**T.J.S ENGINEERING COLLEGE**
**TJS Nagar, Thiruvallur – 601 206**

**Department of Electrical and Electronics Engineering**

**List of courses offered during 2020-21(Odd Semester)**

| Sl. No. | Semester | Theory/Practical | Course Code / Course Name |
|---|---|---|---|
| 1 | 3 | Theory | MA8353 – Transforms and Partial Differential Equations |
| 2 | 3 | Theory | EE8351 - Digital Logic Circuits |
| 3 | 3 | Theory | EE8391 – Electromagnetic Theory |
| 4 | 3 | Theory | EE8301 – Electrical Machines-1 |
| 5 | 3 | Theory | EC8353– Electron Devices and Circuits |
| 6 | 3 | Theory | ME8792 - Power Plant Engineering |
| 7 | 3 | Practical | EC8311- Electronics Laboratory |
| 8 | 3 | Practical | EE8311- Electrical Machines Laboratory – I |
| 9 | 5 | Theory | EE8501 – Power System Analysis |
| 10 | 5 | Theory | EE8551- Microprocessor And Microcontroller |
| 11 | 5 | Theory | EE 8591 – Digital Signal Processing |
| 12 | 5 | Theory | EE8552– Power Electronics |
| 13 | 5 | Theory | CS 8392 – Object Oriented Programming |
| 14 | 5 | Theory | OAN551- Sensors and Transducers |
| 15 | 5 | Practical | EE8511- Control and Instrumentation Laboratory |
| 16 | 5 | Practical | HS8581 - Professional Communication |
| 17 | 5 | Practical | CS8383- Object Oriented Programming Laboratory |
| 18 | 7 | Theory | EE8701 – High voltage engineering |
| 19 | 7 | Theory | EE8702 – Power system operation and control |
| 20 | 7 | Theory | EE8703– Renewable Energy Systems |
| 21 | 7 | Theory | EI8075- Fibre Optics and Laser Instrumentation |
| 22 | 7 | Theory | OCS752 –Introduction to C programming |
| 23 | 7 | Theory | EE8010 –Power System Transients |
| 24 | 7 | Practical | EE6711 - Power System Simulation Lab |
| 25 | 7 | Practical | EE6712- Comprehension Laboratory Lab |

**Course outcomes- 2019-2020 (odd semester)**

**Third Semester**

| **Course Code: MA8353**<br>**Course Name: Transforms And Partial Differential Equations** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Understand how to solve the given standard partial differential equations. |
| **CO – 2** | Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. |
| **CO – 3** | Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations. |
| **CO – 4** | Understand the mathematical principles on Fourier transforms would provide them the ability to formulate and solve some of the physical problems of engineering. |
| **CO – 5** | Construct z- transform and find inverse z-transform techniques for discrete time systems. |
| **CO – 6** | Use the effective mathematical tools for the solutions of difference equations by using Z transform techniques for discrete time systems. |

| **Course Code:EE8351**<br>**Course Name: Digital Logic Circuits** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Ability to interpret number systems and simplify logical expressions |
| **CO – 2** | Ability to construct combinational logic circuits |
| **CO – 3** | Ability to develop the synchronous sequential circuits |
| **CO – 4** | Ability to develop the Asynchronous Sequential Circuits |
| **CO – 5** | Ability to analyze the Programmable Logic Devices |
| **CO-6** | Ability to develop VHDL programs to design digital logic circuits |

| Course Code: EC8353<br>Course Name: Electron Devices And Circuits | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Explain the structure, characteristics of various diodes and their applications |
| **CO – 2** | Analyse the operation of transistors and thyristors |
| **CO – 3** | Analyze the small signal models transistor amplifier |
| **CO – 4** | Examine/ Construct multistage amplifiers |
| **CO – 5** | Describe the benefits of negative feedback for amplifier circuits |
| **CO-6** | Explain the structure, characteristics of various diodes and their applications |

