

**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

**Subject: Electrical Drives (ED)**

**Class: BE (EEE)**

**Subject code: EEP/401**

**Course Outcomes (COs)**

- Students got the idea of fundamentals of Electric Drives.
- Students got the idea of working of DC motor Drives, operating modes and their control, recent trends & applications.
- Students understood the Three phase induction motor drives; VSI & CSI fed induction motor drives.
- Students understood the Synchronous motor and Brushless DC Motor Drives, their control and applications.



  
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**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

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**Class: BE (EEE)**

**Subject code: EEP/401**

**Program Specific Outcomes (PSOs)**

- Students understood the basic fundamentals of Electric Drives.
- Student got the idea of different parts of Electric drives, torque equations and load equalization.
- Students got the idea of control of electric drives, selection procedure of different drive components.
- Students understood the basics of DC Motor drives.
- Students understood the single phase half and full controlled rectifier fed dc drives, their operation.
- Students got the idea of the three phase controlled rectifier and dual converter fed dc drives.
- Students understood the speed control schemes of DC Motor drives.
- Students understood the recent trends and applications of DC Drives
- Students got the idea of AC Voltage controlled drives, their operation.
- Students got the idea of Variable frequency control, VSI and CSI fed induction motor drive.
- Students understood the slip power recovery scheme, rotor resistance control.
- Students understood the recent trends and applications of AC Drive control.
- Students got the idea of Control and operation of synchronous motor drives.
- Students got the idea of Control and operation of brushless dc motor drives.
- Students understood the recent trends and applications of synchronous and BLDC drive.

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**Department of Electrical and Electronics Engineering**

**Program Outcomes (P.O.s)**

At the end of the program, the graduates of B.E EEE engineering department will be able to :

PO 1 – Application of Engineering Knowledge: Apply knowledge of Engineering, mathematics and science for solving engineering problems. Analyze, plan and apply the acquired knowledge in basic sciences and mathematics in solving problems with technical, economic, environmental and social contexts.

PO 2 – Analysis of Problem: Ability to Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate circuits and systems and make own projects utilizing latest software tools and techniques. Design, build and test analog & digital electronic systems for given specifications.

PO 3 - Design/development of solutions: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations.

PO 4 - Conduct investigations of complex problems: Use research -based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5 - Modern tool us age: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6 - The engineer and society: Apply reasoning in formed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7 - Environment and sustainability: Understand and correctly interpret the impact of engineering solutions in global, societal and environmental contexts and demonstrate the knowledge of a need for sustainable development.

PO 8 - Ethics: Understand ethics of life and professions and abide by them.

PO 9 - Individual and Team-work: Communicate effectively, demonstrate leadership qualities and exhibit professional conduct in their career. Work with a multi-disciplinary team, and appreciate the role of a leader, leadership principles, and attitudes conducive to effective professional practice of Engineering.

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PO 12 - Life-long learning: Engage in life-long learning, demonstrate knowledge and understanding of contemporary and emerging issues relevant to their domain - demonstrate knowledge and understanding of business practices and principles of management and understand their limitations, develop awareness of legal consequences of engineering solution.



  
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**Department of Electrical & Electronics Engineering**

**Subject: Power System Protection.**

**Class: B.E.**

**Subject Code: EED-402**

**Course Outcome of CO's**

- Students understood the basic concept of types of protective relaying
- Students understood the basic concept of working principle of relays.
- Students understood the basic concept of Protection Schemes.
- Students understood the basic concept of Protection of Transmission Lines.
- Students understood the basic concept of Circuit Breakers.
- Students understood the knowledge of Microprocessor Based Protective Relays.

