



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

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

B. Tech. Scheme of Examination & Syllabus 2023-24

Electrical Engineering

SEMESTER VI

| Sr. No | Course Category | Course Code | Course Title | Hours per Week | | | Credits | Maximum Marks | | | | No. of Hrs for ESE |
|--------|-----------------|-------------|-------------------------------------|----------------|---|----|---------|---------------------|----------------------|---------------------|-------|--------------------|
| | | | | L | T | P | | Mid Sem Examination | Continual Assessment | End Sem Examination | Total | |
| 1. | PCC | 23EE601T | High Voltage Engineering | 2 | 1 | - | 3 | 15 | 15 | 70 | 100 | 3 |
| 2. | PCC | 23EE601P | High Voltage Engineering Lab | - | - | 2 | 1 | - | 25 | 25 | 50 | - |
| 3. | PCC | 23EE602T | Control System Engineering | 2 | 1 | - | 3 | 15 | 15 | 70 | 100 | 3 |
| 4. | PCC | 23EE602P | Control System Engineering Lab | - | - | 2 | 1 | - | 25 | 25 | 50 | - |
| 5. | PEC | 23EE603T | Program Elective - II | 3 | - | - | 3 | 15 | 15 | 70 | 100 | 3 |
| 6. | AEC | 23AS601T | Economics & Management | 2 | - | - | 2 | 7.5 | 7.5 | 35 | 50 | 1.5 |
| 7. | OE | 23EE661O | Open Elective - III | 3 | - | - | 3 | 15 | 15 | 70 | 100 | 3 |
| 8. | PR | 23EE604P | Project - I | - | - | 4 | 2 | - | 50 | - | 50 | - |
| 9. | PCC | 23EE605P | Electrical Engineering Workshop Lab | | | 2 | 1 | - | 50 | - | 50 | - |
| 10. | SEC | 23EE641P | Career Development - VI | - | - | 2 | 1 | - | 50 | - | 50 | - |
| 11. | MDM | 23EE631M | Multidisciplinary Minor - II | 3 | - | - | 3 | 15 | 15 | 70 | 100 | 3 |
| | | | | 15 | 2 | 12 | 23 | 82.5 | 282.5 | 435 | 800 | |

| Course Code | Open Elective - III | Course Code | Program Elective - II |
|--------------|---|---------------|--|
| 23EE661O(i) | Electric Vehicle | 23EE603T(i) | Micro-controller Application in Electrical Engineering |
| 23EE661O(ii) | Monitoring & Testing of Electrical Machines | 23EE603T(ii) | Computer Applications in Power System |
| | | 23EE603T(iii) | Electric Drives |
| | | 23EE603T(iv) | Vehicle Dynamics |
| | | 23EE603T(v) | Utilization of Electrical Energy |
| 23EE603T(vi) | Monitoring & Testing of Electrical Machines | | |
| Course Code | Multidisciplinary Minor - IV | | |
| 23EE631M | Electric Drives | | |

| | | | | |
|----------------|------------------|-----------------|---------|---------------------------|
| | | July 2025 | NEP 2.1 | Applicable for 2025-26 |
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B. Tech. Scheme of Examination & Syllabus 2023-24

ELECTRICAL ENGINEERING

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | | |
|-------------|--------------------------|----|----|----|---------|------------|----|-----|-------|
| | | | | | | MSE | CA | ESE | Total |
| 23EE601T | High Voltage Engineering | 2 | 1 | - | 3 | 15 | 15 | 70 | 100 |
| | | | | | | | | | |

| Course Objectives | Course Outcomes |
|---|---|
| <ol style="list-style-type: none">1. Enable students to explain the breakdown mechanism of dielectrics2. Enable students to describe various methods of high voltage generation and measurement.3. Enable students to understand the impact of non-destructive testing of power system equipment. | <p>Students will be able to</p> <ol style="list-style-type: none">1. Describe the breakdown processes of gas, liquid, solid and vacuum dielectrics.2. Enumerate the causes of over voltages due to lightning, switching and explain the effects due to travelling waves.3. Explain the high AC, DC & impulse voltage generators for testing of insulators.4. Compare and describe the measurement methods for high AC, DC & impulse voltages used for testing of insulators.5. Explain the testing methods of different power system components. |