| Course Code: EE8301<br>Course Name: Electrical Machines - 1 | |
|---|---|
| **CO** | **Course Outcome(CO) - Statement** |
| **CO – 1** | Understand the laws governing the analysis of magnetic circuits and apply the same in simplifying complicated magnetic circuits and calculating various parameters of the magnetic circuit. |
| **CO – 2** | Understand the working principle of transformer and calculate the performance parameters of a transformer through various tests by applying various conducting suitable tests. |
| **CO – 3** | Understand the working principle of rotating machines and apply the basic laws governing magnetic circuits for calculating the force/torque experienced by an electromagnetic system. |
| **CO – 4** | Understand the construction and working principle of DC machines |
| **CO – 5** | Calculate various performance parameters of the machine, when running as a generator, by conducting suitable tests. |
| **CO-6** | Apply the laws governing the working of a motor for calculating the performance parameters by conducting suitable tests. |

| Course Code:EE8391 | Course Name: Electromagnetic Theory |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Express the basic mathematical concepts related to electromagnetic vector fields |
| **CO – 2** | Correlate the basic concepts of electrostatics, electric potential, energy density with their applications |
| **CO – 3** | Discuss the basic concepts of magneto statics, magnetic flux density, scalar and vector potential and its applications |
| **CO – 4** | Differentiate the methods of EMF generation and Maxwell's equations |
| **CO – 5** | Express the basic concepts of electromagnetic waves and characterizing parameters |
| **CO - 6** | Analyze the Electromagnetic fields and apply them for the design of electrical equipment's and systems. |

**Course Code: ME8792** **Course Name: Power Plant Engineering**

| | |
|---|---|
| **CO** | Summarize the layout, construction and working of the components inside a thermal power plant. |
| **CO – 1** | Analyze the different types of steam cycles and it's efficiencies in a steam power plant. |
| **CO – 2** | Explain the basic working principles of gas turbine, diesel engine and combined cycle power plants. Define the performance characteristics and components of such power plants. |
| **CO – 3** | Describe the working of Renewable Energy based Power plants. |
| **CO – 4** | Discuss the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production. |
| **CO – 5** | List the principal components and types of nuclear reactors |
| **CO-6** | Summarize the layout, construction and working of the components inside a thermal power plant. |

## Laboratory

| EC8311 | Electronics Laboratory |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Explain the characteristics of semiconductor devices |
| **CO – 2** | Analyze astable and monostable multivibrators |
| **CO – 3** | Develop differential amplifiers using FET |
| **CO – 4** | Infer frequency and phase measurements using CRO |
| **CO – 5** | Construct RC, LC phase shift oscillators |
| **CO – 6** | Experiment with passive filters |

| **Course code : EE8311**<br>**Course Name: Electrical Machines Laboratory - I** | |
|---|---|
| **CO** | **Course outcome(CO) – Statements** |
| **CO – 1** | Ability to understand and analyze DC Generator |
| **CO – 2** | Ability to understand and analyze DC Motor |
| **CO – 3** | Ability to understand and analyse Transformers. |

## Fifth Semester

| **Course Code: EE8501**<br>**Course Name: Power System Analysis** | |
|---|---|
| **CO** | **Course Outcome (CO) - Statement** |
| **CO – 1** | Model the power system under steady state operating condition |
| **CO – 2** | Understand and apply iterative techniques for power flow analysis |
| **CO – 3** | Model and carry out symmetrical short circuit studies on power system. |
| **CO – 4** | Model and carry out unsymmetrical short circuit studies on power system |
| **CO – 5** | Model and analyze stability problems in power system |
| **CO-6** | Model and analyze the transient behaviour of power system when it is subjected to a fault |

| **Course Code: EE8551**<br>**Course Name: Power Electronics** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Summarize the fundamental concepts of power switching devices. |
| **CO – 2** | Analyze single phase power converter circuits and their application. |
| **CO – 3** | Analyze three phase power converter circuits and their application. |
| **CO – 4** | Analyze switching regulator circuits and their application. |
| **CO – 5** | Analyze various harmonic reduction techniques. |
| **CO - 6** | Develop skills to simulate converter circuits using simulation software. |

