PROPOSED

SCHEME AND DETAILED SYLLABUS

of

S. Y. B. Tech. (Electrical Engineering)

of

FOUR YEAR DEGREE COURSE IN ENGINEERING & TECHNOLOGY

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

FACULTY OF ENGINEERING AND TECHNOLOGY

PROPOSED WORK FOR B.TECH- II-YEAR – (ELECTRICAL) 2015-16

Sub No.	SEMESTER-III	Contact Hrs / Week									
	Subject	**L**	**T**	**P**	**Total**	**CT**	**TH**	**T A**	**P**	**Total**	**Credits**
BSH201	Mathematics-III	3	1	-	4	20	80	-	-	100	4
ELE202	DC Machines & Transformers	3	1	-	4	20	80	-	-	100	4
ELE203	Power Plant Engineering	3	1	-	4	20	80	-	-	100	4
ELE204	Electronic Devices & Circuits	3	1	-	4	20	80	-	-	100	4
ELE205	Electrical Engineering Materials	3	1	-	4	20	80	-	-	100	4
ELE206	Renewable Energy sources	2	-	-	2	10	40	-	-	50	2
ELE221	Lab I: DC Machines & Transformers	-	-	2	2	-	-	25	25	50	1
ELE222	Lab II: Power Plant Engineering	-	-	2	2	-	-	25	25	50	1
ELE223	Lab III: Electronic Devices & Circuits	-	-	2	2	-	-	25	25	50	1
BSH225	Lab IV :Development of Skill-II	-	-	2	2	-	-	50	-	50	1
ELE226	Lab V :PLC Fundamentals	-	-	2	2	-	-	50	-	50	1
	Total of Semester-III	**17**	**5**	**10**	**32**	**110**	**440**	**175**	**75**	**800**	**27**

Sub No.	SEMESTER-IV	Contact Hrs / Week									
	Subject	**L**	**T**	**P**	**Total**	**CT**	**TH**	**T A**	**P**	**Total**	**Credits**
BSH251	Mathematics-IV	3	1	-	4	20	80	-	-	100	4
ELE252	AC Machines	3	1	-	4	20	80	-	-	100	4
ELE253	Electrical Measurements	3	1		4	20	80			100	4
ELE254	Network Analysis	3	1	-	4	20	80	-	-	100	4
ELE255	Analog & Digital Circuits	3	1	-	4	20	80	-	-	100	4
ELE256	Data Structure	2	-	-	2	10	40	-	-	50	1
ELE271	Lab VI: AC Machines	-	-	2	2	-	-	25	25	50	2
ELE272	Lab VII: Electrtical Measuremnts	-	-	2	2	-	-	25	25	50	1
ELE273	Lab VIII: Network Analysis			2	2	-	-	25	25	50	1
ELE274	Lab IX : Analog & Digital Circuits			2	2			50	-	50	1
ELE275	LAB X: Fundamentals of Metlab	-	-	2	2	-	-	50	-	50	1
	Total of Semester IV	**17**	**5**	**10**	**32**	**110**	**440**	**175**	**75**	**800**	**27**
	Grand Total of III & IV									**1600**	**54**

[Second Year –Electrical Engineering]

L: Lecture hours per week T: Tutorial hours per week P: Practical hours per week CT: Class Test

TH: University Theory Examination TW: Term Work P: Practical/Oral Examination

TH: University Theory Examination TW: Term Work P: Practical/Oral Examination

Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Engineering & Technology)

Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-III

Code No.: BSH201	**Title: Engineering Mathematics –III**
Teaching Scheme: 04Hrs/week	**Class Test: 20**
Theory: 03Hrs/week	**Theory Examination (Duration): 03 Hrs**
Tutorial: 01Hr/week	**Theory Examination (Marks): 80**
Credits:04	

Objectives	**:**	The contents aims to develop the knowledge of the student in the direction of solving the practical problem in the engineering and technology related to differential equation, Fourier Transforms, Statistical techniques Vectors and Probability.
Unit-I	**:**	**Linear Differential Equation**: **(15 Hrs)** Solution of linear differential equation of order n with constant coefficients: The complementary function, Method of finding particular integral: Short method, General method, Method of variation of parameters Equations reducible to linear form*:* i) The Cauchy's linear equation. ii) The Legendre's linear equation. Simultaneous differential equations. Application of linear differential equations to: i). Mechanical system. ii). Electrical System iii). Beam and Shafts
Unit-II	**:**	**Vector Differentiation: (10 Hrs)** Differentiation of vectors, Radial, Transverse, Normal And tangential components of velocity and acceleration, Scalar and vector point function , Gradient of scalar point function , Divergence and curl of vector point function , Second order differentiation operator , Irrotational and solenoid fields .
Unit-III	**:**	**Statistics: (5 Hrs)** Measures of central tendency: Mean Median, Quartiles and Mode. Measures of dispersion: Quartile deviation, Mean deviation, Standard deviation, coefficient of variation, Moments, Skewness, Kurtosis.
Unit-IV	**:**	**Laplace Transform: (15 Hrs)** Definition, Laplace Transform of elementary function and its table, Theorem and properties of Laplace Transform: First shifting theorem, Second Shifting Theorem, Multiplication by $t^{n,}$ Division by t, Change of scale property, Laplace Transform of integral, Laplace Transform of Derivative. Laplace Transform of some special functions: Bessel's function, Periodic function, Error Function, Heaviside Unit Step Function, Displaced Heaviside Unit Step Function Laplace Transform using Heaviside Unit function, Dirac delta function. Method to find inverse Laplace Transform: i. Use of Laplace Transform table ii. Use of Theorem and properties of Laplace iii. Use of partial fraction iv. Convolution theorem v. Use of development of Heaviside Unit Step Function

		Application of Laplace Transform to solve linear differential equation, Simultaneous differential equation. .
Unit-V	**:**	**Fourier Transform**: (**10 Hrs**) Fourier integral: Complex form of Fourier integral, sine and cosine integral, Fourier transform and inverse transform. D.U.I.S. rule (only statement), Fourier transform and inverse transform for even and odd function, Fourier sine and cosine transform and inverse transform.
Unit-VI	**:**	**Probability:** (**5 Hrs**) Introduction, Probability Distribution: Binomial Distribution, Poisson Distribution, Normal Distribution
Reference Books:	**:**	1. A Text Book Of Applied Mathematics Volume-III BY P.N. Wartikar J.N.Wartikar, Pune Vidyaryhi Griha Prakashan, Ninth edition. **2.** Advanced Engineering Mathematics BY H.K.Dass, S.Chand and Co.Ltd, Eighteenth edition. **3.** Higher Engineering Mathematics BY Dr.B.S.Grewal, Khanna Publishers, 46th edition. **4.** Higher Engineering Mathematics BY B.V.Ramana, Tata McGraw-Hill Publishing Co.Ltd., First edition. **5.** Solution to Higher Engineering Mathematics Volume –III BY C.P.Gandhi

Section A: Includes Unit I, II and III; Section **B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Minimum ten questions
- Five questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

COURSE OUTCOMES:

1. Students will be able to understand the Linear Differential Equations and their applications.
2. Students will be able to understand the Differentiation of vectors, divergence, curl, second order differential operators.
3. Students will be able to understand the Mean Median, Quartiles and Mode, Standard deviation, Measures of dispersion.
4. Students will be able to understand the Laplace Transform of elementary function, Theorem its properties, Methods of Inverse Laplace transforms.
5. Students will be able to understand the Fourier integral, Fourier transform and inverse transform for even and odd function.
6. Students will be able to understand the Binomial Distribution, Poisson distribution, and Normal Distribution.

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(Faculty of Engineering & Technology)
Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-III

Code No.: ELE202 | **Title: DC Machines & Transformers**
Teaching Scheme:4 hrs / Week | **Class Test: 20**
Theory: 3 | **Theory Examination (Duration): 3 Hrs**
Tutorial: 1 | **Theory Examination (Marks): 80**
Credits:4

Objectives	**:**	**1. Familiarization of DC Machines & Transformers** **2. Understanding the various Construction, Operations & Applications o these machines** **3. Understanding the response o these machines for electrical/ Mechanical Loads.** **4. Use & applications o these machines on Socio –Industrial purpose.**
Unit-I	**:**	**DC Machines (10 Hrs)** **Electromechanical Energy Conversion Principle, Different parts & construction, their functions, Armature windings, Winding elements, Different pitches including resultant pitch, Single layer/Double layer windings-LAP,WAVE,Numbering of coil& Commutator Segments, Dummy or idle coils, Use of Lap & wave .**
Unit-II	**:**	**DC Generator (10Hrs)** **Basic principle of working, Different Types, E.M.F. equation, Armature reaction, Demagnetization & cross magnetization Conductors ,Demagnetization AT/Pole,Comensating winding, Communication, Value of reactive voltage, Overcoming of armature reaction., Causes of bad commutation and remedies, Characteristics and applications of different types, Parallel operation of shunt Generators-Load sharing- Compound Generators in parallel, Uses of Generators.**
Unit -III		**D.C. Motors (10Hrs)** **Principles of working, Significance of Back EMF, Torque Equation, Types, methods of excitation- Motor voltage equation, Characteristics and Selection of DC Motors for various applications, Starting of DC Motors, Speed Control of DC Shunt and Series Motors, Braking of DC Motors- Plugging, Dynamic Braking, Regenerative Braking; Losses and Efficiency, Condition for Maximum Efficiency, Effect of saturation and armature reaction on losses.**

