

**R.M.K. ENGINEERING COLLEGE**  
**RSM Nagar, Kavaraipettai – 601 206**

**Department of Electronics and Instrumentation Engineering**

**Course Outcomes – ODD Semester 2018-19**

S.No	Semester	Theory/Practical	Course Code / Course Name
1.	3	Theory	MA8353- Transforms and Partial Differential Equations
2.	3	Theory	EC8353- Electronic Devices and Circuits
3.	3	Theory	EE8351- Digital Logic Circuits
4.	3	Theory	EI8351- Electrical Measurements
5.	3	Theory	CS8392- Object Oriented Programming
6.	3	Theory	EI8352- Transducers Engineering
7.	3	Practical	EI8361- Measurements and Transducers Lab
8.	3	Practical	CS8383- Object Oriented Programming Laboratory
9.	5	Theory	EE6502-Microprocessors and Microcontrollers
10.	5	Theory	IC6501-Control Systems
11.	5	Theory	EE6503-Power Electronics
12.	5	Theory	EI6501-Analytical Instruments
13.	5	Theory	EI6502-Industrial Instrumentation – I
14.	5	Theory	CS6401-Operating Systems
15.	5	Practical	EE6612--Microprocessors and Microcontrollers Laboratory
16.	5	Practical	EI6511-Transducers and Measurements Laboratory
17.	5	Practical	GE6674-Communication and Soft Skills - Laboratory Based
18.	7	Theory	EI6701-Industrial Data Networks
19.	7	Theory	EI6702-Logic and Distributed Control System
20.	7	Theory	EC6601-VLSI Design
21.	7	Theory	EI6703-Fibre Optics and Laser Instruments
22.	7	Theory	EI6704-Biomedical Instrumentation
23.	7	Theory	EE6008-Microcontroller Based System Design
24.	7	Practical	EC6612-VLSI Lab
25.	7	Practical	EI6711-Instrumentation System Design Laboratory
26.	7	Practical	EI6712-Comprehension

**THIRD SEMESTER**

MA8353- Transforms and Partial Differential Equations

COs	Course Outcome : The students, after the completion of the course, are expected to ....
CO1	Understand how to solve the given standard partial differential equations.
CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO4	Understand the mathematical principles on Fourier transforms would provide them the

	ability to formulate and solve some of the physical problems of engineering.
<b>CO5</b>	Construct z- transform and find inverse z-transform techniques for discrete time systems.
<b>CO6</b>	Use the effective mathematical tools for the solutions of difference equations by using Z transform techniques for discrete time systems.

#### EC8353- Electronic Devices and Circuits

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the structure, characteristics and biasing of various PN junction diodes and its applications.
<b>CO2</b>	Explain the structure, characteristics and biasing of various types of transistors, thyristors and IGBT.
<b>CO3</b>	Analyze the BJT amplifier circuits using small signal and high frequency model.
<b>CO4</b>	Analyze the FET amplifier circuits using small signal and high frequency model.
<b>CO5</b>	Explain the differential amplifier and types of power amplifier and derive its efficiency.

#### EE8351- Digital Logic Circuits

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the Concept of Number Systems
<b>CO2</b>	Construct the Combinational Logic Circuits
<b>CO3</b>	Develop the Synchronous Sequential Circuits
<b>CO4</b>	Develop the Asynchronous Sequential Circuits
<b>CO5</b>	Construct the Programmable Logic Devices
<b>CO6</b>	Develop VHDL programs for Digital Logic Circuits

#### EI8351- Electrical Measurements

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Classify the standard devices and galvanometers for the measurement of voltage and current
<b>CO2</b>	Construct the wattmeter and energy meter to measure power and energy
<b>CO3</b>	Construct instrumentation transformer to measure high values of current and voltage
<b>CO4</b>	Analyze the bridges for the measurement of low, medium and high resistance
<b>CO5</b>	Analyze the bridges for the measurement of inductance and capacitance measurement
<b>CO6</b>	Construct the potentiometers to measure AC and DC values of unknown voltage

#### CS8392- Object Oriented Programming

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop Java programs using OOP principles
<b>CO2</b>	Develop Java programs using the concepts of inheritance and interfaces
<b>CO3</b>	Build Java applications using exceptions and I/O streams
<b>CO4</b>	Develop Java applications with threads and generics classes
<b>CO5</b>	Develop interactive Java programs using swings
<b>CO6</b>	Develop an application based upon the concepts of Java.

EI8352- Transducers Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ...
CO1	Understand how physical quantities are measured and how they are converted to electrical or other forms.
CO2	Explain the static and dynamic characteristics of transducer, analysis of Zero, First and Second order transducer..
CO3	Explain the construction and operation of variable resistance transducer.
CO4	Demonstrate the knowledge of inductance and capacitance transducers.
CO5	Demonstrate the construction and operation of other transducers and sensors.
CO6	Understand smart traducer and its standard.