| **Course Code: EE8551**<br>**Course Name: Microprocessors and Microcontrollers** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Describe the functional blocks of 8085 microprocessor |
| **CO – 2** | Develop an simple assembly language program of 8085 microprocessor |
| **CO – 3** | Explain the architecture of 8051 microcontroller |
| **CO – 4** | Analyze the data transfer information through serial and parallel ports. |
| **CO – 5** | illustrate how the different peripherals are interfaced with Microprocessor and microcontroller |
| **CO - 6** | Develop a program for various application of 8051 |

| **Course Code: OAN551**<br>**Course Name: Sensors & Transducers** | |
|---|---|
| **CO – 1** | Understand the concepts of measurement technology, classification of transducers & Expertise in various calibration techniques and signal types for sensors |
| **CO – 2** | Understand the working of various motion, proximity and ranging sensors |
| **CO – 3** | Learn the various sensors used to measure various physical parameters like force, magnetic and heading Sensors |
| **CO – 4** | Study the basic principles of optical, pressure, temperature sensors & smart sensors |
| **CO – 5** | Apply the various sensors in the Automotive and Mechatronics applications |
| **CO – 6** | Implement the DAQ systems with different sensors for real time applications |

| **Course Code:EE8591**<br>**Course Name: Digital Signal Processing** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Ability to understand the basic concepts of Signals and systems, their mathematical representation and quantization effects. |
| **CO – 2** | Ability to apply the Z transformation techniques on discrete time systems. |
| **CO – 3** | Ability to apply the concepts of the Discrete Fourier transformation techniques & their computation. |
| **CO – 4** | Ability to analyze the types of Finite Impulse Response filters and their design for digital implementation. |
| **CO – 5** | Ability to analyze the types of Finite Impulse Response filters and their design for digital implementation. |
| **CO-6** | Ability to understand the architecture and addressing modes of programmable digital signal processors. |

| **Course Code:** ***CS8392***<br>**Course Name: Object Oriented Proogramming** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Develop Java programs using OOP principles |
| **CO – 2** | Develop Java programs using the concepts of inheritance and interfaces |
| **CO – 3** | Build Java applications using exceptions and I/O streams |
| **CO – 4** | Develop Java applications with threads and generics classes |
| **CO – 5** | Develop interactive Java programs using swings |
| **CO-6** | Develop an application based upon the concepts of Java. |

## Laboratory

| Course Code:EE8511<br>Course Name: Control and Instrumentation Laboratory | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Ability to understand control theory and apply them to electrical engineering |
| **CO – 2** | Ability to analyze the various types of converters |
| **CO – 3** | Ability to design compensators |
| **CO – 4** | Ability to understand the basic concepts of bridge networks |
| **CO – 5** | Ability to the basics of signal conditioning circuits |
| **CO – 6** | Ability to study the simulation packages. |

| Course Code:HS8581<br>Course Name: Professional Communication | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | Enhance the Employability and Career Skills of students |
| **CO – 2** | Orient the students towards grooming as a professional |
| **CO – 3** | Make them Employability Graduates |
| **CO – 4** | Develop their confidence and help them attend interviews successfully. |

| Course Code:CS8383<br>Course Name: Object Oriented Programming Lab | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| **CO – 1** | To build software development skills using java programming for real-world |
| **CO – 2** | To understand and apply the concepts of classes, packages, interfaces, array list, exception handling and file processing. |
| **CO – 3** | To develop applications using generic programming and event handling. |