| | |
|--|---------------|
| Unit I | [9Hrs] |
| Breakdown mechanism in Di-electric: Townsend's criterion for break down (B.D.) in gases, Paschen's law. Corona discharge introduction and applications, Vacuum insulation, Liquid insulators B.D., Solid insulator B.D. | |
| Unit II | [9Hrs] |
| Lightning and switching over voltages (O.V.): Characteristics of lightning strokes, Protection of lines by ground wires, protection by lightning arrester, selection of L.A ratings, surge-absorber. Characteristics of switching surges; control of O.V. due to switching. Traveling waves and Insulation coordination; Introduction to Traveling waves on transmission lines, Classification of lines, attenuation and distortion of traveling waves, Introduction to BIL and SIL. | |
| Unit III | [9Hrs] |
| Generation of high voltage and Currents: Generation of High DC voltages, Generation of high AC voltages. Generation of impulse voltages, generation of switching surges, generation of impulse current. | |
| Unit IV | [9Hrs] |
| Measurement of high voltage and current: Measurement of high AC & DC voltage using various methods. Measurement of High AC & DC current using various methods. | |
| Unit V | [9Hrs] |
| Non-destructive and high voltage testing of electrical apparatus: Measurement of DC Resistivity, measurement of Dielectric constant and loss-factor, Schering bridge circuit, partial discharge measurement, discharge detection in power cable. | |

Text Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--------------------------|---------------------------|---------|-----------------------|
| 1 | High voltage Engineering | M. S. Kamaraju & V. Naidu | | Tata MacGraw-hill |
| 2 | High voltage Engineering | C. L. Wadhwa | | New Age International |

Reference Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--------------------|-----------------|---------|-----------------------|
| 1 | EHVAC transmission | R. D. Begamudre | | New Age International |

| | | | | |
|----------------|------------------|-----------------|---------|---------------------------|
| | | July 2025 | NEP 1.0 | Applicable for 2025-26 |
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B. Tech. Scheme of Examination & Syllabus 2023-24

ELECTRICAL ENGINEERING

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | |
|-------------|------------------------------|----|----|----|---------|------------|-----|-------|
| | | | | | | CA | ESE | Total |
| 23EE601P | High Voltage Engineering Lab | - | - | 2 | 1 | 25 | 25 | 50 |
| | | | | | | | | |

| Course Objectives | Course Outcomes |
|--|---|
| <ol style="list-style-type: none">To study and use different high voltage equipmentTo understand breakdown mechanism of different dielectrics | <ol style="list-style-type: none">Enlist high voltage equipment used in testingDetermine the breakdown strength of solid insulatorsDetermine the breakdown strength of liquid insulatorsDemonstrate the use of sphere gapVisualize the electric field distributions |

| Expt. No. | Title of the experiment |
|-----------|--|
| 1 | Study of High Voltage Laboratory Equipment. |
| 2 | Study arcing phenomenon using Horn Gap Apparatus. |
| 3 | Demonstration of treeing phenomenon on solid insulation i.e. Paper, Card board on '25 KV High Voltage Tester'. |
| 4 | To study Voltage Distribution in Uniform & Non Uniform Fields using 'Electrolytic Tank assembly'. |
| 5 | Demonstration of Corona formation on High Voltage Overhead Lines. |
| 6 | Calibration of voltmeter using Sphere gap assembly |
| 7 | To determine the breakdown strength of Transformer oil |
| 8 | To study surface breakdown for thin paper sample. |

Text Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--------------------------|---------------------------|---------|-----------------------|
| 1 | High voltage Engineering | M. S. Kamaraju & V. Naidu | | Tata MacGraw-hill |
| 2 | High voltage Engineering | C. L. Wadhwa | | New Age International |

Reference Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--------------------|-----------------|---------|-----------------------|
| 1 | EHVAC transmission | R. D. Begamudre | | New Age International |

