R.M.D. ENGINEERING COLLEGE
(An Autonomous Institutions)

DEPARTMENT OF INFORMATION TECHNOLOGY

CO STATEMENTS

SEMESTER III

MA8351 – DISCRETE MATHEMATICS

Course Code	Course Outcome Statement
C201.1	Find the pcnf & pdnf, rules of inference theory and proof methods.
C201.2	Explain the mathematical Induction, pigeonhole principle, Permutations and combinations, Generating functions, Inclusion and exclusion principle and Applying its applications.
C201.3	Apply the concepts and techniques of Graphs and graph models
C201.4	Apply the concepts and properties of algebraic structures such as groups, rings and fields.
C201.5	Explain lattices and Boolean algebra
C201.6	Develop knowledge in Logic, Graphs and algebraic system in engineering.

CS8351 – DIGITAL PRINCIPLES AND SYSTEM DESIGN

Course Code	Course Outcome Statement
C202.1	Design Digital Circuits using simplified Boolean functions
C202.2	Design Combinational Circuits
C202.3	Design Synchronous Sequential Circuits
C202.4	Design Asynchronous Sequential Circuits
C202.5	Implement designs using Programmable Logic Devices
C202.6	Implement HDL code for Combinational and Sequential Circuits

CS8391 – DATA STRUCTURES

Course Code	Course Outcome Statement
C203.1	Implement abstract data types using arrays and linked list.
C203.2	Apply the linear data structures stack and queue to various computing problems.
C203.3	Make use of different types of trees, a non-linear data structure, for problem solving.
C203.4	Implement the nonlinear data structure, graph, along with its various operations for computational applications.
C203.5	Differentiate the various sorting and searching algorithms.
C203.6	Explain the different types of hashing techniques.

CS8392 – OBJECT ORIENTED PROGRAMMING

Course Code	Course Outcome Statement
C204.1	Develop Java programs using OOP principles
C204.2	Develop Java programs using the concepts of inheritance and interfaces
C204.3	Build Java applications using exceptions and I/O streams
C204.4	Develop Java applications with threads and generics classes
C204.5	Develop interactive Java programs using swings
C204.6	Develop an application based upon the concepts of Java

EC8394 – ANALOG AND DIGITAL COMMUNICATION

Course Code	Course Outcome Statement
C205.1	Make use of the principles of analog communication techniques
C205.2	Make use of the principles of pulse communication techniques
C205.3	Utilize the fundamentals of data communication
C205.4	Utilize the principles of digital communication techniques
C205.5	Solve source coding and error control coding problems
C205.6	Make use of the fundamentals of multi-user radio communication

CS8381 – DATA STRUCTURES LABORATORY

Course Code	Course Outcome Statement
C206.1	Develop and Test C programs to implement linear data structures
C206.2	Use appropriate linear data structures for the given problem
C206.3	Develop and Test C programs to implement non-linear data structures
C206.4	Use and Test appropriate non-linear data structures for the given problem
C206.5	Develop and Test C programs for implementing sorting and searching algorithms
C206.6	Use and Test appropriate hashing techniques for the given problem

CS8383 – OBJECT ORIENTED PROGRAMMING LABORATORY

Course Code	Course Outcome Statement
C207.1	Develop and Test Java programs to implement simple applications that make use of classes and packages
C207.2	Develop and Test Java programs to implement simple applications that make use of inheritance and interfaces
C207.3	Develop and Test Java programs to implement applications with arraylist and exception handling
C207.4	Develop and Test Java programs to implement applications with multi-threading
C207.5	Develop and Test Java programs to implement applications with file processing
C207.6	Develop and Test Java programs to implement applications with generic programming and event handling

CS8382 – DIGITAL SYSTEMS LABORATORY

Course Code	Course Outcome Statement
C208.1	Inspect simplified combinational circuits using logic gate
C208.2	Inspect simplified combinational circuits using MSI devices
C208.3	Inspect various shift registers
C208.4	Inspect various counters
C208.5	Examine combinational circuits using HDL
C208.6	Examine sequential circuits using HDL

HS8381 – INTERPERSONAL SKILLS/LISTENING AND SPEAKING

Course Code	Course Outcome Statement
C209.1	Listen and respond appropriately
C209.2	Participate in group discussions
C209.3	Make effective presentations
C209.4	Participate confidently and appropriately in conversations both formal and informal
C209.5	Attend the classes regularly
C209.6	Submit the Observation and Record regularly.