EI8361- Measurements and Transducers Lab

COs	Course Outcome : The students, after the completion of the course, are expected to ...
CO1	Understand the concepts of measurement, error and uncertainty.
CO2	Understand the static and dynamic characteristics of measuring instruments.
CO3	Gain knowledge about the principle of operation and characteristics of different types of resistance, capacitance and inductance transducers.
CO4	Acquire knowledge of analyzing different stages of signal conditioning units.
CO5	Ability to interpret the results and draw meaningful conclusions.
CO6	Ability to work as a member of a team while carrying out experiments.

CS8383- Object Oriented Programming Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to ...
CO1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
CO2	Develop and implement Java programs with array list
CO3	Develop and implement Java programs with exception handling and multithreading .
CO4	Design applications using file processing and generic programming
CO5	Design applications using event handling.

**FIFTH SEMESTER**

EE6502-Microprocessors and Microcontrollers

COs	Course Outcome : The students, after the completion of the course, are expected to ...
CO1	Explain the architecture and functionalities of 8085 Microprocessor.
CO2	Analyze Assembly level programming in real time applications using 8085.
CO3	Explain the architecture and functionalities of 8051 Microcontroller.
CO4	Configure the external peripherals interfacing with the 8085 microprocessor and 8051 microcontroller.
CO5	Develop skill in simple applications programming with 8051.
CO6	Compare the programming concepts of 8085 and 8051

IC6501-Control Systems

COs	Course Outcome : The students, after the completion of the course, are expected to ...
CO1	Understand the transfer function model for Physical systems

<b>CO2</b>	Illustrate adequate knowledge in the time response of systems and steady state error analysis.
<b>CO3</b>	Examine the frequency-domain response of closed loop system
<b>CO4</b>	Build a compensator system satisfying requirements
<b>CO5</b>	Analyse the stability of linear systems
<b>CO6</b>	Develop state models for linear time invariant system

#### EE6503-Power Electronics

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Outline of different types of power semiconductor devices and their switching characteristics.
<b>CO2</b>	Analyze single phase controlled converters and their performance parameters.
<b>CO3</b>	Examine three phase controlled converters and their performance parameters.
<b>CO4</b>	Develop basic topologies of DC - DC switching regulators.
<b>CO5</b>	Understand PWM based inverters and harmonic reduction techniques.
<b>CO6</b>	Explain the operation of AC to AC converters.

#### EI6501-Analytical Instruments

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain various techniques for Colorimeters spectrophotometers
<b>CO2</b>	Summarize Chromatography
<b>CO3</b>	Analyze different techniques to measure industrial gas and air pollution
<b>CO4</b>	Outline of pH Measurements
<b>CO5</b>	Illustrate Nuclear magnetic resonance and microscopic techniques
<b>CO6</b>	Analyse a suitable instrumentation system for various industries

#### EI6502-Industrial Instrumentation – I

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate measurement techniques for force, torque and speed
<b>CO2</b>	Illustrate measurement techniques for acceleration, vibration and density
<b>CO3</b>	Select a suitable instrument for measuring pressure and vacuum
<b>CO4</b>	Summarize various temperature measurement techniques
<b>CO5</b>	Identify special techniques for high temperature measurements
<b>CO6</b>	Analyse a suitable instrumentation system for various industries

#### CS6401-Operating Systems

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand the basic concepts and functions of Operating Systems
<b>CO2</b>	Design various scheduling algorithms and apply principles of concurrency
<b>CO3</b>	Students will be able to apply deadlock prevention and avoidance algorithms
<b>CO4</b>	Ability to compare and contrast various memory management schemes
<b>CO5</b>	Design and implement a prototype file systems and I/O sub systems
<b>CO6</b>	Ability to perform administrative tasks on Linux Servers

EE6612--Microprocessors and Microcontrollers Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop the simple arithmetic operations using 8085 Microprocessors
<b>CO2</b>	Develop Programming with control instructions
<b>CO3</b>	Explain the interfacing techniques using 8085 Microprocessors
<b>CO4</b>	Develop simple programs using 8051 microcontrollers
<b>CO5</b>	Demonstrate basic instructions using 8051 microcontroller
<b>CO6</b>	Design and implementation of embedded system based projects

EI6511-Transducers and Measurements Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Examine the characteristics of potentiometric transducer, Strain gauge and Load cell.
<b>CO2</b>	Examine the characteristics of LVDT, Hall Effect transducer, LDR and Photoelectric tachometer
<b>CO3</b>	Analyse the characteristics and step response of temperature transducer
<b>CO4</b>	Experiment with balancing of DC bridges
<b>CO5</b>	Experiment with balancing of AC bridges
<b>CO6</b>	Examine the errors through calibration of various meters

