.

Motor starters (3-point and 4-point starters) Testing of D.C. machines - Losses – Constant &Variable losses – calculation of efficiency – condition for maximum efficiency.

UNIT-III:

TESTING OF DC MACHINES: Methods of Testing – direct, indirect, and regenerative testing – Braketest – Swinburne's test – Hopkinson's test –Field's test - separation of stray losses in a D.C. motor test.

UNIT-IV:

SINGLE PHASE TRANSFORMERS: Types - constructional details-minimization of hysteresis and eddy current losses- EMF equation - operation on no load and on load - phasor diagrams and Applications.

Equivalent circuit - losses and efficiency – regulation - All day efficiency - effect of variations of frequency &supply voltage on iron losses.

UNIT-V:

TESTING OF TRANSFORMERS AND POLY-PHASE TRANSFORMERS: Open Circuit and Short Circuit tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses test- parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit -comparison with two winding transformers.

Poly-phase transformers – Poly-phase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ, Scott connection and Applications.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers,2004.

VAAGDEVI COLLEGE OF ENGINEERING

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POWER SYSTEM - I

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2
Electrical Machines-I & Electrical Machines-II

Course Objectives:

- To understand the power generation through conventional and non-conventional sources.
- To illustrate the economic aspects of power generation and tariff methods.
- To know about overhead line insulators, substations and AC & DC distribution systems.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand the operation of conventional and renewable electrical power generating stations.
- Evaluate the power tariff methods and Economics associated with power generation.
- Modelling of various parameters of transmission lines and classification of overhead line insulators and evaluation of string efficiency.
- Analyze the operations of AIS and GIS
- Compare and evaluate various distribution systems

UNIT-I:

GENERATION OF ELECTRIC POWER:

Conventional Sources (Qualitative): Hydro station, Steam Power Plant, Nuclear Power Plant and GasTurbine Plant.

Non-Conventional Sources (Elementary Treatment):

Solar Energy, Wind Energy, Fuel Cells, Ocean Energy, Tidal Energy, Wave Energy, Cogeneration,Energy conservation and storage.

UNIT-II:

ECONOMICS OF POWER GENERATION: Introduction, definitions of connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants.

Cost of electrical energy-fixed cost, running cost, Tariff on charge to customer.

UNIT-III:

OVER HEAD TRANSMISSION LINES: Line conductors, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, Composite conductors- transposition, bundled conductors, and effect of earth on capacitance,skin and proximity effects.

OVERHEAD LINE INSULATORS: Introduction, types of insulators, Potential distribution over a string of suspension insulators, Methods of equalizing the potential, testing of insulators, Sag and tension calculations.

UNIT-IV:

SUBSTATIONS:

AIR INSULATED SUBSTATIONS (AIS): Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

GAS INSULATED SUBSTATIONS (GIS): Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gasinsulated substations.

UNIT-V:

DC DISTRIBUTION: Classification of Distribution Systems. - Comparison of DC vs. AC and Under- Ground vs. Over- Head Distribution Systems. - Requirements and Design features of Distribution Systems. -Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases:Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.

A.C. DISTRIBUTION: Introduction, AC distribution, Single phase, 3-phase, 3 phase 4 wire system, bus bar arrangement, Selection of site for substation. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

TEXT BOOKS:

1. C.L. Wadhwa, "Generation, Distribution and Utilization of Electrical Energy", 2nd Edition,New AgeInternational, 2009.
2. V.K Mehta andRohit Mehta, "Principles of Power Systems", S. Chand & Company Ltd, NewDelhi, 2004.

REFERENCE BOOKS:

1. A. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, "A Text book on Power System Engineering", Dhanpat Rai Publishing Company (P) Ltd, 2008.
2. C.L. Wadhwa, "Electrical Power Systems", 5th Edition, New Age International, 2009.
3. M.V. Deshpande, "Elements of Electrical Power Station Design", 3rd Edition, Wheeler Pub.1998.
4. H.Cotton & H. Barber, "The Transmission and Distribution of Electrical Energy", 3rd Edition,1970.
5. W.D.Stevenson, "Elements of Power System Analysis", 4th Edition, McGraw Hill, 1984.

VAAGDEVI COLLEGE OF ENGINEERING

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ELECTROMAGNETIC FIELDS

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites: Mathematics & Applied Physics

Course Objectives:

- To introduce the concepts of electric field and magnetic field.
- To know Applications of electric and magnetic fields in the development of the theory for power transmission linesand electrical machines.
- To study about electromagnetic waves.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand the basic laws of electromagnetism and their applications.
- Understand the behavior of conductors and dielectrics, their boundary conditions, Maxwell's equations with respect to electrostatics
- Analyze the relation between the electric field and magnetic field
- Analyze time varying electric and magnetic fields.
- Understand the propagation of EM waves.

UNIT-I:

STATIC ELECTRIC FIELD: Review of conversion of a vector from one coordinate system to another coordinate system, Coulomb's law, Electricfield intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law andits applications. Absolute Electric potential, potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.

