



MEENAKSHI COLLEGE OF ENGINEERING

No-12,Vembuli Amman Koil Street, West K.K.Nagar,
Chennai- 600 078

Department of Computer Science and Engineering

REGULATION-2017

COURSE OUTCOMES

SEMESTER - I

Course Name: HS8151 - COMMUNICATIVE ENGLISH

CO1	Read articles of a general kind in magazines and newspapers.
CO2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
CO3	Comprehend conversations and short talks delivered in English
CO4	To help learners use language effectively in professional contexts
CO5	Write short essays of a general kind and personal letters and emails in English.

Course Name: MA8151 - ENGINEERING MATHEMATICS -I

CO1	Use the matrix algebra methods for solving practical problems
CO2	Apply differential calculus tools in solving various application problems
CO3	Able to use differential calculus ideas on several variable functions
CO4	Apply different methods of integration in solving practical problems
CO5	Apply multiple integral ideas in solving areas, volumes and other practical problems

Course Name: PH8151 - ENGINEERING PHYSICS

CO1	Understand the importance of mechanics
CO2	Express their knowledge in electromagnetic waves
CO3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers
CO4	Understand the importance of quantum physics
CO5	Comprehend and apply quantum mechanical principles towards the formation of energy bands

Course Name: CY8151- ENGINEERING CHEMISTRY

CO1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water
CO2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications
CO3	To apply the knowledge of phase rule and composites for material selection requirements
CO4	To recommend suitable fuels for engineering processes and applications
CO5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors

Course Name: GE8151- PROBLEM SOLVING AND PYTHON PROGRAMMING

CO1	Develop algorithmic solutions to simple computational problems
CO2	Develop and execute simple Python programs
CO3	Write simple Python programs using conditionals and loops for solving problems
CO4	Decompose a Python program into functions
CO5	Represent compound data using Python lists, tuples, dictionaries etc

Course Name: GE8152- ENGINEERING GRAPHICS

CO1	Familiarize with the fundamentals and standards of Engineering graphics
CO2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO3	Project orthographic projections of lines and plane surfaces
CO4	Draw projections and solids and development of surfaces.
CO5	Visualize and to project isometric and perspective sections of simple solids.
CO6	Apply the concept of drawing in practical applications.

Course Name: GE8161- PROBLEM SOLVING AND PYTHON PROGRAMMING
LABORATORY

CO1	Develop algorithmic solutions to simple computational problems
CO2	Develop and execute simple Python programs
CO3	Implement programs in Python using conditionals and loops for solving problems
CO4	Deploy functions to decompose a Python program.
CO5	Process compound data using Python data structures
CO6	Utilize Python packages in developing software applications

Course Name: BS8161- PHYSICS AND CHEMISTRY LABORATORY

CO1	Understand the functioning of various physics laboratory equipment
CO2	Use graphical models to analyze laboratory data
CO3	Use mathematical models as a medium for quantitative reasoning and describing physical reality
CO4	Access, process and analyze scientific information
CO5	Solve problems individually and collaboratively

SEMESTER - II**Course Name:** HS8251- TECHNICAL ENGLISH

CO1	Read technical texts and write area- specific texts effortlessly.
CO2	Listen and comprehend lectures and talks in their area of specialization successfully
CO3	Speak appropriately and effectively in varied formal and informal contexts.
CO4	Foster their ability to write convincing job applications and effective reports.
CO5	Write reports and winning job applications.

Course Name: MA8251- ENGINEERING MATHEMATICS -II

CO1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
CO2	Gradient, divergence and curl of a vector point function and related identities.
CO3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
CO4	Analytic functions, conformal mapping and complex integration
CO5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients

Course Name: PH8252- PHYSICS FOR INFORMATION SCIENCE

CO1	Gain knowledge on classical and quantum electron theories, and energy band structures
CO2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,
CO3	Get knowledge on magnetic properties of materials and their applications in data storage
CO4	Have the necessary understanding on the functioning of optical materials for optoelectronics,
CO5	Understand the basics of quantum structures and their applications in carbon electronics

Course Name: BE255- BASIC ELECTRICAL, ELECTRONICS and MEASUREMENT ENGINEERING

CO1	Discuss the essentials of electric circuits and analysis.
CO2	Discuss the basic operation of electric machines and transformers
CO3	Introduction of renewable sources and common domestic loads.
CO4	Introduction to measurement and metering for electric circuits
CO5	To understand the principles and operation of measuring instruments and transducers

Course Name: GE291- ENVIRONMENTAL SCIENCE AND ENGINEERING

CO1	Interpret the basic concept of Ecosystems and Biodiversity.
CO2	Distinguish the types of pollution and its control measures.
CO3	Describe the importance of natural resources and Disaster management.
CO4	Illustrate the importance of environment by assessing its impact on the human world.
CO5	Summarize the population related issues and types of welfare programmes in the society.