GE6674-Communication and Soft Skills - Laboratory Based

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Take part in international exams like IELTS and TOEFL
<b>CO2</b>	Develop writing skills
<b>CO3</b>	Experiment with speaking skills
<b>CO4</b>	Build leadership qualities
<b>CO5</b>	Interpret contextual knowledge clearly
<b>CO6</b>	Utilize mass media and technology effectively

**SEVENTH SEMESTER**

EI6701-Industrial Data Networks

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand basic concepts of data networks
<b>CO2</b>	Explain basics of inter networking and serial communications
<b>CO3</b>	Summarize HART and Field buses
<b>CO4</b>	Illustrate MODBUS, PROFIBUS and other communication protocol
<b>CO5</b>	Interpret Industrial Ethernet
<b>CO6</b>	Explain Wireless communication

EI6702-Logic and Distributed Control System

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate Programmable Logic Controller and various programming languages
<b>CO2</b>	Outline various instructions in Programmable Logic Controller
<b>CO3</b>	Develop a logic for various industrial applications using PLC programming language
<b>CO4</b>	Explain computer control systems

<b>CO5</b>	Demonstrate Distributed Control Systems
<b>CO6</b>	Make use of interface techniques in Distributed Control System

#### EC6601-VLSI Design

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Examine basic CMOS circuits and properties of CMOS transistors and able to draw stick diagram and layout of CMOS circuits
<b>CO2</b>	Examine CMOS realization for combinational logic design and analyze the delay models for combinational circuits
<b>CO3</b>	Evaluate the power dissipation and low power design principles in CMOS circuits.
<b>CO4</b>	Develop sequential logic circuits and memory architecture and low power memory circuits
<b>CO5</b>	Construct different architectures for Arithmetic building blocks
<b>CO6</b>	Develop the techniques of chip design using programmable devices

#### EI6703-Fibre Optics and Laser Instruments

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Compare types of Optical fibers, optical sources and Detectors
<b>CO2</b>	Classify the industrial applications of optical fibers
<b>CO3</b>	Explain the various types of LASER
<b>CO4</b>	Relate the industrial applications of LASER
<b>CO5</b>	Interpret holography techniques
<b>CO6</b>	Compare the various medical applications of LASER

#### EI6704-Biomedical Instrumentation

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the different physiological systems of human
<b>CO2</b>	Summarize various electrical and non electrical parameters measuring devices.
<b>CO3</b>	Illustrate non electrical parameters measurement methods
<b>CO4</b>	Classify the various recording methods used in medical field
<b>CO5</b>	Infer the graphical and imaging applications in biomedical system.
<b>CO6</b>	Summarize the life assisting and therapeutic devices

#### EE6008-Microcontroller Based System Design

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the architecture of PIC microcontroller
<b>CO2</b>	Demonstrate use of interrupts and timers
<b>CO3</b>	Explain on the peripheral devices for data communication and transfer
<b>CO4</b>	Explain functional blocks of ARM processor
<b>CO5</b>	Illustrate the architecture of ARM processors

#### EC6612-VLSI Lab

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected</b>
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	<b>to ....</b>
<b>CO1</b>	Summarize HDL based design entry
<b>CO2</b>	Build simple counters, state machines, adders (min 8 bit) and multipliers
<b>CO3</b>	Develop hardware fusing and testing
<b>CO4</b>	Experiment with differential amplifier
<b>CO5</b>	Develop Layout generation
<b>CO6</b>	Analyse the static timing analysis

#### EI6711-Instrumentation System Design Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Analyse Instrumentation amplifier, active filters, regulated power supply, V/I and I/V converters
<b>CO2</b>	Examine the signal conditioning circuit for Thermocouple, strain gauge and RTD
<b>CO3</b>	Analyse Control valve, orifice plate and rotameter.
<b>CO4</b>	Inspect PID controller
<b>CO5</b>	Summarize P & ID for industrial process
<b>CO6</b>	Illustrate Programmable Logic Controller for digital logic gates

#### EI6712-Comprehension

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain Engineering fundamentals
<b>CO2</b>	Apply mathematics to engineering problem
<b>CO3</b>	Apply Engineering fundamentals to complex circuits
<b>CO4</b>	Take part in discussion as a leader in diverse teams
<b>CO5</b>	Extend knowledge on communication and presentation skills
<b>CO6</b>	Develop managerial skills to establish start ups