UNIT-II:

CONDUCTORS, DIELECTRICS AND CAPACITANCE: Current and current density, Ohms Law in Point form, Continuity equation, Boundary conditions of conductors and dielectric materials. Capacitance, Capacitance of a two-wire line, Poisson's equation, Laplace's equation, Solution of Laplace and Poisson's equation.

UNIT-III:

STATIC MAGNETIC FIELDS AND MAGNETIC FORCES: Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced bycurrent carrying conductors.

Force on a moving charge, Force on a differential current element, Force between differential current elements, Magnetic boundary conditions, Magnetic circuits, Self-inductances and mutual inductances.

UNIT-IV:

TIME VARYING FIELDS AND MAXWELL'S EQUATIONS: Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations, Motional Electromotive forces.

UNIT-V:

ELECTROMAGNETIC WAVES: Derivation of Wave Equation, Uniform Plane Waves, Maxwell's equation in Phasor form, Wave equation in Phasor form, Plane wave in free space and in a homogenous material. Wave equation for a conducting medium, Plane waves in lossy dielectrics, Propagation in good conductors. Poynting theorem.

TEXT BOOKS:

1. M. N. O. Sadiku, "Elements of Electromagnetics", Oxford University Publication, 2014.
2. W. Hayt, "Engineering Electromagnetics", McGraw Hill Education, 2012.

REFERENCE BOOKS:

1. A. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India, 2012.
2. G. W. Carter, "The electromagnetic field in its engineering aspects", Longmans, 1954.
3. W. J. Duffin, "Electricity and Magnetism", McGraw Hill Publication, 1980.
4. W. J. Duffin, "Advanced Electricity and Magnetism", McGraw Hill, 1968.
5. E. G. Cullwick, "The Fundamentals of Electromagnetism", Cambridge University Press, 1966.
6. B. D. Popovic, "Introductory Engineering Electromagnetics", Addison-Wesley Educational Publishers,International Edition, 1971.
7. A. Pramanik, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi,2009.

VAAGDEVI COLLEGE OF ENGINEERING

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ELECTRICAL MACHINES LABORATORY – I

B.Tech. II Year I Sem.

L T P C
0 0 2 1

Prerequisites: Electrical Machines- I

Course Objectives:

- To expose the students to the operation of DC Generators.
- To know the operation of various types of DC Motors.
- To examine the performance of Single and Three Phase Transformers.

Course Outcomes: After learning the contents of this paper the student must be able to

- Start and control the Different DC Machines.
- Assess the performance of different machines using different testing methods
- Evaluate the performance of different Transformers using different testing methods

The following experiments are required to be conducted compulsory experiments:

1. Magnetization characteristics of DC shunt generator (Determination of critical field resistanceand critical speed)
2. Load test on DC shunt generator (Determination of characteristics)
3. Load test on DC series generator (Determination of characteristics)
4. Hopkinson's test on DC shunt machines (Predetermination of efficiency)
5. Swinburne's test on DC Shunt machine(Predetermination of efficiencies)
6. Speed control of DC shunt motor
7. Brake test on DC compound motor (Determination of performance curves)
8. Brake test on DC shunt motor (Determination of performance curves)
9. Load test on DC compound generator (Determination of characteristics.
10. Fields test on DC series machines (Determination of efficiency)

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers,2004.

VAAGDEVI COLLEGE OF ENGINEERING

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ELECTRICAL SIMULATION TOOLS LABORATORY

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Prerequisites: Mathematics, ECA-I, & ECA-II,

Course Objectives:

- To understand basic block sets of different simulation platform used in electrical/electroniccircuit design.
- To understand use and coding in different software tools used in electrical/ electronic circuitdesign.
- To understand the simulation of electric machines/circuits for performance analysis.

Course Outcomes: After learning the contents of this paper the student must be able to

- Develop knowledge of software packages to model and program electrical and electronicssystems.
- Model different electrical and electronic systems and analyze the results.
- Articulate importance of software packages used for simulation in laboratory experimentationby analyzing the simulation results.

Students should be encouraged to use open-source software's such as **SCILAB, ORCAD, LTSPICE, Ngspice, Octave, Solve Elec, Simulide, CircuitLab, QElectroTech, Circuit Sims, DcAcLab, Every Circuit, DoCircuits**etc. for carrying out the lab simulation listed below.

Use of Professional Licensed versions of softwares**like MATLAB, LabVIEW, NI Multisim, PSpice,PowerSim, TINA** etc. is also allowed.

Use of **'Python'** platform for simulating components/ circuit behaviour.

Suggested List of Laboratory Experiments:

The following experiments need to be performed from various subject domains.

1. Introduction to basic block sets of simulation platforms. Basic matrix operations, Generation of standard test signals
2. Solving the linear and nonlinear differential equations
3. Verification of different network theorems with independent sources using suitable simulation tools.
4. Analysis of series and parallel resonance circuits using suitable simulation tools
5. Obtaining the response of the electrical network for standard test signals using suitable simulation tools.
6. Modeling and Analysis of Low pass and High pass Filters using suitable simulation tools.
7. Performance Analysis of DC Motor using suitable simulation Tools.
8. Analysis of single-phase bridge rectifier with and without filter using suitable Simulation tools.
9. Modeling of transmission line using simulation tools.
10. Performance Analysis of Solar PV Model using suitable Tools

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MEASUREMENTS AND INSTRUMENTATION

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2, Analog Electronics
Electro Magnetic Fields.