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ELECTRICAL ENGINEERING

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | | |
|-------------|----------------------------|----|----|----|---------|------------|----|-----|-------|
| | | | | | | MSE | CA | ESE | Total |
| 23EE602T | Control System Engineering | 2 | 1 | - | 3 | 15 | 15 | 70 | 100 |

| Course Objectives | Course Outcomes |
|--|--|
| This course is intended <ol style="list-style-type: none">To determine transfer function of linear time-invariant systemTo understand the stability, time domain specifications and tools.To study state variable analysis | Students will be able to <ol style="list-style-type: none">Determine transfer function by classical approach.Evaluate time response specifications of second order system.Analyse stability of the control systemAnalyze the relative stability through root locus method.Determine state model. |

| | |
|--|----------|
| Unit I | [09Hrs] |
| Introduction to Control System:- Need of control system, Open loop and closed loop control system, Transfer function, Block diagram reduction. Signal flow graph. | |
| Unit II | [09Hrs] |
| Time Response Analysis:- Basic concept of steady state and transient response, Time response of first and second order system, Time response specifications of second order system. | |
| Unit III | [09Hrs] |
| Stability Analysis :- Stability of control systems, Stability by Routh Hurwitz criterion, special cases for determining relative stability. | |
| Unit IV | [09 Hrs] |
| Root Locus Techniques: Root location and its effect on time response, Construction of root locus. | |
| Unit V | [09Hrs] |
| State Variable Analysis: Formation of state model in phase variable and diagonal (CCF) form, determination of transfer function using state model | |

Text Books

| S.N | Title | Authors | Edition | Publisher |
|-----|----------------------------|-----------------|---------|------------------------|
| 1 | Feedback Control System | R A Barapatre | 11 | Tech-Max |
| 2 | Modern Control Engineering | D Roy Choudhary | | PHI |
| 3 | Control System Engineering | U A Bakshi | | Technical Publications |

Reference Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--------------------------------------|--------------------|---------|------------------------|
| 1 | Control System Engineering | S. K. Bhattacharya | | Pearson |
| 2 | Control Systems, Principles & Design | M. Gopal | | TMH (Tata McGraw Hill) |
| 3 | Control Systems Engineering | Samarajit Ghosh | | Pearson |

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ELECTRICAL ENGINEERING

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | |
|-------------|--------------------------------|----|----|----|---------|------------|-----|-------|
| | | | | | | CA | ESE | Total |
| 23EE602P | Control System Engineering Lab | - | - | 2 | 1 | 25 | 25 | 50 |
| | | | | | | | | |

| Course Objectives | Course Outcomes |
|--|--|
| <p>This course is intended</p> <ol style="list-style-type: none">1. To determine transfer function of linear time-invariant system.2. To understand the stability, time domain specifications and tools.3. To study state variable analysis | <p>Students will be able to</p> <ol style="list-style-type: none">1. Determine transfer function by classical approach.2. Understand time response specifications of second order system.3. Analyse stability of the control system4. Analyze the relative stability through root locus method.5. To determine state model. |

| Expt. No. | Title of the experiment |
|-----------|--|
| 1 | To plot the characteristics of Potentiometer as an Error detector. |
| 2 | To Plot the characteristic of synchro as a: a) Transducer b) Transmitter-Receiver c) Error detector |
| 3 | To plot Speed-Torque characteristics of AC servo motor. |
| 4 | To plot effect of gain on speed of DC servo motor in closed loop. |
| 5 | To study the time response of a second order control system using PSIM. |
| 6 | To study the frequency response of a second order control system using PSIM. |
| 7 | To plot the effect of addition of zero and pole on time response of a unity feedback control system using MATLAB. |
| 8 | To plot the effect of addition of zero and pole to open loop transfer function on root locus for a unity feedback control System using MATLAB. |
| 9 | To develop state space model for transfer function using MATLAB. |

Text Books

| S.N | Title | Authors | Edition | Publisher |
|-----|-----------------------------------|---------------|---------|-----------------------|
| 1 | Modern Control System Engineering | K. Ogatta | | Prentice Hall, India |
| 2 | Control System Analysis | Nagrath/Gopal | | New age International |
| 3 | Automatic Control Systems | B. C. Kuo | | Prentice Hall, India |