Course Name: CS251- PROGRAMMING IN C

CO1	Describe the basic constructs and syntax of C programming
CO2	Apply the concepts of Arrays, Strings for user defined problems.
CO3	Develop programs using functions and pointers.
CO4	Apply the concepts of structure and develop application using structures.
CO5	Explain the concepts of read and write data from/to files

Course Name: GE261- ENGINEERING PRACTICES LABORATORY

CO1	To Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work
CO2	To Wire various electrical joints in common household electrical wire work
CO3	To Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work
CO4	To Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB

Course Name: CS8261- C PROGRAMMING LABORATORY

CO1	Develop C programs for simple applications by making use of basic constructs.
CO2	Implement the concept of conditionals and loops in C programs.
CO3	Develop the C programs with arrays and strings.
CO4	Apply the concept of functions, recursion in C programs
CO5	Interpret the concept of pointers, and structures in C
CO6	Examine the use of file processing techniques.

SEMESTER-III

Course Name: MA8351- DISCRETE MATHEMATICS

CO1	Describe the concepts needed to test the logic of a program.
CO2	Describe structures on many levels.
CO3	Illustrate the class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
CO4	Develop the knowledge of the counting principles.
CO5	Interpret the concepts and properties of algebraic structures such as groups, rings and fields.

Course Name: CS8351- DIGITAL PRINCIPLES AND SYSTEM DESIGN

CO1	Apply Arithmetic operations in any number system and various techniques to simplify the Boolean function
CO2	Build combinational circuits that perform arithmetic operations & code Conversions.
CO3	Design synchronous sequential circuits.
CO4	Design Asynchronous sequential circuits.
CO5	Model memory arrays for any Boolean function.

Course Name: CS8391- DATA STRUCTURES

CO1	Illustrate the basic concepts of abstract data types and implement List ADT
CO2	Implement Stack, Queue Data structures and its operations
CO3	Illustrate the basic concepts of tree & heaps and its applications
CO4	Implement Graph Data structures and summarize its applications
CO5	Summarize various searching, sorting and hashing techniques

Course Name: CS8392- OBJECT ORIENTED PROGRAMMING

CO1	Summarize Object Oriented Programming concepts and basic characteristics of Java
CO2	Interpret principles of packages, inheritance and interfaces
CO3	Interpret exceptions and use I/O streams
CO4	Solve a java application with threads and generics classes
CO5	Demonstrate and build simple Graphical User Interfaces

Course Name: EC8395- COMMUNICATION ENGINEERING

CO1	To Speak effectively in group discussions held in formal/semi formal contexts
CO2	To Discuss, analyze and present concepts and problems from various perspectives to arrive at suitable solutions
CO3	To Write emails, letters and effective job applications
CO4	To Write critical reports to convey data and information with clarity and precision
CO5	To Give appropriate instructions and recommendations for safe execution of tasks

Course Name: CS8381- DATA STRUCTURES LABORATORY

CO1	Implement various Abstract Data Types and its operations
CO2	Develop simple applications using various data structures
CO3	Implement various tree operations
CO4	Implement various graphs algorithms
CO5	Implement various sorting and searching algorithms

Course Name: CS8383- OBJECT ORIENTED PROGRAMMING LABORATORY

CO1	Develop java programs using class concepts
CO2	Implement java programs for simple application that makes use of packages and interfaces
CO3	Develop Java programs using Arrays and Lists
CO4	Demonstrate java programs with exception handling and multithreading
CO5	Design application using file processing, generic programming and event handling
CO6	Exhibit ethical principles in engineering practices.

Course Name: CS8382- DIGITAL SYSTEMS LABORATORY

CO1	Interpret Combinational circuits Using Logic gates.
CO2	Illustrate Combinational circuits Using MSI Devices.
CO3	Practice various counters using Flip-flops.
CO4	Practice shift registers using Flip-flops
CO5	Solve verilog codes for the design of digital circuits.
CO6	Demonstrate simple digital system.