Course Objectives:

- To introduce the basic principles of all measuring instruments.
- To deal with the measurement of voltage, current, Power factor, power, energy, R, L,C and magnetic measurements.
- To understand the basic concepts of smart and digital metering.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand different types of measuring instruments, their construction operation andcharacteristics
- Identify the instruments suitable for typical measurements.
- Analyze the measurement of voltage, current, Power factor, power, energy, R, L,C and magnetic measurements.
- Apply the knowledge about transducers and instrument transformers to use them effectively.
- Apply the knowledge of smart and digital metering for industrial applications.

UNIT - I:

INTRODUCTION TO MEASURING INSTRUMENTS: Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

UNIT-II:

POTENTIOMETERS & INSTRUMENT TRANSFORMERS: Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors

UNIT-III:

MEASUREMENT OF POWER & ENERGY: Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeter, expression for deflecting and control torques – Extension of range of wattmeter using instrument transformers – Measurement of active andreactive powers in balanced and unbalanced systems.

Single phase induction type energy meter – driving and braking torques – errors and compensations –testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximumdemand meters.

UNIT-IV:

DC & AC BRIDGES: Method of measuring low, medium and high resistance – sensitivity of Wheat- stone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method.

Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge - Owen's bridge. Measurement of capacitance and loss angle –Desaunty's Bridge - Wien's bridge – Schering Bridge.

UNIT-V:

TRANSDUCERS: Definition of transducers, Classification of transducers, Advantages of Electrical transducers, Characteristics and choice of transducers; Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors,Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes.

INTRODUCTION TO SMART AND DIGITAL METERING: Digital Multi-meter, True RMS meters, Clamp- on meters, Digital Energy Meter, Cathode Ray Oscilloscope, Digital Storage Oscilloscope.

TEXTBOOKS:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications,2005.
2. Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers1989.

REFERENCE BOOKS:

1. G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition,2016.
2. R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand andCompany Ltd.,2007.
3. S. C. Bhargava, "Electrical Measuring Instruments and Measurements", BS Publications, 2012.
4. Buckingham and Price, "Electrical Measurements", Prentice – Hall, 1988.
5. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
6. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments",fifth Edition,Wheeler Publishing, 2011.

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ELECTRICAL MACHINES – II

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Electrical Circuit Analysis-1 & Electrical Circuit Analysis-2 & Electrical Machines-I

Course Objectives:

- To deal with the detailed analysis of poly-phase induction motors & Alternators.
- To understand operation, construction and types of single-phase motors and their applicationsin household appliances and control systems.
- To introduce the concept of parallel operation of alternators.

Course Outcomes: After learning the contents of this paper the student must be able to

- Understand the concepts of rotating magnetic fields,operation of ac machines.
- Learn the various methods of testing, speed control of induction motors
- Understand the construction of synchronous machines, analyze performance characteristics of synchronous generators.
- Explore the parallel operation ,analyze the performance of synchronous motor.
- Analyze study the various single-phase induction motors

UNIT-I:

POLY-PHASE INDUCTION MACHINES: Constructional details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor EMF and rotor frequency - rotor reactance, rotor current and Power factor at standstill and during operation. Rotor power input, rotor copper loss and mechanical power developed and their inter relation.

UNIT-II:

CHARACTERISTICS OF INDUCTION MACHINES: Torque equation-expressions for maximum torqueand starting torque - torque slip characteristic - equivalent circuit - phasor diagram - crawling and cogging, No-load Test and Blocked rotor test –Predetermination of performance-Methods of starting and starting current and Torque calculations, Applications.

SPEED CONTROL METHODS: Change of voltage, change of frequency, voltage/frequency, injection of an EMF into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

UNIT-III:

SYNCHRONOUS MACHINES: Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings –distribution, pitch and winding factors – E.M.F Equation. Harmonics in generated e.m.f. – suppression of harmonics – armature reaction - leakage reactance – synchronous reactance and impedance – experimental determination - phasor diagram – load characteristics.

Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods –salient pole alternators – two reaction analysis – experimental determination of X_d and X_q (Slip test) Phasor diagrams – Regulation of salient pole alternators.

UNIT-IV:

PARALLEL OPERATION OF SYNCHRONOUS MACHINES: Synchronizing alternators with infinite bus bars – synchronizing power torque – parallel operation and load sharing -Effect of change of excitation and mechanical power input. Analysis of short circuit current wave form – determination of sub-transient, transient and steady state reactance's and Applications.

SYNCHRONOUS MOTORS: Theory of operation – phasor diagram – Variation of current and power factor with excitation – synchronous condenser – Mathematical analysis for power developed. - Hunting and its suppression – Methods of starting – synchronous induction motor.

UNIT-V:

SINGLE PHASE MACHINES: Single phase induction motor – Constructional Features-Double revolving field theory – split-phase motors – AC series motor- Universal Motor- -Shadedpole motor andApplications.