Unit-IV	**:**	**Single Phase Transformers- (10Hrs)** **Working of transformer on no-load and on load, phasor diagrams Exact and approximate equivalent circuits referred to either side, losses, Efficiency, maximum efficiency, ratings. Open circuit and short circuit tests, determination of equivalent circuit parameters from the test data, Polarity test, Parallel operation, and conditions to be satisfied, load sharing under various conditions. Autotransformers, their ratings and applications. Comparison with two winding transformer with respect to saving of copper and size.**
Unit-V	**:**	**Three Phase Transformers: (10Hrs)** **Types construction, comparison with a bank of three single phase transformers, Standard connections, phasor groups, and their suitability for particular applications, polarity test, Efficiency & regulation by direct and indirect methods, Descriptive treatment of Parallel operation of three phase transformers.**
Unit-VI	**:**	**Special Motors: (10 Hrs)** **Stepper Motor & it's types(Variable Reluctance,PM,Hybrid.Permanent magnet DC Motor, Low inertia DC Motor, Printed D Motors, Permanent Magnet Synchros Types of Synchros Application of Synchros,Control Differential Transmitter, Control Diferential Reciever,Synchros,Servomotors.**
Reference Books:		**1.Theory of AC Machines by Langsdorf (Tata McGrawHill)** **2. Principles and practice of Electrical Engineering by Gray Wallance(Int. student Ed.VIII Ed.)** **3. Performance and design of d.c. machines by Claytonand and Hancokk.** **4. Indian Standard Guide for testing DC Machine. IS: 9320-1979, By I S I, New Delhi.** **5. I S Specification for safety transformer. IS: 1416-1972, By I S I, New Delhi.**
Text Books	**:**	**1 A text book of Electrical Technology by B.L Theraja Vol-II Chand Publication** **2. Principlles of Electrical Machines by V.K.Mehta –Chand Publication.** **3. Electrical Machines by Ashfaque Hussain.** **4. Electrical Machines by Nagnath Kothari TATA MICR Mc Graw Hill.** **5 Electrical Technology by Edward Hughes Elbs BY Pearson Education.**

Tutorials: 15 Tutorial classes are to be arranged on above syllabus. Tutorial classes may be as case studies, recent trends in concerned subject , assignment works etc.

Section A: Includes Unit I, II and III;

Section B: Includes Unit IV, V and VI.

All units carry equal weightage

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts . Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. **Minimum ten questions**
2. **Five questions in each section**
3. **Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for 10 marks each. The Question no.1 and 6 should be of objective nature.**
4. **Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.**

COURSE OUTCOMES:

1. Students will be able to understand the principle and construction of DC machines.
2. Students will be able to understand working principle of DC generator, Characteristics and applications.
3. Students will be able to understand working principle of DC motor, Characteristics and applications, different braking systems.
4. Students will be able to understand working of transformer, phasor diagrams, equivalent circuit parameters and applications.
5. Students will be able to understand construction, phasor diagrams, efficiency & regulation, parallel operation.
6. Students will be able to understand the working principle of different special motors and their applications.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-II

Code No.: ELE203 **Title: Power Plant Engineering**

Teaching Scheme:4 hrs / Week **Class Test: 20**

Theory: 3 **Theory Examination (Duration): 3 Hrs**

Tutorial: 1 **Theory Examination (Marks): 80**

Credits:4

Objectives	**:**	• Classify the different sources of electric power generation. • Decide the various factors governing selection of site for power plant and list their merits. • Describe principle and operation of power generation. • Identify and describe the function of each component of power plant. • Select the power generation technique based on economy. • Compare between various sources of power generation.
Unit-I	**:**	**Introduction: (10Hrs)** Power to progress, importance of power generation and electrical energy in India Different types of conventional energy sources, types of non conventional energy sources, Structure of power industry, advantages and disadvantages of conventional and nonconventional energy resources.
Unit-II	**:**	**Thermal Power Plants: (10 Hrs)** Types of boilers, Feed water and its treatment, Steam turbine and alternators. Site selection, Main parts and its working. Fuel Handling: delivery of load, unloading, preparation, transfer, outdoor (dead) storage, indoor (live)storage, In plant Handling, Coal weighing. Ash disposal and dust collation: Draught systems, electrostatic precipitator Prospectus and development of thermal plants in India.
Unit-III	**:**	**Hydro Power Plant: (10 Hrs)** Site selection, Hydrology, storage and poundage, general arrangements and operation of hydro power plant, Hydraulic turbines, turbine size, peltonwheel turbine, Francis and Kaplan turbines, selection of turbines, Dams, Spillways, gates, intake and out take works, canals and layout of penstocks, water hammer and surge tank, simple numerical on hydrographs and number of turbine required Prospectus and development of hydro plants in India.
Unit-IV	**:**	**Nuclear power plant: (10 Hrs)** Introduction, atomic physics, nuclear reaction, materials, site selection, nuclear reactors and working of each part, classification of nuclear reactor, nuclear waste disposal, plant layout, Prospectus and development of nuclear plants in India

Unit-V	**:**	**Gas power plant: (10 Hrs)** Simple gas turbine power plant, methods to improve thermal efficiency, open loop and closed loop cycle power plants, gas fuels, gas turbine materials, plant layout. **Diesel power Plants:** Introduction (advantages & disadvantages), typical layout of power plant, site selection, applications.
Unit-VI	**:**	**Economic Aspects of Power Generation: (10 Hrs)** Introduction, terms commonly used in system operations, variable load on power station, peak load, base load, diversity factor, plant utility factor, maximum demand, load curves, load duration curves, types of loads, selection of generation units, interconnected grid systems, cost of electrical energy, Tariff & different types of tariff.
Reference Books:	**:**	**Reference Books** 1. Arora and Domkundwar: A course in Power Plant Engineering , Dhapat Rai publication. 2. S. P. Sukhatme: Solar Energy.
Text Books	**:**	**Text Books** 1. P. K. Nag : Power Plant Engineering ,Tata McGraw Hil 2. Dr. P. C. Sharma: Power Plant Engineering , 3. Chakrabarti, Soni, Gupta, Bhatnagar ”A text book on power system Engineering” Dhanpat Rai publication 4. R.K.Rajput, “Power Plant Engineering” 5. J B Gupta, , “Power Plant Engineering”

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Section A: Includes Unit I, II and III;
Section B: Includes Unit IV, V and VI.
All units carry equal weightage

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

For 40 marks Paper:

1. Minimum eight questions
2. Four questions in each section
3. Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 6 should be of objective nature.
4. Two questions of 7 marks each from remaining questions from each section A and B be asked to solve.

COURSE OUTCOMES:

1. Students will be able to introduce about the power generation, conventional and non-conventional energy sources.
2. Students will be able to understand the working of boilers, water treatment, Steam turbine and alternators of thermal power plant.
3. Students will be able to understand the operation and working of different types of hydro power plant.
4. Students will be able to introduce about of atomic physics, nuclear reaction and classification of nuclear reactors in nuclear power plant.
5. Students will be able to introduce about the different methods of gas and diesel power plant.
6. Students will be able to analyze the economic aspects of power generation based on different parameters.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-III

Code No.: ELE204 **Title: Electronic Devices and Circuits**

Teaching Scheme:4 hrs / Week **Class Test: 20**

Theory: 3 **Theory Examination (Duration): 3 Hrs**

Tutorial: 1 **Theory Examination (Marks): 80**

Credits:4

Objectives	**:**	1. Familiarization of various electronic devices and circuits 2. Understand the various Methods used to bias the amplifying circuits. 3. Understanding of low frequency and high frequency models of transistors. 4. Understanding the power amplifying circuits and oscillating circuits.
Unit-I	**:**	**Rectifiers and Filters (10 Hrs)** Half wave rectifier, full wave rectifier, bridge rectifier, PIV, efficiency, ripple factor.TUF analysis, Ripple Factor calculation for C,L,LC , regulation with and without filter, load and line regulation. Fixed and variable regulated integrated circuits IC's, protection circuits in power supply.
Unit-II	**:**	**Theory of Junction Transistors and Field Effect Transistor (10 Hrs)** Transistor action – Transistor parameter, Transistor current components, Transistor as an amplifier and as switch , collector efficiency, early effect in transistor, Junction FET operation, Enhancement MOSFET, depletion MOSFET, comparison. JFET and MOSFET. Power MOSFET, Equivalent circuit operation, static characteristics – Transistor testing by different methods.
Unit-III	**:**	**Bias Stability and Device Stabilization (10 Hrs)** Transistor Biasing : Location of Q point, fixed bias circuit, collector to base circuit, self bias circuit, graphical DC bias analysis, design of all biasing circuits, FET biasing: self biasing, voltage divider biasing. Stability factor and methods on bias compensation
Unit-IV	**:**	**Amplifiers (10 Hrs)** Frequency Response, RC coupled and transformer coupled amplifier, single stage and multi stage amplifier, wide band amplifier, cascade amplifiers, feedback amplifiers, positive and negative feedback, current and voltage feedback. Effect of feedback on gain, Input and output impedance, Noise and distortion.(derivation treatment.) DC amplifiers: Drift in amplifiers, differential amplifiers.
Unit-V	**:**	**Transistor Model and High Frequency Amplifiers (10 Hrs)** Hybrid parameters: H equivalent , Pi equivalent circuit, small signal single stage amplifier, analysis of CE,CC,CB circuits, voltage gain, current gain, input/output impedance, dependence on source and load impedance, emitter follower analysis, boot strapping in emitter follower. High frequency equivalent circuits, for

