



MEENAKSHI COLLEGE OF ENGINEERING

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING REGULATION-2021 COURSE OUTCOMES

SEMESTER – I

Course Name: HS3152-PROFESSIONAL ENGLISH I

CO1	To use appropriate words in a professional context
CO2	To gain understanding of basic grammatic structures and use them in right context
CO3	To read and infer the denotative and connotative meanings of technical texts
CO4	To help learners use language effectively in professional contexts
CO5	To write definitions, descriptions, narrations and essays on various topics

Course Name: MA3151-MATRICES AND CALCULUS

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: PH3151-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: CY3151-ENGINEERING CHEMISTRY

C01	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water
C02	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications
C03	To apply the knowledge of phase rule and composites for material selection requirements
C04	To recommend suitable fuels for engineering processes and applications
C05	To recognize different forms of energy resources and apply them for suitable applications in energy sectors

Course Name: GE3151-PROBLEM SOLVING AND PYTHON PROGRAMMING

C01	Develop algorithmic solutions to simple computational problems
C02	Develop and execute simple Python programs
C03	Write simple Python programs using conditionals and loops for solving problems
C04	Decompose a Python program into functions
C05	Represent compound data using Python lists, tuples, dictionaries etc
C06	Read and write data from/to files in Python programs

Course Name: GE3152- HERITAGE TAMILS

C01	Discuss the Tamil Language and Literature
C02	Discuss about the paintings modern Art Sculpture
C03	Illustrate the folk martial arts
C04	Understand the Sangam age through Tamil Literature
C05	Discuss the contribution of Tamil Literature in Indian Civilization

Course Name: GE3171-PROBLEM SOLVING AND PYTHON PROGRAMMING

LABORATORY

C01	Develop algorithmic solutions to simple computational problems
C02	Develop and execute simple Python programs
C03	Implement programs in Python using conditionals and loops for solving problems
C04	Deploy functions to decompose a Python program.
C05	Process compound data using Python data structures
C06	Utilize Python packages in developing software applications

Course Name: BS3171-PHYSICS LABORATORY

C01	Understand the functioning of various physics laboratory equipment
C02	Use graphical models to analyze laboratory data
C03	Use mathematical models as a medium for quantitative reasoning and describing physical reality
C04	Access, process and analyze scientific information
C05	Solve problems individually and collaboratively

Course Name: BS3171-CHEMISTRY LABORATORY

C01	Understand the functioning of various physics laboratory equipment
C02	Use graphical models to analyze laboratory data
C03	Use mathematical models as a medium for quantitative reasoning and describing physical reality
C04	Access, process and analyze scientific information
C05	Solve problems individually and collaboratively

Course Name: GE3172-ENGLISH LABORATORY

C01	To listen to and comprehend general as well as complex academic information
C02	To listen to and understand different points of view in a discussion
C03	To speak fluently and accurately in formal and informal communicative contexts
C04	To describe products and processes and explain their uses and purposes clearly and accurately
C05	To express their opinions effectively in both formal and informal discussions

SEMESTER - II

Course Name: HS3252-PROFESSIONAL ENGLISH II

C01	To compare and contrast products and ideas in technical texts
C02	To identify and report cause and effects in events, industrial processes through technical texts
C03	To analyse problems in order to arrive at feasible solutions and communicate them in the written format
C04	To present their ideas and opinions in a planned and logical manner
C05	To draft effective resumes in the context of job search

Course Name: MA3251-STATISTICS AND NUMERICAL METHODS

C01	Apply the concept of testing of hypothesis for small and large samples in real life problems
C02	Apply the basic concepts of classifications of design of experiments in the field of agriculture
C03	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
C04	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
C05	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

Course Name: PH3256-PHYSICS FOR INFORMATION SCIENCE

C01	Gain knowledge on classical and quantum electron theories, and energy band structures
C02	Acquire knowledge on basics of semiconductor physics and its applications in various devices
C03	Get knowledge on magnetic properties of materials and their applications in data storage,
C04	Have the necessary understanding on the functioning of optical materials for optoelectronics
C05	Understand the basics of quantum structures and their applications and basics of quantum computing

Course Name: BE3251-BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

C01	Compute the electric circuit parameters for simple problems
C02	Explain the working principle and applications of electrical machines
C03	Analyze the characteristics of analog electronic devices
C04	Explain the basic concepts of digital electronics
C05	Explain the operating principles of measuring instruments