## Seventh Semester

| **Course code : EE8701**<br>**Course Name: High voltage engineering** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| CO-1 | Understand various types of over voltages experienced by the power system |
| CO-2 | Understand and explain the breakdown mechanism of different types of dielectrics |
| CO-3 | Explain the generation of High voltages and currents and apply the same for calculating the voltage to be generated for testing an apparatus of a particular rated voltage |
| CO-4 | Understand various methods of HV measurements and identify the appropriate measuring system for various types of over voltages and currents |
| CO-5 | Understand process of testing of various power system apparatus |
| CO-6 | Understand the significance of insulation coordination and apply the same for fixing the BIL of an apparatus |

| **Course code : EE8702**<br>**Course Name: POWER SYSTEM OPERATION AND CONTROL** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| CO-1 | Ability to understand the day-to-day operation of electric power system. |
| CO-2 | Ability to analyse the control actions to be implemented on the system to meet the minute-to-minute variation of system demand. |
| CO-3 | Ability to understand the significance of power system operation and control. |
| CO-4 | Ability to acquire knowledge on real power-frequency interaction. |
| CO-5 | Ability to understand the reactive power-voltage interaction. |
| CO-6 | Ability to design SCADA and its application for real time operation. |

| **Course code : EE8703 Course Name: Renewable Energy Systems** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| CO-1 | Understand the current energy scenario, environment aspect and renewable energy resources in India |
| CO-2 | Understand the basic concept of wind energy conversion system and basics of grid Integration. |
| CO-3 | Understand the solar energy conversion system and different types of solar plants. |
| CO-4 | Experiment with stand alone and grid connected PV system. |
| CO-5 | Explain the basic of renewable sources like Hydro, biomass and Geothermal |
| CO-6 | Explain the basic of different ocean energy system and Fuel cell. |

| Course code: EI8075<br>Course Name: Fibre optics & Laser Instrumentation | |
|---|---|
| CO | Course outcome(CO) - Statements |
| CO-1 | Understand the principle, transmission, dispersion and attenuation characteristics of opticalfibers |
| CO-2 | Apply the gained knowledge on optical fibers for its use as communication medium and as sensor as well which have important applications in production, manufacturing industrial and biomedical applications. |
| CO-3 | Ability to apply laser theory for the selection of lasers for a specific Industrial and medical application. |
| CO-4 | Understand Industrial application of lasers |
| CO-5 | Understand about holography and Medical applications of Lasers. |
| CO-6 | Industrial application of lasers. |

| **Course code : EE8010**<br>**Course Name: Power System Transients** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| CO-1 | To impart knowledge in switching and lightning transients. |
| CO-2 | Understanding on generation of switching transients and their control. |
| CO-3 | Ability to acquire knowledge on Propagation, reflection and refraction of travelling waves |
| CO-4 | Understand the importance of propagation, reflection and refraction of travelling waves. |
| CO-5 | Find the voltage transients caused by faults. |
| CO-6 | concept of circuit breaker action, load rejection on integrated power system. |

| **Course code : OCS752**<br>**Course Name: Introduction to C Programming** | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| CO-1 | Develop algorithmic solutions to simple computational problems using basic constructs |
| CO-2 | Develop simple applications in C using Control Constructs |
| CO-3 | Design and implement applications using arrays |
| CO-4 | Represent data using string and string operations |
| CO-5 | Decompose a C program into functions and pointers |
| CO-6 | Represent and write program using structure and union |

## Laboratory

| Course code : EE8711<br>Course Name: Power System Simulation lab | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| CO-1 | Model the Transmission line of power system |
| CO-2 | Develop Bus Impedance and Admittance matrices for a network |
| CO-3 | Analysis of Load flow by numerical methods |
| CO-4 | Determine the fault current for the N bus system |
| CO-5 | Examine the stability level of Single and Multi machine system |
| CO-6 | Analyze the load frequency dynamics of multi area system |

| Course code : EE8712<br>Course Name: Comprehension Laboratory | |
|---|---|
| **CO** | **Course outcome(CO) - Statements** |
| CO-1 | Explain Engineering fundamentals |
| CO-2 | Apply mathematics to engineering problem |
| CO-3 | Apply Engineering fundamentals to complex circuits |
| CO-4 | Take part in discussion as a leader in diverse teams |
| CO-5 | Extend knowledge on communication and presentation skills |
| CO-6 | Develop managerial skills to establish start ups |

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**List of courses offered during 2020-21**

