ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2025-26

ELECTRICAL ENGINEERING

SEMESTER III

Sr No	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				Minimum Passing Marks	No. of Hrs for ESE
				L	T	P		Mid-Sem Exam	Continual Assessment	End Sem Exam	Total		
1	PCC	25EE301T	Network Analysis	3	-	-	3	20	20	60	100	45	3
2	PCC	25EE302T	Electrical Machines - I	3	-	-	3	20	20	60	100	45	3
3	PCC	25EE302P	Electrical Machines - I Lab	-	-	2	1	-	25	25	50	25	-
4	PCC	25EE303T	Electrical Power System	3	-	-	3	20	20	60	100	45	3
5	PCC	25EE304T	Renewable Energy Sources	2	-	-	2	10	10	30	50	25	1.5
6	PCC	25EE304P	Renewable Energy Sources Lab	-	-	2	1	-	25	25	50	25	-
7	VEC	25EE305T	Environmental Science	2	-	-	2	10	10	30	50	23	1.5
8	HSSM	25EE306T	Fundamentals of Economics and Management	2	-	-	2	10	10	30	50	23	1.5
9	SEC	25EE341P	Career Development - I	-	-	2	1	-	50	-	50	25	-
10	MDM	25EE331M	MDM - I (Refer MDM basket)	2	-	-	2	10	10	30	50	23	1.5
			Total	17	-	6	20	100	200	350	650	-	-

 # MDM to be selected from the list of NPTEL Courses

Multidisciplinary Minor - I	
25EE331M	Fundamentals of Electrical Engineering

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Chairman - BoS	Dean – Academics	Date of Release	Version	

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B. Tech. Scheme of Examination & Syllabus 2025-26

ELECTRICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE301T	Network Analysis	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended • Basic circuit-solving techniques. • Different techniques for DC and AC single-phase and three-phase circuits. • Behavior of different balanced and unbalanced loads • Various mathematical tools/transformations used in circuit analysis.	**Students will be able to** • Apply Kirchhoff's laws and simplify the network using reduction techniques and mesh analysis. • Evaluate the electrical network by Nodal Analysis and simplify the network using Duality. • Analyse the circuit using the network simplification theorems • Analyse the transient response of series and parallel AC circuits and solve problems in the time domain using the Laplace transform. • Formulate the network transfer function in the s-domain and evaluate Two Port Network Parameters and Phase-balanced and unbalanced parameters.

Unit I	**[09Hrs]**
Mesh Analysis: - Introduction to Voltage and Current dependent and independent sources, Source transformation, Mesh basis equilibrium equation, Matrix approach for complicated electrical network containing independent sources and reactance..	
Unit II	**[09Hrs]**
Nodal Analysis and Duality: - Nodal basis equilibrium equation, Matrix approach for a complicated electrical network containing independent sources and reactance, Duality.	
Unit III	**[09Hrs]**
Network Theorem: - Thevenin's, Norton's, Maximum Power Transfer and Reciprocity theorem as applied to A.C. & D.C. circuits (electrical network containing independent sources only).	
Unit IV	**[09Hrs]**
Laplace transform and properties: - Partial fractions, Waveform Synthesis, Analysis of RC, RL, and RLC network with and without initial conditions with Laplace transforms,.	
Unit V	**[09Hrs]**
Two port network: -Definitions of Driving Point and Transfer Functions, Two Port network parameters and their interconnections,	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Network Analysis	Van Valkenburg	3rd	Pearson Education
2	Linear Network Theory	Kelkar and Pandit	39th	Pratibha Publication
3	Circuit and Network	A. Sudhakar and S. P. Shyam Mohan	2nd	Tata MCGraw-Hill Education Pvt. Ltd.

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Network and System	D. P. Roy Choudhary	3rd	New Age International Pvt. Ltd.
2	Electrical circuit	Del Toro		Prentice Hall
3	Electric Circuits & Network	K. Sureshkumar		Pearson Education

Chairman - BoS	Dean – Academics	July 2026 Date of Release	NEP 3.0 Version	Applicable for 2026-27

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE302T	Electrical Machines - I	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
1. To understand 1-phase and 3-phase transformer 2. To develop familiarity with DC Generator 3. To understand basic operation of D. C. Motor	1. To explain the knowledge of the single-phase transformer and different tests to be carried out for performance evaluation 2. To illustrate the knowledge of Three-phase transformer, phasor groups and parallel connection. 3. To analyze and learn the basic concept, construction, working of the D. C. Generator and its characteristics. 4. To discuss the basic concept, working of the D. C. Motor and its characteristics. 5. To analyze and learn the basic concept, construction, working of 3-phase Induction motor and its power stages.

