

# **R.M.K. ENGINEERING COLLEGE**

**RSM Nagar, Kavaraipettai – 601 206**

## **Department of Electronics and Instrumentation Engineering**

### **Course Outcomes – EVEN Semester 2023-24**

<b>S.No</b>	<b>Semester</b>	<b>Theory/Practical</b>	<b>Course Code / Course Name</b>
1	4	Theory	Numerical Methods
2	4	Theory	Digital Principles and System Design
3	4	Theory	Industrial Instrumentation
4	4	Theory	Control System Design
5	4	Theory	Linear Integrated Circuits
6	4	Theory	Universal Human Values II- Understanding Harmony
7	4	Practical	Linear and Digital Integrated Circuits Lab
8	4	Practical	Measurements and Transducers Lab
9	4	Practical	Foundation Lab on Internet of Things
10	4	Practical	Aptitude & Coding Skills-II
11	6	Theory	Factory Automation
12	6	Theory	Industrial Internet of Things
13	6	Theory	Communication Engineering
14	6	Theory	Embedded Systems
15	6	Practical	Industrial Instrumentation and IoT Lab
16	6	Practical	Industrial Automation Lab
17	6	Practical	Advanced Aptitude & Coding Skills -II
18	8	Practical	Project Work

**FOURTH SEMESTER**  
**20MA403 - Numerical Methods**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Compute the solutions of algebraic, transcendental and the system of equations
<b>CO2</b>	Implement the numerical techniques of interpolation in equal and unequal intervals
<b>CO3</b>	Apply the numerical techniques of differentiation and integration for engineering problems.
<b>CO4</b>	Employ the various techniques and methods for solving first and second order ordinary differential equations.
<b>CO5</b>	Solve the partial differential equations with initial and boundary conditions by using certain techniques with engineering applications.

**20EI401      DIGITAL PRINCIPLES AND SYSTEM DESIGN**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Design Digital Circuits using simplified Boolean functions
<b>CO2</b>	Analyze and Design Combinational Circuits
<b>CO3</b>	Analyze and Design Synchronous Sequential Circuits
<b>CO4</b>	Analyze and Design Asynchronous Sequential Circuits
<b>CO5</b>	Interpret designs using Programmable Logic Devices
<b>CO6</b>	Write HDL code for Combinational and Sequential Circuits.

**20EI402      INDUSTRIAL INSTRUMENTATION**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Differentiate the construction and working of various temperature measurement devices.
<b>CO2</b>	Explain the construction and working of instruments used for the measurement of Pressure.
<b>CO3</b>	Describe the construction and working of instruments used for the measurement of level and humidity.
<b>CO4</b>	Study the different flow measurement techniques used in process industries

<b>CO5</b>	Describe the construction and working of instruments used for the measurement of speed, density and viscosity
<b>CO6</b>	Identify a suitable measuring instrument for an application.

**20EI403 CONTROL SYSTEM DESIGN**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop various representations of system based on the first principles approach.
<b>CO2</b>	Determine steady state error and error coefficients for various input signals.
<b>CO3</b>	Construct and interpret root locus, Bode plot, polar plot and Nyquist plot and infer the time domain and frequency domain specifications from the response.
<b>CO4</b>	Analyze and infer the stability of systems in time and frequency domain
<b>CO5</b>	Design and implement lag, lead, lag-lead compensators to meet the time and frequency domain specifications.
<b>CO6</b>	Determine the system equations in state variable form.

**20EE304 LINEAR INTEGRATED CIRCUITS**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Demonstrate the fabrication of IC's.
<b>CO2</b>	Analyze the performance characteristics of Op-Amp.
<b>CO3</b>	Design Op-Amp based circuits for engineering applications.
<b>CO4</b>	Classify and comprehend the working principle of data converters.
<b>CO5</b>	Illustrate the function of application specific IC's such as VCO, PLL and its applications.
<b>CO6</b>	Classify the different voltage regulators using Op-Amp.

**20GE301 UNIVERSAL HUMAN VALUES II: UNDERSTANDING HARMONY**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Become more aware of themselves, and their surroundings (family, society, nature);
<b>CO2</b>	Become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

<b>CO3</b>	Have better critical ability.
<b>CO4</b>	Become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
<b>CO5</b>	Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

### **20EI411      LINEAR AND DIGITAL INTEGRATED CIRCUITS LAB**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Implement Boolean Functions.
<b>CO2</b>	Interpret the importance of code conversion.
<b>CO3</b>	Execute 4-bit shift registers.
<b>CO4</b>	Design and implement counters using specific counter IC.
<b>CO5</b>	Acquire knowledge on Application of OPAMP and Regulators.
<b>CO6</b>	Construct Voltage frequency converters and Regulators

### **20EI412      MEASUREMENTS AND TRANSDUCERS LABORATORY**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Apply different types of transducers for measurement applications.
<b>CO2</b>	Evaluate the static and dynamic characteristics of measuring instruments.
<b>CO3</b>	Design signal conditioning circuit for various transducers
<b>CO4</b>	Construct the measurement systems using different types of resistance, capacitance and inductance transducers.
<b>CO5</b>	Interpret the results of analysis in oral form as well as in written form and draw meaningful conclusions.
<b>CO6</b>	Develop and test the real time application using LabVIEW.