**Even Semester**

| Sl. No. | Semester | Theory/Practical | Course Code / Course Name |
|---|---|---|---|
| 1 | 4 | Theory | MA8491 Numerical Methods |
| 2 | 4 | Theory | EE8401 Electrical Machines - II |
| 3 | 4 | Theory | EE8402 Transmission and Distribution |
| 4 | 4 | Theory | EE8403- Measurements and Instrumentation |
| 5 | 4 | Theory | EE8451- Linear Integrated Circuits and Applications |
| 6 | 4 | Theory | IC8451 -control systems |
| 7 | 4 | Practical | EE8411- Electrical Machines Laboratory – II |

| | | | |
|---|---|---|---|
| 8 | 4 | Practical | EE8461- Linear Integrated Circuits and Applications lab |
| 9 | 4 | Practical | EE8412-Technical Seminar |
| 10 | 6 | Theory | EE8601 – Solid State Drives |
| 11 | 6 | Theory | EE8602- Protection and Switch Gear |
| 12 | 6 | Theory | EE 8691 – Embedded Systems |
| 13 | 6 | Theory | EE8002 Design of Electrical Apparatus |
| 14 | 6 | Theory | EE8005 Special Electrical Machines |
| 15 | 6 | Practical | EE8661 Power Electronics and Drives Laboratory |
| 16 | 6 | Practical | EE8681 Microprocessors and Microcontrollers Laboratory |
| 17 | 6 | Practical | EE8611 Mini Project |
| 18 | 8 | Theory | EE8015-Electric. Energy. Generation,. Utilization and Conservation |
| 19 | 8 | Theory | EE8017-High Voltage Direct Current Transmission |
| 20 | 8 | Theory | EE8811 – Project work |

| **Semester: 04**<br>**Course Name: Numerical methods (MA8491)**<br>**Year of study: 2019-20 and 2020-21(2017 Regulation)** | |
|---|---|
| **CO – 1** | Find the solutions of algebraic and transcendental equations |
| **CO – 2** | Choose power method for Eigen values |
| **CO – 3** | Apply the concept of Numerical differentiation and integration in engineering |
| **CO – 4** | Examine Initial value problem for Ordinary differential equation |
| **CO – 5** | Apply the boundary value problem in PDE and ODE |
| **CO-6** | Solve the Linear system of Equation |

| **Semester: 04**<br>**Course Name: Transmission & Distribution (EE8402)**<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **CO – 1** | To understand the importance and the functioning of transmission line parameters. |
| **CO – 2** | To understand the concepts of Lines and Insulators. |
| **CO – 3** | To acquire knowledge on the performance of Transmission lines. |
| **CO – 4** | To understand the importance of distribution of the electric power in power system. |
| **CO – 5** | To acquire knowledge on Underground Cabilitys |
| **CO-6** | To become familiar with the function of different components used in Transmission and Distribution levels of power system and modeling of these components. |

| **Semester: 04**<br>**Course Name: Electrical Machines-II (EE8401)**<br>**Year of study: 2019-20 & 2020-21 (2017 Regulation)** | |
|---|---|
| **CO – 1** | Ability to understand the construction and working principle of Synchronous Generator |
| **CO – 2** | Ability to understand MMF curves and armature windings |
| **CO – 3** | Ability to acquire knowledge on Synchronous motor. |
| **CO – 4** | Ability to understand the construction and working principle of Three phase Induction Motor |
| **CO – 5** | Ability to understand the construction and working principle of Special Machines |
| **CO - 6** | Ability to predetermine the performance characteristics of Synchronous Machines. |

| **Semester: 04**<br>**Course Name: Linear integrated circuits and applications EE8451**<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **CO – 1** | Outline the fabrication process of IC |
| **CO – 2** | Illustrate the ideal and non ideal characteristics of op-amp |
| **CO – 3** | Explain various applications of op-amp. |
| **CO – 4** | Design the different types of oscillators and ADC,DAC |
| **CO – 5** | Illustrate various application ICs |
| **CO-6** | Explain the working of special function ICs. |