### Course Outcomes – EVEN Semester 2018-19

S.No	Semester	Theory/Practical	Course Code / Course Name
1.	4	Theory	MA8491- Numerical Methods
2.	4	Theory	EI8451- Electrical Machines
3.	4	Theory	EI8452- Industrial Instrumentation - I
4.	4	Theory	EE8451- Linear Integrated Circuits and Applications
5.	4	Theory	IC8451- Control Systems
6.	4	Theory	EC8395- Communication Engineering
7.	4	Practical	EI8461- Devices and Machines Laboratory
8.	4	Practical	EE8461- Linear and Digital Integrated Circuits Laboratory
9.	6	Theory	EI6601- Modern Electronic Instrumentation
10.	6	Theory	EI6602- Process Control
11.	6	Theory	EI6603-Industrial Instrumentation – II
12.	6	Theory	EC6651- Communication Engineering
13.	6	Theory	EE6602- Embedded Systems
14.	6	Theory	EI6002- Power Plant Instrumentation
15.	6	Practical	EI6611- Industrial Instrumentation lab
16.	6	Practical	EI6612- Process Control Lab
17.	8	Theory	MG6851- Principles of Management
18.	8	Theory	EI6801- Computer Control of Processes
19.	8	Theory	GE6757- Total Quality Management
20.	8	Practical	EI6811- Project Work

#### FOURTH SEMESTER

##### MA8491- Numerical Methods

COs	Course Outcome : The students, after the completion of the course, are expected to ....
CO1	Apply the concepts of algebraic and transcendental equations
CO2	Evaluate the eigenvalues of a matrix numerically
CO3	Construct an approximate interpolating polynomials for equal and unequal intervals.
CO4	Apply the numerical techniques of differentiation and integration for engineering problems.
CO5	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO6	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

##### EI8451- Electrical Machines

COs	Course Outcome : The students, after the completion of the course, are expected to ....
CO1	Understand the working principles of DC machines as Generator and Motor, types, determination of their no-load/load characteristics, starting and methods of speed control of motors.
CO2	Acquire the basic knowledge of construction, working and operation of transformer



<b>CO3</b>	Analyse the construction and working of Synchronous machines
<b>CO4</b>	Understand the construction working starting and speed control of three phase induction motor
<b>CO5</b>	Understand the principle of operation of Single Induction machines

EI8452- Industrial Instrumentation – I

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Introduce the measurement techniques of force, torque and speed
<b>CO2</b>	Introduce the measurement techniques of acceleration, Vibration and density
<b>CO3</b>	Introduce the measurement techniques of Viscosity, Humidity and moisture.
<b>CO4</b>	Introduce the temperature measurement techniques
<b>CO5</b>	Introduce the pressure measurement techniques

EE8451- Linear Integrated Circuits and Applications

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Outline the fabrication process of IC
<b>CO2</b>	Illustrate the ideal and non ideal characteristics of op-amp
<b>CO3</b>	Explain various applications of op-amp.
<b>CO4</b>	Design the different types of oscillators and ADC,DAC
<b>CO5</b>	Illustrate various application ICs
<b>CO6</b>	Explain the working of special function ICs.

IC8451- Control Systems

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Analyze electromechanical systems by mathematical modeling.
<b>CO2</b>	Illustrate the time response of first and second order systems using standard test signals
<b>CO3</b>	Examine the frequency-domain response of closed loop system
<b>CO4</b>	Identify a compensator system satisfying requirements
<b>CO5</b>	Develop system equations in state-variable form (state variable models)
<b>CO6</b>	Analyze a control theory applications to AC motors

EC8395- Communication Engineering

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Identify and Understand analog communication techniques
<b>CO2</b>	Discuss about pulse modulation techniques.
<b>CO3</b>	Identify and Understand digital communication techniques
<b>CO4</b>	Understand the various source coding techniques and apply the suitable error control codes
<b>CO5</b>	Understand about spread spectrum techniques.
<b>CO6</b>	Understand about Multiple access techniques.

EI8461- Devices and Machines Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
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<b>CO1</b>	Gain knowledge on the proper usage of various electronic equipment and simulation tools for design and analysis of electronic circuits.
<b>CO2</b>	Get hands-on experience in studying the characteristics of semiconductor devices.
<b>CO3</b>	Ability to analyze various electronic circuits such as voltage regulators, transistor amplifiers and oscillators.
<b>CO4</b>	Ability to make use of basic concepts to obtain the no load and load characteristics of D.C machines.
<b>CO5</b>	Analyze and draw conclusion from the characteristics obtained by conducting experiments on machines.
<b>CO6</b>	Ability to carry out the Experiments in batches to motivate the Team work.