SEMESTER IV

MA8391 – PROBABILITY AND STATISTICS

Course Code	Course Outcome Statement
C210.1	Explain the fundamental knowledge of the concepts of probability and one dimensional random variables
C210.2	Apply the fundamental knowledge of standard distributions which can describe real life phenomenon.
C210.3	Apply the basic concepts of two dimensional random variables and apply in engineering applications
C210.4	Explain the concept of testing of hypothesis for small and large samples in real life problems.
C210.5	Infer the concept of testing of hypothesis with the ANOVA techniques in design of experiments in the field of agriculture.
C210.6	Examine the sampling distributions and statistical techniques used in engineering and management problems.

CS8491 – COMPUTER ARCHITECTURE

Course Code	Course Outcome Statement
C211.1	Identify the basic organization of computer system and performance of a computer system
C211.2	Utilize the basic instruction set, operations and addressing modes of MIPS architecture.
C211.3	Examine the procedure involved in designing ALU
C211.4	Compare and contrast the non-pipelined and pipelined data path implementation of MIPS
C211.5	Inspect Parallel Processing challenges, Hardware Multithreading and Multicore architectures
C211.6	Examine the performance of Memory and I/O systems

CS8492 – DATABASE MANAGEMENT SYSTEMS

Course Code	Course Outcome Statement
C212.1	Classify the modern and futuristic database applications based on size and complexity
C212.2	Construct ER model to Relational model to perform database design effectively
C212.3	Write queries using normalization criteria and optimize queries
C212.4	Summarize the properties of transaction and concurrency control mechanisms
C212.5	Compare and contrast various indexing strategies in different database systems
C212.6	Evaluate how advanced databases differ from traditional databases

CS8451 – DESIGN AND ANALYSIS OF ALGORITHMS

Course Code	Course Outcome Statement
C213.1	Explain the Analysis of Algorithm Efficiency and Compare the Mathematical analysis for Recursive and Non-recursive algorithms
C213.2	Identify the efficiency of Brute Force and Divide-and-Conquer technique algorithms
C213.3	Identify the efficiency of Dynamic Programming and Greedy Technique algorithms
C213.4	Solve the problems using Iterative Improvement technique
C213.5	Solve the problems using Backtracking and Branch and Bound Technique
C213.6	Examine the limitations of Algorithm power

CS8493 – OPERATING SYSTEMS

Course Code	Course Outcome Statement
C214.1	Explain the overall view of the computer system and operating system.
C214.2	Apply various CPU scheduling algorithms, synchronization primitives and deadlock handling methods
C214.3	Compare and contrast various memory management schemes and file system functionalities
C214.4	Categorize the performance of the various page replacement algorithms and interpret the file system implementation, sharing and protection mechanisms.
C214.5	Inspect the performance of the various disk scheduling algorithms
C214.6	Demonstrate administrative tasks on Linux servers and to be familiar with the basics of Mobile OS like iOS and Android

GE8291 – ENVIRONMENTAL SCIENCE AND ENGINEERING

Course Code	Course Outcome Statement
C215.1	Demonstrate on public awareness of environment, different types of ecosystems, values, threats and conservation of biodiversity.
C215.2	Illustrate the diverse pollution control methods, the techniques of waste management and know about the serious environmental disasters.
C215.3	Explain the nature and facts about environment and the effects of exploitation of natural resources on the environment.
C215.4	Classify the importance of social issues due to developmental activities on environment and distinguish the various environmental laws & regulations for a good environmental sustainability.
C215.5	Identify the effects of human population on the environment and the role of IT and GPRS on human health and the society.
C215.6	Study the integrated themes of biodiversity, natural resources, pollution control, waste management, find and implement scientific, technological, economic and political solutions to environmental problems.