Unit I : Single Phase Transformer	**[8Hrs]**
Revision of single phase transformer, phasor diagram, equivalent circuit, losses, Eddy current losses and Hysteresis losses, efficiency and regulation, O.C. & S.C. test, condition for maximum efficiency, all day efficiency, parallel operation, auto transformer.	
Unit II : Three Phase Transformer:	**[8Hrs]**
Types of 3-ph Transformer, connection diagram, Scott connection, V-V connections, methods of cooling, Sumpner's Test temperature rise test, maintenance of transformer, insulation of transformer, Magnetizing current and harmonics , Polarity test, Numerical on three phase transformer.	
Unit III : DC Generator	**[6Hrs]**
Construction, Basic principle & operation, Types of Generator, Characteristics, Armature reaction & commutation, Compensating winding, interpoles, Critical field resistance, Power stages. Efficiency.	
Unit IV : D.C. Motor	**[6Hrs]**
Basis principle & operation, Types, Characteristics of shunt series & compound motor, speed control of d.c. shunt & series motor, Starting of DC motors, three point and four point starters, losses and efficiency, Applications.	
Unit V : Three Phase Induction Motor	**[8Hrs]**
Construction, Types (Squirrel Cage and Slip-ring), Rotating Magnetic field, Working Principle, Starting & Maximum Torque, Torque-slip characteristics, Power stage and Efficiency	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Electrical Machinery	Dr. P. K. Mukherjee & S. Chakraborty		Rai publication
2	Electrical Machinery	Dr. P. S. Bimbhra		Khanna publisher
3	Electrical Machines	I.S.Nagrath & Dr. D. P. Kothari		McGraw Hill

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Elect. Machinery	Fitzogerald and Kingsley and Kusco		McGraw Hill
2	Performance & Design of A.C. M/C.	M.G. Say,		CBS publisher
3	Performance and design of DC machines	A. E. Clayton and N.N. Hancock,		CBS Publishers

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE302P	Electrical Machines – I Lab	-	-	2	1	-	25	25	50

Course Objectives	Course Outcomes
1. To learn basic operation and test performed on transformer. 2. To study DC Generator and its Characteristics 3. To study DC Motor, its speed control and its Characteristics 4. To study Induction Motor and its Characteristics	1. To identify the tests performed on 1-phase & 3-phase transformer. 2. To identify methods of speed control og DC motor. 3. To illustrate the process of Voltage builed up in DC Generator. 4. To analyze load characteristics of DC Motor. 5. To analyze load characteristics of Induction Motor

Expt. No.	Title of the experiment
1	To Perform Open Circuit And Short Circuit Test On A Three Phase Transformer.
2	Determination of Efficiency and Voltage Regulation of a Three Phase Transformer by Direct Loading
3	To find Magnetization Characteristic of a DC Generator
4	To study the voltage build up of DC Shunt Generator
5	To Perform Load Test on DC Shunt Generator
6	Speed Control of D.C. Shunt Motor a) By Varying Field Current With Armature Voltage Kept Constant b) By Varying Armature Voltage With Field Current Kept Constant.
7	To Perform Load Test On D.C. Shunt Motor.
8	To Study Constructional parts of DC Machine.
9	To perform No-load and Blocked rotor test on 3-phase Induction Motor
10	To perform load test on 3-phase Induction Motor

Text Books

S.N	Title	Authors	Edition	Publisher
1	Electrical Technology Volume II	B. L. Thareja		Khanna publisher
2	Electrical Machines	Dr. P. S. Bimbhra		Khanna publisher

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Laboratory Manual			
2	Laboratory Courses in Electrical Engineering	R.L. Kharbanda and S. G. Tarnekar		Khanna publisher

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE303T	Electrical Power System	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
Students will develop the ability to: • model & represent the power system components. • represent & calculate the transmission line parameters. • explain the concepts of load flow analysis.	**Students will be able to:** • Explain the generation, transmission, and distribution of power & represent power system in per unit. • Calculate transmission line parameters of a power system. • Classify various distribution schemes, LT & HT cables. • Evaluate performance of transmission lines by interpretation of equations and analytical solutions in system design. • Describe basic concepts of load flow analysis & Insulators.