#### EE8461- Linear and Digital Integrated Circuits Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Ability to understand and implement Boolean Functions.
<b>CO2</b>	Ability to understand the importance of code conversion
<b>CO3</b>	Ability to Design and implement 4-bit shift registers.
<b>CO4</b>	Ability to acquire knowledge on Application of Op-Amp
<b>CO5</b>	Ability to Design and implement counters using specific counter IC

### SIXTH SEMESTER

#### EI6601- Modern Electronic Instrumentation

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate various electronic instruments for measurement of voltage
<b>CO2</b>	Illustrate various types of cathode ray oscilloscopes and their applications
<b>CO3</b>	Summarize different types of signal analysers
<b>CO4</b>	Explain different types of waveform generators
<b>CO5</b>	Examine a measurement system using VI programming techniques
<b>CO6</b>	Apply different types of modulation and multiplexing techniques in telemetry

#### EI6602- Process Control

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Analyze the dynamics of various processes such as level, pressure and temperature.
<b>CO2</b>	Develop the suitable controller for different processes.
<b>CO3</b>	Model actuators, control valves and compare their characteristics.
<b>CO4</b>	Analyze the evaluation criteria and tuning techniques of controllers.
<b>CO5</b>	Explain multivariable control and explain the concept of multi loop control techniques.
<b>CO6</b>	Apply the multi loop control technique to construct the controllers.

#### EI6603-Industrial Instrumentation – II

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate variable head type flow meters
<b>CO2</b>	Illustrate quantity meters, air flow meters and mass flow meters
<b>CO3</b>	Explain electrical type flow meters
<b>CO4</b>	Identify techniques for level measurement

CO5	Explain different techniques for Viscosity, moisture and Humidity measurement
CO6	Analyze a suitable instrumentation system for various industries

#### EC6651- Communication Engineering

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ...</b>
CO1	Analyze different methods of analog communication and their significance
CO2	Illustrate Digital Communication methods for high bit rate transmission
CO3	Inspect the concepts of source and line coding techniques for enhancing rating of transmission of minimizing the errors in transmission
CO4	Understand MA Techniques in communication
CO5	Describe satellite communication systems for enhancing the number of users.
CO6	Describe various media for optical communication

#### EE6602- Embedded Systems

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ...</b>
CO1	Outline the essentials of function and Blocks of Embedded system
CO2	Explain the different communication network strategies of embedded systems
CO3	Demonstrate the different phases of embedded product development life cycle (EDLC)
CO4	Interpret the issues, modeling and computational models in Embedded design
CO5	Explain the basic concepts and compare the features of real time operating systems (RTOS)
CO6	Summarize the concepts of Embedded Systems in real time applications

#### EI6002- Power Plant Instrumentation

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ...</b>
CO1	Illustrate an overview on power generation through various methods
CO2	Explain the important power plant measurements and devices
CO3	Explain basic Boiler control techniques
CO4	Explain advanced Boiler control techniques
CO5	Understand the turbine control techniques

#### EI6611- Industrial Instrumentation lab

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ...</b>
CO1	Test for Discharge coefficient of orifice plate and Calibration of pressure gauge
CO2	Test for Torque, Viscosity and Vacuum pressure measurement
CO3	Experiment for level measurement using d/p transmitter and capacitance based
CO4	Experiment with UV – Visible and IR spectrophotometer
CO5	Experiment with pH and conductivity meter
CO6	Examine Pulse rate and ECG measurement

#### EI6612- Process Control Lab

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ...</b>
CO1	Experiment with Level Control and Pressure Control in Process Control Training

	Plant
<b>CO2</b>	Experiment with flow Control and Temperature Control in Process Control Training Plant
<b>CO3</b>	Infer characteristics Pneumatically Actuated Control Valve
<b>CO4</b>	Analyse PID Controller for mathematically described processes and implementation issues
<b>CO5</b>	Examine Multi-loop PI Controller for Three and four tank system
<b>CO6</b>	Make use of AC and DC drives

### **EIGHTH SEMESTER**

#### MG6851- Principles of Management

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explaining the basic principles, concepts, evolution of Management thinking, the role of managers and different types of organization.
<b>CO2</b>	Apply knowledge on Planning tools and techniques
<b>CO3</b>	Discuss the stages in decision making process and explain the types of strategies in order to make rational decisions
<b>CO4</b>	Illustrate the concepts of controlling and organizing of an organization.
<b>CO5</b>	Assess and compare different leadership styles and select appropriate style for an organization
<b>CO6</b>	Compile and demonstrate effective communication and explain various theories of motivation, innovation and creativity

#### EI6801- Computer Control of Processes

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Construct the discrete time systems in state variable form
<b>CO2</b>	Explain the system identification techniques
<b>CO3</b>	Make use of different types of algorithms for the design of direct discrete system
<b>CO4</b>	Explain the concept of Digital Feed forward Controllers, Internal Model Control and LQG Control
<b>CO5</b>	Illustrate the multi-loop regulatory control techniques
<b>CO6</b>	Explain the different types of multivariable regulatory controllers

