



# R.M.K. ENGINEERING COLLEGE

(An Autonomous Institution)

R.S.M Nagar, Kavaraipettai, Gummidipoondi Taluk, Thiruvallur District, Tamil Nadu- 601206

Affiliated to Anna University, Chennai / Approved by AICTE, New Delhi/Accredited by NAAC with A+ Grade

An ISO 21001:2018 Certified Institution / All the Eligible UG Programs are accredited by NBA, New Delhi



## Department of Computer Science and Design

### Course Outcomes

#### ODD Semester 2024-2025

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1	3	Theory	Discrete Mathematics
2	3	Theory	Universal HumanValues 2: Understanding Harmony
3	3	Theory	Computer Organization and Architecture
4	3	Theory with Practical	Advanced Java Programming
5	3	Theory with Practical	Operating Systems
6	3	Theory with Practical	Design Thinking
7	3	Practical	Product Development Lab – 3
8	3	Practical	Aptitude and Coding Skills I
9	3	Practical	Internship and Seminar*
10	3	-	Value Education (Non Credit)

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1	5	Theory	Open Elective I
2	5	Theory	Professional Elective II
3	5	Theory	Professional Elective III
4	5	Theory	Computer Graphics and Multimedia

5	5	Theory with Practical	Product Centric Agile Development
6	5	Theory with Practical	Computer Networks
7	5	Theory with Practical	Advanced Aptitude and Coding Skills I
8	5	Practical	Internship*
9	5	-	Indian Constitution (Non Credit)

Sl. No.	Semester	Theory/ Practical/Honour Degree/Minor Degree	Course Code / Course Name
1	7	Theory with practical	20CD701- Cloud Computing (Lab Integrated)
2.	7	Theory	20CE002- Geographic Information System
3.	7	Theory with practical	20CD915- Web Development Frameworks (Lab Integrated)
4.	7	Theory with practical	20CD913- Game Design(Lab Integrated)
5.	7	Practical	20IT928- Professional Readiness For Innovation, Employability And Entrepreneurship
6.	7	Minor Degree	20EC960 -Robot Operating System

### EVEN Semester 2024-2025

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1	4	Theory	Probability and Statistics
2	4	Theory with Practical	Web Development Frameworks
3	4	Theory	Design and analysis of algorithms
4	4	Theory	Human Computer Interaction
5	4	Theory with Practical	Design Programming
6	4	Theory with Practical	Professional Elective I
7	4	Practical	Advanced Aptitude and Coding Skills II
8	4	Practical	Product Development Lab - 4

9	4	Practical	Aptitude and Coding Skills II
10	4	-	Yoga/ Personality Development (Non Credit)

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1	6	Theory	Professional Ethics
2	6	Theory	Open Elective II
3	6	Theory with Practical	Object Oriented Software Engineering
4	6	Theory with Practical	Principles of UI/UX Design
5	6	Theory with Practical	Professional Elective IV
6	6	Theory with Practical	Professional Elective V
7	6	Practical	Advanced Aptitude and Coding Skills II

Sl. No.	Semester	Theory/ Practical	Course Code / Course Name
1	8	Practical	Project Work

### **ODD Semester 2024-2025**

#### **3rd Semester – B.E. Computer Science and Design**

##### **22MA301-Discrete Mathematics**

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Examine the validity of the arguments

**CO2:** Apply various proof techniques and principles using analytic and combinatorial methods

**CO3:** Develop the recurrence relation for the given problems.

**CO4:** Implement graph theory technique to solve real time problems.

**CO5:** Understand groups, Rings and Fields.

**CO6:**Solve problems in lattices and Boolean algebra.

### **22GE301- Universal HumanValues 2: Understanding Harmony**

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Be aware of themselves, and their surroundings (family, society, nature).

**CO2:** Be more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

**CO3:** Have better critical ability.

**CO4:** Become sensitive to their commitment towards what they have understood (human values, human relationships, and human society).