		BJT and FET amplifiers, hybrid Pi equivalent circuit, Determination of lower and higher cutoff, frequencies, Effect of junction capacitance and miller's theorem.
Unit-VI	**:**	**A. Power Amplifiers (10 Hrs)** Types: Class A, Class B, Class AB, and Class C , capacitor coupled quasi complimentary, push pull, expression for efficiency of Class A class B amplifier, distortion in amplifiers, **B. Oscillators and Tuned Amplifiers** Barkhausen criterion, tank circuit, RC and LC oscillators, Crystal oscillators, designing examples of Tuned Amplifiers – Single tuned, double tuned Stager tuned.
Reference Books:	**:**	1.J. Milliman and C.C. Halkies, "Electronics devices and circuits", McGraw Hill,1995. 2. J. Milliman and C.C. Halkies, "Integated Electronics", McGraw Hill. 3. Malvino A P "Electronics Principles", McGraw Hill International,1998. 4. David A. Bell, "Electronics devices and circuits",PHI,1998. 5. Boylestred R and Nashelsky, "Electronics devices and circuits theory",,PHI 1993. 6. Somnath Nair, "Electronics devices and applications" PHI 2002. 7. Russell L. Meade, "Foundations of Electronics circuits and devices " Thomson Asia.
Text Books	**:**	1. 'Electronic Devices' by Thomas Floyd. 2. Electronic Circuit Analysis and Design by Donald Neamem

Tutorials: 15 Tutorial classes are to be arranged on above syllabus. Tutorial classes may be as case studies, recent trends in concerned subject, assignment works etc.
Section A: Includes Unit I, II and III;
Section B: Includes Unit IV, V and VI.
All units carry equal weight age.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Minimum ten questions
- Five questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

For 40 marks Paper:

- Minimum eight questions
- Four questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 6 should be of objective nature.

COURSE OUTCOMES:

1. Students will be able to understand the different types of rectifiers, filters and protection circuits.
2. Students will be able to understand the characteristic operation of different transistors such as FET, MOSFET, Power MOSFET, etc.,
3. Students will be able to analyze the bias stability and stabilization of transistors.
4. Students will be able to understand the operation of different amplifiers and their feedback circuits.
5. Students will be able to analyze the various transistor circuit models and high frequency amplifiers.
6. Students will be able to understand the different power amplifiers, oscillators and tuned amplifiers.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-II

Code No.: ELE205 **Title: Electrical Engineering Materials**

Teaching Scheme:4 hrs / Week **Class Test: 20**

Theory: 3 **Theory Examination (Duration): 3 Hrs**

Tutorial: 1 **Theory Examination (Marks): 80**

Credits:4

Objectives	:	1. Familiarization of various Properties of Insulating Materials. 2. Understanding the various classifications of insulating material. 3. Understanding of different types of magnetic materials. 4. Introductions to the concept of nanotechnology.
Unit-I	:	**(A)Dielectric Properties of Insulating Materials: (06 Hrs)** Static Field ,Dielectric Parameters [Dielectric constant, Dipole moment, Polarization, Polarizability], Mechanisms of Polarizations-Electronic, Ionic and Orientational Polarization (Descriptive treatment only), Pyro-Electric & Ferro-Electric Materials, Dielectric Loss and loss Tangent. **(B) Optical Properties of Materials & Cells used for Power Generation:** Photo-Conductivity, Photo-Electric Emission, Photo-Voltaic cells [Materials Used,Construction, Equivalent Circuit, Working and Application], Photo-Conductive cells,Photo-Emissive cells.
Unit-II	:	**(A)Insulating Materials, Properties & Application: (08 Hrs)** Introduction, Characteristics of Good Insulating Material, Classification, Solid Insulating Materials-Paper Press Board, Fibrous Materials, Ceramics, and Mica &Asbestos. Liquid Insulating Materials such as Transformer Oil, varnish, Askarel, Insulating Gases like Air, SF6, Insulating Materials for Power &Distribution Transformers, Rotating Machines, Capacitors, Cables, Line Insulators and Switchgears. **(B) Dielectric Breakdown:** Introduction, Concept of Primary & Secondary Ionization of Gases(Descriptive treatment only), Breakdown Voltage, Breakdown Strength, Factors affecting Breakdown Strengths of Gaseous, Liquid and Solid Dielectric Materials. Breakdown in Vacuum.
Unit-III	:	**Magnetic Materials: (08 Hrs)** Introduction, Magnetic Parameters [Permeability, Magnetic Susceptibility, Magnetization], Classification of Magnetic Materials, Diamagnetism, Para-magnetism, Ferro-magnetism, Ferri-magnetism, Ferro-magnetic behavior below Critical Temperature, Spontaneous Magnetization & , Anti-ferromagnetism, Ferrites, Applications of Ferro-magnetic Materials, Magnetic materials for Electric Devices such as Transformer Core , Core of Rotating Machines, Soft Magnetic

		Materials, Hard Magnetic Materials, Magnetic Recording Materials, Compact Discs.
Unit-IV	:	**Conducting Materials**: **(06 Hrs)** General Properties of Conductor, Electrical Conducting Materials - Copper, Aluminum and its applications, Materials of High & Low Resistivity - Constantan, Nickel-Chromium Alloy, Tungsten, Canthal, Silver & Silver alloys Characteristics of Copper Alloys (Brass & Bronze), Materials used for Lamp Filaments, Transmission Lines, Electrical Carbon Materials, Material used for Solders, Metals & Alloys for different types of Fuses, Thermal Bimetal & Thermocouple.
Unit-V	:	**Nanotechnology: (04 Hrs)** Introduction, Concepts of Energy bands & various Conducting Mechanism in Nanostructures,Carbon Nano-structures, Carbon Molecules, Carbon Clusters, Carbon Nano-tubes, Applications of Carbon Nano-tubes, Special Topics in Nano Technology such as Single Electron Transistors, Molecular Machines, BN Nano tubes, Nano wires.
Unit-VI	:	**Testing of Materials: (06 Hrs)** 1 Measurement of Tangent of Dielectric Loss Angle (tan δ) by ScheringBridge-IS 13585-1994. 2. Measurement of Dielectric Strength of Solid Insulating Material-IS 2584. 3. Measurement of Dielectric Strength of Liquid Insulating Material -IS6798. 4. Measurement of Dielectric Strength of Gaseous Insulating Material -IS2584. 5. Measurement of P.F. and partial discharge of high voltage cables. 6. Testing of high voltage bushing. 7. Measurement of Flux Density by Gauss-meter.
Reference Books	:	1) Nanotechnology - A gentle introduction to next big idea by Mark Ratner & Daniel Ratner, Pearson Education. 2) Introduction to Nanotechnology by Charles P. Poole, Jr. Frank & J. Ownes (Wiley Student Edition)
Text Books	:	1) A Course in Electrical Engineering Materials by S. P. Seth, Dhanpat Rai and Sons, Delhi -6. 2) Electrical Engineering Materials, T.T.T.I, Madras 3) Electrical Engineering Materials by K. B. Raina & S. K. Bhattacharya, S. K. Kataria & Sons,Delhi-06. 4) Nanotechnology - A gentle introduction to next big idea by Mark Ratner & Daniel Ratner, Pearson Education.

Tutorials: 15 Tutorial classes are to be arranged on above syllabus. Tutorial classes may be as case studies, recent trends in concerned subject , assignment works etc.
Section A: Includes Unit I, II and III;
Section B: Includes Unit IV, V and VI.
All units carry equal weight age

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- Five questions in each section
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For 40 marks Paper:

- Minimum eight questions
- Four questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 7 marks each from remaining questions from each section A and B be asked to solve.

COURSE OUTCOMES:

1. Students will be able to understand the material properties of optical and dielectrics for Power Generation.
2. Students will be able to introduce about the dielectric breakdown, material properties of insulators and its applications.
3. Students will be able to introduce about the different magnetic materials and its applications.
4. Students will be able to understand the characteristics properties of different conducting materials and materials used for solders.
5. Students will be able to introduce about the concepts of Nanotechnology and its applications.
6. Students will be able to understand the testing of dielectric strength of different insulating materials, measurement of power factor, partial discharge, and flux density.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-II

Code No.: ELE206 **Title: Renewable energy resources**
Teaching Scheme:2 hrs / Week **Class Test: 10**
Theory: 2Hrs **Theory Examination (Duration): 2 Hrs**
Theory Examination (Marks): 40
Credits:2

Objectives	**:**	1. Familiarization of Principles of solar radiations 2. Understanding the various classifications of Energy: Sources.
Unit-I	**:**	**Solar Energy:** **(08 Hrs)** Principles of solar radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data. Solar energy collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors. Solar energy storage and applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating, cooling techniques, solar distillation and drying, photovoltaic energy conversion.
Unit-II	**:**	**Wind Energy**: **(04 Hrs)** Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.
Unit-III	**:**	**Bio-Mass**: **(06 Hrs)** Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, IC Engines operation on Bio-mass and their economic aspects.
Unit-IV	**:**	**Ocean Energy**: **(04 Hrs)** Ocean Thermal Energy Conversion, Principles utilization, setting of Ocean.
Unit-V	**:**	**Geothermal Energy:** **(04 Hrs)** Resources, types of wells, methods of harnessing the energy, potential in India.
Unit-VI	**:**	**Thermal Energy**: **(04 Hrs)** Conversion plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.
Text Books	**:**	1. Fundamentals of Renewable Energy Resources, G.N. Tiwari and M. K. Ghosal, Narosa Publishing House, 2007. 2. Solar Energy, Sukhatme, 3rd Edition, Tata McGraw-Hill Education, 2008