#### GE6757- Total Quality Management

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the customer care management systems
<b>CO2</b>	Apply the leadership qualities in management
<b>CO3</b>	Explain the Benchmark in manufacturing system
<b>CO4</b>	Execute the Quality Management principles using six sigma
<b>CO5</b>	Explain the ISO Auditing system

#### EI6811- Project Work

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate a sound technical knowledge of their selected project topic
<b>CO2</b>	Identify the problem, formulation and solution
<b>CO3</b>	Design engineering solutions to complex problems utilising a systems approach

<b>CO4</b>	Develop an engineering project
<b>CO5</b>	Demonstrate the knowledge, skills and attitudes of a professional engineer
<b>CO6</b>	Improve the managerial skills to meet the industry

### Course Outcomes – ODD Semester 2018-19

S.No	Semester	Theory/Practical	Course Code / Course Name
1.	3	Theory	MA8353- Transforms and Partial Differential Equations
2.	3	Theory	EC8353- Electronic Devices and Circuits
3.	3	Theory	EE8351- Digital Logic Circuits
4.	3	Theory	EI8351- Electrical Measurements
5.	3	Theory	CS8392- Object Oriented Programming
6.	3	Theory	EI8352- Transducers Engineering
7.	3	Practical	EI8361- Measurements and Transducers Lab
8.	3	Practical	CS8383- Object Oriented Programming Laboratory
9.	5	Theory	EI8551- Analytical Instruments
10	5	Theory	EI8552- Industrial Instrumentation - II
11	5	Theory	EI8553- Process Control
12	5	Theory	EE8551- Microprocessors and Microcontrollers
13	5	Theory	EE8591- Digital Signal Processing
14	5	Theory	OCE551- Air Pollution and Control Engineering
15	5	Practical	EI8561- Industrial Instrumentation Laboratory
16	5	Practical	EE8681- Microprocessors and Microcontrollers Laboratory
17	7	Theory	EI6701-Industrial Data Networks
18	7	Theory	EI6702-Logic and Distributed Control System
19	7	Theory	EC6601-VLSI Design
20	7	Theory	EI6703-Fibre Optics and Laser Instruments
21	7	Theory	EI6704-Biomedical Instrumentation
22	7	Theory	EE6008-Microcontroller Based System Design
23	7	Practical	EC6612-VLSI Lab
24	7	Practical	EI6711-Instrumentation System Design Laboratory
25	7	Practical	EI6712-Comprehension

### THIRD SEMESTER

#### MA8353- Transforms and Partial Differential Equations

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand how to solve the given standard partial differential equations.
<b>CO2</b>	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
<b>CO3</b>	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
<b>CO4</b>	Understand the mathematical principles on Fourier transforms would provide them the ability to formulate and solve some of the physical problems of engineering.
<b>CO5</b>	Construct z- transform and find inverse z-transform techniques for discrete time systems.
<b>CO6</b>	Use the effective mathematical tools for the solutions of difference equations by using Z transform techniques for discrete time systems.

#### EC8353- Electronic Devices and Circuits

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
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<b>CO1</b>	Explain the structure, characteristics and biasing of various PN junction diodes and its applications.
<b>CO2</b>	Explain the structure, characteristics and biasing of various types of transistors, thyristors and IGBT.
<b>CO3</b>	Analyze the BJT amplifier circuits using small signal and high frequency model.
<b>CO4</b>	Analyze the FET amplifier circuits using small signal and high frequency model.
<b>CO5</b>	Explain the differential amplifier and types of power amplifier and derive its efficiency.

#### EE8351- Digital Logic Circuits

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the Concept of Number Systems
<b>CO2</b>	Construct the Combinational Logic Circuits
<b>CO3</b>	Develop the Synchronous Sequential Circuits
<b>CO4</b>	Develop the Asynchronous Sequential Circuits
<b>CO5</b>	Construct the Programmable Logic Devices
<b>CO6</b>	Develop VHDL programs for Digital Logic Circuits

#### EI8351- Electrical Measurements

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Classify the standard devices and galvanometers for the measurement of voltage and current
<b>CO2</b>	Construct the wattmeter and energy meter to measure power and energy
<b>CO3</b>	Construct instrumentation transformer to measure high values of current and voltage
<b>CO4</b>	Analyze the bridges for the measurement of low, medium and high resistance
<b>CO5</b>	Analyze the bridges for the measurement of inductance and capacitance measurement
<b>CO6</b>	Construct the potentiometers to measure AC and DC values of unknown voltage

#### CS8392- Object Oriented Programming

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop Java programs using OOP principles
<b>CO2</b>	Develop Java programs using the concepts of inheritance and interfaces
<b>CO3</b>	Build Java applications using exceptions and I/O streams
<b>CO4</b>	Develop Java applications with threads and generics classes
<b>CO5</b>	Develop interactive Java programs using swings
<b>CO6</b>	Develop an application based upon the concepts of Java.