Reference Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--------------------------------------|--------------------|---------|------------------------|
| 1 | Control System Engineering | S. K. Bhattacharya | | Pearson |
| 2 | Control Systems, Principles & Design | M. Gopal | | TMH (Tata McGraw Hill) |
| 3 | Control Systems Engineering | Samarajit Ghosh | | Pearson |

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ELECTRICAL ENGINEERING

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | | |
|---------------|-------------------------|----|----|----|---------|------------|----|-----|-------|
| | | | | | | MSE | CA | ESE | Total |
| 23EE603T(iii) | PE - II Electric Drives | 3 | - | - | 3 | 15 | 15 | 70 | 100 |

| Course Objectives | Course Outcomes |
|--|---|
| <ol style="list-style-type: none"> 1. Enable students to learn concepts of Electric Drive, characteristics, Dynamics of Electric Drives 2. Enables students to learn concept of Various contactors used, MMC design 3. Enables students to learn concept of Electric Traction system, Control of Traction Motors 4. Enables student to learn concept of different control techniques used for control of Electric Drives 5. Enables students to learn concept of Digital control of AC Electric Drives using Microprocessor | <p>Students will be able to</p> <ol style="list-style-type: none"> 1. Classify various types Electric Drives, different motors used in Electric Vehicle, their dynamics along with selection and control 2. Select various AC and DC contactors used in starting and control of Electric Drives 3. Explain the concept of Electric traction and their control strategies used in practice 4. Describe various converters used in control of electrical drives in industries 5. Analyze modern control of Electric Drives using microprocessor |

| | |
|---|-----------------|
| Unit I | [10 Hrs] |
| Basics of Electric Drive: Block Diagram, Advantages of Electric Drives, Different motors used in Electric Vehicles, Dynamics of Electric Drives, Classes of Motor Duty, Selection of Power Rating of Motors, Braking of Electric Drives, Load equalization | |
| Unit II | [09 Hrs] |
| AC and DC Contactors and Relays: Lock out contactors, Magnetic structure, Operation, Arc Interruption, Contactor Rating, HV contactors, Control circuit for automatic starting and braking of DC motors and 3 phase induction motor drives, Control Panel design for MCC | |
| Unit III | [10 Hrs] |
| Electric Traction Drives: Motors used in AC / DC traction, Their performance and desirable characteristics, requirement and suitability of Motor for traction duty Traction motor control – Control of DC traction motor, Series - Parallel control with numerical starting and braking of traction motors | |
| Unit IV | [08 Hrs] |
| Control Techniques for Electrical Drives: Basic features, Block Diagram representation, Transfer function of Armature and Field Control of DC Motors, | |
| Unit V | [08Hrs] |
| Microprocessors and Control of Electrical Drives: Use of Microprocessor in Drives Technology, Control of AC Drives using Microprocessors – Field Orientation Control of Induction Motors, Microprocessor control of Synchronous Motors, Microprocessor based Variable Speed Drives | |

Text Books

| S. N. | Title | Authors | Edition | Publisher |
|-------|--|---------------------------------|-----------------|---------------|
| 1 | Electric Drives: Concepts and Applications | Vedam Subrahmanyam | 2 nd | TMH |
| 2 | Modern Electric Traction: Including Other Applications of Electrical Engineering in Railways | H Pratap | | Dhanpat Rai |
| 3 | Fundamentals Of Electric Drives And Control | B.R. Gupta (Author), V. Singhal | | Katson |
| 4 | Fundamentals of Electric Drives | G K Dubey | 2 nd | Alpha Science |

Reference Books

| S. N. | Title | Authors | Edition | Publisher |
|-------|---|-------------------|-----------------|-------------------------|
| 1 | Industrial Motor Control | Stephen L. Herman | 7 th | Delmar Cengage Learning |
| 2 | Electric Motor Drives: Modelling Analysis and Control | R. Krishnan | | Prentice Hall |

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B.Tech. Scheme of Examination & Syllabus 2023-24**Electrical Engineering****SIXTH SEMESTER**