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers,2004.

VAAGDEVI COLLEGE OF ENGINEERING

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POWER SYSTEMS - II

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Power Systems –I & Electro Magnetic Fields

Course Objectives:

- To study the performance of transmission lines and travelling waves.
- To understand the concept of voltage control, compensation methods and per unitrepresentation of power systems.
- To know the methods of overvoltage protection, Insulation coordination, Symmetricalcomponents and fault calculation analysis.

Course Outcomes: After learning the contents of this paper the student must be able to

- Design of transmission lines and investigate the concepts of corona and its effects
- Apply load compensation techniques to control reactive power
- Acquire and apply the knowledge of per unit quantities in power system
- Investigate the concepts of overvoltage protection, insulation coordination, lightning surges and switching surges
- Determine the fault currents for symmetrical and unbalanced loads

UNIT - I:

PERFORMANCE OF LINES: Representation of lines, short transmission lines, medium length lines, nominal T and PI- representations, long transmission lines. The equivalent circuit representation of a long Line, A, B, C, D constants, Ferranti Effect.

Corona: Introduction, disruptive critical voltage, corona loss, Factors affecting corona loss and methods of reducing corona loss, Disadvantages of corona, interference between power and Communication lines.

UNIT-II:

VOLTAGE CONTROL & POWER FACTOR IMPROVEMENT: Introduction – methods of voltage control, shunt and series capacitors / Inductors, tap changing transformers, synchronous phase modifiers, power factor improvement methods.

COMPENSATION IN POWER SYSTEMS: Introduction - Concepts of Load compensation – Load ability characteristics of overhead lines – Uncompensated transmission line – Symmetrical line – Radial line with asynchronous load – Compensation of lines.

UNIT-III:

PER UNIT REPRESENTATION OF POWER SYSTEMS: The one-line diagram, impedance and reactance diagrams, per unit quantities, changing the base of per unit quantities, advantages of per unitsystem.

TRAVELLING WAVES ON TRANSMISSION LINES: Production of travelling waves, open circuited line, short-circuited line, line terminated through a resistance, line connected to a cable, reflection and refraction at T-junction line terminated through a capacitance, capacitor connection at a T-junction, Attenuation of travelling waves.

UNIT-IV:

OVERVOLTAGE PROTECTION AND INSULATION COORDINATION: Over voltage due to arcing ground and Peterson coil, lightning, horn gaps, surge diverters, rod gaps, expulsion type lightning arrester, valve type lightning arrester, ground wires, ground rods, counter poise, surge absorbers, insulation coordination, volt-time curves.

UNIT-V:

SYMMETRICAL COMPONENTS AND FAULT CALCULATIONS: Significance of positive, negative and zero sequence components, Average 3-phase power in terms of symmetrical components, sequence impedances and sequence networks, fault calculations, sequence network equations, single line to ground fault, line to line fault, double line to ground fault, three phase fault, faults on power systems, faults with fault impedance, reactors and their location, short circuit capacity of a bus.

TEXT BOOKS:

1. C.L. Wadhwa, "Electrical Power Systems", New Age International Pub. Co, Third Edition, 2001.
2. D.P. Kothari and I.J. Nagrath, "Modern Power System Analysis", Tata Mc Graw Hill Pub. Co.,New Delhi, Fourth edition, 2011.

REFERENCE BOOKS:

1. A. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, "A Text book on Power System Engineering", Dhanpat Rai Publishing Company (P) Ltd, 2008.
2. John J. Grainger & W.D. Stevenson, "Power System Analysis", Mc Graw Hill International,1994.
3. Hadi Scadat, "Power System Analysis", Tata Mc Graw Hill Pub. Co. 2002.
4. W.D. Stevenson, "Elements of Power system Analysis", McGraw Hill International StudentEdition.

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

MEASUREMENTS AND INSTRUMENTATION LABORATORY

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

Prerequisites: Measurements and Instrumentation

Course Objectives:

- To calibrate Watt, Energy and PF Meter and determination of three phase active & reactivepowers.
- To determine unknown inductance, resistance, capacitance by performing experiments on D.CBridges & A. C Bridges.
- To determine the ratio and phase angle errors of Instrument transformers.

Course Outcomes: After learning the contents of this paper the student must be able to

- Choose and test any measuring instruments.
- Find the accuracy of any instrument by performing experiments.
- Calculate the various parameters using different types of measuring instruments.

The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing of single-phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Measurement of parameters of choke coil using three voltmeter and three ammeter methods
4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance.
5. Calibration LPF wattmeter – by Phantom testing.
6. Resistance strain gauge – strain measurements and Calibration.
7. Schering Bridge & Anderson Bridge.
8. Measurement of 3 - Phase reactive power with single-phase wattmeter.
9. Measurement of displacement with the help of LVDT
10. Measurement of 3-phase power with single wattmeter and two CTs

TEXT BOOKS:

1. A. K. Sawhney, "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications,2005.
2. Dr. Rajendra Prasad, "Electrical Measurements & Measuring Instruments", Khanna Publishers1989.