Course Name: HS8381- INTERPERSONAL SKILLS/LISTENING & SPEAKING

CO1	Listen and respond appropriately.
CO2	Participate in group discussions
CO3	Make effective presentations
CO4	Participate confidently and appropriately in conversations both formal and informal
CO5	Exhibit ethical principles in engineering practices
CO6	Perform task as an individual and/ or team member to manage the task in time

SEMESTER-IV

Course Name: MA8402- PROBABILITY AND QUEUEING THEORY

CO1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
CO2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
CO3	Apply the concept of random processes in engineering disciplines.
CO4	Acquire skills in analyzing queuing models.
CO5	Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner

Course Name: CS8491-COMPUTER ARCHITECTURE

CO1	Understand the basics structure of computers, operations and instructions.
CO2	Design arithmetic and logic unit.
CO3	Understand pipelined execution and design control unit.
CO4	Understand parallel processing architectures.
CO5	Understand the various memory systems and I/O communication

Course Name: CS8492 - DATABASE MANAGEMENT SYSTEMS

CO1	Classify the modern and futuristic database applications based on size and complexity
CO2	Map ER model to Relational model to perform database design effectively
CO3	Write queries using normalization criteria and optimize queries
CO4	Compare and contrast various indexing strategies in different database systems
CO5	Appraise how advanced databases differ from traditional databases

Course Name: CS8451- DESIGN AND ANALYSIS OF ALGORITHMS

CO1	Design algorithms for various computing problems.
CO2	Analyze the time and space complexity of algorithms.
CO3	Critically analyze the different algorithm design techniques for a given problem.
CO4	Modify existing algorithms to improve efficiency

Course Name: CS8493- OPERATING SYSTEMS

CO1	Analyze various scheduling algorithms.
CO2	Understand deadlock, prevention and avoidance algorithms.
CO3	Compare and contrast various memory management schemes.
CO4	Understand the functionality of file systems.
CO5	Perform administrative tasks on Linux Servers.
CO6	Compare iOS and Android Operating Systems.

Course Name: CS8494 - SOFTWARE ENGINEERING

CO1	Identify the key activities in managing a software project.
CO2	Concepts of requirements engineering and Analysis Modeling.
CO3	Apply systematic procedure for software design and deployment.
CO4	Compare and contrast the various testing and maintenance.
CO5	Manage project schedule, estimate project cost and effort required

Course Name: CS8481- DATABASE MANAGEMENT SYSTEMS LABORATORY

CO1	Use typical data definitions and manipulation commands.
CO2	Design applications to test Nested and Join Queries
CO3	Implement simple applications that use Views
CO4	Implement applications that require a Front-end Tool
CO5	Critically analyze the use of Tables, Views, Functions and Procedures

Course Name: CS8461- OPERATING SYSTEMS LABORATORY

CO1	Compare the performance of various CPU Scheduling Algorithms
CO2	Implement Deadlock avoidance and Detection Algorithms
CO3	Implement Semaphores
CO4	Create processes and implement IPC
CO5	Analyze the performance of the various Page Replacement Algorithms
CO6	Implement File Organization and File Allocation Strategies

Course Name: HS8461- ADVANCED READING AND WRITING

CO1	Write different types of essays.
CO2	Write winning job applications
CO3	Read and evaluate texts critically.
CO4	Display critical thinking in various professional contexts

SEMESTER-V

Course Name: MA8551- ALGEBRA AND NUMBER THEORY

CO1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
CO2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO3	Demonstrate accurate and efficient use of advanced algebraic techniques.
CO4	Demonstrate their mastery by solving non – trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.
CO5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

Course Name: CS8591- COMPUTER NETWORKS

CO1	Understand the basic layers and its functions in computer networks.
CO2	Evaluate the performance of a network.
CO3	Understand the basics of how data flows from one node to another.
CO4	Analyze and design routing algorithms.
CO5	Understand the working of various application layer protocols.

