

T.J.S ENGINEERING COLLEGE**T.J.S Nagar, Thiruvallur – 601 206****Department of Electrical and Electronics Engineering****List of courses offered during 2019-20 (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	EE6701 – High voltage engineering
19	7	Theory	EE6702 – Protection and Switchgear
20	7	Theory	EE6703– Special Electrical Machines
21	7	Theory	MG6851- Principles Of Management
22	7	Theory	EI6703 – Fiber Optics & Laser Instruments
23	7	Theory	EE 6007 – Micro Electro Mechanical Systems
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	
Course Name: Transforms And Partial Differential Equations	
CO	Course outcome(CO) - Statements
CO – 1	Apply the solutions of partial differential equations
CO – 2	Utilize the Fourier series problems in current flow, sound waves
CO – 3	Find one dimensional wave equation and heat equations
CO – 4	Inference of Fourier transforms is in continuous time signals
CO – 5	Apply the Z transforms in discrete time signals
CO – 6	Summarize the physical problems of engineering.

Course Code:EE8351	
Course Name: Digital Logic Circuits	
CO	Course outcome(CO) - Statements
CO – 1	To study various number systems and simplify the logical expressions using Boolean functions
CO – 2	To study combinational circuits
CO – 3	To design various synchronous and asynchronous circuits.
CO – 4	To introduce asynchronous sequential circuits and PLDs
CO – 5	To introduce digital simulation for development of application oriented logic circuits.
CO – 6	

Course Code: EC8353	
Course Name: Electron Devices And Circuits	
CO	Course outcome(CO) - Statements
CO – 1	Explain the structure, characteristics and biasing of various PN junction diodes and its applications.
CO – 2	Explain the structure, characteristics and biasing of various types of transistors, thyristors and IGBT.
CO – 3	Analyze the BJT amplifier circuits using small signal and high frequency model.
CO – 4	Analyze the FET amplifier circuits using small signal and high frequency model.

CO – 5	Explain the differential amplifier and types of power amplifier and derive its efficiency.
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Course Code: EE8301	
Course Name: Electrical Machines - 1	
CO	Course Outcome(CO) - Statement
CO – 1	To familiarize with Magnetic-circuit analysis and introduce magnetic materials
CO – 2	To understand Constructional details, the principle of operation, prediction of performance, the methods of testing the transformers and three phase transformer connections
CO – 3	To understand the Working principles of electrical machines using the concepts of electromechanical energy conversion principles and derive expressions for generated voltage and torque developed in all Electrical Machines.
CO – 4	To understand the Working principles of DC machines as Generator types, determination of their no-load/load characteristics, starting and methods of speed control of motors.
CO – 5	To study Various losses taking place in D.C. Motor and to study the different testing methods to arrive at their performance

Course Code:EE8391 Course Name: Electromagnetic Theory	
CO	Course outcome(CO) - Statements
CO – 1	Interpret the coordinate systems used in electromagnetic theory
CO – 2	Explain the Electric and Magnetic field intensity for continuous charge distributions
CO – 3	Develop the expression for capacitance and inductance in the continuous charge distributions
CO – 4	Build the boundary conditions for electric and magnetic field intensity
CO – 5	Illustrate the generation of EMF in static and dynamic conditions
CO - 6	Identify the properties of electromagnetic wave propagation from Maxwell's equation.
CO – 6	To develop the ability to model and analyze electrical apparatus and their application to power system

CO	Course outcome(CO) - Statements
CO – 1	Explain the layout, construction and working of the components inside a thermal power plant
CO – 2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
CO – 3	Explain the layout, construction and working of the components inside nuclear power plants.
CO – 4	Explain the layout, construction and working of the components inside Renewable energy power plants
CO – 5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy

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

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	
Course Name: Power System Analysis	
CO	Course Outcome (CO) - Statement
CO – 1	Ability to model the power system under steady state operating condition
CO – 2	Ability to understand and apply iterative techniques for power flow analysis
CO – 3	Ability to model and carry out balanced short circuit studies on power system
CO – 4	Ability to model and carry out unbalanced short circuit studies on power system
CO – 5	Ability to model and analyze stability problems in power system

Course Code: EE8551	
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	
Course Name: Microprocessors and Microcontrollers	
CO	Course outcome(CO) - Statements
CO – 1	Explain the architecture and functionalities of 8085 Microprocessor.
CO – 2	Analyze Assembly level programming in real time applications using 8085.
CO – 3	Explain the architecture and functionalities of 8051 Microcontroller.