| **Semester: 04**<br>**Course Name: Measurements and Instrumentation EE8403**<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **CO – 1** | Outline the fabrication process of IC |
| **CO – 2** | Explain the working principle of electrical measuring instruments |
| **CO – 3** | Interpret the resistance, capacitance and inductance using bridges |
| **CO – 4** | Select the storage devices for measuring electrical quantities |
| **CO – 5** | Choose the analog and digital display devices for measuring electrical quantities |
| **CO-6** | Identify the type of electrical transducers for physical quantities |

| **Semester: 04**<br>**Course Name: Control Systems-IC 8451**<br>**Year of study: 2019-20 (2017 Regulation)** | |
|---|---|
| **CO – 1** | **Develop** various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals. |
| **CO – 2** | **Illustrate** the time response of first and second order systems using standard test signals and the use of PID controller in closed loop system. |
| **CO – 3** | **Examine** the frequency-domain response of various models of linear system. |
| **CO – 4** | **Identif**y a compensator system for the given specifications. |
| **CO – 5** | **Interpret** characteristics of the system to develop mathematical model in state-variable form (state variable models) |
| **CO - 6** | **Perceive** the solution for complex control problem. |

| **Course Code: EE8411**<br>**Course Name: Electrical Machines Laboratory – II** | |
|---|---|
| **CO** | **Course outcome(CO) – Statements** |
| **CO – 1** | Ability to understand and analyze EMF and MMF methods |
| **CO – 2** | Ability to analyze the characteristics of V and Inverted V curves |
| **CO – 3** | Ability to understand the importance of Synchronous machines |
| **CO – 4** | Ability to understand the importance of Induction Machines |
| **CO – 5** | Ability to acquire knowledge on separation of losses |

| **Course Code: EE8461**<br>**Course Name: Linear and Digital Integrated Circuits Laboratory** | |
|---|---|
| **CO** | **Course outcome(CO) – Statements** |
| **CO – 1** | Ability to understand and implement Boolean Functions |
| **CO – 2** | Ability to understand the importance of code conversion |
| **CO – 3** | Ability to Design and implement 4-bit shift registers |
| **CO – 4** | Ability to acquire knowledge on Application of Op-Amp |
| **CO – 5** | Ability to Design and implement counters using specific counter IC. |

| Course Code: EE8412<br>Course Name:Technical Seminar | |
|---|---|
| **CO** | **Course outcome(CO) – Statements** |
| CO 209. 1 | To encourage the students to study advanced engineering developments |
| CO 209. 2 | To prepare and present technical reports. |
| CO 209. 3 | To encourage the students to use various teaching aids such as overhead projectors, power point presentation and demonstrative models. |

| Semester: 06<br>CourseName:Design of Electrical Apparatus(EE8002)<br>Year of study: 2019-2020& 2020-21 (2017 Regulation) | |
|---|---|
| **CO – 1** | Ability to understand the design consideration for rotating and static electrical machines |
| **CO – 2** | Ability to design field systems for its application |
| **CO – 3** | Ability to design single and three phase transformers. |
| **CO – 4** | Ability to design field and armature of DC machines. |
| **CO – 5** | Ability to design stator and rotor of induction motor. |
| **CO - 6** | Ability to design and analyze synchronous machines. |

| Semester: 06<br>Course Name: Solid State Drives ( EE8601)<br>Year of study: 2019-20 & 2020-21 (2017 Regulation) | |
|---|---|
| **CO – 1** | Ability to understand and suggest a converter for solid state drive |
| **CO – 2** | Ability to select suitability drive for the given application |
| **CO – 3** | Ability to study about the steady state operation and transient dynamics of a motor load system |
| **CO – 4** | Ability to analyze the operation of the converter/chopper fed dc drive |
| **CO – 5** | Ability to analyze the operation and performance of AC motor drives |
| **CO-6** | Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive |

| **Semester: 06**<br>**Course Name:** ***Protection and Switchgear*** (EE8602)<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **C302.1** | Explain the causes of abnormal operating conditions of the apparatus and system. |
| **C302.2** | Illustrate the Characteristics & functions of Electromagnetic Relays. |
| **C302.3** | Apply different protection schemes for apparatus protection |
| **C302.4** | Explain the characteristics and functions of Static & Numerical Relays |
| **C302.5** | Demonstrate the various abnormal behaviour happens during circuit breaker operation |
| **C302.6** | Explain the working of different types of Circuit Breakers |