**CO5:** Be able to 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.

### **22CS302- Computer Organization and Architecture**

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Explain the basic principles and operations of digital computers.

**CO2:** Design Arithmetic and Logic Unit to perform fixed and floating-point operations

**CO3:** Analyze and Implement Instruction Execution.

**CO4:** Evaluate Pipelining and Superscalar Operations..

**CO5:** Understand I/O and Memory Systems.

**CO6:** Explore Parallel Processing and Multicore Computers.

### **22CS305- Advanced Java Programming**

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Implement various data structures by utilizing core Java features and libraries.

**CO2:** Demonstrate proficiency in handling Java I/O operations, including file manipulation for efficient data storage and retrieval..

**CO3:** Apply and Analyze the Stream API for functional programming and data processing.

**CO4:** Implement advanced object serialization for complex data structures.

**CO5:** Utilize regular expressions for text parsing and string manipulation..

**CO6:** Build applications using advanced Java programming techniques.

### **22CS304- Operating Systems**

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Describe computer system organization, operating system structures, and

services.

**CO2:** Demonstrate basic Unix commands and develop programs using shell scripting.

**CO3:** Analyze process concepts and scheduling, and implement interprocess communication using message queues.

**CO4:** Implement CPU scheduling algorithms and use threading models to manage concurrency.

**CO5:** Address process synchronization issues and implement deadlock avoidance techniques.

**CO6:** Understand and Apply Memory and Storage Management Techniques.

### 22CD301- Design Thinking

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Understand the phases of design thinking process.

**CO2:** Conduct an immersion activity to create an empathy map.

**CO3:** Define the key problems of the personas created.

**CO4:** Apply the ideation phase steps to present the prototype ideas.

**CO5:** Create a prototype with value propositions and test the prototype

## Laboratory

### 22ME311- PRODUCT DEVELOPMENT LAB – 3

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1 :** Enhance their skills in design concepts, rules and procedures.

**CO2 :** Develop their cognitive strategy to think, organize, learn and behave.

**CO3 :** Demonstrate the ability to provide conceptual design strategies for a product.

**CO4 :** Describe the procedure for designing a Mock-up model.

**CO5 :** Recognize and apply appropriate interdisciplinary and integrative strategies for solving complex problems.

### 22CS311 - APTITUDE AND CODING SKILLS – I

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Develop vocabulary for effective communication and reading skills.

**CO2:** Build the logical reasoning and quantitative skills.

**CO3:** Develop error correction and debugging skills in programming.

## **ODD Semester 2024-2025**

### **5th Semester – B.E. Computer Science and Design**

<b>OPEN ELECTIVE-I</b>	<b>22EC012-INDUSTRIAL IOT APPLICATIONS</b>
<b>Cos</b>	<b>Course Outcome: Upon completion of the course, the students will be able to:</b>
	<b>CO1:</b> Describe IOT, IIOT.
	<b>CO2:</b> Understand various IoT Layers and their relative importance
	<b>CO3:</b> Interpret the requirements of IIOT sensors and understand the role of actuators.
	<b>CO4:</b> Study various IoT platforms and Security
	<b>CO5:</b> Realize the importance of Data Analytics in IoT..
	<b>CO6:</b> Design various applications using IIoT in manufacturing sector

<b>22CD919- GAME DESIGN</b>	
<b>Cos</b>	<b>Course Outcome: Upon completion of the course, the students will be able to:</b>
	<b>CO1:</b> Use the Fundamental principles of Game Design and Development in context.
	<b>CO2:</b> Able to apply AI techniques in Game Design and Development.
	<b>CO3:</b> Thoroughly understand the detailed processes of the Game Engine.
	<b>CO4:</b> Design and Implement simple 2D games using the design and development process learnt.
	<b>CO5:</b> Design and Implement simple 3D games using the design and development process learnt.