CS8481 – DATABASE MANAGEMENT SYSTEMS LABORATORY

Course Code	Course Outcome Statement
C216.1	Make use of typical data definitions and manipulation commands
C216.2	Test the implementation of nested and join queries
C216.3	Develop simple application using views, sequences and synonyms.
C216.4	Inspect and implement applications that require front-end tools
C216.5	Examinedatabase programming using implicit and explicit cursors.
C216.6	Test the implementation of Tables, views, functions, procedures, triggers and exception handling.

CS8461 – OPERATING SYSTEMS LABORATORY

Course Code	Course Outcome Statement
C217.1	Make use of Linux commands, develop shell programs, implement system calls and simulate Linux commands
C217.2	Test the implementation of processes and IPC
C217.3	Compare the performance of various CPU scheduling algorithms
C217.4	Experiment with the implementation of semaphores, deadlock avoidance algorithm and deadlock detection algorithm
C217.5	Compare the implementation of various memory allocation, memory management and page replacement strategies.
C217.6	Examine the implementation of file allocation and file organization strategies.

HS8461 – ADVANCED READING AND WRITING

Course Code	Course Outcome Statement	Cognitive/Affective Level of the Course Outcome	Expected Level of Attainment
Course Outcome Statementsin Cognitive Domain			
C218.1	Write different types of Essays	Valuing (A3)	95%
C218.2	Write winning job applications	Valuing (A3)	95%
C218.3	Read and evaluate texts critically	Valuing (A3)	95%
C218.4	Display critical thinking in various professional contexts	Valuing (A3)	95%
C218.5	Attend the classes regularly	Respond (A2)	95%
C218.6	Submit the Observation and Record regularly.	Respond (A2)	95%

SEMESTER V

MA8551 – ALGEBRA AND NUMBER THEORY

Course Code	Course Outcome Statement
C301.1	Apply the basic notions of groups which will be used to solve group theory related problems.
C301.2	Apply the basic notions of rings, fields which will then be used to solve related problems.
C301.3	Demonstrate accurate and efficient use of advanced algebraic techniques such as finite fields and polynomials.
C301.4	Explain the fundamental concepts of number theory, advanced algebra and their role in modern mathematics.
C301.5	Demonstrate the number theory concepts by solving non - trivial related problems.
C301.6	Apply integrated approach to number theory and abstract algebra and prove simple theorems.

CS8591 – COMPUTER NETWORKS

Course Code	Course Outcome Statement
C302.1	Illustrate the basic layers and its functions in computer networks
C302.2	Evaluate the performance of a network
C302.3	Demonstrate the basics of how data flows from one node to another
C302.4	Design routing algorithm and protocols for various functions in the network
C302.5	Utilize functionalities and protocols at the Transport Layer
C302.6	Explain the working of various application layer protocols

EC8691 – MICROPROCESSORS AND MICROCONTROLLERS

Course Code	Course Outcome Statement
C303.1	Develop and execute programs based on 8086 microprocessor.
C303.2	Demonstrate the configurations of 8086 and able to design a system.
C303.3	Design Memory Interfacing circuits with 8086.
C303.4	Design and interface I/O circuits with 8086.
C303.5	Develop and execute programs based on 8051 microcontroller.
C303.6	Design and implement 8051 microcontroller based systems

IT8501 – WEB TECHNOLOGY

Course Code	Course Outcome Statement
C304.1	Develop simple web pages using markup languages like HTML and XHTML
C304.2	Build dynamic web pages using DHTML and Java script that is easy to navigate and use
C304.3	Develop server side web pages that have to process request from client side web pages
C304.4	Develop applications using JSP
C304.5	Represent web data using XML and develop web pages using JSP
C304.6	Explain various web services and how they interact