Reference Book	**:**	1. Renewable Energy Resources, John Twidell & Anthony D. Weir, 2nd Edition, Taylor & Francis, 2006 2. Thermal Energy, Mahesh Rathore, Tata McGraw-Hill Education, 2010 3. Principles of Solar Energy, D. Yogi Goswami, Frank Krieth & John F Kreider, 2nd Edition, Taylor & Francis, 2000 4. Non-Conventional Energy, Ashok V Desai, Wiley Eastern Ltd. New Delhi, 2003 5. Non-Conventional Energy Systems, K. Mittal, Wheeler Publishing, 1997

COURSE OUTCOMES:

1. Students will be able to understand the principle, classifications and applications of Solar Energy resources.
2. Students will be able to understand the principle, performance characteristics and applications of Wind Energy resources.
3. Students will be able to understand the principle of bio-conservation, Types, Characteristics, Utilization and their economic aspects.
4. Students will be able to understand the principle, ocean thermal energy conversion and utilization.
5. Students will be able to understand the resources, types, methods of harnessing of Geo-thermal Energy.
6. Students will be able to understand the thermodynamic cycles, potential and conversion techniques of Tidal and Wave Energy, mini-hydel power plants and their economics.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-III

Code No.: ELE221 **Title: Lab I: DC Machines & Transormers**
Teaching Scheme: Practical **Teachers Assessment: TW-25 Marks**
Practical/Term Work: 2Hrs /Week **Practical/Viva Exam: 25 Marks**
Credits: 1

Course Objectives	**:**	**Familiarization of understanding the construction, operations & applications of DC Machines & Transformers through practical approach .**
List of Practical's (Not Less than 10)	**:**	**Practical / Drawings / Design / Workshop** **List of Practical :** **Any 10 experiments from following list----** **1. Internal, External,& Magnetizing Characteristics (occ)of DC shunt Generator.** **2. Load Characteristics of DC Series/compound Generator** **3 Study of Three Point starter for DC Motors..** **4. To perform Starting and Reversing of DC Shunt motor..** **5. To perform Speed control of DC shunt motor.** **6. To perform Load test on DC shunt/series motor** **7 Efficiency and losses calculation of DC motor by by Swinburne's test, limitations of this test.** **8. Parallel operation of single phase transformer.** **n 9 Study of vector Group connections of Three Phase Transformer.** **10 Polarity & Turns Ratio test on 3 Phase Transformer** **11. Efficiency and regulation of three phase transformer by direct loading.** **12. Efficiency and regulation of three phase transformer by indirect loading.** **13. Swmpner's test on 1-phase transformers.**

The assessment of term work shall be done on the basis of the following.

- **Continuous assessment.**
- **Performing the experiments in the laboratory.**
- **Oral examination conducted on the syllabus and term work mentioned above.**

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Code No.: ELE222 **Title: Lab II: Power Plant Engineering**
Teaching Scheme: Practical **Teachers Assessment: TW-25 Marks**
Practical/Term Work: 2Hrs /Week **Practical/Viva Exam: 25 Marks**
Credits: 1

Course Objectives	**:**	Familiarization of various Power Plants through practical demonstrations.
List of Practical's (Not Less than 10)	**:**	**Practical / Drawings / Design / Workshop** **List of Practical :** The term work shall consist of a record of any FIVE of the following: **PART-A** 1) Study of boiler mounting and accessories. 2) Study of modern thermal power plant. 3) Demonstration and study on diesel engine. 4) Demonstration and study on diesel power plant. 5) Study of modern hydro electric power plant. 6) Demonstration and study of solar photo voltaic system. 7) Demonstration and study of any water turbine. 8) Demonstration and study of a centrifugal pump. 9) Demonstration and study of a pelton wheel turbine, Francis and Kaplan turbines. **PART-B** Arrange one industrial visit to any electrical power generating station and ask the students to Submit the report.

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Code No.: ELE 223 | **Title: Lab III: Electronic Devices and Circuits**

Teaching Scheme: Practical | **Teachers Assessment: TW-25 Marks**
Practical/Term Work: 2Hrs /Week | **Practical/Viva Exam: 25 Marks**
Credits: 1

Course Objectives	**:**	To study the practical aspects of semiconductor devices and circuits.
List of Practical's (Not Less than 10)	**:**	**Practical / Drawings / Design / Workshop** **List of Practicals :** 1. Determination of ripple factor, PIV, TUF of Half wave and full wave rectifier(with and without capacitors). 2. Fixed and self biased circuits analysis using stability factor. 3. Study of transformer coupled power amplifiers. 4. Plot transistor characteristics in CE configuration and Determination of h-parameters graphically. 5. Plot transistor characteristics in CE configuration and Determination of h-parameters graphically. 6. Plot and compare frequency response of RC coupled amplifiers with feedback and without feedback (comparison of Gain and Bandwidth). 7. Determination of Voltage gain, current gain, input and output impedance of FET amplifiers. 8. Designing and frequency calculation of RC phase shift oscillator, Hartley oscillator, Colpitts oscillator 9. Study of class A, class B, class AB amplifiers. 10. Design and test fixed IC regulated circuit.

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Code No.: BSH 225 **Title: Lab IV: Development of Skills-II**
Teaching Scheme: 02 Hrs/week **Teachers Assessment: 50M**
Credits: 1

Course Objectives	**:**	1. To help the engineering students acquire adequate mastery of communicative English language primarily - reading and writing skills. 2. To provide language training to the students to enable them to understand and acquire knowledge in technical subjects.
List of Practicals (Not Less than 10)	**:**	**1.** Importance of Reading and Writing Skills. **2.** Remedial Grammar: 1 Sentence Analysais.2. Phrases. 3. Clauses. **3.** Remedial Grammar: Sentence Errors Types of sentences and Combining sentences. **4.** Reading Comprehension and Vocabulary Building: The reading process, purpose, different kinds of texts (scientific and technical), Active and Passive reading. Reading Strategies: Skimming, scanning, eye reading and visual perception, prediction techniques, distinguishing facts and opinions, drawing inferences and conclusions. **5.** Reading Comprehension and Vocabulary Building: Exercise - An unseen passage should be given and questions may be asked in the form of True or False statements, MCQ, short answers. Comprehension of technical material- scientific and technical texts, instructions and technical manuals, graphic information. Summarizing and paraphrasing. **6.** Writing as a Process: Writing Steps, Rules for effective writing. **7.** Writing as a Process: Writing paragraphs and essays Impromptu Essays. **8.** Business Correspondence: Types of letters (Formal and Informal).Inquiry, Request, Complain, Sales. **9.** Business Correspondence: Follow-up, Cover, Application. **10.** Business Correspondence: Writing office documents like

		circulars, notices and memos. **11.** Writing Reports: General reports, Types of reports, information and analytical reports. Technical reports and Posters. **12.** Resume: Writing Resume suiting your skills and experience **Assessment:** of term work shall be done on the 12 assignments based on the topics mentioned above and Oral examination would be conducted internally on the syllabus mentioned above too
List of Reference Books	**:**	1. English Grammar Composition & Effective Business Communication. By M. A. Pink, S. E. Thomas, publication: Chand & Company Ltd. 2. Living English Structure by W. Stannard Allen, publication: Orient Longman. 3. Effective Teaching- A measure of Excellence by Mathew Thomas, publication: Chand & Company. 4. Any day English for Effective Communication by Henry Van Dyke, Mortha Prabhakar Rao. 5. Written Communication in English by Sarah Freeman, publication: Orient Longman. 6. A University Grammar of English by Randolph Quirk Sidney Green Baum, publication: Pearson Education. 7. Modern Commercial Correspondence by R. S. N. Pillai, publication: Chand & Company Ltd. 8. Technical Writing and Professional Communication by T.Huckins , publication: McGraw Hill Publication. 9. Technical Communication by Farathullah. 10. Excellence in Business Communication by J H V Thill, Cortland L. Bovee, publication: Macmillan Publication. 11. Effective Technical Communication' by M Ashraf Rizvi, publication: Tata McGraw Hill.

		12. Basic Managerial Skills for all by E. H. McGrath, publication: Eastern Economy Edition, Prentice Hall India. 13. Developing Communication Skills' by Skills' Krishna Mohan, Meera Bannerji, and publication: McMillan India Ltd. 14. The structure of Technical English by Herbert. A. J, publication: Orient Longman. 15. A Remedial English Grammar for Foreign Students by F.T. Wood, publication: Macmillan Publication. 16. Business Communication Strategy and Skill by Munter, Mary, publication: Prentice Hall Inc., New Jersey. 17. Business Writing and Communication by Kenneth W. Davis, publication: TMGH 18. Technical Report Writing Today by Daniel G. Riordan, Steven E. Pauley, publication: Indian Adaptation, Biztantra. 19. Basic business communication by Raymond V.Lesikar. 20. Effective Business Communication by Asha Kaul, publication: Prentice-Hall India Pvt. Ltd. 21. Technical Writing by B. N. Basu , publication: Prentice-Hall India Pvt. Ltd 22. Business Communication Strategies by Matthukutty M. Monippally ,publication: TMGH
Digital References:	**:**	**1.** www.mindtools.com **2.** http://esl.about.com

The assessment of term work shall be done on the basis of the following.