<b>22AI301- ARTIFICIAL INTELLIGENCE</b>	
<b>Cos</b>	<b>Course Outcome: Upon completion of the course, the students will be able to:</b>
	<b>CO1:</b> Illustrate the structure of agents and to implement various Intelligent agents
	<b>CO2:</b> Apply search strategies in problem solving and game playing using heuristic function.
	<b>CO3:</b> Implement logical agents and first-order logic problems.
	<b>CO4:</b> Apply problem-solving strategies with knowledge representation mechanism for solving hard problems..
	<b>CO5:</b> Demonstrate the basics of expert systems and to develop models using machine learning techniques.

### 22CD501- COMPUTER GRAPHICS AND MULTIMEDIA

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Implement 2D transformations and algorithms for generating primitives and attributes.

**CO2:** Solve problems in 3D transformations and viewing.

**CO3:** Implement the process of open source Vulkan API.

**CO4:** Implement rendering techniques and use advanced based rendering.

**CO5:** Apply lighting and shading models to enhance graphical scenes.

**CO6:** Understand the multimedia systems and animation.

### 22CD502- PRODUCT CENTRIC AGILE DEVELOPMENT

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Apply agile development methods in software development practices.

**CO2:** Obtain knowledge on Product Centric Value Delivery.

**CO3:** Implement Agile metrics and its ways of working.

**CO4:** Apply Product Centric Agile Development to develop web services

**CO5:** Apply DevOps concepts and tools for Web Development.

**CO6:** Develop effective collaboration and communication skills essential for working Within agile teams

### 22CS501- COMPUTER NETWORKS

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Understand the fundamental concepts of computer networks.

**CO2:** Apply the various routing protocols to solve real-world problems.

**CO3:** Build simple applications to solve societal problems..

**CO4:** Apply the simulation tools to implement various protocols used in the various layers.

**CO5:** Analyze the various application layer protocols.

**CO6:** Apply the mathematical knowledge to do performance analysis of various routing

### Laboratory

#### 22CS511 - ADVANCED APTITUDE AND CODING SKILLS - I

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Develop vocabulary for effective communication and reading skills.

**CO2:** Build the logical reasoning and quantitative skills.

**CO3:** Develop error correction and debugging skills in programming.

## INDIAN CONSTITUTION

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Interpret the knowledge on Indian Constitution.