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | | |
|-------------|------------------------|----|----|----|---------|------------|-----|-----|-------|
| | | | | | | MSE | CA | ESE | Total |
| 23AS601T | Economics & Management | 2 | - | - | 2 | 7.5 | 7.5 | 35 | 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. | 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, financial and HRM 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 |

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ELECTRICAL ENGINEERING

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | | |
|-------------|------------------------|----|----|----|---------|------------|----|-----|-------|
| | | | | | | MSE | CA | ESE | Total |
| 23EE661O(i) | OE-II Electric Vehicle | 3 | - | - | 3 | 15 | 15 | 70 | 100 |

| Course Objectives | Course Outcomes |
|---|---|
| <ol style="list-style-type: none">1. The course will enable students to compare and analyse different types of EVs.2. The course will enable students to select suitable of electric motors for EV.3. The course will enable students analyse various types of energy storage devices for EV. | <p>Students will be able to</p> <ol style="list-style-type: none">1. Quantify economic and environmental impact of EVs compared to IC engines.2. Analyze the mathematical models of EVs and justify impact of various parameters3. Compare various types of EV propulsion drive motors and be able to choose best for given application4. Enlist various types of EV storage systems and analyze characteristics5. Analyze various Power electronic circuit topologies for EVs |

| | |
|---|--------|
| Unit I | [8Hrs] |
| Introduction: History of EVs, Economic and Environmental impact of IC Engine vehicles, Benefits and limitations of EV, Types of EV, EV block diagram, Power source characteristics of EV, Various types of Drive trains | |
| Unit II | [7Hrs] |
| Electric Vehicle Modelling: Rolling resistance, Aerodynamic drag, Power and energy equations, Model of traction force of EV, angular acceleration force, dynamic model of EV, vehicle performance parameters, various types of drive trains. | |
| Unit III | [7Hrs] |
| Electric Propulsion: Classification of electric motors, Introduction to Brushed DC Motor, Induction motors, BLDC motor and SRM motor. Comparison of Characteristics of motors and EV Motor Sizing. | |
| Unit IV | [7Hrs] |
| Energy Storage: Classification of energy storage devices, Battery based energy storage, Introduction to various types of batteries, battery charging methods, Fuel cells, Ultra Capacitor based energy storage and Flywheel based energy storage. | |
| Unit V | [7Hrs] |
| Power Converters: Buck, Boost and Buck-Boost Converters, Multi-quadrant DC-DC converters, Types of inverter, Control of inverters | |

Text Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--|---|---------|-----------------|
| 1 | Electric and Hybrid Vehicles: Design Fundamentals | Iqbal Hussein | | CRC Press, 2003 |
| 2 | Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design | Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi | | CRC Press, 2004 |
| 3 | Electric Vehicle Technology Explained | James Larminie, John Lowry | | Wiley, 2003 |

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ELECTRICAL ENGINEERING

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | |
|-------------|-------------|----|----|----|---------|------------|-----|-------|
| | | | | | | CA | ESE | Total |
| 23EE604P | Project-I | - | - | 4 | 2 | 50 | - | 50 |

| Course Objectives | Course Outcomes |
|---|--|
| This course is intended To enable the Students to undertake short research projects and Fabricate it. | Students will be able to Explain fabrication work of project set up / devices or developed software. |

| S.N. | Project |
|------|---|
| 1 | Projects are based on : Recent Trends in Electrical Power System, Power Electronics and Renewable Energy. |

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SIXTH SEMESTER

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|-------------|-------------------------------------|----|----|----|---------|------------|-----|-------|
| | | | | | | CA | ESE | Total |
| 23EE605P | Electrical Engineering Workshop Lab | - | - | 2 | 1 | 50 | - | 50 |
| | | | | | | | | |

| Course Objectives | Course Outcomes |
|---|---|
| <p>This course is intended</p> <ul style="list-style-type: none">To develop basic knowledge of preliminary energy audit, design of illumination scheme and wiring system.To introduce with transformer design for particular ratingTo introduce with home appliances. earthing system and modern tools used for electrical design | <p>Students will be able to</p> <ul style="list-style-type: none">Calculate total energy consumed or electric billDesign illumination scheme and wiring system in case of domestic consumersManufacture small VA rating shell type transformerUnderstand earthing system and different types of home appliancesDesign of control panel using AutoCad Electrical |