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**Department of Electrical & Electronics Engineering**

**Subject: Power System Protection.**

**Class: B.E.**

**Subject Code: EED-402**

**Program Specific Outcome (PSO's)**

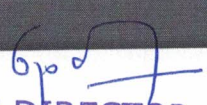
- Students got the Knowledge of the zones of protection.
- Students understood different classification of protective schemes.
- Students understood the current transformer and potential transformer.
- Students got the idea of single line diagram.
- Students understood the idea of Classification of relays.
- Students got the knowledge of construction, working principle of relay.
- Students understood the concept of characteristics and application relay.
- Students understood the concept of static relay.
- Students got knowledge of Alternator Protection.
- Students understood how to Protection Transformer.
- Students got knowledge of Induction Motor Protection.
- Students understood the knowledge of Protection schemes for feeder.
- Students got knowledge of Distance (Impedance) protection.
- Students understood the knowledge of Protection against lighting.
- Students understood the protection of transmission lines against direct strokes.
- Students understood the knowledge Circuit Breakers.
- Students got knowledge of Arc formation, Arc interruption.
- Students got knowledge Rate of Rise of Prestriking Voltage (RRRV).
- Students understood the knowledge of Construction & working principle CB.
- Students understood the knowledge of Microprocessor Based Protective Relays.

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**Department of Electrical and Electronics Engineering**

**Program Outcomes (P.O.s)**

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## Department of Electrical and Electronics Engineering

**Subject: Digital Signal Processing**

**Class B.E.**

**Subject Code: EED/403**

### Course Outcome of CO's

- Students understood what different types of signals exist, conversion of signals and why digital signal processing is preferred
- Students understood the mathematical operation on discrete signals
- Students learned to Sketch the magnitude and phase response of DFT, Inverse DFT and FFT of discrete time signals
- Students learned to calculate linear and circular convolution of discrete sequences
- Students learned to Implement Z transform and inverse Z transform of discrete signals
- Students learned the Model IIR and FIR filter using window techniques



  
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## Department of Electrical and Electronics Engineering

**Subject: Digital Signal Processing**

**Class B.E.**

**Subject Code: EED/403**

### Program Specific Outcome (PSO's)

- Students learned about elements of Digital Signal Processing system
- Students got insights about sampling of signals, sampling theorem and its relevance
- Students learned about quantization of signals, quantization noise, and way to avoid it
- Students learned about categories of discrete time signals
- Students learned about categories of discrete time systems and their interconnections
- Students learned analysis of discrete time linear time invariant system
- Done mathematical operations on discrete time signals
- Studied Convolution and its properties
- Learned about representation of discrete time system using difference equation
- Studied about Z-transform, its properties and inverse Z-transform
- Learned to apply Z-transform for analysis and design of LTI systems
- Learned to apply Inverse Z-transform for system analysis and solution of difference equation
- Understood the applications of Fourier transform and properties to analyze discrete time signal effectively
- Studied Frequency domain sampling and DFT
- Students compared DFT with other transforms and established relationship between them
- Learned circular convolution, and problem solving using circular convolution
- Got the fundamental concept of digital filters
- Learned about FIR filter realization
- Learned about IIR filter realization

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**Department of Electrical and Electronics Engineering**

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**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

**Subject: Power Electronics-II (PE-II)**


**Class: BE (EEE)**

**Subject code: EEP/442**

**Course Outcomes (COs)**

- Students got the idea of basic concepts of power semiconductor devices.
- Students understood the working of AC to DC power converters and different power factor improvement techniques.
- Students understood the working and voltage control method of DC to AC power converters and advanced modulation techniques.
- Students got the idea of the working of different multilevel inverters.
- Students got the idea of resonant pulse inverters and their comparison.
- Students understood the various DC Power supplies and control circuits.



  
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**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

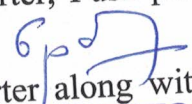
**Subject: Power Electronics-II (PE-II)**

**Class: BE (EEE)**

**Subject code: EEP/442**

**Program Specific Outcomes (PSOs)**

- Students understood the basics of power semiconductor devices.
- Students got the idea of structure, characteristics, switching actions, trigger requirements of different power semiconductor devices.
- Students understood the ratings, protection circuits and applications of power semiconductor devices such as power diode, SCR, GTO, IGBT, Power MOSFET and IGCTs.
- Students got the idea of the working of single phase controlled rectifiers.
- Students got the idea of the working of three phase controlled rectifiers.
- Students understood the different power factor improvement techniques and twelve-pulse converters.
- Students understood the DC to AC power converters.
- Students got the idea of voltage control and advanced modulation techniques of Inverters.
- Students understood the working of different types of multilevel inverters.
- Students understood the comparison of various multilevel inverters.
- Students got the idea of frequency response of Series and Parallel resonant inverters.
- Students got the idea of voltage control of resonant inverters.
- Students understood the working of ZCS and ZVS Inverters.
- Students understood the comparison between ZCS and ZVS resonant inverters.
- Students understood the DC Power supplies.
- Students got the idea of working of Fly-back converter, Forward converter, Push-pull converter.
- Students got the idea of working of half-bridge and full bridge converter along with control circuits.