- Continuous assessment.
- Performing the experiments in the laboratory.
- Oral examination conducted on the syllabus and term work mentioned above.

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Syllabus of Second Year B. Tech. (Electrical Engineering) Semester III

Code No: ELE226 **Title: Laboratory V: PLC Fundamentals**

Teaching Scheme: **Term Work (Marks): 50**

Practical: 02 Hrs/week

Credits: 01

Course Objectives	**:**	• To study the Fundamentals of Programmable Logic Controllers • To study the specifications of PLC and wiring diagram • To study the programming and applications related to process control.
List of Practical's	**:**	**Experiments:** 1. To understand and study the Architecture of PLC. 2. To study the different input and output devices. 3. To study the programming languages of PLC. 4. To study the Ladder logic and the instruction set of PLC. 5. To study and develop the ladder logic for flashing of LEDs. 6. To study and develop the ladder logic for Traffic signal Controllers. 7. To study and develop the ladder logic for water level control. 8. To study the communication between PLC and SCADA . 9. Case study of PLC of any make 10. To study the different communication protocols.
List of Reference Books	**:**	1. Garry Denning, "Introduction to Programmable Logic Controller", 2. C. D. Johnson," Process Instrumentation Technology", Prentice Hall Of India 3. William Boltan , ''Programmable logic Controller'', 4th Edition, Newnes 2009 4. The open international standard IEC 61131 for programmable logic controllers

Term Work assessment shall be done on the basis of

- Performing the experiments in the laboratory and
- Continuous assessment

Practical Examination shall be conducted on the syllabus and term work mentioned above.

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Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester- IV

Code No.: BSH251	**Title: Engineering Mathematics -IV**
Teaching Scheme: 04Hrs/week	**Class Test: 20 M**
Theory: 03Hrs/week	**Theory Examination (Duration): 03 Hrs**
Tutorial: 01Hr/week	**Theory Examination (Marks): 80**
Credits:04	

Objectives	**:**	The contents aims to develop the knowledge of the student in the direction of solving the practical problem in the engineering and technology related to Function of complex variable, transforms, Numerical Methods, Vectors.
Unit-I	**:**	**Function of complex variable** : **(15 Hrs)** Introduction , Analytic function ,Cauchy-Riemann equation in Cartesian and polar coordinates ,Harmonic function, orthogonal system , Integration in complex plane: Line integral, Contour integral, Cauchy's integral theorem , Cauchy's integral formula, Extension of Cauchy's theorem on multiply connected region Taylor's and Laurent's series(without proof), Singularities, Residues, Cauchy's residue theorem. .
Unit-II	**:**	**Application of Complex Variable: (5 Hrs)** Evaluation of real integrals: Integration along unit circle and along the upper half semi circle, Conformal Transformation, Bilinear transformation.
Unit-III	**:**	**Vector Integration: (10 Hrs)** Line integral, Surface integral, Gauss divergent theorem, Stoke's theorem, Green's theorem, Curvilinear coordinates: Cylindrical and Spherical polar coordinates.
Unit-IV	**:**	**Application of partial differential equation** : **(10 Hrs)** Solution of partial differential equation by method of separation variable Application to i. Vibration of a string (The wave equation), ii. One dimensional heat flow (The diffusion equation) iii. Two dimensional heat flow.(The Laplace equation)
Unit-V	**:**	**Z- transform : (8 Hrs)** Definition, Z-transform of elementary function , properties of Z-transform , Inverse Z-transform :Partial fraction method, inversion integral method(Residue method),Solution of Difference equation by using Z-transform.
Unit-VI	**:**	**Numerical Method: (12 Hrs)** Solution of algebraic and transcendental equation, Newton Raphson method, Lagrange's interpolation, Solution of linear simultaneous equation; by Gauss elimination method, The Guass-seidal method,Solution of ordinary differential equations: Taylor series method, Fourth order Runge-Kutta method.

Reference Books:	**:**	1. A Text Book of Applied Mathematics Volume-II –by P.N. Wartikar and J.N.Wartikar. 2. A Text Book Of Applied Mathematics Volume-III-by P.N. Wartikar and J.N.Wartikar. 3. Advanced Engineering Mathematics-by H.K.Dass. 4. Higher Engineering Mathematics- by Khanna Publishers. 5. Higher Engineering Mathematics- by B.V.Ramana.
Additional Reference Books	**:**	1. Solution to Higher Engineering Mathematics Volume –III -by C.P.Gandhi

Section A: Includes Unit I, II and III; **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Minimum ten questions.
- Five questions in each section.
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

COURSE OUTCOMES:

1. Students will be able to introduce the complex variable function on Cauchy-Riemann equation, Cauchy's theorem, Taylor's and Laurent's series and Cauchy's residue theorem.
2. Students will be able to understand the applications of complex variables.
3. Students will be able to understand the vector integrations such as line integral, surface integral, Gauss divergent theorem, Stoke's theorem, Cylindrical and Spherical polar coordinates.
4. Students will be able to understand the applications of partial differential equation based on wave equation, diffusion equation and Laplace equation.
5. Students will be able to define z-transform of elementary functions, properties of Z-transform and Inverse Z-transform.
6. Students will be able to understand the Solution of algebraic and transcendental equation, Newton Raphson method, Guass-seidal method, Taylor series method and Fourth order Runge-Kutta method.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV

Code No.: ELE252 **Title: AC Machines**

Teaching Scheme:4 hrs / Week **Class Test: 20**

Theory: 3 **Theory Examination (Duration): 3 Hrs**

Tutorial: 1 **Theory Examination (Marks): 80**

Credits:4

Objectives	**:**	1. To introduce fundamentals, physical concepts, and operating principles of AC machines and special machines. 2. Student will be able to determine performance AC motors. 3. Student will be able to design rating of induction motor for a given application 4. Student will be able to design the ratings of synchronous machines for given application. 5. Student will develop good ethical practices in the society & Industry for the operation of AC machines.
Unit-I	**:**	**Three Phase Induction Motors--- (10 Hrs)** Classification of A.C. Machines, Ferraris Principle, Production of 2- phase and 3-phase rotating magnetic fields, principle of operation and constructional (salient and non-salient pole)Construction & principle of operation, types of I.M, slip, frequency of rotor current, rotor EMF, current, pf and torque. Phasor diagrams, different torque equations and relation between them. Torque-Slip, current-speed and Torque- Speed Characteristics, Losses and efficiency. Circle diagrams, starters. I.M tests, cogging and crawling, speed control, Applications, advantages and disadvantages of I.M.
Unit-II	**:**	**Single Phase Induction Motors-- (10 Hrs)** Introduction, single phase induction motors, double revolving field theory, circuit model of single phase induction motor, Split Phase,Capacitor Start,Capacitor start & run,Shaded Pole, determination of circuit parameters I.M.Torque-slip characteristics & applications. Comparison of 1-phase induction motor with 3-phase induction motor. Comparision o Different single phase motors in view of performance.

Unit -III	**:**	**Special Motors:--** **(10Hrs)** Construction, principle of working, characteristics, ratings & applications of Brushless DC motors, Permanent Magnet motor, linear induction motors, AC series motors, universal motors,repulsion type motors, Schrage motor, servo motors, hysteresis motor.
Unit-IV	**:**	**Synchronous Generators OR Alternators:** **(10Hrs)** Features of synchronous generators. Production of sinusoidal alternating EMF and its frequency, armature winding, winding factor, EMF equation.Harmonics in voltage waveform, leakage reactance, armature reaction. Short circuit ratio, synchronous reactance, synchronous impedance, determination of voltage regulation (by Potier, EMF, MMF methods), power developed by synchronous generators, phasor diagrams, transient conditions, losses and efficiency.
Unit-V	**:**	**Parallel Operation of Alternators** **(10Hrs)** Conditions for parallel operation , Load sharing between two alternators in parallel ,parallel-Generator theorem Process of synchronizing an alternator with infinite bus-bars by lamp methods & by use of synchroscope. Synchronizing torque, power and current.
Unit-VI	**:**	**Synchronous Motors** **(10Hrs)** Construction & principle of operation, various methods of starting, phenomenon of hunting or phase – swinging – its remedies. Operation of 3-phase Synchronous motor with constant excitation & variable load. Significance of torque angle, load characteristics Phasor diagram on the basis of synchronous impedance. Power flow chart, losses. Operation of 3-phase synchronous motor with a constant mechanical load on its shaft & variable excitation. 'V' Curves &'Inverted V' (pf) curves. Merits and demerits of synchronous motors & its application
Reference Books:	**:**	1. Theory of AC Machines by Langsdorf (Tata McGrawHill) 2. Principles and practice of Electrical Engineering by Gray Wallance(Int. student Ed.VIII Ed.) 3 ; "Electric Machines," Nagrath, Kothari Tata McGraw Hill Publication. IInd Edition.. 4. "Electrical Machinery" A.E.Fitzgerald, C.Kingsley, S.D.Umans Tata McGraw Hill. 5. Performance & Design of Alternating Current Machine. Say.M.G - CBS Publisher (2002).

