

# R.M.K. ENGINEERING COLLEGE

RSM Nagar, Kavaraipettai – 601 206

## Department of Electronics and Instrumentation Engineering

### Course Outcomes – ODD Semester 2023-24

S.No	Semester	Theory/Practical	Course Code / Course Name
1	3	Theory	20MA301-Transforms and Partial Differential Equations
2	3	Theory	20EI301-Instrument Transducers
3	3	Theory	20EI302-Electrical and Electronic Measurements
4	3	Theory	20EI303-Electrical Machines
5	3	Theory	20EC302-Electronic Circuits
6	3	Theory	20CS302-Object Oriented Programming
7	3	Practical	20EI311-Devices and Machines lab
8	3	Practical	20EI312-Mini project
9	3	Practical	20CS311-Object Oriented Programming Laboratory
10	3	Practical	20CS313-Aptitude & Coding Skills -I
11	5	Theory	20CS201-Data structures
12	5	Theory	20EC402-Microprocessors and Microcontrollers
13	5	Theory	20EE603-Digital Signal Processing
14	5	Theory	20EI501-Process Control
15	5	Theory	20EI902-Professional Elective I – Analytical instrumentation
16	5	Theory	20CE004-Open Elective-I – Air Pollution and Control Engineering
17	5	Practical	20EI511-Process Control Lab
18	5	Practical	20EC411-Microprocessors and Microcontrollers Lab
19	7	Theory	EI8751- Industrial Data Networks
20	7	Theory	EE8691- Embedded Systems
21	7	Theory	EC8093- Digital Image Processing
22	7	Theory	EI8075-Fibre Optics and Laser Instrumentation
23	7	Theory	GE8077-Total Quality Management
24	7	Theory	OCS752 -Introduction To C Programming
25	7	Practical	Ei8761-industrial automation laboratory
26	7	Practical	EI8762-Instrumentation System Design Laboratory

### THIRD SEMESTER

#### 20MA301- Transforms and Partial Differential Equations

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Employ the Fourier series concept in Engineering Problems
CO2	Identify the solution of Fourier transform in continuous time signals.
CO3	Elucidate the difference equation using Z-transform.
CO4	Compute the solutions of the partial differential equation.
CO5	Utilize the Fourier series for heat and wave equations.

#### 20EI301-Instrument Transducers

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Understand the physical quantities for measurement
CO2	Compare the mathematical model of Zero, First and Second order transducer.
CO3	Explain the construction and operation of variable resistance transducer..
CO4	Describe the knowledge of inductance transducer.
CO5	Illustrate the knowledge of capacitance transducers.
CO6	Differentiate the construction and operation of other transducers and sensors.

#### 20EI302 - Electrical and Electronic Measurement

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Compare various measuring instruments and extension of range of instruments.
CO2	Construct the wattmeter and energy meter to measure power and energy.
CO3	Design DC and AC bridges for the measurement of R, L, C and Frequency measurement.
CO4	Classify the kind of instrument suitable for typical electronic measurements.
CO5	Compare various signal generators and waveform analyzers.
CO6	Minimize the errors occurring in the instrument.

### 20EC302 - Electronic Circuits

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Analyze biasing of BJT and BJT amplifiers
CO2	Analyze biasing of MOSFET and MOSFET amplifiers.
CO3	Compute the frequency response of amplifiers.
CO4	Acquire the knowledge of feedback amplifiers.
CO5	Acquire the knowledge of oscillators.
CO6	Illustrate the operation of power amplifiers.

### 20CS302-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.

### 20EI303- Electrical Machines

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Identify the starting and control techniques of DC Machine.
CO2	Solve the performance calculation of Transformer
CO3	Compare the starting and control techniques of 3 phase induction motor
CO4	Explain the performance characteristic of Synchronous Machines
CO5	Interpret the performance characteristic of Special motors
CO6	Design Electrical Machines for Industrial Drive Applications

### 20CS311-- 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.

### 20EI311-Devices and Machines lab

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Differentiate the usage of various electronic equipment and simulation tools for design and analysis of electronic circuits.
<b>CO2</b>	Demonstrate the hands-on experience in studying the characteristics of semiconductor devices.
<b>CO3</b>	Analyze various electronic circuits such as voltage regulators, transistor amplifiers and oscillators.
<b>CO4</b>	Interpret the various speed control techniques of DC machines.
<b>CO5</b>	Compute the equivalent circuit parameters of single-phase transformer under short circuit test and No-load test
<b>CO6</b>	Illustrate the characteristics of transformer and Induction motor under load test

**FIFTH SEMESTER**  
**20CS201-DATA STRUCTURES**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Implement abstract data types using arrays and linked list.
<b>CO2</b>	Apply the linear data structures stack and queue to various computing problems.
<b>CO3</b>	Make use of different types of trees, a non-linear data structure, for problem solving.
<b>CO4</b>	Implement the non linear data structure, graph, along with its various operations for computational applications.
<b>CO5</b>	Differentiate the various sorting and searching algorithms.
<b>CO6</b>	Explain the different types of hashing techniques.