CS8494 – SOFTWARE ENGINEERING

Course Code	Course Outcome Statement
C305.1	Identify the key activities in managing a software project
C305.2	Compare different process models
C305.3	Summarize the concepts of requirements engineering and analysis modelling
C305.4	Make use of systematic procedure for software design and deployment
C305.5	Compare and contrast the various software testing and maintenance strategies
C305.6	Develop project schedule, identify project costs and efforts required

OCE552 – GEOGRAPHIC INFORMATION SYSTEM

Course Code	Course Outcome Statement
C306.1	Explain the basic idea about fundamentals of GIS.
C306.2	Illustrate the types of spatial data models.
C306.3	Discuss about the data input and topology.
C306.4	Explain the data management functions and data output.
C306.5	Demonstrate the application of GIS.
C306.6	Apply the GIS tools to develop real time applications.

EC8681 – MICROPROCESSORS AND MICROCONTROLLER LABORATORY

Course Code	Course Outcome Statement
C307.1	Develop and execute programs based on 8086 microprocessor.
C307.2	Develop the configurations of 8086 and able to design a system.
C307.3	Design Memory Interfacing circuits with 8086.
C307.4	Design and interface I/O circuits with 8086.
C307.5	Develop and execute programs based on 8051 microcontroller.
C307.6	Design and implement 8051 microcontroller based systems

CS8581 – NETWORKS LABORATORY

Course Code	Course Outcome Statement
C308.1	Examine the use of various commands using a network protocol analyzer
C308.2	Experiment with TCP and UDP protocols to implement echo client, echo server, chat and file transfer
C308.3	Compare the performance of transport layer protocols
C308.4	Examine the performance of various network protocols
C308.5	Examine various routing algorithms
C308.6	Infer the importance and implementation of error correcting codes

IT8511 – WEB TECHNOLOGY LABORATORY

Course Code	Course Outcome Statement
C309.1	Test the working of simple web pages designed using markup languages like HTML and XHTML
C309.2	Examine dynamic web pages created using DHTML and Java script
C309.3	Test the working of server side web pages implemented for handling requests from client side web pages
C309.4	Inspect the installation of Apache Tomcat web server
C309.5	Categorize web data using XML and develop web pages using JSP
C309.6	Examine the interactions of web services

SEMESTER-VI

IT8601 –COMPUTATIONAL INTELLIGENCE

Course Code	Course Outcome Statement
C310.1	Illustrate a basic exposition to the goals and methods of Computational Intelligence
C310.2	Study of the design of intelligent computational techniques.
C310.3	Apply the Intelligent techniques for problem solving
C310.4	Improve problem-solving skills using the acquired knowledge in the areas of supervised, un supervised and reinforcement learning.
C310.5	Improve problem-solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, and Information retrieval
C310.6	Use different machine learning techniques to design AI machine and enveloping applications for real world problems.

CS8592 – OBJECT ORIENTED ANALYSIS AND DESIGN

Course Code	Course Outcome Statement
C311.1	Explain the fundamentals of object modeling
C311.2	Demonstrate and differentiate Unified Process from other approaches.
C311.3	Design with static UML diagrams.
C311.4	Design with the UML dynamic and implementation diagrams.
C311.5	Improve the software design with design patterns.
C311.6	Test the software against its requirements specification

IT8602 – MOBILE COMMUNICATION

Course Code	Course Outcome Statement
C312.1	Summarize the basics of mobile telecommunication system and generations of mobile communication technologies
C312.2	Compare various MAC protocols such as TDMA, FDMA and CDMA
C312.3	Examine the various mobile telecommunication systems such as GSM, GPRS and UMTS
C312.4	Inspect the architectures of various wireless LAN technologies
C312.5	Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks
C312.6	Summarize the functionality of Transport and Application layer

CS8091 – BIG DATA ANALYTICS

Course Code	Course Outcome Statement
C313.1	Identify big data use cases, characteristics and make use of HDFS and Map-reduce programming model for data analytics
C313.2	Examine the data with clustering and classification techniques
C313.3	Discover the similarity of huge volume of data with association rule mining and examine recommender system
C313.4	Perform analytics on data streams
C313.5	Inspect NoSQL database and its management
C313.6	Examine the given data with R programming