Text Books	**:**	**1** A test book of ELECTRICAL TECHNOLOGY by B.L.THERAJA VOL-II Chand Publication. **2**. PRINCIPLLES OF ELECTRICAL MACHINES by V.K.MEHTA – Chand Publication. **3**. ELECTRICAL MACHINES by Ashfaque Hussain. **4**. ELECTRICAL MACHINES by Nagnath Kothari TATA MICR Mc Graw Hill. **5**. J.B. Gupta – Electrical Machines, SK Kataria & Sons Publication (2010).

Tutorials: 15 Tutorial classes are to be arranged on above syllabus. Tutorial classes may be as case studies, recent trends in concerned subject , assignment works etc.
Section A: Includes Unit I, II and III;
Section B: Includes Unit IV, V and VI.
All units carry equal weightage

Pattern of Question Paper:

The six units in the syllabus shall be divided in two equal parts . Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Minimum ten questions.
- Five questions in each section.
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for 10 marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve..

COURSE OUTCOMES:

1. Students will be able to introduce about the construction, principle and operation of three phase induction motor, phasor diagram, torque equations, touque-speed characteristics, advantages and disadvantages and its applications.
2. Students will be able to introduce about the single phase induction motors, circuit model, characteristics, applications and comparison with different single phase motor along with performance.
3. Students will be able to understand the construction, principle, working, characteristics and its applications of special motors.
4. Students will be able to understand the features of synchronous generators, armature winding, EMF equations, Short circuit ratio, phasor diagram, losses and efficiencies.
5. Students will be able to understand the conditions for parallel operation, load sharing, parallel-Generator theorem, bus-bars method and Synchronizing torque, power and current.
6. Students will be able to understand the construction, principle, operation synchronous motor, phasor diagram, power flow chart, 'V' Curves and 'Inverted V' (pf) curves, merits, demerits and its applications.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV

Code No.: ELE253	**Title: Electrical Measurements**
Teaching Scheme:4 hrs / Week	**Class Test: 20**
Theory: 3	**Theory Examination (Duration): 3 Hrs**
Tutorial: 1	**Theory Examination (Marks): 80**
Credits:4	

Objectives	**:**	1. Classify the different measuring instruments. 2. Various methods of measurement of resistance. 3. Describe principle and operation of Wattmeter and measurement of power. 4. Introduction and working principal of Energy meter theory, Instruments transformer, Oscilloscope.
Unit-I	**:**	**A)Measurement and Instrumentation theory: (8 Hrs)** Characteristics of measuring instruments: Static and dynamic, accuracy, linearity, speed of response, dead zone, repeatability, resolution, span, reproducibility, drifts. Need for calibration, standards and their classification. Block diagram of generalized Instrumentation system. Classification of measuring instruments - Absolute and secondary instruments, types of secondary instruments: indicating, integrating, and Recording, analog / digital. **B) Essentials of indicating instruments: (3 Hrs)** Deflecting, controlling and damping systems. Construction, working, torque equation, various advantages and disadvantages of MI (attraction and repulsion), and PMMC. **C)** Ammeter and Voltmeter theory Extension of range of ammeters and voltmeters Using shunt, multiplier. Universal shunt, Universal multiplier. Block diagram and Operation of digital ammeters and voltmeters in brief. **(3 Hrs)**
Unit-II	**:**	**A) Measurement of Resistance :** Measurement of low, medium and high resistance. Kelvin's Double Bridge, Ammeter-Voltmeter method, Megger, Earth tester for earth resistance measurement, Measurement of insulation resistance when power is ON. **(4 Hrs)** **B) A.C. Bridges:** Introduction, sources & detectors for a.c. bridge, general equation for bridge at balance. Measurement of Inductance: Maxwell's Inductance & Maxwell's Inductance – Capacitance Bridge, Andersons Bridge. Measurement of Capacitance: Shearing Bridge. **(4 Hrs)**
Unit-III	**:**	**Wattmeter theory and measurement of power (6 Hrs)** Construction, working, torque equation, errors and their compensation, advantages/disadvantages of dynamometer type wattmeter, low power factor Wattmeter, poly-phase wattmeter. Power measurement in three phase system. Power measurement in three phase system for balanced and unbalanced load using three wattmeter method, two wattmeter method

Unit-IV	**:**	**Energy meter theory: (03 Hrs)** Construction, working, torque equation, errors and adjustments of single phase conventional (induction type) energy meter, Block diagram and operation of electronic energy meter. Three-phase energy meters.
Unit-V	**:**	**Instrument Transformers: (03 Hrs)** Construction, connection of CT & PT in the circuit, advantages of CT / PT over shunt and multipliers for range extension, transformation ratio, turns ratio, nominal ratio, burden etc, ratio and phase angle error. (No derivation of formulae is expected).
Unit-VI		**A)** Oscilloscope: Introduction, various parts, front panel controls, block diagram of dual trace and dual beam CRO, use of CRO for measurement of voltage, , period, frequency, phase angle & frequency by lissajous pattern. **(3 Hrs)** **B)** Transducers: Introduction, classification, basic requirements, types: Resistive, inductive, Capacitive (brief treatment only), advantages of electrical transducers.**(2 Hrs)**
Reference Books:	**:**	**Reference Books** 1. Electrical measurement & measuring instrument by E. W. Golding & widing, Fifth edition, A. H. Wheeler & Co. ltd. 2. Electonic measurement and instrumentation by Dr. Rajendra Prasad, Khanna Publisher, New Delhi. 3. Introduction to Measurements and instrumentation by Ghosh, Second Edition PHI Publication. 4. Introduction to Measurements and instrumentation by Anand PHI Publication.
Text Books	**:**	 1. A Course in Electrical and Electronic measurements & Instrumentation – by A. K. Sawhaney, Dhanpat Rai & Suns 2. A Course in Electronic and Electronic measurements by J. B. Gupta, S. K. Kataria & Sons. 3. Instrumentation: Measurement and Analysis by Nakra & Chaudhari Sixth Reprint, Tata McGraw Hill, New Delhi.

Tutorials: 15 Tutorial classes are to be arranged on above syllabus. Tutorial classes may be as case studies, recent trends in concerned subject, assignment works etc.
Section A: Includes Unit I, II and III;
Section B: Includes Unit IV, V and VI.
All units carry equal weight age.

PATTERN OF QUESTION PAPER:

Six units in the syllabus shall be divided in two equal parts i.e. 3 units in each part. Question paper shall
be set having two sections A and B. Section A questions shall be set on first part and Section B questions
on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum ten questions
2. Five questions in each section
3. Question no 1 from section A and Question no 6 from section B having weightage of 10 marks each be made
compulsory and should have at least eight bits of two marks out of which five to be solved.
4. Two questions from remaining questions from each section A and B be asked to solve each having weight age of 15
marks.

COURSE OUTCOMES:

1. Students will be able to introduce about the measurement and instrumentation theory and essential parameters for indicating instruments.
2. Students will be able to understand the measurement of resistance by different measuring instruments and they were introduce about the A.C. Bridges by general equations and measurement of inductance and measurement of capacitance by different bridge circuits.
3. Students will be able to understand the construction, working, torque equation of different types of wattmeter and power measurement by wattmeter method.
4. Students will be able to understand the construction, working, torque equation of energy meter, block diagram and operation of electronic energy meter and three phase energy meter.
5. Students will be able to understand the construction, connections of instrument transformers, transformer ratio, turns ratio, nominal ratio and burden.
6. Students will be able to introduce about the diagram, classification of oscilloscope and transducers.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV

Code No.: ELE254 | **Title: Network Analysis**

Teaching Scheme:4 hrs / Week | **Class Test: 20**

Theory: 3 | **Theory Examination (Duration): 3 Hrs**

Tutorial: 1 | **Theory Examination (Marks): 80**

Credits:4

Objectives	**:**	1. Familiarization of various network analysis and topologies 2. Understanding the various methods for analysis of electrical networks. 3. Understanding of transient response analysis of electrical network. 4. Design and set up of simple analog filter circuits.
Unit-I	**:**	**Circuit Analysis (AC) : (12 Hrs)** Voltage and Current laws (KVL/KCL), Network Analysis: Mesh, Super mesh, Node and Super Node analysis. Source transformation and source shifting. dot convention for coupled circuits., Network Theorems: Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorem, Tellegen's Theorem, Substitution theorem, Millers Theorem , Milman's Theorem, Dual Network and Duality theorem. Resonance and its types, Quality factor
Unit-II	**:**	**Graph Theory : (6 Hrs)** Graph of a network, Definitions, Tree, Co tree, Link, basic loop and basic cut set, Incidence matrix, Cut set matrix, Tie set matrix, Duality, Loop and Nodal methods of analyses.
Unit-III	**:**	**Transient Circuit Analysis: (12Hrs)** Initial Condition and its evaluation, Natural response and forced response, Transient response and steady state response , Evaluation of time response both through classical and Laplace methods , Inverse Laplace transforms, transformed networks with initial conditions. Analysis of electrical circuits with applications of step, pulse, impulse & ramp functions, Laplace transforms various periodic and non periodic waveforms application of Laplace transforms.
Unit-IV	**:**	**Two Port Network: (12Hrs)** Characteristics of linear Time invariant network, Z, Y, H and transmission parameters, Interrelations between parameters Z,Y,H. Ladder and Lattice networks. T & π Representation , Open and short Circuit Impedance, Image Impedance.
Unit-V	**:**	**Filters Analysis : (10 Hrs)** Basic Network types-Symmetrical and Asymmetrical Filter fundamentals, Pass and stop bands, Characteristic impedance, Constant K low pass filter, Constant K high pass filter, m - derived T section, m -π derived Section, Variation of characteristic impedance over the pass band, Termination with m-derived half section, Band pass filters, Filter circuit design, Filter performance, Composite filters.
Unit-VI	**:**	**Network Functions: (8 Hrs)** Poles and Zeros: Terminal pairs or ports, network functions for the one port and two port, The calculation of network functions ,ladder networks, general networks. Poles