  
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**Department of Electrical and Electronics Engineering**

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**Department of Electrical & Electronics Engineering**

**Subject : High Voltage Engineering**

**Class B.E. EEE**

**Subject Code: EED/ 451**

**Course Outcome (CO's)**

- Students understood the concept of High-voltage engineering.
- Students got knowledge of breakdown in dielectric materials.
- Students learned generation and measurement of high voltage and current
- Students understood the concept of overvoltages and insulation co-ordination.
- Students learned how materials and apparatus are tested.



  
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## Department of Electrical & Electronics Engineering

**Subject : High Voltage Engineering**

**Class B.E. EEE**

**Subject Code: EED/**

### Program Specific Outcome(PSO)

- Students understood Electric Field Stresses, Gas/Vacuum as Insulator
- Students got concepts of Liquid Dielectrics, Solids and Composites, Estimation and Control of Electric Stress
- Students learned Numerical methods for electric field computation
- Students understood Surge voltages, their distribution and control
- Students got the concept of rotating machines, circuit breakers.
- Students understood cable power capacitors and bushings
- Students got knowledge of Gases as insulating media, collision process, Ionization process.
- Students learned the concept of Townsend's criteria of breakdown in gases, Paschen's law.
- Students understood all types of breakdown in dielectric materials.
- Students understood the generation of high DC and AC voltages.
- Students got knowledge of measurement of high DC and AC voltages.
- Students understood Natural causes for over voltages.
- Students got knowledge of Overvoltage due to switching surges, system faults and other abnormal conditions,
- Students learned Principles of Insulation Coordination on High voltage and Extra High Voltage power systems.
- Students understood Significance and importance of FARADAY CAGE in HV labs.
- Students got knowledge of Measurement of D.C. Resistivity
- Students understood the concept of Measurement of Dielectric Constant and loss factor.
- Students learned Partial discharge measurements.
- Students got the concept of Double frequency-Double voltage Testing of Instrument/ power Transformers.
- Students understood Testing of Isolators and circuit breakers.
- Students got knowledge of testing of cables, Testing of Surge Arresters, and Radio Interference (EMI) measurements



  
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## Department Of Electrical and Electronics Engineering

**Subject :POWER SYSTEM OPERATION AND CONTROL**


**Class B.E.**

**Subject Code: EED 452**

### Course Outcome of CO's

- Students understood the synchronous machine modeling schematic diagram –physical and mathematical description-and transformation with their different factors –equation and calculations.
- Students understood the element of excitation system and their types along with control and protective function also understood the turbine and governing system with block diagram with different parameters.
- Students understood the classification of stability with its basic concept and definition also define rotor angle stability along with stability phenomena –fundamental concept and dynamic systems .
- Students understood the economic operation of the power system with review of economic dispatch problem-hydrothermal problems and its scheduling.
- Students understood the reactive power and voltage control with their production and absorption and applications of changing transformers to transmission systems.
- Students understood the review of AGC and reactive power control system operating state by security functions with energy center SCADA and data acquisition and control -EMS system.



  
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## Department Of Electrical and Electronics Engineerin

**Subject :POWER SYSTEM OPERATION AND CONTROL**

**Class B.E.**

**Subject Code: EED 452**

### Program Specific Outcome(PSO's)

- Students understood the synchronous machine.
- Students understood the transformation .
- Students understood simplified models with amortisseurs neglected.
- Students understood the elements of excitation system or control and protective functions.
- Students got the idea of modeling of power generation and control.
- Students understood the block diagram of governor with transient droop compensation.
- Students got the knowledge of stability.
- Students understood the classical machine stability analysis with numerical example.
- Students understood the review of economic dispatch problem .
- Students understood the hydrothermal scheduling problem formulation.
- Students understood the optimal scheduling of hydrothermal system.
- Students understood the maintenance of scheduling using mathematical programming.
- Students understood the production and absorption of reactive power .
- Students understood the application of tap changing transformers to transmission systems.
- Students got knowledge of modelling of transformer ULTC control systems .
- Students understood the AGC and reactive power control
- Students understood the system operating states by security control functions
- Students understood the different systems like SCADA-EMS etc .