CS8092 – COMPUTER GRAPHICS AND MULTIMEDIA

Course Code	Course Outcome Statement
C314.1	Discuss about the fundamentals of Illumination and color models
C314.2	Design two dimensional graphics and Apply two dimensional transformations.
C314.3	Design three dimensional graphics and Apply three dimensional transformations.
C314.4	Illustrate Different types of Multimedia File Format
C314.5	Demonstrate Hypermedia messaging
C314.6	Design Basic 3d Scenes using Blender

IT8076 – SOFTWARE TESTING

Course Code	Course Outcome Statement
C315.1	Explain the impact of defects in software development process
C315.2	Design test cases suitable for a software development for different domains
C315.3	Identify suitable tests to be carried out
C315.4	Prepare test planning based on the document
C315.5	Design document test plans and test cases
C315.6	Use automatic testing tools

CS8662 – MOBILE APPLICATION DEVELOPMENT LABORATORY

Course Code	Course Outcome Statement
C316.1	Design mobile applications using GUI and Layouts
C316.2	Design mobile applications using event listeners
C316.3	Design mobile applications using databases
C316.4	Design mobile applications using RSS feed, internal/external storage
C316.5	Design mobile applications using SMS, Multithreading and GPS
C316.6	Inspect and discover own mobile app for simple needs

CS8582 – OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

Course Code	Course Outcome Statement
C317.1	Identify and map basic software requirements in UML mapping
C317.2	Identify use cases and develop the Use Case model
C317.3	Test the compliance of the software with the SRS
C317.4	Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that
C317.5	Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams
C317.6	Develop reusability and maintainability of the software system by applying appropriate design patterns.

HS8581 – PROFESSIONAL COMMUNICATION LABORATORY

Course Code	Course Outcome Statement
C318.1	Develop adequate Soft Skills required for the workplace
C318.2	Make use of effective presentations
C318.3	Utilize Group Discussions or increasing the confidence level
C318.4	Develop interview etiquette and be successful in interview process
C318.5	Develop long-term career plan, stress and time management, respecting social protocols

IT8611 – MINI PROJECT

Course Code	Course Outcome Statement
C319.1	Examine appropriate methodologies for solving problems related to real life situations using the engineering knowledge
C319.2	Comprehend the existing solutions and summarize problem definition
C319.3	Test design strategies for providing solution to a problem
C319.4	Acquire skills of collaboration and working in teams.
C319.5	Organize ideas clearly both orally and in written

SEMESTER-VII

MG8591 – PRINCIPLES OF MANAGEMENT

Course Code	Course Outcome Statement
C401.1	Describe the historical evolution of management theories for business organizations
C401.2	Demonstrate the use of planning tools for strategic management.
C401.3	Identify the most appropriate organizational structure.
C401.4	Discuss HR strategies for planning, recruiting and training employees.
C401.5	Explain the theories of motivation and leadership to manage a group.
C401.6	Summarize the controlling methods and tools to increase productivity of the Organization.

CS8792 – CRYPTOGRAPHY AND NETWORK SECURITY

Course Code	Course Outcome Statement
C402.1	Illustrate the fundamentals of networks security, security architecture, threats and vulnerabilities
C402.2	Apply the different cryptographic operations of symmetric cryptographic algorithms
C402.3	Apply the different cryptographic operations of public key cryptography
C402.4	Apply the various Authentication schemes to simulate different applications.
C402.5	Explain various Security practices
C402.6	Demonstrate System security standards

CS8791 – CLOUD COMPUTING

Course Code	Course Outcome Statement
C403.1	Describe the principles of Parallel and Distributed Computing and evolution of cloud computing from existing technologies
C403.2	Implement different types of Virtualization technologies and Service Oriented Architecture systems
C403.3	Elucidate the concepts of NIST Cloud Computing architecture and its design challenges
C403.4	Test the issues in Resource provisioning and Security governance in clouds
C403.5	Choose among various cloud technologies for implementing applications
C403.6	Apply current cloud technologies

GE8077 – TOTAL QUALITY MANAGEMENT

Course Code	Course Outcome Statement
C404.1	Explain the quality philosophies and customer focused managerial system
C404.2	Summarize the quality management principles
C404.3	Apply six sigma concept in manufacturing and service sector
C404.4	Describe the tools and techniques for quality improvement.
C404.5	Categorize standards and auditing system on implementation of TQM.
C404.6	Categorize standards for the operation of EMS.