Unit I	**[9 Hrs]**
Structure of electrical power systems: - Brief exposure of generation, transmission & distribution aspects; Elementary consideration of economic bulk power supply system; Use of high voltage; General system consideration, Concept of real, reactive, and complex power; Power Transfer in AC circuits and Reactive Power. Load and their characteristic; Voltage & Frequency dependence of loads; Per Unit (PU) system representation.	
Unit II	**[9 Hrs]**
Representation of power system components, Inductance & Capacitance of transmission lines.	
Unit III	**[9 Hrs]**
Elementary distribution schemes & Cables: - Feeders and Distributors; LT & HT cables.	
Unit IV	**[9 Hrs]**
Performance of transmission lines: - Voltage regulation & efficiency of power transmission line using simple series equivalent representation, T-representation, pi- representation.	
Unit V	**[9 Hrs]**
Load flow studies & Insulators: - Introduction to load flow studies, Classification of buses, Formation of bus admittance matrix, Static load flow equations; Concept of insulator, types of insulators, String efficiency.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Elements of Power System	Gaurav Gadge	1	Electro-Tech Publication, Satara
2	Power System Analysis	C. L. Wadhawa	6	New Age International
3	Power System Analysis	Ashfaq Hussain	5	CBS

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Elements of Power System Analysis	W. D. Stevenson	4	Mc-Graw Hill
2	Electric Energy System Theory	O. E. Elgerd	2	Mc-Graw Hill
3	Modern Power System Analysis	Nagrath & Kothari	3	Tata Mc-Graw Hill

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ELECTRICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE304T	Renewable Energy Sources	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended • To learn the principles of generating Electrical energy from Renewable Energy Sources. • To gain understanding of the working of Off-grid and Grid connected Renewable Energy Generation Schemes.	**Students will be able to** **1.** Explain the fundamentals of solar radiation geometry, its measurement & estimation. **2.** Gain the knowledge of selection of sites for wind farm and their different types of wind generators. **3.** Identify renewable energy sources such as geothermal, MHD, biomass, fuel cell, tidal, ocean for generating electricity.

Unit I	**[10Hrs]**
Solar Radiation & its Measurement: Solar Constant, Solar radiation at earth's surface, solar radiation geometry, solar radiation measurement, estimation of average solar radiation. **Solar Energy Collectors**: Principles of the conversion of solar radiation into heat, flat plate collectors, energy balance equation, concentrating collectors, comparison of concentrating and flat plate collectors.	
Unit II	**[10Hrs]**
Solar Photovoltaic power generation: Introduction to PV cell, Construction & working, basic PV system for power generation, Characteristic of solar cell, series and parallel connection, types of solar cell, module manufacturing, partial shading, bypass and blocking diode, different panel selection (Monocrystalline, Polycrystalline etc.), Calculation of Solar rooftop setup (rating), Introduction to MPPT.	
Unit III	**[10Hrs]**
Wind Energy: Basic principles of wind energy conversion, site selection considerations, wind energy conversion system, lift and drag force, classification of wind energy conversion system (WECS), basic components of WEC system, types of wind turbine with advantages and disadvantages.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Non-conventional Energy Sources	G.D Rai	10th reprint 2002	Khanna Publishers, New Delhi
2	Non-conventional Energy Resources	B. H. Khan	2006	Tata Mc Graw hill Publishing Co. Ltd.
3	Solar Photovoltaics Fundamentals, Technologies and Applications	C. S. Solank	2011	PHI

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Renewable Energy Applications	G. N. Tiwari and M. K. Ghosal	2004	Narosa Publications
2	Energy Technology	Rao and Parulekar	2nd reprint 2002	Khanna Publishers, New Delhi

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE304P	Renewable Energy Sources Lab	-	-	2	1	-	25	25	50

Course Objectives	Course Outcomes
This course is intended • To learn the principles of generating Heat Energy and • Electrical energy from Renewable Energy Sources. • To gain understanding of the working of Off-grid and • Grid-connected Renewable Energy Generation • Schemes.	**Students will be able to** 1. Explain V-I characteristics of solar PV module. 2. Explain V-I characteristics of a series and parallel connected PV modules. 3. Explain effect of tilt angle on power output of module 4. Explain effect of shadow on power output of solar PV module 5. Describe wind power generation.