| Expt. No. | Title of the experiment (Any 8 practicals) |
|-----------|--|
| 1 | Calculation of cost of energy consumption in case of domestic consumers |
| 2 | To find number of lights required for given space |
| 3 | Design of wiring system 1) Staircase Wiring and 2) Godown Wiring |
| 4 | Design of wiring system for residential building |
| 5 | Design of single phase shell type transformer of small VA rating |
| 6 | To study different types of earthing system |
| 7 | Design of overall dimensions of three phase core type transformer using MATLAB |
| 8 | Design of overall dimensions of three phase Induction Motor using MATLAB |
| 9 | To study home appliances 1) Electric Fan 2) Electric Mixer 3) Water Heater |
| 10 | Design of control panel of electrical machines using AutoCad Electrical |
| 11 | PCB Design |

Text Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--|--------------------|---------|----------------------------------|
| 1 | Electrical Design Estimating & Costing | S. K. Bhattacharya | Third | New Age International Publishers |
| 2 | Electrical Wiring Estimating & Costing | Dr. S. L. Uppal | Second | Khanna Publishers |

Reference Books

| S.N | Title | Authors | Edition | Publisher |
|-----|---------------------------|--------------|---------|-------------------|
| 1 | Electrical Machine Design | A.K. Sawhney | Third | Dhanpat Rai & Co. |

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Electrical Engineering

SIXTH SEMESTER

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | |
|-------------|-------------------------|----|----|----|---------|------------|-----|-------|
| | | | | | | CA | ESE | Total |
| 23EE641P | Career Development – VI | - | - | 2 | 1 | 50 | - | 50 |

| Course Objectives | Course Outcomes |
|--|--|
| 1. The sole objective of imparting aptitude training is to make students able to critically evaluate various real-life situations by resorting to an analysis of key issues and factors. 2. This Aptitude Training helps them to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions. 3. To categorize, apply and use thought process to distinguish between concepts of Quantitative methods. | 1. Students shall solve real life problems comparison of various probabilities, Permutation and combinations to ascertain the best outcomes expected 2. Students shall draw conclusions or Understand geometrical terminology for angles, triangles, quadrilaterals and circles with the help of formulas. 3. The ability to analyze and interpret different forms of data, including tables, graphs, charts, and more. 4. Enable students to critically analyze material (information) to order to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions. 5. The ability to analyses visual information and solve problems based on visual reasoning. |

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| Unit I | [6Hrs] |
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Aptitude:- Permutation and Combinations:- Letter Arrangement, Number Arrangement, miscellaneous questions
 Probability:- Color balls, Dice Problems, coins Problems, Playing Cards Problem, Miscellaneous
 Imax:- Learn Start-up, True Entrepreneurship,

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| Unit II | [6Hrs] |
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Aptitude: - Mensuration: - 2-Dimension Problems, 3-Dimension Problems, Area, Volume, Surface Area, Total Surface Area.
 Geometry: - Lines, Circle, Triangles Etc.
 Imax:- Personal Accountability, Innovation Lessons from our Ancestors

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| Unit III | [6Hrs] |
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Aptitude:- Data Interpretation:-
 Tabular DI
 Bar Graph
 Line graph
 Pie Char

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| Unit IV | [6Hrs] |
|----------------|---------------|

Aptitude:- Logical Thinking (Syllogism) and Venn Diagram problem:- Some, No, All, Some Not, Very Few, Few, Possibility Problem
 Imax:- Interview Practice 1, Interview Practice 2, Interview Practice 3

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| Unit V | [6Hrs] |
|---------------|---------------|

Aptitude:- Non Verbal Reasoning:- Mirror Images, Water Images, Paper Cutting, Paper Folding, Fig Embedded
 Imax:- Interview Practice 4, Interview Practice 5, Interview Practice 6