Course Name: EC8691- MICROPROCESSORS AND MICROCONTROLLERS

CO1	Understand and execute programs based on 8086 microprocessor.
CO2	Design Memory Interfacing circuits.
CO3	Design and interface I/O circuits.
CO4	Design and implement 8051 microcontroller based systems

Course Name: CS8501- THEORY OF COMPUTATION

CO1	Construct automata, regular expression for any pattern.
CO2	Write Context free grammar for any construct.
CO3	Design Turing machines for any language.
CO4	Propose computation solutions using Turing machines.
CO5	Derive whether a problem is decidable or not

Course Name: CS8592-OBJECT ORIENTED ANALYSIS AND DESIGN

CO1	Express software design with UML diagrams
CO2	Design software applications using OO concepts.
CO3	Identify various scenarios based on software requirements
CO4	Transform UML based software design into pattern based design using design patterns
CO5	Understand the various testing methodologies for OO software

Course Name: OCE551- AIR POLLUTION AND CONTROL ENGINEERING

CO1	An understanding of the nature and characteristics of air pollutants, noise pollution and basic
CO2	Concepts of air quality management
CO3	Ability to identify, formulate and solve air and noise pollution problems
CO4	Ability to design stacks and particulate air pollution control devices to meet applicable standards.
CO5	Ability to ensure quality, control and preventive measures

Course Name: EC8681- MICROPROCESSOR AND MICROCONTROLLERS

LABORATORY

CO1	Write ALP Programmes for fixed and Floating Point and Arithmetic operations
CO2	Interface different I/Os with processor
CO3	Generate wave forms using Microprocessors
CO4	Execute Programs in 8051
CO5	Explain the difference between simulator and Emulator

Course Name: CS8582- OBJECT ORIENTED ANALYSIS AND DESIGN

LABORATORY

CO1	Perform OO analysis and design for a given problem specification.
CO2	Identify and map basic software requirements in UML mapping.
CO3	Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns
CO4	Test the compliance of the software with the SRS

Course Name: CS8581- NETWORKS LABORATORY

CO1	Implement various protocols using TCP and UDP.
CO2	Compare the performance of different Transport layer protocols.
CO3	Use simulation tools to analyze the performance of various network protocols.
CO4	Analyze various routing algorithms.
CO5	Implement error correction codes

SEMESTER-VI

Course Name: CS8651- INTERNET PROGRAMMING

CO1	Construct a basic website using HTML and Cascading Style Sheets.
CO2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
CO3	Develop server side programs using Servlets and JSP.
CO4	Construct simple web pages in PHP and to represent data in XML format.
CO5	Use AJAX and web services to develop interactive web applications

Course Name: CS8691- ARTIFICIAL INTELLIGENCE

CO1	Use appropriate search algorithms for any AI problem
CO2	Represent a problem using first order and predicate logic
CO3	Provide the apt agent strategy to solve a given problem
CO4	Design software agents to solve a problem
CO5	Design applications for NLP that use Artificial Intelligence

Course Name: CS8601- MOBILE COMPUTING

CO1	Explain the basics of mobile telecommunication systems
CO2	Illustrate the generations of telecommunication systems in wireless networks
CO3	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network
CO4	Explain the functionality of Transport and Application layers
CO5	Develop a mobile application using android/blackberry/ios/Windows SDK

Course Name: CS8602- COMPILER DESIGN

CO1	Understand the different phases of compiler.
CO2	Design a lexical analyzer for a sample language
CO3	Apply different parsing algorithms to develop the parsers for a given grammar.
CO4	Understand syntax-directed translation and run-time environment.
CO5	Design and implement a scanner and a parser using LEX and YACC tools

Course Name: CS8603- DISTRIBUTED SYSTEMS

CO1	Elucidate the foundations and issues of distributed systems
CO2	Understand the various synchronization issues and global state for distributed systems.
CO3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems
CO4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
CO5	Describe the features of peer-to-peer and distributed shared memory systems

Course Name: IT8076- SOFTWARE TESTING

CO1	Explain about Software testing principles and the Defect Repository and Test Design
CO2	Predict test cases suitable for a software development for different domains
CO3	Outline the various levels of testing
CO4	Summarize, how to document test plans and test cases designed
CO5	Demonstrate the use of automatic testing tools, develop and validate a test plan.

Course Name: CS8661- INTERNET PROGRAMMING LABORATORY

CO1	Construct Web pages using HTML/XML and style sheets.
CO2	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.
CO3	Develop dynamic web pages using server side scripting.
CO4	Use PHP programming to develop web applications.
CO5	Construct web applications using AJAX and web services

Course Name: CS8662- MOBILE APPLICATION AND DEVELOPMENT

LABORATORY

CO1	Develop mobile applications using GUI and Layouts.
CO2	Develop mobile applications using EventListener.
CO3	Develop mobile applications using Databases.
CO4	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi- threading and GPS.
CO5	Analyze and discover own mobile app for simple needs

Course Name: CS8611- MINI PROJECT

CO1	Identify the problem by applying acquired knowledge and survey the relevant literature for getting exposed to related solutions.
CO2	Analyze and categorize executable project modules after considering risks.
CO3	Choose efficient tools for designing project modules.
CO4	Combine all the modules through effective team work after efficient testing.
CO5	Implement and test solutions to trace against the user requirements.
CO6	Elaborate the completed task and compile the project report.