Expt. No.	Title of the experiment
1	To demonstrate the I-V and P-V characteristics of PV module with varying radiation and temperature level.
2	To demonstrate the I-V and P-V characteristics of series and parallel combination of PV modules
3	To show the effect of variation in tilt angle of PV module.
4	To demonstrate the effect of shading on module output power.
5	To demonstrate the working of diode as bypass diode and blocking diode.
6	Visit to rooftop Solar Power Plant.
7	To demonstrate solar thermal water heater.
8	To find out the start up speed and cut -in speed of wind turbine experimentally.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Non-conventional Energy Sources	G.D Rai	10th reprint 2002	Khanna Publishers, New Delhi
2	Non-conventional Energy Resources	B. H. Khan	2006	Tata Mc Graw hill Publishing Co. Ltd.
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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE401T	Environmental Sciences	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended 1. **To provide knowledge** of natural resources, their classification, utilization, and the importance of conservation for sustainable development. 2. **To create awareness** about climate change issues such as global warming, ozone depletion, acid rain, and their environmental impacts along with mitigation strategies. 3. **To introduce** the fundamental concepts of **Sustainable Science** and promote awareness of eco-friendly technologies	**Students will be able to** 1. Describe natural resources, their classification, and the importance of conservation, including the role of individuals and public awareness in sustainable resource management. 2. Analyze climate change and assess their environmental impacts and mitigation strategies. 3. Examine different types of environmental pollution, their causes, effects, and control measures, along with solid waste management practices and disaster management techniques. 4. Apply concepts of sustainable practices to evaluate environmentally friendly materials, processes, and technologies in engineering applications

UNIT I – Natural Resources & Climate Changes **[10 Hrs.]**

Natural Resources- Definition, scope and importance; Need for public awareness -Institutions in environment, people in environment. Renewable and non-renewable and associated problems; Role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles. Conservation of biodiversity**:** In-situ and Ex-situ conservation of biodiversity. **Climate Changes** Global warming and greenhouse effect, Climate change impacts and mitigation strategies.

UNIT II - Environmental Pollution **[10 Hrs.]**

Definition Cause, effects and control measures of a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. **Solid waste Management:** Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. **Disaster management:** floods, earthquake, cyclone and landslides, Ozone layer depletion, Acid rain.

UNIT II – Sustainable Science **[10 Hrs.]**

Introduction, Principles of Green Chemistry with example, Green Reagents- Super Critical Fluid (CO2)- Properties and Applications, Green Building-Introduction, Components, Reuse and safety of building material and its environmental impact., Green Crackers- Introduction, Advantages. Carbon Credit, Carbon Sequestration, Carbon Capture and Storage CCS.

Reference Books-

S.N	Title	Authors	Edition	Publisher
1	Environmental Problems and solutions	D.K.Asthana,Mira Asthana		S.Chand.
2	Bio-Diversity	M.S.Swaminathan		Macmillan India Ltd.
3	Essentials of Ecology & Environmental Science	Rana		Prentice Hall of India
4	Environmental Chemistry	A.K.De		New Age International
5	Environmental Pollution Monitoring & Control	Khopkar S. M.		New Age International

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE402T	Fundamentals of Economics and Management	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
1. The course examines how the economics, business and industrial management practices are related and how business decision is taken.	**Students will be able to:** 1. Apply economic principles for business decisions by understanding production cost relationships 2. Assess impact of macroeconomics and government policies on business and economy. 3. Recognize key management, marketing, and financial functions and their role in effective business decision-making

Unit I	**[10Hrs]**
Economics, Classification of economics, Industrial economics, Consumer demand, Law of Demand, Determinants of demand, Demand forecasting, Law of supply, Types of Elasticity of demand, Concept of Production, Factors of Production, types of cost, cost curves.	
Unit II	**[10Hrs]**
Market Structures: Perfect competition, Monopoly, and Monopolistic competition, Functions of central bank, Inflation, Deflation, Recession, National income, GDP, GNP, Liberalization, Privatization and Globalization	
Unit III	**[10Hrs]**
Definition of management, functions of management, Functions of human resources Management, Marketing Management, Functions of Marketing Management. Methods of pricing, advertising and sales promotion. Financial Management, functions of financial management, Sources of finance.	

Text Books

S. N	Title	Authors	Edition	Publisher
1.	Managerial Economics	D.N. Dwivedi	8th	Vikas Publishing
2.	Modern Economic Theory	K.K. Dewett	2005	S. Chand Publisher
3.	Industrial Management	Dr.I.K. Chopde, Dr.A.M. Sheikh	Revised edition	S. Chand Publisher

Reference Books

S. N	Title	Authors	Edition	Publisher
1.	Industrial Organization and Industrial economics	T.R. Banga, S.C. Sharma	2006	Khanna Publishers

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
25EE341P	Career Development – I	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
To develop students' quantitative aptitude, logical reasoning, verbal communication, critical thinking, self-management, and professional employability skills required for academic success, competitive examinations, and workplace readiness.	**CO1.** Students will be able to solve problems related to number systems, logical series, equations, ratios, proportions, and arrangement-based reasoning with accuracy and logical understanding. **CO2.** Students will be able to apply concepts of percentage, partnership, profit and loss, discount, simple interest, and compound interest to solve practical and business-oriented numerical problems. **CO3.** Students will be able to perform SWOC analysis, formulate SMART goals, and demonstrate professional verbal communication skills in workplace environments. **CO4.** Students will be able to construct logical arguments, participate effectively in debates, and deliver coordinated group presentations with confidence and clarity. **CO5.** Students will be able to demonstrate proficiency in grammar, vocabulary, reading comprehension, and professional communication while exhibiting consistent participation, individual responsibility, collaborative teamwork, and professional classroom conduct.