CS8079 – HUMAN COMPUTER INTERACTION

Course Code	Course Outcome Statement
C405.1	Examine the effective dialog for HCI
C405.2	Inspect interactive design process in human computer interaction
C405.3	Inspect software design process in human computer interaction
C405.4	Examine various models and theories related to human computer interaction
C405.5	Utilize the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites
C405.6	Build meaningful user interface

OME752 – SUPPLY CHAIN MANAGEMENT

Course Code	Course Outcome Statement
C406.1	Explain fundamental supply chain management concepts.
C406.2	Illustrate the design factors and various design options of distribution networks in industries
C406.3	Apply the framework of supply chain networks and functions
C406.4	Apply the foundational role of logistics as it relates to transportation and warehousing.
C406.5	Explain the various sourcing decisions in supply chain
C406.6	Take part in the supply chain management in IT industries

IT8711 – FOSS AND CLOUD COMPUTING LABORATORY

Course Code	Course Outcome Statement
C407.1	Develop applications using gcc, make, version control system
C407.2	Examine the working of web applications after deployed in Paas environment
C407.3	Inspect various virtualization tools such as Virtual Box, VMware workstation
C407.4	Test for implementing new schedulers through simulation in cloud environment
C407.5	Make use of a generic cloud environment that can be used as a private cloud.
C407.6	Inspect the manipulation of large data sets in a parallel environment

IT8761 – SECURITY LABORATORY

Course Code	Course Outcome Statement
C408.1	Develop code for classical Encryption Techniques to solve the problems.
C408.2	Examine cryptosystems by applying symmetric and public key encryption algorithms
C408.3	Test the use of the code for authentication algorithms
C408.4	Examine a signature scheme using Digital signature standard
C408.5	Inspect the network security system using open source tools for IDS
C408.6	Inspect the network security system using open source tools for automated attack and penetration tools, defeating malware

SEMESTER-VIII

GE8076 –PROFESSIONAL ETHICS IN ENGINEERING

Course Code	Course Outcome Statement
C409.1	Build awareness on human values and apply ethics in society.
C409.2	Identify an ethical issue and assess variety of moral issuesusing ethical theories in engineering.
C409.3	Inspect Engineering, Social Experimentation and Engineers as responsible experimenters
C409.4	Infer engineers' safety and their responsibilities, professionalrights, employee rights, and intellectual property rights.
C409.5	Interpret various types of ethics like business ethics, environmental ethics and computer ethics.
C409.6	Take part an Engineers as managers, consulting engineers,engineers as expert witness and advisors.

IT8005 – ELECTRONIC COMMERCE

Course Code	Course Outcome Statement
C410.1	Design Website using HTML CSS and JS
C410.2	Design Responsive Sites
C410.3	Construct Web Apps, Manage, Maintain and Support Web Apps
C410.4	Summarize the basic concepts and technologies used in the field ofmanagement informationsystems
C410.5	Identify the ethical, social, and security issues of information systems
C410.6	Examine how some of the technologies detailed in the courseare used in concert to realise atypical commercial system.

IT8811 – PROJECT WORK

Course Code	Course Outcome Statement
C411.1	Examine appropriate methodologies for solving problems related to real life situations using the engineering knowledge
C411.2	Comprehend the existing solutions and summarize problem definition
C411.3	Test design strategies for providing solution to a problem
C411.4	Acquire skills of collaboration and working in teams.
C411.5	Select and Evaluate different tools and techniques for validating the solution to the problem under consideration
C411.6	Organize ideas clearly both orally and in written