REFERENCE BOOKS:

1. G. K. Banerjee, "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition,2016.
2. R. K. Rajput, "Electrical & Electronic Measurement & Instrumentation", S. Chand andCompany Ltd.,2007.
3. S. C. Bhargava, "Electrical Measuring Instruments and Measurements", BS Publications, 2012.
4. Buckingham and Price, "Electrical Measurements", Prentice – Hall, 1988.
5. Reissland, M. U, "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
6. E.W. Golding and F. C. Widdis, "Electrical Measurements and measuring Instruments",fifth Edition,Wheeler Publishing, 2011.

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

ELECTRICAL MACHINES LABORATORY – II

B.Tech. II Year II Sem.

L T P C
0 0 2 1

Prerequisites: Electrical Machines-I & Electrical Machines-II

Course Objectives:

- To understand the operation of Induction, Synchronous machines and Transformers.
- To study the performance analysis of Induction and Synchronous Machines through varioustesting methods.
- To analyze the performance of single and 3-phase phase transformer with experiments.

Course Outcomes: After learning the contents of this paper the student must be able to

- Assess the performance of different types of AC machines using different testing methods.
- Analyze the suitability of AC machines and Transformers for real word applications.
- Design the machine models based on the application requirements.

The following experiments are required to be conducted as compulsory experiments:

1. OC and SC Test on single-phase transformer
2. Sumpner's test on a pair of single-phase transformers
3. Scott Connection of transformer
4. No-load & Blocked rotor tests on three phase Induction motor
5. Regulation of a three –phase alternator by synchronous impedance & m.m.f. methods.
6. 'V' and 'Inverted V' curves of a three—phase synchronous motor.
7. Equivalent Circuit of a single-phase induction motor
8. Determination of Xd and Xq of a salient pole synchronous machine
9. Load test on three phase Induction Motor
10. Efficiency of a three-phase alternator

TEXT BOOKS:

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. Prithwiraj Purkait, Indrayudh Bandyopadhyay, "Electrical Machines", Oxford, 2017.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
4. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers,2004.

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

NETWORK ANALYSIS AND SYNTHESIS

B.Tech. II Year I Sem. ECE

L	T	P	C
3	0	0	3

Prerequisites: Mathematics and Basic Electrical Engineering

Course Objectives:

1. To understand the basic concepts on RLC circuits.
2. To know the behavior of the steady state and transient states in RLC circuits.
3. To understand the two port network parameters.
4. Learn the design concepts of various filters and attenuators

Course Outcomes: Upon successful completion of the course, students will be able to:

1. Gain the knowledge on basic RLC circuit's behaviour.
2. Analyse the Steady state and transient analysis of RLC Circuits.
3. Characterization of two port network parameters.
4. Analyse the Design aspect of various filters and attenuators
5. Synthesize the network functions

UNIT - I

Network Topology: Basic cutset and tie set matrices for planar networks, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT - II

Transient and Steady state analysis: RC, RL and RLC Circuits, Sinusoidal, Step and Square responses. RC Circuits as integrator and differentiators. 2^{nd} order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves.

UNIT - III

Two port network parameters: Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros. Standard T, □, L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network.

UNIT-IV

Filters: Classification of Filters, Filter Networks, Constant-K Filters-Low pass, high pass, Band pass, band-stop filters, M-derived Filters- T and π filters- Low pass, high pass

Attenuators: Types – T, π , L, Bridge T and lattice ,Asymmetrical Attenuators T, π , L Equalizers- Types- Series, Shunt, Constant resistance, bridge T attenuation, bridge T phase, Lattice attenuation, lattice Phase equalizers

UNIT – V

Network Synthesis: Driving point impedance and admittance, transfer impedance and admittance, network functions of Ladder and non ladder networks, Poles, Zeros analysis of network functions,

Hurwitz polynomials, Positive Real Functions, synthesis of LC, RC and RL Functions by foster andcauser methods.

TEXT BOOKS:

1. Van Valkenburg -Network Analysis, 3rd Ed., Pearson, 216.
2. JD Ryder - Networks, Lines and Fields, 2nd Ed., PHI, 1999.

REFERENCE BOOKS:

1. J. Edminister and M. Nahvi - Electric Circuits, Schaum's Outlines, Mc Graw Hills Education,1999.
2. A. Sudhakar and Shyammohan S Palli - Networks & Circuits, 4th Ed., Tata McGraw- HillPublications
3. William Hayt and Jack E. Kimmerley - Engineering Circuit Analysis, 6th Ed., William Hayt andJack E. Kimmerley, McGraw Hill Company

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to Civil & Mechanical Engineering)

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives:

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.
- To introduce the concepts of diodes & transistors, and
- To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes:

- To analyze and solve electrical circuits using network laws and theorems.
- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines
- To introduce components of Low Voltage Electrical Installations
- To identify and characterize diodes and various types of transistors.

UNIT - I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation.

A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits , Three- phase balanced circuits, voltage and current relations in star and delta connections.

UNIT - II:

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

UNIT - III:

Electrical Machines: Working principle of Single-phase transformer, equivalent circuit, losses in transformers, efficiency, Three-phase transformer connections. Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors, Construction and working principle of Three-phase Induction motor, Torques equations and Speed control of Three-phase induction motor. Construction and working principle of synchronous generators.