Course Name: GE3251-ENGINEERING GRAPHICS

C01	To Use BIS conventions and specifications for engineering drawing
C02	To Construct the conic curves, involutes and cycloid
C03	To Solve practical problems involving projection of lines
C04	To Draw the orthographic, isometric and perspective projections of simple solids
C05	To Draw the development of simple solids

Course Name: CS3251-PROGRAMMING IN C

C01	To Demonstrate knowledge on C Programming constructs
C02	To Develop simple applications in C using basic constructs
C03	To Design and implement applications using arrays and strings
C04	To Develop and implement modular applications in C using functions
C05	To Develop applications in C using structures and pointers.
C06	To Design applications using sequential and random access file processing.

Course Name: GE3252- TAMILS AND TECHNOLOGY

C01	Learn about weaving and ceramic methods in Sangam period
C02	Experience about art and sculpture in Sangam period
C03	Make and use of metals in Sangam period
C04	Apply the knowledge on water management in Sangam Period
C05	Implementing the digitization in Tamil

Course Name: GE3271-ENGINEERING PRACTICES LABORATORY

C01	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
C02	To Wire various electrical joints in common household electrical wire work
C03	To Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts;
C04	To Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB
C05	Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work

Course Name: CS3271-PROGRAMMING IN C LABORATORY

C01	Demonstrate knowledge on C programming constructs
C02	Develop programs in C using basic constructs
C03	Develop programs in C using arrays.
C04	Develop applications in C using strings, pointers, functions
C05	Develop applications in C using structures ,file processing.

Course Name: GE3272-COMMUNICATION LABORATORY

C01	To Speak effectively in group discussions held in formal/semi formal contexts
C02	To Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
C03	To Write emails, letters and effective job applications
C04	To Write critical reports to convey data and information with clarity and precision
C05	To Give appropriate instructions and recommendations for safe execution of tasks

SEMESTER - III

Course Name: MA3354 -DISCRETE MATHEMATICS

C01	To have knowledge of the concepts needed to test the logic of a program.
C02	To have an understanding in identifying structures on many levels
C03	To be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science
C04	To be aware of the counting principles.
C05	To be exposed to concepts and properties of algebraic structures such as groups, rings and fields

Course Name: CS3351 -DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION

C01	Design various combinational digital circuits using logic gates
C02	Design sequential circuits and analyze the design procedures
C03	State the fundamentals of computer systems and analyze the execution of an instruction
C04	Analyze different types of control design and identify hazards
C05	Identify the characteristics of various memory systems and I/O communication

Course Name: CS3352 -FOUNDATIONS OF DATA SCIENCE

C01	Define the data science process
C02	Understand different types of data description for data science process
C03	Gain knowledge on relationships between data
C04	Use the Python Libraries for Data Wrangling
C05	Apply visualization Libraries in Python to interpret and explore data

Course Name: CS3301 - DATA STRUCTURES

CO1	To understand the concepts of ADTs
CO2	To Learn linear data structures – lists, stacks, and queues.
CO3	To understand non-linear data structures – trees and graphs.
CO4	To understand sorting, searching and hashing algorithms.
CO5	To apply Tree and Graph structures.

Course Name: CS3391 - OBJECT ORIENTED PROGRAMMING

CO1	Apply the concepts of classes and objects to solve simple problems
CO2	Develop programs using inheritance, packages and interfaces
CO3	Make use of exception handling mechanisms and multithreaded model to solve real world problems
CO4	Build Java applications with I/O packages, string classes, Collections and generics concepts
CO5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications

Course Name: CS3311 - DATA STRUCTURES LABORATORY

CO1	Implement Linear data structure algorithms.
CO2	Implement applications using Stacks and Linked lists
CO3	Implement Binary Search tree and AVL tree operations.
CO4	Implement graph algorithms.
CO5	Analyze the various searching and sorting algorithms.

Course Name: CS3381 - OBJECT ORIENTED PROGRAMMING LABORATORY

CO1	Design and develop java programs using object oriented programming concepts
CO2	Develop simple applications using object oriented concepts such as package, exceptions
CO3	Implement multithreading, and generics concepts
CO4	Create GUIs and event driven programming applications for real world problems
CO5	Implement and deploy web applications using Java

Course Name: CS3361 - DATA SCIENCE LABORATORY

CO1	Make use of the python libraries for data science
CO2	Make use of the basic Statistical and Probability measures for data science.
CO3	Perform descriptive analytics on the benchmark data sets.
CO4	Perform correlation and regression analytics on standard data sets
CO5	Present and interpret data using visualization packages in Python.