Text Books

| S.N | Title | Authors | Edition | Publisher |
|-----|--|---------------|---------|--------------------|
| 1 | Quantitative Aptitude By R. S. Aggarwal | R.S. Aggarwal | | |
| 2 | Quantitative Aptitude | Shripad Deo | | Allied Publication |
| 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 | | |
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| Chairman - BoS | Dean – Academics | Date of Release | Version | |

**SIXTH SEMESTER**

| Course Code | Course Name | Th | Tu | Pr | Credits | Evaluation | | | |
|-------------|--------------------------|----|----|----|---------|------------|----|-----|-------|
| | | | | | | MSE | CA | ESE | Total |
| 23EE631M | MDM – IV Electric Drives | 3 | - | - | 3 | 15 | 15 | 70 | 100 |
| | | | | | | | | | |

| Course Objectives | Course Outcomes |
|--|---|
| <ol style="list-style-type: none">1. Provide fundamental knowledge of electrical drives, their components, classifications, and applications.2. Develop understanding of construction, operation, control, and characteristics of AC and DC motor drives.3. Explain starting, speed control, and braking techniques for induction, DC, and synchronous machines.4. Familiarize students with modern drives such as Switched Reluctance Motors (SRM) and Servo Motors.5. Enable students to select appropriate drives for industrial applications based on performance and economic considerations. | <p>Students will be able to</p> <ol style="list-style-type: none">1. Understand the construction, working principles, and characteristics of major electric drives and their components.2. Analyze starting, speed control, and braking methods of AC and DC motor drives.3. Compare and select suitable electrical drives (Induction, DC, Synchronous, SRM, Servo) for different industrial applications.4. Interpret drive control circuits, block diagrams, and converter configurations used in modern electric drive systems.5. Apply knowledge of electrical drives to evaluate performance, duty classes, and operational advantages for practical use in industries. |

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| Unit I | [10 Hrs.] |
| Basics of Electric Drive: Electrical Drives, Types of Electrical Drives: single-motor, group motor, and multi-motor drives. Reversible vs. Non-Reversible Drives, Parts of Electrical Drives: Block Diagram, load, motor, power modulator, control unit, and source. Motor Duty Class and its Classification, Advantages of Electrical Drives, History of Electric Drives. | |
| Unit II | [09 Hrs.] |
| Induction Motor Drives: Construction, Working & Types, Starting Methods: star-delta starters, auto-transformers, and reactor starter. Speed Control Techniques- Pole changing, Stator voltage control, Supply frequency control, Rotor resistance control, Braking Types, Advantages of Induction Motors. | |
| Unit III | [10 Hrs.] |
| DC Motor Drive: Construction, Working & Types, Starting Mechanisms, Speed Control: voltage, field flux, and resistance methods, Braking Systems: Regenerative, dynamic, and plugging, | |
| Unit IV | [08 Hrs.] |
| Synchronous Motor: Construction & Working Principle, Types of Synchronous Motor, Starting Methods, Speed Control Techniques, Braking Systems | |
| Unit V | [08Hrs.] |
| Switched Reluctance Motor (SRM): Construction, Working & Types, Block diagram of SRM, The converter circuit of SRM. Advantage & Disadvantages of SRM, Applications | |
| Servo Motor: Construction & working, Types, Control Systems, Control & Feedback Mechanism, Applications. | |

Text Books

| S. N. | Title | Authors | Edition | Publisher |
|-------|--|---------------------------------|-----------------|---------------|
| 1 | Electric Drives: Concepts and Applications | Vedam Subrahmanyam | 2 nd | TMH |
| 2 | Modern Electric Traction: Including Other Applications of Electrical Engineering in Railways | H Pratap | | Dhanpat Rai |
| 3 | Fundamentals Of Electric Drives And Control | B.R. Gupta (Author), V. Singhal | | Katson |
| 4 | Fundamentals of Electric Drives | G K Dubey | 2 nd | Alpha Science |

Reference Books

| S. N. | Title | Authors | Edition | Publisher |
|-------|---|-------------------|-----------------|-------------------------|
| 1 | Industrial Motor Control | Stephen L. Herman | 7 th | Delmar Cengage Learning |
| 2 | Electric Motor Drives: Modelling Analysis and Control | R. Krishnan | | Prentice Hall |

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