		and zeros of network functions, Restrictions on poles and zeros locations for transfer functions, Time –domain behaviour from the pole and zero plot .Stability of active networks
Reference Books:	**:**	1. Network Analysis by Cramer McGraw Hill Publication. 2. "Engineering Circuit Analysis" by William H. Hayt, Jr. Jack E. Kemmerly, McGraw Hill. 3. "Introduction to Circuit Analysis" by Bolylestad Robert L. 4. Electric Circuits and Networks by K.S. Suresh Kumar, Pearson Education 5.Network and systems, by Roy Choudhary D, New Age Pub
Text Books	**:**	1. "Network Analysis" by M. E. Van Valkenburg. Third Edition, Prentice Hall of India Private Limited. 2. Network Theory by N. C. Jagan, C. Lakshminarayana, Second Edition, BSP Publication. 3. Network Analysis & Synthesis – G. K. Mittal, Khanna Publication. 4. Introduction to Electric Circuits by Richard C. Dirof, James A. Svoboda, Sixth Edition, Wiley. 5. Introduction to Electric Circuits -Alexander & Sadiku. 6. Introduction to Electric Circuits –S Charkarboorty. 7. Fundamentals of Electrical Networks- B.R.Gupta & Vandana Singhal – S.Chand Publications 8. Electrical Circuit Analysis by P. Rameshbabu, Scitech PublicationIndia Pvt Ltd,

Tutorials: 15 Tutorial classes are to be arranged on above syllabus. Tutorial classes may be as case studies, recent trends in concerned subject , assignment works etc.
Section A: Includes Unit I, II and III;
Section B: Includes Unit IV, V and VI.
All units carry equal weightage

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Minimum ten questions.
- Five questions in each section.
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

For 40 marks Paper:

- Minimum eight questions
- Four questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 7 marks each from remaining questions from each section A and B be asked to solve.

COURSE OUTCOMES:

1. Students will be able to introduce about the A.C. circuit analysis by Mesh, Super mesh, node, super node and theorems such as super position, thevenin's, nortons, Norton's and Maximum Power Transfer Theorem and Resonance and its types.
2. Students will be able to introduce about the Graph theory of a network such as Tree, Co tree, Link, basic loop and basic cut set, Incidence matrix, Cut set matrix, Tie set matrix, Duality, Loop and Nodal methods of analyses.
3. Students will be able to understand the initial conditions, response, evaluation, transformation, analysis of transient circuit and its applications.
4. Students will be able to understand the characteristics of two port networks, Interrelations between parameters, Ladder and Lattice networks, T & π Representation , Open and short Circuit Impedance.
5. Students will be able to introduce about the fundamentals of filter analysis, characteristics, constants, circuit design and its performances.
6. Students will be able to understand the poles and zeros of network functions, time-domain behavior and stability analysis.

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(Faculty of Engineering and Technology)

Syllabus of second Year B. Tech. (Electrical Engineering) Semester IV

Code No.: ELE255 | **Title: Analog and Digital Circuits**

Teaching Scheme: | **Class Test (Marks): 20**

Theory: 03 Hrs/ week | **Theory Examination (Duration): 03hrs**

Tutorial: 01 Hr/week | **Theory Examination (Marks): 80**

Credits:04

Prerequisites	**:**	**Basic Electronics**
Course Objectives	**:**	• To introduce the basic building blocks, theory and applications of analog and digital circuits.
Unit-I	**:**	**Special Diodes-** (**10 Hrs)** LED, Varactor diode, Photo diode, Schottky diode, Tunnel diode; their characteristics and applications. Transistors as a switch.
Unit-II	**:**	**Linear Voltage Regulators -** (**10 Hrs)** IC -78xx, 79xx, LM 317. Design of adjustable voltage source using IC- LM317, Low Dropout (LDO) voltage regulator IC – 555 – functional block diagram, Application of IC555 – Design of Multivibrator (Monostable and Astable), VCO
Unit-III	**:**	**Oscillator:** (**10 Hrs)** Basic principle of sinusoidal oscillator, R-C Phase Shift and Wein-Bridge oscillators, tuned oscillators- Collpitts and Hartley; Crystal oscillator.
Unit-IV	**:**	**Logic families :** (**10 Hrs)** Review of Number formats: Binary, hexadecimal, BCD and their basic math operations like addition and subtraction Introduction to Logic gates and Boolean Algebra Specifications of Digital IC, Logic Families: TTL, TTL variant families: like standard, LS, HS, Tristate gate, CMOS logic, Comparison of logic families, Interfacing of TTL and CMOS different families.

Unit-V	**:**	**Combinational Logic Circuit:** (**10 Hrs)** K-Maps and their use in specifying Boolean expressions upto 4 variables, Minterm, Maxterm, SOP and POS implementation Implementing logic function using universal gates, Binary Arithmetic circuits: Adders, Subtractors (Half and Full), BCD adder – Subtractor, Carry look ahead adder, Serial adder, Multiplier Magnitude comparators, Designing code converter circuit e.g binary to gray, BCD to Seven segment parity generator, Arithmetic Logic units. Multiplexer (ULM), Shannon's theorem, De- multiplexers, Designing using ULMS. Hazards i combinational circuit.
Unit-VI	**:**	**Sequential Logic Circuits :** (**10 Hrs)** Comparison of combinational & sequential circuit Flip-flops:SR, T, D, JK, Master Slave JK, Converting one flip-flop to another, Use of debounce switch Counters: Modulus of counter, Design of Synchronous, Asynchronous counters, Ripple counters, Up/Down Counter, Ring counter, Johnson counter, Sequence generator. Unused states and locked conditions. Shift Register
Text Books	**:**	1. Boatkar K. R., "Integrated Circuits", Khanna Publication. 2. Millman and Halkias, 'Integrated Electronics', Tata McGraw Hill 3. Jain R.P., "Modern Digitals Electronics", Tata McGraw Hill, 1984. 4. Roger L. Tokheim, "Digital Electronics", Tata McGraw Hill.
References **e- books,** **e- Journals**	**:**	3. Boylestad Robert and Nashelsky Louis - 'Electronic Devices and Circuits', Prentice-Hall of India, 4. Malvino & Leach, "Digital principal and Application", Tata McGraw Hill, 1991.

Section A: Includes Unit I, II and III; **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six units in the course syllabus shall be divided in two equal parts of 3 units each. Question paper shall be set having two sections; Section A and Section B. The questions of Section A shall be set on first part and questions of Section B on second part. Question paper should cover the entire syllabus.

For 80 marks Paper:

- Set ten questions in all, with five questions in each section.
- Question no. 1 from section A and Question no. 6 from section B should be made compulsory and should cover the entire course syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each

section A and B should be asked to solve.

COURSE OUTCOMES:

1. Students will be able to introduce about the special diodes such as LED, Varactor diode, Photo diode, Schottky diode, Tunnel diode characteristics and its applications.
2. Students will be able to understand the different IC's of linear voltage regulator, functional block diagram, application of IC555 and design of multivibrator.
3. Students will be able to understand the basic principle of oscillator and its types in detail.
4. Students will be able to understand the logic families by numbering system, logic gates, logic families, TTL and CMOS logics and interfacing.
5. Students will be able to understand the K – Mapping, Boolean expression, SOP, POS, Adder, Subtractor, BCD adder, code converters and Hazards in combinational logic circuits.
6. Students will be able to understand the Flip-Flops and its types, Counters and Shift registers in sequential logic circuits.

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Syllabus of S. Y. B. Tech. (Electronics and Telecommunication) Semester-IV

Code No.: ELE256	**Title: Data Structure**
Teaching Scheme:2 hrs / Week	**Class Test: 10**
Theory: 02 Hrs/week	**Theory Examination (Duration): 2 Hrs**
Tutorial: 01Hr/week	**Theory Examination (Marks): 40**
Credits:2	

Objectives	**:**	The students shall learn the C language and pointers in depth. They will be able to use pointers for data manipulation. They will learn linear data structures.
Unit-I	**:**	**Introduction to Data structures & Analysis of Algorithms (5 Hrs)** Introduction to Data Structures: Concept of data, Data object, Data structure, Abstract Data Types (ADT), realization of ADT in 'C'. Concept of Primitive and non primitive, linear and Non-linear, static and dynamic, persistent and ephemeral data structures.
Unit-II	**:**	**Searching and sorting techniques (5 Hrs)** Need of searching and sorting, why various methods of searching and sorting, Sorting methods: Linear and binary search. Sorting methods : Bubble, insertion, selection, merge, quick, bucket, Time complexity of each searching and sorting algorithm.
Unit-III	**:**	**Linear data structures using sequential organization (5 Hrs)** Concept of sequential organization, Concept of Linear data structures, Concept of ordered list, Storage representations of ordered list such as row major, column major and their address calculation.
Unit-IV	**:**	**Linear data structures using linked organization (5 Hrs)** Concept of linked organization, singly linked list, doubly linked list, circular linked list. Linked list as ADT. Concept of stack as ADT, Implementation of stacks using linked and sequential organization.
Unit-V		**Stack and queues (5 Hrs)** Concept of queues as ADT, Implementation of linear and circular queue using linked and sequential organization. Concept of multiqueues, Stacks
Unit-VI	**:**	**Tree and Graphs (5 Hrs)** Difference in linear and non-linear data structure, Trees and binary trees-concept and terminology. Binary tree as an ADT.B+ Tree and AVL Tree. Graph as an ADT.
Reference Books:	**:**	1. R. Gilberg, B. Forouzan, "Data Structures: A pseudo code approach with C", Cenage Learning, ISBN 9788131503140. 2.Samirkumar bandhopadhay ,Kashnath Dey,"Data structures using C",Pearson publication 3.A.K.Sharma ,"Data structures using C" Pearson publication,ISBN 978-81-317-5566-2 4. Yashwant Kanitkar,"Let us C & Pointer in C",BPB Publication

Additional Reference Books	**:**	1. Kernighan and Ritchie, "The C Programming Language", Prentice Hall 2. Tremblay and Sorenson, "An introduction to data structures with applications", Tata McGrawHill, Second Edition

Section A: Includes Unit I, II and III; **Section B**: Includes Unit IV, V and VI.