### **20EC312      FOUNDATION LAB ON INTERNET OF THINGS (IoT)**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Acquire knowledge on Internet of Things and its hardware and software components.
<b>CO2</b>	Demonstrate to interface I/O devices, sensors & communication modules.
<b>CO3</b>	Analyze by connecting and exchanging data with other devices and systems over the Internet.
<b>CO4</b>	Analyze to remotely monitor data and control devices.
<b>CO5</b>	Develop real life IoT based projects.
<b>CO6</b>	Integrate as a member in a group.

**20CS414      APTITUDE AND CODING SKILLS – II**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop advanced vocabulary for effective communication and reading skills.
<b>CO2</b>	Build an enhanced level of logical reasoning and quantitative skills.
<b>CO3</b>	Develop error correction and debugging skills in programming.
<b>CO4</b>	Apply data structures and algorithms in problem solving

## SIXTH SEMESTER

### 20EI601 FACTORY AUTOMATION

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Understand all the important components such as PLC, SCADA, DCS, I/O modules and field devices of an industrial automation system.
CO2	Develop PLC program in different languages for industrial sequential applications.
CO3	Configure and develop Feedback Control Schemes using PLC and DCS.
CO4	Select and use most appropriate automation technologies for a given application.
CO5	Ability to gain knowledge on the recent developments in industrial automation.
CO6	Understand the communication protocols

### 20EI602 INDUSTRIAL INTERNET OF THINGS

COs	Course Outcome: The students, after the completion of the course, are expected to ....
CO1	Understand IoT value chain structure (device, data cloud), application areas and technologies involved.
CO2	Understand various protocols in Data Link and Network Layer
CO3	Understand various protocols in Transport, Session, Service and Security Layer
CO4	Learn about Internet of Things with the help of projects designed for Raspberry P.
CO5	Explore various Case Studies related to Industrial Internet of Things
CO6	Understand IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules.

### 20EI603 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 the 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

<b>CO6</b>	Understand about Multiple Access Techniques
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**20EI603      COMMUNICATION ENGINEERING**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Acquire knowledge on basic components of embedded system design
<b>CO2</b>	Analyze the concepts of embedded systems.
<b>CO3</b>	Describe the architecture and programming of ARM processor.
<b>CO4</b>	Use the system design techniques to develop software for embedded systems
<b>CO5</b>	Acquire knowledge on fundamentals of RTOS and its various scheduling policies
<b>CO6</b>	Model real-time consumer/industrial applications using embedded-system concepts

**20EI611      INDUSTRIAL INSTRUMENTATION AND IOT LAB**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Experiment the industrial process parameters such as flow, level and temperature.
<b>CO2</b>	Experiment the industrial process parameters such as pressure and viscosity.
<b>CO3</b>	Analyze pH, conductivity, UV absorbance and transmittance
<b>CO4</b>	Analyze physiological parameters such as BP, ECG and pulse rate.
<b>CO5</b>	Apply sensor output in cloud and IoT.
<b>CO6</b>	Evaluate the Calibration of ammeter and Voltmeter

**20EI612      INDUSTRIAL AUTOMATION LABORATORY**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Understand and Programming of PLC, SCADA and DCS
<b>CO2</b>	Ability to working with industrial automation system
<b>CO3</b>	Design and implement control schemes in PLC & DCS
<b>CO4</b>	Interface field devices with PLC & DCS

<b>CO5</b>	Understand various communication protocols
<b>CO6</b>	Identify a separate Team to do mini project as Team work.

**20CS614      ADVANCED APTITUDE AND CODING SKILLS - II**

<b>COs</b>	<b>Course Outcome: The students, after the completion of the course, are expected to ....</b>
<b>CO1</b>	Develop advanced vocabulary for effective communication and reading skills.
<b>CO2</b>	Build an enhanced level of logical reasoning and quantitative skills.
<b>CO3</b>	Develop error correction and debugging skills in programming.
<b>CO4</b>	Apply data structures and algorithms in problem solving.