  
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## Department of Electrical and Electronics Engineering

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## Department of Electrical and Electronics Engineering

**Subject: Elective-II: EMBEDDED SYSTEM**

**Class B.E.**

**Subject Code: EEP/496**

### Course Outcome of CO's

- Students understood design process and design metrics of embedded system
- Students got the insights of ARM7-TDMI architecture and it's peripherals
- Students understood program execution process in Arm7 by studying the instruction set, pipelining, operating modes, etc.
- Students developed basic C applications using ARM7 MCU for real world problems
- Students understood need and ways of interfacing different components with MCU
- Students understood the basic concepts of RTOS in Embedded Systems



  
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## Department of Electrical and Electronics Engineering

**Subject: Elective-II: EMBEDDED SYSTEM**

**Class B.E.**

**Subject Code: EEP/496**

### Program Specific Outcome (PSO's)

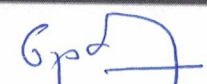
- Students understood the basic difference between the Embedded System and General Purpose System.
- Students got the idea of the core of the embedded system
- Students got the idea design challenges and time to market
- Students understood different examples of Embedded systems.
- Students understood the block diagram and operating modes of ARM7TDMI
- Students got the idea of 3 stage pipeline and instruction set.
- Students understood thumb and arm instructions.
- Students got the knowledge of on chip peripherals of ARM like watch dog Timer, UART and I2C
- Students understood interfacing of external components and chips like ultrasonic sensor, Stepper motor and servo motor
- Students understood how to program using Embedded C
- Students got knowledge of Real Time Operating System of embedded System.
- Students understood the knowledge of Non-preemptive scheduling
- Students got knowledge of preemptive scheduling.
- Students understood the knowledge of shared memory.

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**Department of Electrical and Electronics Engineering**

**Program Outcomes (P.O.s)**

At the end of the program, the graduates of B.E EEE engineering department will be able to :

PO 1 – Application of Engineering Knowledge: Apply knowledge of Engineering, mathematics and science for solving engineering problems. Analyze, plan and apply the acquired knowledge in basic sciences and mathematics in solving problems with technical, economic, environmental and social contexts.

PO 2 – Analysis of Problem: Ability to Design and conduct experiments as well as to analyze and interpret experimental or collected data, simulate and fabricate circuits and systems and make own projects utilizing latest software tools and techniques. Design, build and test analog & digital electronic systems for given specifications.

PO 3 - Design/development of solutions: Design a system, component or process to meet the desired specifications, performance and capabilities; compatible with health, safety, legal, societal and environmental considerations.

PO 4 - Conduct investigations of complex problems: Use research -based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5 - Modern tool us age: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6 - The engineer and society: Apply reasoning in formed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7 - Environment and sustainability: Understand and correctly interpret the impact of engineering solutions in global, societal and environmental contexts and demonstrate the knowledge of a need for sustainable development.

PO 8 - Ethics: Understand ethics of life and professions and abide by them.

PO 9 - Individual and Team-work: Communicate effectively, demonstrate leadership qualities and exhibit professional conduct in their career. Work with a multi-disciplinary team, and appreciate the role of a leader, leadership principles, and attitudes conducive to effective professional practice of Engineering.

PO 10 - Communication: Communicate and present effectively both orally and in writing, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO 11 - Project management and finance: Demonstrate knowledge and understanding of the engineering finance and management principles as a member and leader in a team to manage projects in multi-disciplinary environments. Apply relevant shop practices in compliance with safety policies and current regulations for engineering workplaces.

PO 12 - Life-long learning: Engage in life-long learning, demonstrate knowledge and understanding of contemporary and emerging issues relevant to their domain - demonstrate knowledge and understanding of business practices and principles of management and understand their limitations, develop awareness of legal consequences of engineering solution.



  
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