**CO2:** Demonstrate the knowledge gained through fundamental rights concept.

**CO3:** Relate the concept of Lok Sabha and Rajya Sabha.

**CO4:** Illustrate the concept of Legislative Assembly and Legislative Council.

**CO5:** Analyze the concept of Local Self Government.

## ODD Semester 2024-2025

### 7th Semester – B.E. Computer Science and Design

#### 20CD701- CLOUD COMPUTING (LAB INTEGRATED)

**COs Course Outcome : The students, after the completion of the course, are expected to....**

**CO1** Understand the basic concepts and key technologies of cloud computing

**CO2** Apply the virtualization techniques for the development of cloud.

**CO3** Understand and use the architecture of compute and storage cloud, service and delivery models.

**CO4** Identify the core issues of cloud computing such as resource management and security

**CO5** Analyze the various cloud service providers and other emerging cloud-based tools.

#### 20CE002- GEOGRAPHIC INFORMATION SYSTEM

**COs Course Outcome : The students, after the completion of the course, are expected to....**

**CO1** Describe the fundamentals of maps and their characteristics, GIS & its components.

**CO2** Demonstrate various spatial data models and their advantages

**CO3** Identify GIS Data sources, data input, data editing and conversion.

**CO4** Carryout raster and vector data analysis for various applications.

**CO5** Explain the spatial information along with quality assessment for applications.

**CO6** Identify an error free GIS database for civil engineering applications.

### 20CD915 - WEB DEVELOPMENT FRAMEWORKS (LAB INTEGRATED)

**COs Course Outcome : The students, after the completion of the course, are expected to....**

**CO1** Personalize web pages using text formatting, graphics, audio, and video.

**CO2** Hands on knowledge on Rest API, propTypes

**CO3** Able to develop a web application using latest React Framework

**CO4** Apply various React features including functions, components, and services.

**CO5** Able to develop application using ReactJs hooks.

### 20CD913 - GAME DESIGN (LAB INTEGRATED)

**COs Course Outcome : The students, after the completion of the course, are expected to....**

**CO1** Use the Fundamental principles of Game Design and Development in context

**CO2** Able to apply AI techniques in Game Design and Development ·

**CO3** Thoroughly understand the detailed processes of the Game Engine ·

**CO4** Design and Implement simple 2D games using the design and development process learnt

**CO5** Design and Implement simple 3D games using the design and development process learnt.

### Laboratory

### 20IT928- PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

**COs Course Outcome : The students, after the completion of the course, are expected to....**

**CO1** Upskill in emerging technologies and apply to real industry-level use cases

**CO2** Understand agile development process

**CO3** Develop career readiness competencies, Team Skills / Leadership qualities

**CO4** Develop Time management, Project management skills and Communication Skills

**CO5** Use Critical Thinking for Innovative Problem Solving

**CO6** Develop entrepreneurship skills to independently work on products

## Minor Degree in Internet of Things

### **20EC960-ROBOT OPERATING SYSTEM**

**COs Course Outcome : The students, after the completion of the course, are expected to....**

**CO1** Understand the robotics design and implementation

**CO2** Comprehend, classify and analyze the behavior of different types of sensors and actuators.

**CO3** Understand the ROS fundamentals

**CO4** Gain the knowledge about the types of actuators: electrical, pneumatic, and hydraulic, performance criteria and selection.

**CO5** Design robotic applications using ROS.

**CO6** Design Robots with Localization.

### **EVEN Semester 2024-2025**

#### **4th Semester – B.E. Computer Science and Design**

### **22MA401- PROBABILITY AND STATISTICS**

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Calculate the statistical measures of standard distributions.

**CO2:** Compute the correlation & regression for two dimensional random variables

**CO3:** Apply the concept of testing the hypothesis.

**CO4:** Implement the concept of analysis of variance for various experimental designs.

**CO5:** Demonstrate the control charts for variables and attributes

### **22IT403- WEB DEVELOPMENT FRAMEWORKS**

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Personalize web pages using text formatting, graphics, audio, and video.

**CO2 :** Hands on knowledge on Rest API , propTypes.

**CO3:** Able to develop a web application using latest React Framework.

**CO4 :** Apply various React features including functions, components, and services.

**CO5 :** Able to develop application using ReactJshooks.

### 22CS306- Design and analysis of algorithms

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Evaluate the efficiency of algorithms using asymptotic notations.

**CO2:** Design, implement, and analyze the time complexity of various sorting algorithms

**CO3:** Develop solutions for optimization problems using dynamic programming techniques.

**CO4:** Implement and analyze greedy algorithms for optimization problems

**CO5:** Develop solutions for complex problems using backtracking and branch and bound techniques.

**CO6:** Analyze NP-complete problems and implement approximation algorithms for these problems

### 22CD401- Human Computer Interaction

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Enumerate the basic concepts of human, computer interactions.

**CO2:** Inspect software design process in human computer interaction

**CO3:** Examine various models and theories related to human computer interaction

**CO4:** Build meaningful user interface

**CO5:** Establish the different levels of communication across the application stakeholders.

### 22CD402- Design Programming

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Learn about Blender interface.

**CO2:** Understand Texture Mapping and Rendering.

**CO3:** Analyse Text to Mesh Object and Curve conversion.

**CO4:** Know the scripting fundamentals.

**CO5:** Understand accessing game objects.

### Laboratory

### 22ME411- Product Development Lab - 4

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO 1:** Identify the real-time problems through literature.

**CO 2:** Develop feasible solutions for the problems.

**CO 3:** Evaluate the methods to develop solutions to the problem.

**CO 4:** Analyze the business opportunities for a new product.

**CO 5:** Prepare a detailed report for the experimental dissemination.

### 22CS411- APTITUDE AND CODING SKILLS – II

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Develop advanced vocabulary for effective communication and reading skills.