UNIT - IV:

P-N Junction and Zener Diode: Principle of Operation Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Zener diode characteristics and applications.

Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L-section Filters, π- section Filters.

UNIT - V:

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC configurations.

Field Effect Transistor (FET): Construction, Principle of Operation, Comparison of BJT and FET, Biasing FET.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCE BOOKS:

1. Electronic Devices and Circuits – R. L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford University Press-2004.
5. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
7. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
8. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
9. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

VAAGDEVI COLLEGE OF ENGINEERING

UGC-Autonomous

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

(Common to Civil & Mechanical Engineering)

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

Pre-requisites: Basic Electrical and Electronics Engineering

Course Objectives:

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To introduce the concepts of diodes & transistors

Course Outcomes:

- To analyze and solve electrical circuits using network laws
- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines
- To identify and characterize diodes and various types of transistors.

List of experiments/demonstrations:

1. Verification of KVL and KCL
2. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer.
3. Magnetization Characteristics of a Separately Excited DC Shunt Generator
4. Swinburn's test on dc shunt machine
5. Performance Characteristics of a Three-phase Induction Motor.
6. Study and operation of
   (i)Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.
7. PN Junction diode characteristics
8. Zener diode characteristics and Zener as voltage Regulator
9. Input & Output characteristics of Transistor in CB / CE configuration
10. Full Wave Rectifier with & without filters

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCE BOOKS:

1. Electronic Devices and Circuits – R. L. Boylestead and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
5. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

The following Transitory Rules will be in force for the students who have re – admitted from R15 Regulation into R18 Regulation.

Branch	Year & Semester	Subjects studied in R15 and repeated Subjects in R18	Credits	Substitute subjects for R18	Credits
EEE	I - I	Nil		Nil	
	I - II	Nil		Nil	
	II - I	Nil		Nil	
	II – II	Nil		Nil	
	III – I	Nil		Nil	
	III – II	Renewable Energy Sources	03	Electrical Distribution Systems	03
		Electrical Engineering Materials	03	Digital Signal Processing	03
	IV – I	HVDC and FACTS	03	Power System Protection	03
		Advanced English Communication Skills Lab	01	Power Systems Lab	01
	IV - II	Neural Networks and Fuzzy Systems	03	Power Quality	03
		Utilization of Electrical Energy (Elective)	03	Electrical Machines Design	03
		Embedded Systems	03	Digital Image Processing	03

Note: Students who re-admitted in III - Sem. of R18 Regulation from R15 Regulation. The course Environmental Science can be discarded as it is a zero (0) credit course in R18 Regulation.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

The following Transitory Rules will be in force for the students who have re – admitted from R15 Regulation into R20 Regulation.

Branch	Year & Semester	Subjects studied in R15 and repeated Subjects in R20	Credits	Substitute subjects for R20	Credits
EEE	I - I	Nil		Nil	
	I - II	Applied Physics	04	Programming for Problem Solving	04
		Applied Physics Lab	02	Programming for Problem Solving Lab	01
		Engineering Drawing	04	Fundamentals of Mechanical Engineering	03
	II - I	Nil		Nil	
	II – II	Nil		Nil	
	III – I	Nil		Nil	
	III – II	Electrical Engineering Materials	03	Industrial Instrumentation	03
	IV – I	Power Systems Operation and Control	04	Computer Methods in Power Systems	03
		High Voltage Engineering	03	Digital Signal Processing	03
		Utilization of Electrical Energy	03	Computer Organization	03
		High Voltage DC Transmission	03	Electrical Distribution Systems	03
	IV - II	Digital Control Systems	03	Advanced Power Electronics	03
		Flexible AC Transmission Systems	03	Advanced Electrical Drives	03
		VLSI Design	03	Electric Machine Design	03
		Embedded Systems	03	AI Techniques in Electrical Engineering	03

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

The following Transitory Rules will be in force for the students who have re – admitted from R18 Regulation into R20 Regulation.

Branch	Year & Semester	Subjects studied in R18 and repeated Subjects in R20	Credits	Substitute subjects for R20	Credits
EEE	I - I	Nil		Nil	
	I - II	Applied Physics	04	Programming for Problem Solving	04
		Applied Physics Lab	1.5	Programming for Problem Solving lab	01
	II – I	Nil		Nil	
	II – II	Power Systems – I	03	Signals and Systems	03
	III – I	Control Systems	03	Signals and Systems	03
		Power Systems-II	03	OOPS through JAVA	03
	III – II	Electrical Distribution Systems	03	Renewable Energy Systems	03
		Control Systems lab	01	Electrical Simulation Lab	01
	IV – I	Power Systems Operation and Control	03	Computer Methods in Power Systems	03
		Power System Protection	03	OOPS Through Java	03
		High Voltage Engineering	03	Advanced Electrical Drives	03
		Advanced Control Systems	03	Electrical and Hybrid Vehicles	03
		Power Systems Lab	01	OOPS Through Java lab	1.5
	IV - II	Soft Computing Techniques	03	Neural Networks and Fuzzy Systems	03
		VLSI Design	03	Power Plant Engineering	03

Note: Students who re-admitted in III –Sem of R20 Regulation from R18 Regulation, has to register one extra course in same semester i.e, Electrical Engineering Practice Lab (B20EE25) of credits 1.5, to meet the required no. of credits (160) for awarding degree.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

The following Transitory Rules will be in force for the students who have re – admitted from R18 Regulation into R22 Regulation.