Pattern of Question Paper:

The six/four units in the syllabus shall be divided in two equal parts i.e. 3 units respectively. Question paper shall be set having two sections A and B. Section A questions shall be set on first part and Section B questions on second part. Question paper should cover the entire syllabus.

For 40 marks Paper:

- Minimum eight questions
- Four questions in each section
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for six marks each. The Question no.1 and 6 should be of objective nature.

Two questions of 7 marks each from remaining questions of each section A and B be asked to solve compulsory in question paper.

For 80 marks Paper:

- Minimum ten questions.
- Five questions in each section.
- Question no 1 from section A and Question no 6 from section B be made compulsory and should cover complete syllabus of the respective section and should be set for ten marks each. The Question no.1 and 6 should be of objective nature.
- Two questions of 15 marks each from remaining questions from each section A and B be asked to solve.

COURSE OUTCOMES:

1. Students will be able to introduce about the concept of data structure, data types, Primitive and non primitive, linear and Non-linear, static and dynamic, persistent and ephemeral of data structures.
2. Students will be able to understand the need of searching and sorting. Sorting methods, Time complexity of each searching and sorting algorithm.
3. Students will be able to understand the concept of sequential organization, linear data structures, ordered list and storage representation.
4. Students will be able to understand the concept of linked organization, singly linked list, doubly linked list, circular linked list, and concept of stacks, Implementation of stacks using linked and sequential organization.
5. Students will be able to understand the concepts of stacks and queues and its implementation.
6. Students will be able to understand the concepts and terminology of tree and binary tree and graphs as an ADT.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV

Code No.: ELE271 **Title: Lab VI: AC MACHINES**

Teaching Scheme: Practical **Teachers Assessment: TW-25 Marks**
Practical/Term Work: 2Hrs /Week **Practical/Viva Exam: 25 Marks**
Credits: 1

Course Objectives	**:**	Familiarization of Construction, principles & working with applications of ac machines through practical approach .
List of Practical's (Not Less than 10)	**:**	1.Study of Cut section of 3 Phase SQ Induction Motor 2. Speed Control of 3 Phase Sq. Cage Induction Motor by VFD Control MMF method. 3. No Load & Blocked rotor test on SQIM and Speed reversal for the same motor. 4. Load test on three phase squirrel cage induction motor. **5.** Operation of induction motor as induction generator. 6. Synchronizing of alternators: Lamp Methods and use of synchroscope. 7. Determination of Squirrel cage induction motor performance from Circle diagram. 8. Load test on three phase Slip ring induction motor. 9. Slip test on Alternator 10. Load test on single phase induction motor. 11. Speed reversal of SQIM & STUDY OF DOL/ STAR DELTA

The assessment of term work shall be done on the basis of the following.

1. Continuous assessment
2. Performing the experiments in the laboratory
3. Oral examination conducted on the syllabus and term work mentioned above

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Code No.: ELE272 **Title: Lab VII: Electrical Measurements**
Teaching Scheme: Practical **Teachers Assessment: TW-25 Marks**
Practical/Term Work: 2Hrs /Week **Practical/Viva Exam: 25 Marks**
Credits: 1

Course Objectives	**:**	Familiarization of various Measuring instruments through practical demonstrations.
List of Practical's (Not Less than 10)	**:**	**Practical / Drawings / Design / Workshop** **List of Practical :** The term work shall consist of any 8 experiments from the list 1. Measurement of power in three phase circuit using two wattmeter method (Balanced & Unbalanced Loads) 2. Measurement of Reactive power in three phase balanced circuit using one wattmeter method and by one wattmeter method with two way switch. 3. Calibration of Single phase or Three phase static energy meter at different power factors using Digital meters. 4. Measurement of Low resistance using Kelvin's Double Bridge. 5. Measurement of inductance using Anderson's Bridge. 6. Earth resistance measurement by Earth Tester. 7. Extension of instrument range: ammeter, voltmeter, watt meter using CT / PT. 8. Measurement of power in three phase four wire using three CTs and Two wattmeters. 9. Study and use of CRO for measurement of Current, Voltage, Time period, Frequency, Phase angle. 10. Study of electrical transducers

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV

Code No.: ELE273	**Title: Lab VIII: Network Analysis**
Teaching Scheme: Practical	**Teachers Assessment: TW-25 Marks**
Practical/Term Work: 2Hrs /Week	**Practical/Viva Exam: 25 Marks**
Credits: 1	

Course Objectives	**:**	Familiarization of various networks through practical approach .
List of Practical's (Not Less than 10)	**:**	**Practical / Drawings / Design / Workshop** List of Practical : Any four experiments from the first five of the following and any four experiments from rest of the list. (Any four experiments should be based on simulation software MATLAB along with hardware verification) 1. Verification of Superposition theorem . 2. Verification of Thevenin's theorem . 3. Verification of Reciprocity theorem . 4. Verification of Maximum Power Transfer Theorem. 5. Plot frequency response of RLC Series Resonance circuit 6. Plot frequency response of RLC Parallel resonance circuit. 7. Plot frequency response of Low pass filter. 8. Plot frequency response of High Pass filter. 9. Determination of time response of R-C circuit to a step D.C. voltage input. (Charging and discharging of a capacitor through a resistor) 10. Determination of time response of R-L circuit to a step D.C. voltage input. (Rise and decay of current in an inductive circuit) 11. Determination of time response of R-L-C series circuit to a step D.C.

The assessment of term work shall be done on the basis of the following.

1 Continuous assessment.
2 Performing the experiments in the laboratory.
3 Oral examination conducted on the syllabus and term work mentioned above.

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Syllabus of Final Year B. Tech. (Electrical Engineering) Semester III

Code No:ELE274	**Title: Lab IX: Analog and Digital Circuits**
Teaching Scheme:	**Term Work (Marks): 50**
Practicals: 02 Hrs/week	**Practical Examination (Marks): 50**
Credits: 01	

Course Objectives	**:**	• To develop ability among students for problem formulation, system design and solving skills
List of Practical's	**:**	**Experiments:** 1. Plot V-I characteristics of LED 2. Plot switching characteristics of Transistor. 3. Design and implementation of variable voltage regulator using IC 317 4. Design and implementation of astable multivibrator 5. Design and implementation of monostable multivibrator 6. Design and implementation of RC phase shift oscillator. 7. Implementing a Binary to Gray, gray to binary or Binary to XS3 code converter using gate ICs. 8. Constructing flip-flops like SR, D, JK and T using all NAND gates 9. Designing a mod N counter where N <14 using J K flip-flops and D flip-flops. 10. Design of a ripple counter / OR a two bit comparator using gate ICs. 11. Building of a ring counter and twisted ring counter using D flip-flop ICs. 12. Any one of the following. (i) Full Adder using Gates and using Decoder or a Multiplexer. (ii) Using a shift register as a sequence generator
List of Reference Books	**:**	1. Morris M. Mano. "Digital Design", Prentice Hall International – 1984.

Term Work assessment shall be done on the basis of

- Performing the experiments in the laboratory.
- Continuous assessment.

Practical Examination shall be conducted on the syllabus and term work mentioned above.

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Syllabus of S. Y. B. Tech. (Electrical Engineering) Semester-IV

Code No.: ELE275 **Title: Lab X: Fundamental of Matlab**
Teaching Scheme: Practical **Teachers Assessment: TW-50 Marks**
Practical/Term Work: 2Hrs /Week **Practical/Viva Exam: NA**
Credits: 1

Course Objectives	**:**	Familiarization of various networks through practical approach .
List of Practical's	**:**	**Practical / Drawings / Design / Workshop** List of Practical : At least 5 practical assignments must be given in each practical's. 1. Introduction to Matlab. 2. Working with Matrices. 3. Working with different mathematical Expressions. 4. Working with Relational & Logical Operations. 5. Working with Plotting Functions. 6. Working with Complex & Statistical Functions. 7. Working with different Input / Output of Variables (Numbers & strings) 8. Working with Flow control Functions 9. Introduction to Matlab Simulink Basics 10. Any electrical Circuit Simulation using Matlab

The assessment of term work shall be done on the basis of the following.

- Continuous assessment.
- Performing the experiments in the laboratory.
- Oral examination conducted on the syllabus and term work mentioned above.