Unit I (10 marks)	**[7Hrs]**
Number System: - Divisibility Test, LCM/HCF Problems, Factorization, Successive Division, **Number Series:-** Missing Number Series, Wrong Number series, Letter Series, Analogy (Number, Letter, Word, Non Verbal analogy), **Simple Equations :-** Two digit, 3 digit, ages and puzzles questions**, Ratio & Proportion:-** Joining of two ratios, Proportion, Mean Proportions, Problems on ages Linear, circular Arrangement	
Unit II (15 marks)	**[7Hrs]**
Percentage: - Percentage to ratio conversion, Successive Percentage, Increase Decrease of Percentage, etc. Partnership Problems, **Profit Loss:-** Concept of Profit loss, Relation between CP ,SP Profit and Loss, Problems on Profit Loss. **Discount:-** Successive Discount, Relation between MP Discount and Selling Price, Problems based on Discount, Simple Interest, Compound Interest	
Unit III (5 marks)	**[5Hrs]**
SWOC Analysis and SMART Goal Setting for Personal and Professional Development **Corporate Communication I –** Professional Verbal Communication in Workplace Environments-	
Unit IV (10 marks)	**[6Hrs]**
Debating Skills – Logical Thinking, Argument Building, and Public Speaking **Group Presentation Skills** – Team Coordination, Public Speaking, and Presentation Techniques	
Unit V (10 marks)	**[3Hrs]**
Verbal Ability Quiz – Grammar, Vocabulary Building, and Reading Comprehension for Professional Communication **Continuous Assessment** - Attendance, Individual Engagement & Team Dynamics	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude By R. S. Aggarwal	R.S. Aggarwal		
2	Quantitative Aptitude	Shripad Deo		Allied Publishers Pvt Ltd
3	A Modern Approach to Verbal & Non-Verbal Reasoning	R.S. Aggarwal		

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude for CAT by Arun Sharma	Arun Sharma		
2	How to Develop Self-Confidence & Influence People by Public Speaking	Dale Carneige	2004	Sulabh Publications
3	Professional Communication Skills	Alok Jain	2006	S Chand & Company Ltd
4	Soft Skills & Employability Skills	Sabina Pillai	2008	Cambridge

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
25EE331M	MDM – I Fundamentals of Electrical Engineering	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended to 1. Understand the basic concepts of electrical engineering, working principles, construction, and applications of single-phase transformers. 2. Comprehend the operation, characteristics, and applications of three-phase induction motors. 3. Analyze the performance and distinguish the functionalities of AC and DC motors.	**Students will be able to** 1. Describe the basic concepts of electrical engineering. 2. Explain construction and working principle of a single-phase transformer with practical applications. 3. Classify different types of DC and AC motors and describe the fundamentals of 3 phase Induction Motor.

UNIT 1: BASIC CONCEPTS OF ELECTRICAL ENGINEERING	**[08Hrs]**
The basic concepts of DC and AC (Single Phase and Three Phase Circuits),Basic Laws, Circuit Theorems, Inductors & Capacitors, Magnetic Circuits.	
Unit II: SINGLE PHASE TRANSFORMER	**[08Hrs]**
Construction and Working Principle, Core and shell types, operation under no-load and load conditions. EMF Equation, Ideal and practical transformer, Efficiency and Regulation.	
UNIT 3: AC AND DC MOTORS	**[08Hrs]**
Introduction to 3 Phase Induction Motor, Principle of Operation, Rotating magnetic field, Construction and Type, torque-slip characteristics, Starting Methods, Speed Control Methods, DC Motors Types (Shunt, Series, Compound)with applications, BLDC motor, AC Motors-Single-phase induction motor: types (capacitor start/run, shaded pole) Universal motor and Servomotor (basic operation and applications).	

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Text Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of Electrical Engineering	Prof. Debpriya Das, IIT Kharagpur https://nptel.ac.in/courses/108105112		