#### EI8352- Transducers Engineering

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand how physical quantities are measured and how they are converted to electrical or other forms.
<b>CO2</b>	Explain the static and dynamic characteristics of transducer, analysis of Zero, First and Second order transducer..
<b>CO3</b>	Explain the construction and operation of variable resistance transducer.
<b>CO4</b>	Demonstrate the knowledge of inductance and capacitance transducers.

<b>CO5</b>	Demonstrate the construction and operation of other transducers and sensors.
<b>CO6</b>	Understand smart traducer and its standard.

EI8361- Measurements and Transducers Lab

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand the concepts of measurement, error and uncertainty.
<b>CO2</b>	Understand the static and dynamic characteristics of measuring instruments.
<b>CO3</b>	Gain knowledge about the principle of operation and characteristics of different types of resistance, capacitance and inductance transducers.
<b>CO4</b>	Acquire knowledge of analyzing different stages of signal conditioning units.
<b>CO5</b>	Ability to interpret the results and draw meaningful conclusions.
<b>CO6</b>	Ability to work as a member of a team while carrying out experiments.

CS8383- Object Oriented Programming Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
<b>CO2</b>	Develop and implement Java programs with array list
<b>CO3</b>	Develop and implement Java programs with exception handling and multithreading .
<b>CO4</b>	Design applications using file processing and generic programming
<b>CO5</b>	Design applications using event handling.

**FIFTH SEMESTER**

EI8551- Analytical Instruments

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Ability to understand the fundamental principles of selective analytical instruments used in medical diagnosis, quality assurance & control and research studies.
<b>CO2</b>	Ability to assess and suggest a suitable analytical method for a specific purpose, and evaluate sensitivity, important sources of interferences and errors, and also suggest alternative analytical methods for quality assurance.
<b>CO3</b>	Ability to critically evaluate the strengths and limitations of the various instrumental methods.
<b>CO4</b>	Ability to develop critical thinking for interpreting analytical data.
<b>CO5</b>	Ability to understand the working principle, types and applications of NMR and Mass spectroscopy
<b>CO6</b>	Illustrate the Microscopic, SEM and TEM techniques.

EI8552- Industrial Instrumentation - II

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate variable head type flow meters
<b>CO2</b>	Illustrate quantity meters, air flow meters and mass flow meters
<b>CO3</b>	Explain electrical type flow meters
<b>CO4</b>	Identify techniques for level measurement
<b>CO5</b>	Explain various types of transmitters
<b>CO6</b>	Analyze a suitable instrumentation system for various industries



EI8553- Process Control

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Ability to understand technical terms and nomenclature associated with Process control domain.
<b>CO2</b>	Ability to build models using first principles approach as well as analyze models.
<b>CO3</b>	Ability to understand final control elements
<b>CO4</b>	Ability to Design, tune and implement PID Controllers to achieve desired performance for various processes
<b>CO5</b>	Ability to Analyze Systems and design & implement control Schemes for various Processes.
<b>CO6</b>	Ability to Identify, formulate and solve problems in the Process Control Domain

EE8551- Microprocessors and Microcontrollers

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Outline the functional blocks of 8085 microprocessor
<b>CO2</b>	Develop an assembly language program for 8085 microprocessor
<b>CO3</b>	Explain the architecture of 8051 microcontroller
<b>CO4</b>	Interpret the interrupt structure of 8085 and 8051
<b>CO5</b>	Illustrate how the different peripherals are interfaced with Microprocessor and microcontroller
<b>CO6</b>	Develop a program for automated system using 8051

EE8591- Digital Signal Processing

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Classify the different types of signals and systems
<b>CO2</b>	Apply z-transform and inverse Z transform in discrete systems
<b>CO3</b>	Explain the sampling process of continuous time signal.
<b>CO4</b>	Apply Radix-2 (DIT) and (DIF) FFT Algorithm using Discrete Fourier Transform
<b>CO5</b>	Compare (IIR) filters and (FIR) filters.
<b>CO6</b>	Explain various architectures of Digital signal processors

OCE551- Air Pollution and Control Engineering

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand the atmospheric process and pollutant transport mechanism
<b>CO2</b>	Apply modelling techniques and to determine the fate of air pollutant with respect to time and space
<b>CO3</b>	Prevent and control air pollution by suitable air pollution control measures
<b>CO4</b>	Control and Monitoring of gaseous contaminants in air pollution
<b>CO5</b>	Prevent, control and measure of Indoor air quality management

EI8561- Industrial Instrumentation Laboratory

COs	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>

<b>CO1</b>	Ability to experimentally measure industrial process parameters such as flow and level,
<b>CO2</b>	Ability to experimentally measure industrial process parameters such as temperature and pressure
<b>CO3</b>	Ability to experimentally measure industrial process parameters such as viscosity.
<b>CO4</b>	Ability to measure and analyze pH, conductivity
<b>CO5</b>	Ability to measure and analyze UV absorbance and transmittance.
<b>CO6</b>	Ability to measure and analyze physiological parameters such as BP, ECG and pulse rate.