CO – 4	Configure the external peripherals interfacing with the 8085 microprocessor and 8051 microcontroller.
CO – 5	Develop skill in simple applications programming with 8051.
CO - 6	Compare the programming concepts of 8085 and 8051

Course Code: OAN551	
Course Name: Sensors & Transducers	
CO – 1	To understand the concepts of measurement technology
CO – 2	Expertise in various calibration techniques and signal types for sensors.
CO – 3	To learn the various sensors used to measure various physical parameters.
CO – 4	To learn the fundamentals of signal conditioning, data acquisition and communication systems used in mechatronics system development.
CO – 5	Study the basic principles of various smart sensors.
CO – 6	Implement the DAQ systems with different sensors for real time applications

Course Code:EE8591	
Course Name: Digital Signal Processing	
CO	Course outcome(CO) - Statements
CO – 1	Signals and systems & their mathematical representation
CO – 2	Discrete time systems.
CO – 3	Transformation techniques & their computation
CO – 4	Filters and their design for digital implementation.
CO – 5	Programmability digital signal processor & quantization effects

Course Code: CS8392	
Course Name: Object Oriented Programming	
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 generic classes
CO – 5	Develop interactive Java programs using swings

CO – 6	Develop an application based upon concepts of Java.
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Laboratory

Course Code:EE8511	
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	
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	
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 : EE6701	
Course Name: High voltage engineering	
CO	Course outcome(CO) - Statements
CO – 1	Describe the causes of power systems over voltages
CO – 2	Summarize the impact of over voltages on dielectrics
CO – 3	Explain the breakdown mechanism of dielectrics
CO – 4	Classify protection devices to prevent Flashovers
CO – 5	Discuss the testing of power system apparatus
CO – 6	Summarize the methods of HV measurements

Course code : EE6702	
Course Name: Protection and Switchgear	
CO	Course outcome(CO) - Statements
CO – 1	Identify the faults in Power system
CO – 2	Interpret the working of relays and their characteristics
CO – 3	Explain the types of Apparatus protection
CO – 4	Analyze the arcing phenomenon and interruption
CO – 5	Explain the different Circuit Breakers
CO – 6	Classify the testing of Circuit Breakers

Course code : EE6703 Course Name: Special Electrical Machines	
CO	Course outcome(CO) - Statements
CO – 1	Explain the performance characteristics of synchronous reluctance motors.
CO – 2	Classify the excitation modes of stepping motor
CO – 3	Construct the power converter circuits for Switched reluctance motor
CO – 4	Analyze the magnetic characteristics of brushless D.C motor
CO – 5	Compare the control methods of permanent magnet synchronous motor
CO – 6	Analyze the logical sequence operation of special machines by using Software program.

Course code: MG6851	
Course Name: Principles of Management	
CO	Course outcome(CO) - Statements
CO – 1	Define the concept of management
CO – 2	Identify current trends and issues in management
CO – 3	Explain the importance of planning and objective setting
CO – 4	Identify the authority and responsibility among people
CO – 5	Apply leadership and motivation theories
CO – 6	Examine qualitative and quantitative information to control methods

Course code : EI6703	
Course Name: Fiber Optics & Laser Instruments	
CO	Course outcome(CO) - Statements
CO – 1	Compare types of Optical fibers
CO – 2	Identify optical sources and Detectors
CO – 3	Relate the industrial applications of optical fibers
CO – 4	Summarize the LASER types
CO – 5	Relate the industrial applications of LASER
CO – 6	Infer holography and medical applications of LASER

Course code : EE6007	
Course Name: Micro Electro Mechanical Systems	
CO	Course outcome(CO) - Statements
CO – 1	Impart knowledge about operation of micro devices, micro systems and their applications
CO – 2	To Design the micro devices, micro systems using the MEMS fabrication process.
CO – 3	knowledge of semiconductors and solid mechanics to fabricate MEMS devices
CO – 4	To Understand rudiments of Micro fabrication techniques
CO – 5	To Understand different materials used for MEMS
CO – 6	To Impart knowledge applications of MEMS to disciplines beyond Electrical and Mechanical engineering.