Course Name: HS8581- PROFESSIONL COMMUNICATION

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

SEMESTER-VII

Course Name: MG8591- PRINCIPLES OF MANAGEMENT

CO1	Discuss the evolution of management thoughts and the challenges of managerial activities in a global business environment
CO2	Outline the nature and purpose of planning and decision-making process in the Organizations.
CO3	Summarize various types of Organization structure and associated Human Management activities for man-power utilization.
CO4	Compare and explain the theories of leadership ,motivation, and effective communication method.
CO5	Analyze various Controlling techniques to maintain standards in Organizations.

Course Name: CS8792- CRYPTOGRAPHY AND NETWORK SECURITY

CO1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
CO2	Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3	Apply the different cryptographic operations of public key cryptography
CO4	Apply the various Authentication schemes to simulate different applications.
CO5	Understand various Security practices and System security standards

Course Name: CS8791- CLOUD COMPUTING

CO1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
CO2	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
CO3	Explain the core issues of cloud computing such as resource management and security.
CO4	Be able to install and use current cloud technologies.
CO5	Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

Course Name: OME752- SUPPLY CHAIN MANAGEMENT

CO1	Illustrate the basic concepts of decision phases, drivers and apply competitive supply chain strategies.
CO2	Analyze factors influencing network design.
CO3	Apply the design, routing and scheduling principles of transportation network in supply chain.
CO4	Describe Sourcing and Coordination Effects of Supply Chain
CO5	Summarize the role of Information Technology and analyse the Customer, Supplier Relationship Coordination in a supply chain.

Course Name: IT8075- SOFTWARE PROJECT MANAGEMENT

CO1	Explain the software project evaluation techniques and planning
CO2	Demonstrate different software process models and cost estimation techniques.
CO3	Illustrate the risk management process.
CO4	Explain the need for Software Project Management and control.
CO5	Summarize the organizational behavior and working in teams.

Course Name: CS8083- MULTICORE ARCHITECTURE & PROGRAMMING

CO1	Describe multicore architectures and identify their characteristics and challenges.
CO2	Identify the issues in programming Parallel Processors.
CO3	Write programs using OpenMP and MPI.
CO4	Design parallel programming solutions to common problems.
CO5	Compare and contrast programming for serial processors and programming for parallel processors

Course Name: CS8711- CLOUD COMPUTING LABORATORY

CO1	Configure various virtualization tools such as Virtual Box, VMware workstation.
CO2	Design and deploy a web application in a PaaS environment.
CO3	Learn how to simulate a cloud environment to implement new schedulers.
CO4	Install and use a generic cloud environment that can be used as a private cloud.
CO5	Manipulate large data sets in a parallel environment

Course Name: IT8761- SECURITY LABORATORY

CO1	Develop code for classical Encryption Techniques to solve the problems.
CO2	Build cryptosystems by applying symmetric and public key encryption algorithms.
CO3	Construct code for authentication algorithms.
CO4	Develop a signature scheme using Digital signature standard.
CO5	Demonstrate the network security system using open source tools

SEMESTER-VIII

Course Name: CS8074- CYBER FORENSICS

CO1	Understand the basics of computer forensics
CO2	Apply a number of different computer forensic tools to a given scenario
CO3	Analyze and validate forensics data
CO4	Identify the vulnerabilities in a given network infrastructure
CO5	Implement real-world hacking techniques to test system security

Course Name: CS8080- INFORMATION RETRIEVAL TECHNIQUES

CO1	Use an open source search engine framework and explore its capabilities
CO2	Apply appropriate method of classification or clustering.
CO3	Design and implement innovative features in a search engine.
CO4	Design and implement a recommender system.
CO5	Demonstrate an open source search engine framework , work flow and its capabilities

Course Name: CS8811- PROJECT WORK

CO1	Identify the problem by applying acquired knowledge and survey the relevant literature for getting exposed to related solutions.
CO2	Analyze and categorize executable project modules after considering risks.
CO3	Choose efficient tools for designing project modules.
CO4	Combine all the modules through effective team work after efficient testing.
CO5	Implement and test solutions to trace against the user requirements.
CO6	Elaborate the completed task and compile the project report.