**20EI902- Analytical Instruments**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand the fundamental principles of selective analytical instruments used in medical diagnosis, quality assurance & control and research studies
<b>CO2</b>	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>	Evaluate the strengths and limitations of the various instrumental methods.
<b>CO4</b>	Develop critical thinking for interpreting analytical data.
<b>CO5</b>	Understand the working principle, types and applications of NMR
<b>CO6</b>	Understand the working principle, types and applications of Mass spectroscopy

**20EI501- Process Control**

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

### 20EC402- Microprocessors and Microcontrollers

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	To explain the Architecture of 8086 Microprocessor.
CO2	To summarize the design aspects of I/O and Memory Interfacing circuits.
CO3	To learn the design aspects of I/O and Memory Interfacing Circuits.
CO4	To interface microprocessors with supporting chips.
CO5	To explain the Architecture of 8051 microcontroller.
CO6	To demonstrate a microcontroller based system.

### 20EE603- Digital Signal Processing

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Categorize the different types of Signals and Systems.
CO2	Examine the LTI systems with different inputs using Z transform.
CO3	Compare Discrete Fourier transform & Fast Fourier transform.
CO4	Realize FIR filters using windowing techniques.
CO5	Design IIR Filters using different types of approximation.
CO6	Summarize the DSP processors and its architectures for different applications.

### 20CE004- Air Pollution and Control Engineering

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Summarize the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management.
CO2	Identify, formulate and solve air pollution problems.
CO3	Design stacks and particulate air pollution control devices to meet applicable standards.
CO4	Select control equipment for gaseous contaminants
CO5	Ensure air quality control and preventive measures for air pollution.
CO6	Apply all quality management measures in the real time applications.

### 20EI511-Process Control Lab

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand and analyze process control engineering problems.
<b>CO2</b>	Build dynamic models using input – output data of a process
<b>CO3</b>	Demonstrate real time control loops for flow and level process
<b>CO4</b>	Demonstrate real time control loops for temperature process
<b>CO5</b>	Demonstrate real time control loops pressure process
<b>CO6</b>	Simulate tools such as MATLAB/LABVIEW

### 20EC411- 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>	Write ALP Programs for Arithmetic and logical operations.
<b>CO2</b>	Analyze to interface different I/Os with processor.
<b>CO3</b>	Analyze waveforms using Microprocessors.
<b>CO4</b>	Write programs in 8051.
<b>CO5</b>	Demonstrate to interface different I/Os with Microcontroller.
<b>CO6</b>	Demonstrate to perform serial communications between two kits

**SEVENTH SEMESTER**  
**EI8751-Industrial Data Networks**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Explain the basic concepts of data networks and communication.
<b>CO2</b>	Explain and relate the functions of networking and internetworking devices and choose the appropriate one depending on application.
<b>CO3</b>	Compare the characteristics of various communication buses like Fieldbus, and Profibus and select the appropriate one depending on application.
<b>CO4</b>	Explain the various communication protocols available like HART, MODBUS in data communication and select the appropriate one depending on application.
<b>CO5</b>	Explain the various Industrial Ethernets.
<b>CO6</b>	Explain the basic concepts of wireless communication.

**EE8691- Embedded Systems**

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

**EC8093- Digital Image Processing**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
<b>CO2</b>	Operate on images using the techniques of smoothing, sharpening and enhancement.
<b>CO3</b>	Understand the restoration concepts and filtering techniques.
<b>CO4</b>	Learn the basics of segmentation features extraction.
<b>CO5</b>	Learn the basics of compression methods for color models.



<b>CO6</b>	Learn the recognition methods.
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### **EI8075-Fibre Optics and Laser Instrumentation**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Classify the types of optical fibers and discuss the various losses and dispersion involved in optical fibers and discuss about various optical sources, optical detectors, optical connectors and splices.
<b>CO2</b>	Illustrate the various applications of lasers in industries.
<b>CO3</b>	Explain the characteristics and types of lasers.
<b>CO4</b>	Develop a thorough knowledge about applications of lasers in industries and material processing.
<b>CO5</b>	Explain the concept of holography using lasers.
<b>CO6</b>	Interpret the applications of lasers in medical field.

### **GE8077-Total Quality Management**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand the quality philosophies and customer focused managerial system
<b>CO2</b>	Summarize the quality management principles
<b>CO3</b>	Apply six sigma concept in manufacturing and service sector
<b>CO4</b>	Determine the tools and techniques for quality improvement.
<b>CO5</b>	Analyze standards and auditing system on implementation of TQM.
<b>CO6</b>	Analyze standards for the operation of EMS.

### **OCS752 -INTRODUCTION TO C PROGRAMMING**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop algorithmic solutions to simple computational problems using basic constructs
<b>CO2</b>	Develop simple applications in C using Control Constructs
<b>CO3</b>	Design and implement applications using arrays
<b>CO4</b>	Represent data using string and string operations
<b>CO5</b>	Decompose a C program into functions and pointers

<b>CO6</b>	Represent and write program using structure and union
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**EI8761-Industrial Automation Laboratory**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understanding programming of PLC
<b>CO2</b>	Understanding programming of SCADA
<b>CO3</b>	Understanding programming of DCS
<b>CO4</b>	Working with Industrial automation system
<b>CO5</b>	Design and implement control schemes in PLC and DCS
<b>CO6</b>	Interface with PLC and DCS

**EI8762-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>	Design of signal conditioning systems
<b>CO2</b>	Design of Instrumentation systems
<b>CO3</b>	Design controller
<b>CO4</b>	Design control valve and Transmitter
<b>CO5</b>	Design and draw piping diagram for Industrial application projects
<b>CO6</b>	Design of Multi-channel data acquisition and transmitter