**CO2:** Build an enhanced level of logical reasoning and quantitative skills.

**CO3:** Develop error correction and debugging skills in programming.

**CO4:** Apply data structures and algorithms in problem solving.

### 22CS412- MINI PROJECT AND DESIGN THINKING LAB

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Understand the design thinking process and able to visualize the problem

**CO2:** Analyse the problem using innovation tools

**CO3:** Design a prototype for an identified problem solution.

**CO4:** Testing and evaluate strategies in improving the solution.

**CO5:** Apply the innovation ideas to real-world applications.

## **EVEN Semester 2024-2025**

### **6th Semester – B.E. Computer Science and Design**

### 22CE701- PROFESSIONAL ETHICS IN ENGINEERING

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Summarize the importance of human values in work place.

**CO2:** Discuss the senses of engineering ethics, moral dilemmas, moral autonomy and uses of ethical theories.

**CO3:** Describe the role of engineers as responsible experimenters and necessity of codes of ethics in engineering.

**CO4:** Explain safety, risk, responsibilities and rights in the society.

**CO5:** Analyze the global issues related to environmental ethics, computer ethics, weapons development and the role of engineers as expert witnesses and advisors.

**CO6:** Apply ethics in society and discuss the ethical issues related to engineering.

## 22CS602- OBJECT ORIENTED SOFTWARE ENGINEERING

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Analyze and gather software requirements.

**CO2:** Use UML to create static and dynamic models.

**CO3:** Design software components using object-oriented principles.

**CO4:** Apply various software testing strategies.

**CO5:** Apply various software testing strategies.

## 22CD601- PRINCIPLES OF UI/UX DESIGN

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Understand the principles of User Interface (UI) Design in order to design with intention.

**CO2:** Learn the effective User eXperience (UX) and the psychology behind user decision making

**CO3:** Understand the importance of UX process and user Psychology

**CO4:** Elucidate the implications for designing web application with multimedia effects.

**CO5:** Create Wireframe and Prototype.

**CO6:** Develop the ability to work collaboratively within design teams and articulate design ideas and decisions effectively.

## 22CS611- ADVANCED APTITUDE AND CODING SKILLS – II

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Develop advanced vocabulary for effective communication and reading skills.

**CO2:** Build an enhanced level of logical reasoning and quantitative skills.

**CO3:** Develop error correction and debugging skills in programming.

**CO4:** Apply data structures and algorithms in problem solving.

## 22AI005- INTRODUCTION TO GENERATIVE AI

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

**CO1:** Elaborate the basic concepts of generative AI

**CO2:** Build generative AI to generate images.

- CO3:** Apply the concepts used in generative AI models.
- CO4:** Use various generative AI models.
- CO5:** Compare and use the various large language models.
- CO6:** Analyse the basics of prompt engineering.

### 22CD934 - C# AND .NET PROGRAMMING

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

- CO1:** Implement Class and Object concepts using C# Language in the .NET Framework.
- CO2:** Develop distributed applications using .NET Framework.
- CO3:** Develop application using advanced C# features.
- CO4:** Understand window-based application, WCF and WWF
- CO5:** Learn assembly management, XAML handling and error resolution.
- CO6:** Create mobile applications using .NET compact Framework.

### 22CS903- BLOCK CHAIN TECHNOLOGY

**Cos Course Outcome: Upon completion of the course, the students will be able to:**

- CO1:** Understand the technology components of Blockchain and how it works behind the scenes.
- CO2:** Understand the Bitcoin and its limitations by comparing with other alternative coins.
- CO3:** Develop deep understanding of the Ethereum model, its consensus model, code execution.
- CO4:** Understand the architectural components of a Hyperledger and its development framework.
- CO5:** Explore the alternative blockchains and its emerging trends.
- CO6 :** Understand blockchain technology, including Bitcoin, Ethereum, and alternative blockchains