EE8681- Microprocessors and Microcontrollers Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Ability to understand and apply computing platform and software for engineering problems.
<b>CO2</b>	Ability to programming logics for code conversion
<b>CO3</b>	Ability to acquire knowledge on A/D and D/A.
<b>CO4</b>	Ability to understand basics of serial communication.
<b>CO5</b>	Ability to understand and impart knowledge in DC and AC motor interfacing.
<b>CO6</b>	Ability to understand basics of software simulators.

**SEVENTH SEMESTER**

EI6701-Industrial Data Networks

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand basic concepts of data networks
<b>CO2</b>	Explain basics of inter networking and serial communications
<b>CO3</b>	Summarize HART and Field buses
<b>CO4</b>	Illustrate MODBUS, PROFIBUS and other communication protocol
<b>CO5</b>	Interpret Industrial Ethernet
<b>CO6</b>	Explain Wireless communication

EI6702-Logic and Distributed Control System

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate Programmable Logic Controller and various programming languages
<b>CO2</b>	Outline various instructions in Programmable Logic Controller
<b>CO3</b>	Develop a logic for various industrial applications using PLC programming language
<b>CO4</b>	Explain computer control systems
<b>CO5</b>	Demonstrate Distributed Control Systems
<b>CO6</b>	Make use of interface techniques in Distributed Control System

EC6601-VLSI Design

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Examine basic CMOS circuits and properties of CMOS transistors and able to draw

	stick diagram and layout of CMOS circuits
<b>CO2</b>	Examine CMOS realization for combinational logic design and analyze the delay models for combinational circuits
<b>CO3</b>	Evaluate the power dissipation and low power design principles in CMOS circuits.
<b>CO4</b>	Develop sequential logic circuits and memory architecture and low power memory circuits
<b>CO5</b>	Construct different architectures for Arithmetic building blocks
<b>CO6</b>	Develop the techniques of chip design using programmable devices

#### EI6703-Fibre Optics and Laser Instruments

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Compare types of Optical fibers, optical sources and Detectors
<b>CO2</b>	Classify the industrial applications of optical fibers
<b>CO3</b>	Explain the various types of LASER
<b>CO4</b>	Relate the industrial applications of LASER
<b>CO5</b>	Interpret holography techniques
<b>CO6</b>	Compare the various medical applications of LASER

#### EI6704-Biomedical Instrumentation

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the different physiological systems of human
<b>CO2</b>	Summarize various electrical and non electrical parameters measuring devices.
<b>CO3</b>	Illustrate non electrical parameters measurement methods
<b>CO4</b>	Classify the various recording methods used in medical field
<b>CO5</b>	Infer the graphical and imaging applications in biomedical system.
<b>CO6</b>	Summarize the life assisting and therapeutic devices

#### EE6008-Microcontroller Based System Design

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the architecture of PIC microcontroller
<b>CO2</b>	Demonstrate use of interrupts and timers
<b>CO3</b>	Explain on the peripheral devices for data communication and transfer
<b>CO4</b>	Explain functional blocks of ARM processor
<b>CO5</b>	Illustrate the architecture of ARM processors

#### EC6612-VLSI Lab

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Summarize HDL based design entry
<b>CO2</b>	Build simple counters, state machines, adders (min 8 bit) and multipliers
<b>CO3</b>	Develop hardware fusing and testing
<b>CO4</b>	Experiment with differential amplifier

<b>CO5</b>	Develop Layout generation
<b>CO6</b>	Analyse the static timing analysis

EI6711-Instrumentation System Design Laboratory

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Analyse Instrumentation amplifier, active filters, regulated power supply, V/I and I/V converters
<b>CO2</b>	Examine the signal conditioning circuit for Thermocouple, strain gauge and RTD
<b>CO3</b>	Analyse Control valve, orifice plate and rotameter.
<b>CO4</b>	Inspect PID controller
<b>CO5</b>	Summarize P & ID for industrial process
<b>CO6</b>	Illustrate Programmable Logic Controller for digital logic gates

EI6712-Comprehension

<b>COs</b>	<b>Course Outcome : The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain Engineering fundamentals
<b>CO2</b>	Apply mathematics to engineering problem
<b>CO3</b>	Apply Engineering fundamentals to complex circuits
<b>CO4</b>	Take part in discussion as a leader in diverse teams
<b>CO5</b>	Extend knowledge on communication and presentation skills
<b>CO6</b>	Develop managerial skills to establish start ups