| **Semester: 06**<br>**Course Name: Embedded Systems-EE 8691**<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **CO1** | Understand and Analyze Embedded systems. |
| **CO2** | Distinguish the bus communication in processors. |
| **CO3** | Operate various Embedded Development Strategies |
| **CO4** | Understand basics of Real time operating system. |
| **CO5** | Classify various processor scheduling algorithms. |
| **CO6** | Interpret an embedded system for a given application. |

| **Semester: 06**<br>**Course Name: SPECIAL ELECTRICAL MACHINES (EE8005)**<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **CO1** | **Explain** the performance characteristics of synchronous reluctance motors. |
| **CO2** | **Classify** the excitation modes of stepping motor |
| **CO3** | **Construct** the power converter circuits for Switched reluctance motor |
| **CO4** | **Analyze** the magnetic characteristics of brushless D.C motor |
| **CO5** | **Compare** the control methods of permanent magnet synchronous motor |
| **CO6** | **Analyze** the logical sequence operation of special machines by using Software program. |

| **Semester: 06**<br>**Course Name:** Microprocessors and Microcontrollers Laboratory**(**EE8681**)**<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **CO1** | Develop the simple arithmetic operations using 8085 processors |
| **CO2** | Explain the interfacing techniques using 8051 microcontrollers |
| **CO3** | Analyze two 8051 kits using serial communication. |
| **CO4** | Develop simple programs using 8051 controllers |
| **CO5** | Demonstrate basic instructions using 8051 microcontroller |
| **CO6** | Design and implementation of embedded system based projects |

| **Semester: 06**<br>**Course Name: Power Electronics and Drives Lab(EE8661)**<br>**Year of study: 2019-20& 2020-21 (2017 Regulation)** | |
|---|---|
| **CO1** | Demonstration of firing circuits |
| **CO2** | Analyze static and dynamic characteristics of switching devices |
| **CO3** | Experiment with converters. |
| **CO4** | Experiment with switch mode power supplies. |
| **CO5** | Experiment with switching regulators. |
| **CO6** | Analyze the converter circuits using simulation software |

**Semester VIII**

| **Semester: 08**<br>**Course Name: Electric Energy Generation Utilization and Conservation(EE8015)**<br>**Year of study: 2020-21** | |
|---|---|
| **CO1** | Impart knowledge To understand the main aspects of generation, utilization and conservation. |
| **CO2** | To identify an appropriate method of heating for any particular industrial application |
| **CO3** | Classify domestic wiring connection and debug any faults occurred |
| **CO4** | To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application |
| **CO5** | To realize the appropriate type of electric supply system as well as to evaluate the performance of a traction unit. |
| **CO6** | To understand the main aspects of Traction. |

| **Semester: 08**<br>**Course Name: EE8017-High Voltage Direct Current Transmission(EE8017)**<br>**Year of study: 2020-21** | |
|---|---|
| **CO1** | To understand the principles and types of HVDC system. |
| **CO2** | To analyze and understand the concepts of HVDC converters. |
| **CO3** | To acquire knowledge on DC link control. |
| **CO4** | To understand the concepts of reactive power management, harmonics and power flow analysis |
| **CO5** | Planning of DC power transmission and comparison with AC power transmission. |
| **CO6** | To understand the importance of power flow in HVDC system under steady state. |

| **Semester: 08**<br><br>**Course Name:** Project Work(EE8811)<br><br>Year of study: **2020-21** | |
|---|---|
| **CO1** | Explain the engineering concepts |
| **CO2** | Solve problems to new situations with knowledge, facts, techniques and rules in a different way |
| **CO3** | Discover new computational platform in electrical & electronics fields |
| **CO4** | Determine the performance of complex power network |
| **CO5** | Formulate real world problem with global outlook |
| **CO6** | Improve the managerial skills to meet the industry |