Laboratory

Course code : EE6711	
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 : EE6712	
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

T.J.S ENGINEERING COLLEGE

T.J.S Nagar, Thiruvallur – 601 206

Department of Electrical and Electronics Engineering

List of courses offered during 2019-20

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	EE6801– Electric Energy Generation Conservation and Utilization
19	8	Theory	EE6009 – Power Electronics for Renewable Energy Systems
20	8	Theory	GE 6757-Total Quality Management
21	8	Theory	EE6811 – Project work

Semester: 04	
Course Name: Numerical methods (MA8491)	
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	
Course Name: Transmission & Distribution (EE8402)	
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 Cabilities
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	
Course Name: Electrical Machines-II (EE8401)	
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	
Course Name: Linear integrated circuits and applications EE8451	
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	
Course Name: Measurements and Instrumentation EE8403	
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	
Course Name: Control Systems-IC 8451	
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	Identify 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	
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	
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	
Course Name: Technical Seminar	
CO	Course outcome(CO) – Statements
CO – 1	To encourage the students to study advanced engineering developments
CO – 2	To prepare and present technical reports.
CO – 3	To encourage the students to use various teaching aids such as overhead projectors, power point presentation and demonstrative models.

Semester: 06	
CourseName: Design of Electrical Apparatus(EE8002)	
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	
Course Name: Solid State Drives (EE8601)	
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	
Course Name: Protection and Switchgear (EE8602)	
Year of study: 2019-20& 2020-21 (2017 Regulation)	
CO – 1	Explain the causes of abnormal operating conditions of the apparatus and system.
CO – 2	Illustrate the Characteristics & functions of Electromagnetic Relays.
CO – 3	Apply different protection schemes for apparatus protection
CO – 4	Explain the characteristics and functions of Static & Numerical Relays
CO – 5	Demonstrate the various abnormal behaviour happens during circuit breaker operation
CO – 6	Explain the working of different types of Circuit Breakers

Semester: 06	
Course Name: Embedded Systems-EE 8691	
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: 07	
Course Name: SPECIAL ELECTRICAL MACHINES (EE8005)	
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**Course Name:** Microprocessors and Microcontrollers Laboratory(EE8681)**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**Course Name:** Power Electronics and Drives Lab(EE8661)**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**Course Name:** Electric Energy Generation, Utilization and Conservation (EE6801)**Year of study:** 2019-20

CO1	Explain the various concepts of renewable energy resources
CO2	Interpret energy conservation and energy auditing.
CO3	Develop the illumination systems based on various lightning system
CO4	Demonstrate the different methods of electric heating and welding
CO5	Illustrate the traction system and their performance
CO6	Organize the engineering aspects of electrical energy generation and utilization.

Semester: 08

Course Name: EE6009 Power Electronics for Renewable Energy Systems Year of study: **2019-20**

CO1	Interpret knowledge about the stand alone and grid connected renewable energy systems
CO2	Derive the criteria for designing the power converters for renewable energy applications
CO3	Analyze the various operating modes of wind electrical generators and solar energy systems
CO4	Design different power converters for renewable energy systems
CO5	Develop maximum power point tracking algorithms
CO6	Analyze power system operation, stability, control and protection

Semester: 08

Course Name: GE6757 Total Quality Management

Year of study: **2019-20**

CO1	Facilitate the Quality Management principles and its process
CO2	Explain the customer care management systems
CO3	Apply the leadership qualities in management
CO4	Explain the Benchmark in manufacturing system
CO5	Explain the ISO Auditing system
CO6	Design the techniques for quality management in the field of manufacturing and services processes.

Semester: 08

Course Name: Project Work(EE6811)

Year of study: 2019-20

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