Branch	Year & Semester	Subjects studied in R18 and repeated Subjects in R22	Credits	Substitute subjects for R22	Credits
EEE	I - I	Nil		Nil	
	I - II	Applied Physics	04	Electrical Circuits – I	03
		Engineering Workshop and IT Workshop	04	Engineering Graphics	03
		English	02	Data Structures Through C++	03
		English Language Communication Skills Lab	01	Data Structures Through C++ Lab	01
	II-I	Electronic Devices and Circuits	03	Elements of Electrical and Electronics Engineering	01
		Electronic Devices and Circuits lab	01	Elements of Electrical and Electronics Engineering lab	01

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

The following Transitory Rules will be in force for the students who have re – admitted from R20 Regulation into R22 Regulation.

Branch	Year & Semester	Subjects studied in R20 and repeated Subjects in R22	Credits	Substitute subjects for R22	Credits
EEE	I – I	Nil		Nil	
	I - II	Engineering and IT Workshop	1.5	Electrical Circuits – I	04
		English Language and Communication Skills Lab	1.5	Elements of Electrical Engineering Lab	01
	II-I	Analog Electronic Circuits	03	Elements of Electrical and Electronics Engineering	01
		Analog Electronic Circuits Laboratory	01	Elements of Electrical and Electronics Engineering lab	01

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

List of External Faculty for Paper setting for semester end Examinations

S. No	Name of the Faculty	Designation	Affiliation
1	Dr. G. Madhusudhan Rao	Professor	O. P. Jindhal University Raigarh
2	Dr. Prasanta Jena	Associate Professor	O. P. Jindhal University Raigarh
3	Dr. G. Sreelaxmi	Associate Professor	CVR College of Engineering
4	Dr. C. Harinatha Reddy	Associate Professor	G.Pulla Reddy Engineering College
5	Dr. Y. V. Subba Reddy	Professor	G. Pullas Reddy Engineering College
8	Mrs. Naveena Bhargavi	Associate Professor	CVR College of Engineering
9	Dr. D. Kumaraswamy	Professor & Head	SVS Group of Institutions
10	Dr. Ch. Lokeshwara Reddy	Professor	CVR College of Engineering
11	Dr. G. Rajender	Associate Professor	KITS, WGL
12	Dr. B. Jagadish Kumar	Associate Professor	KITS, WGL
13	Dr.B.Vijay Kumar	Associate Professor	KITS, WGL
14	Mr. M. Narasimha Rao	Associate Professor	KITS Warangal, KU
15	Dr. D. Venu Gopal	Associate Professor	KITS(S), Singapoor, HZB
16	Mr. T.Raju	Assistant Professor	KITS(S), JNTUH
17	Dr. M. M. Irfan	Assistant Professor	SR University
18	Dr. G. Sunil Kumar	Assistant Professor	KITS(S),WGL
19	Mr M. Satyanarayana	Associate professor	JITS,JNTUH
20	Dr. M. Ranjit	Assistant Professor	VNR VJIET
21	Dr. Md. Qutubuddin	Associate professor	TKR College of Engineering & Technology
22	Dr.D.Rajababu	Assistant Professor	SR University
23	Dr.A.V.V.Sudhakar	Associate Professor	SR University
24	Dr. C. Subba Rami Reddy	Professor	B V Raju Institute of Technology (BVRIT)
25	Mr.D.Rajani Kumar	Associate Professor	Jayamukhi Institute of Technological Sciences
26	Mr.G.Anil	Associate Professor	Jayamukhi Institute of Technological Sciences
27	Mr.K.Ajith	Assistant Professor	KITSW
28	Mr. .PRAVEEN KUMAR	Assistant Professor	KITSW
29	Mr.M.A.Nabi	Associate Professor	MLRITM
30	Dr. V. Anantha Lakshmi	Associate Professor	G.Pulla Reddy Engineering College
31	Dr. M. Harsha Vardhan Reddy	Associate Professor	G.Pulla Reddy Engineering College
32	Dr. GORU RADHIKA	Senior Asst. Prof	VNR VJIET
33	Dr.O.SOBHANA	Assistant Professor	VNR VJIET

