R.M.K. ENGINEERING COLLEGE

RSM Nagar, Kavaraipettai – 601 206

Department of Electronics and Instrumentation Engineering

Course Outcomes – ODD Semester 2019-20

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

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.
CO5	Construct z- transform and find inverse z-transform techniques for discrete time systems.
CO6	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

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

EE8351- Digital Logic Circuits

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

EI8351- Electrical Measurements

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

CS8392- Object Oriented Programming

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

FIFH SEMESTER

EI8551- Analytical Instruments

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Ability to understand the fundamental principles of selective analytical instruments used in medical diagnosis, quality assurance & control and research studies.
CO2	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.
CO3	Ability to critically evaluate the strengths and limitations of the various instrumental methods.
CO4	Ability to develop critical thinking for interpreting analytical data.
CO5	Ability to understand the working principle, types and applications of NMR and Mass spectroscopy
CO6	Illustrate the Microscopic, SEM and TEM techniques.

EI8552- Industrial Instrumentation - II

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

EI8553- Process Control

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

EE8551- Microprocessors and Microcontrollers

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

EE8591- Digital Signal Processing

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

OCE551- Air Pollution and Control Engineering

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

EI8561- Industrial Instrumentation Laboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Ability to experimentally measure industrial process parameters such as flow and level,
CO2	Ability to experimentally measure industrial process parameters such as temperature and pressure
CO3	Ability to experimentally measure industrial process parameters such as viscosity.
CO4	Ability to measure and analyze pH, conductivity
CO5	Ability to measure and analyze UV absorbance and transmittance.
CO6	Ability to measure and analyze physiological parameters such as BP, ECG and pulse rate.

EE8681- Microprocessors and Microcontrollers Laboratory

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

SEVENTH SEMESTER

EI6701-Industrial Data Networks

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

EI6702-Logic and Distributed Control System

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

EC6601-VLSI Design

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

EI6703-Fibre Optics and Laser Instruments

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

EI6704-Biomedical Instrumentation

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

EE6008-Microcontroller Based System Design

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

EC6612-VLSI Lab

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

EI6711-Instrumentation System Design Laboratory

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

EI6712-Comprehension

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

Course Outcomes – EVEN Semester 2019-20

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	EI8651-Logic and Distributed Control System
10.	6	Theory	EI8691-Computer Control of Processes
11.	6	Theory	CS8391-Data Structures
12.	6	Theory	EI8692-Electronic Instrumentation
13.	6	Theory	EI8077-Power Electronics and Drives
14.	6	Theory	EI8072-Advanced Instrumentation Systems
15.	6	Practical	CS8381-Data Structures Laboratory
16.	6	Practical	EI8661-Process Control Laboratory
17.	6	Practical	HS8581-Professional Communication
18.	8	Theory	MG6851- Principles of Management
19.	8	Theory	EI6801- Computer Control of Processes
20.	8	Theory	GE6757- Total Quality Management
21.	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
CO3	Analyse the construction and working of Synchronous machines
CO4	Understand the construction working starting and speed control of three phase induction motor
CO5	Understand the principle of operation of Single Induction machines

EI8452- Industrial Instrumentation – I

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

EE8451- Linear Integrated Circuits and Applications

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

IC8451- Control Systems

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

EC8395- Communication Engineering

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

EI8461- Devices and Machines Laboratory

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

EE8461- Linear and Digital Integrated Circuits Laboratory

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

SIXTH SEMESTER

EI8651-Logic and Distributed Control System

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Understand all the important components of PLC and SCADA, I/O modules and field devices of an industrial automation system.
CO2	Develop PLC program in using ladder diagram for industrial sequential applications.
CO3	Develop PLC program in using other languages for industrial sequential applications.
CO4	Understand all the important components of DCS and Smart field devices of an industrial automation system.
CO5	Explain the most appropriate automation technologies for a given application.
CO6	Outline the recent developments in industrial automation.

EI8691-Computer Control of Processes

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Ability to analyze the discrete time systems
CO2	Ability to build models from input-output data
CO3	Ability to design a digital controller
CO4	Ability to design multi-loop controller and multivariable controller for multi-variable systems.
CO5	Illustrate the multi-loop regulatory control techniques
CO6	Explain the different types of multivariable regulatory controllers

CS8391-Data Structures

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Implement abstract data types using arrays and linked list.
CO2	Apply the different linear data structures like stack and queue to various computing problems.
CO3	Implement different types of trees and apply them to problem solutions.
CO4	Discuss graph structure and understand various operations on graphs and their applicability.
CO5	Analyze the various sorting and searching algorithms.
CO6	Understand the hashing technique and hash functions.

EI8692-Electronic Instrumentation

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

EI8077-Power Electronics and Drives

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Summarize the Switching concepts of power devices
CO2	Analyze Controlled Rectifiers and AC Controllers
CO3	Analyze DC to DC Converters and its Applications
CO4	Analyze the classification of Inverters
CO5	Apply Converters in Drives and Control

EI8072-Advanced Instrumentation Systems

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Understand the instrumentation behind flow, level, temperature and pressure measurement
CO2	Acquire basic knowledge on the various types of analyzers used in typical industries.
CO3	Understand the role of Safety instrumented system in the industry.
CO4	Explain Standards for applying Instrumentation in Hazards Locations.
CO5	Design, develop, and interpret the documents used to define instruments and control Systems for a typical project, including P&IDs, loop diagrams, specification forms, Instrument lists, logic diagrams, installation details, and location plans

CS8381-Data Structures Laboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Write functions to implement linear and non-linear data structure operations
CO2	Suggest appropriate linear / non-linear data structure operations for solving a given problem
CO3	Appropriately use the linear / non-linear data structure operations for a given problem
CO4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

EI8661-Process Control Laboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Ability to understand and analyze process control engineering problems.
CO2	Be able to build dynamic models using input – output data of a process
CO3	Ability to working with real time control loops(flow/level/temperature/pressure)
CO4	Get exposed to simulation tools such as MATLAB/LABVIEW/ASPEN
CO5	Ability to learn and implement simple adaptive and model based control schemes

HS8581-Professional Communication

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Make effective presentations
CO2	Participate confidently in Group Discussions
CO3	Attend job interviews and be successful in them
CO4	Develop adequate Soft Skills required for the workplace
CO5	Enhance the Employability and Career Skills

EIGHTH SEMESTER

MG6851- Principles of Management

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

EI6801- Computer Control of Processes

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

GE6757- Total Quality Management

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

EI6811- Project Work

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Demonstrate a sound technical knowledge of their selected project topic
CO2	Identify the problem, formulation and solution
CO3	Design engineering solutions to complex problems utilizing a systems approach
CO4	Develop an engineering project
CO5	Demonstrate the knowledge, skills and attitudes of a professional engineer
CO6	Improve the managerial skills to meet the industry