34	Dr.A.GIRI PRASAD	Assistant Professor	VNR VJIET
35	Dr.M.ARUNA BHARATHI	Professor	Geethanjali College of Engineering & Technology
36	Dr. Ahmad Syed	Assistant Professor	CBIT
37	Dr. CH. KASI RAMAKRISHNA REDDY	Assistant Professor	Vasavi College of Engineering
38	Dr. S. Narasimha	Professor	TKR College Of Engineering & Technology
39	Dr. K. Raju	Associate Professor	TKR College Of Engineering & Technology
40	Mr.R.Jagan	Assistant Professor	Gurunanak Institutions Technical Campus
41	Dr. I. KASI REDD	Associate Professor	Vishnu Institute of Technology
42	Dr.K.Vinay Kumar	Associate Professor	Chaitanya (Deemed to be University)
43	Mr.G.Naveen	Associate Professor	Joginpally B R Engineering College, Hyderabad
44	Dr.P.B.Chennaiah	Associate Professor	Annamacharya Institute of Technology & Sciences
45	Dr. G. Annapurna	Professor	G. Narayanamma Institute of Technology Science
46	Mrs.E. Gouthami	Associate Professor	G. Narayanamma Institute of Technology Science
47	Dr.Y.Mohamed Shuaib	Professor	B.S.Abdur Rahman Crescent Institute of Science and Technology, Chennai
48	Mr.B.GaneshBabu	Assistant Professor	VNR VJIET
49	Dr V Madhusudana Reddy	Professor	PBR VITS, Kavali
50	Mr.Naresh	Assistant Professor	JNTUH
51	Mr.C.Radhacharan	Assistant Professor	JNTU,Jagityal
52	Dr.R.Durga Rao	Assistant Professor	JNTU,Jagityal

R18 student promoted to R22 II sem	R18 student promoted to R22 III sem	R18 student promoted to R22 IV sem	R18 student promoted to R22 V sem	R18 student promoted to R22 VI sem	R18 student promoted to R22 VII sem	R18 student promoted to R22 VIII sem
18	18	18	18	18	18	18
20	20	20	20	20	20	20
18	18	22	22	22	22	22
			22	22	22	22
				20	20	20
					19	19
						24
56	56	60	82	102	121	145

R20 student promoted to R22 II sem	R20 student promoted to R22 III sem	R20 student promoted to R22 IV sem	R20 student promoted to R22 V sem	R20 student promoted to R22 VI sem	R20 student promoted to R22 VII sem	R20 student promoted to R22 VIII sem
18	18	18	18	18	18	18
22	21	21	21	21	21	21
18	18	19	19	19	19	19
			20	20	20	20
				19	19	19
					19	19
						26
58	57	58	78	97	116	142

Sem	R15 Credits	R18 Credits	R 20 Credits	R 22 Credits
I	24	18	18	20
II	24	20	21	20
III	24	22	19	
IV	24	22	20	
V	24	20	19	
VI	24	19	19	
VII	24	24	26	
VIII	24	15	18	
Total Credits	192	160	160	40

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

CREDIT TRANSFER

R15 student promoted to R18 II sem	R15 student promoted to R18 III sem	R15 student promoted to R18 IV sem	R15 student promoted to R18 V sem	R15 student promoted to R18 VI sem	R15 student promoted to R18 VII sem	R15 student promoted to R18 VIII sem
24	24	24	24	24	24	24
20	24	24	24	24	24	24
22	**22**	24	24	24	24	24
22	**22**	**22**	24	24	24	24
20	**20**	**20**	**20**	24	24	24
19	**19**	**19**	**19**	**19**	24	24
24	**24**	**24**	**24**	**24**	**24**	24
15	**15**	**15**	**15**	**15**	**15**	**15**
166	**170**	**172**	**174**	**178**	**183**	**183**

R15 student promoted to R20 II sem	R15 student promoted to R20 III sem	R15 student promoted to R20 IV sem	R15 student promoted to R20 V sem	R15 student promoted to R20 VI sem	R15 student promoted to R20 VII sem	R15 student promoted to R20 VIII sem
24	24	24	24	24	24	24
19	24	24	24	24	24	24
19	**19**	24	24	24	24	24
20	**20**	**20**	24	24	24	24
19	**19**	**19**	**19**	24	24	24
19	**19**	**19**	**19**	**19**	24	24
25	**25**	**25**	**25**	**25**	**25**	24
18	**18**	**18**	**18**	**18**	**18**	**18**
163	**168**	**173**	**177**	**182**	**187**	**186**

R18 student promoted to R20 II sem	R18 student promoted to R20 III sem	R18 student promoted to R20 IV sem	R18 student promoted to R20 V sem	R18 student promoted to R20 VI sem	R18 student promoted to R20 VII sem	R18 student promoted to R20 VIII sem
18	18	18	18	18	18	18
20.5	20	20	20	20	20	20
19	**20.5**	22	22	22	22	22
20	**20**	**20**	22	22	22	22
19	**19**	**19**	**19**	20	20	20
19	**19**	**19**	**19**	**19**	19	19
26	**26**	**26**	**26**	**26**	**26**	24
18.5	**18.5**	**18.5**	**18.5**	**18.5**	**18.5**	**18.5**
160	**161**	**162.5**	**164.5**	**165.5**	**165.5**	**163.5**

Sem	R15 Credits	R18 Credits	R 20 Credits	R 22 Credits
I	24	18	18	20
II	24	20	21	20
III	24	22	19	
IV	24	22	20	
V	24	20	19	
VI	24	19	19	
VII	24	24	26	
VIII	24	15	18	
Total Credits	**192**	**160**	**160**	**40**