Course Name: GE3361 - PROFESSIONAL DEVELOPMENT

CO1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

SEMESTER - IV

Course Name: CS3452 - THEORY OF COMPUTATION

CO1	Construct automata theory using Finite Automata
CO2	Write regular expressions for any pattern.
CO3	Write regular expressions for any pattern.
CO4	Design Turing machine for computational functions
CO5	Differentiate between decidable and undecidable problems

Course Name: CS3491 - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CO1	Use appropriate search algorithms for problem solving
CO2	Apply reasoning under uncertainty.
CO3	Build supervised learning models
CO4	Build ensembling and unsupervised models
CO5	Build deep learning neural network models.

Course Name: CS3492 - DATABASE MANAGEMENT SYSTEMS

CO1	Construct SQL Queries using relational algebra
CO2	Design database using ER model and normalize the database.
CO3	Construct queries to handle transaction processing and maintain consistency of the database
CO4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database
CO5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.

Course Name: CS3401 - ALGORITHMS

CO1	Analyze the efficiency of algorithms using various frameworks
CO2	Apply graph algorithms to solve problems and analyze their efficiency
CO3	Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems
CO4	Use the state space tree method for solving problems.
CO5	Solve problems using approximation algorithms and randomized algorithms

Course Name: CS3451 - INTRODUCTION TO OPERATING SYSTEMS

CO1	Analyze various scheduling algorithms and process synchronization.
CO2	Explain deadlock prevention and avoidance algorithms.
CO3	Compare and contrast various memory management schemes.
CO4	Explain the functionality of file systems, I/O systems, and Virtualization
CO5	Compare iOS and Android Operating Systems.

Course Name: GE3451 - ENVIRONMENTAL SCIENCES AND SUSTAINABILITY

CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
CO2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations
CO4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development
CO5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.

Course Name: CS3461 - OPERATING SYSTEMS LABORATORY

CO1	Define and implement UNIX Commands.
CO2	Compare the performance of various CPU Scheduling Algorithms.
CO3	Compare and contrast various Memory Allocation Methods.
CO4	Define File Organization and File Allocation Strategies.
CO5	Implement various Disk Scheduling Algorithms.

Course Name: CS3481 - DATABASE MANAGEMENT SYSTEMS LABORATORY

CO1	Create databases with different types of key constraints.
CO2	Construct simple and complex SQL queries using DML and DCL commands.
CO3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.
CO4	Create an XML database and validate with meta-data (XML schema).
CO5	reate and manipulate data using NOSQL database

SEMESTER - V

Course Name: CS3591 - COMPUTER NETWORKS

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

Course Name: CS3501 - COMPILER DESIGN

CO1	Understand the techniques in different phases of a compiler
CO2	Design a lexical analyser for a sample language and learn to use the LEX tool.
CO3	Apply different parsing algorithms to develop a parser and learn to use YACC tool
CO4	Understand semantics rules (SDT), intermediate code generation and run-time environment.
CO5	Implement code generation and apply code optimization techniques.

Course Name: CB3491 - CRYPTOGRAPHY AND CYBER 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 cyber crimes and cyber security.

Course Name: CS3551 - DISTRIBUTED COMPUTING

CO1	Explain the foundations of distributed systems
CO2	Solve synchronization and state consistency problems
CO3	Use resource sharing techniques in distributed systems
CO4	Apply working model of consensus and reliability of distributed systems
CO5	Explain the fundamentals of cloud computing

Course Name: CCS372 – VIRTUALIZATION (PROFESSIONAL ELECTIVE – I)

CO1	Analyse the virtualization concepts and Hypervisor
CO2	Apply the Virtualization for real-world applications
CO3	Install & Configure the different VM platforms
CO4	Experiment with the VM with various software

Course Name: CCS344 - ETHICAL HACKING (PROFESSIONAL ELECTIVE – II)

CO1	To express knowledge on basics of computer based vulnerabilities
CO2	To gain understanding on different foot printing, reconnaissance and scanning methods.
CO3	To demonstrate the enumeration and vulnerability analysis methods
CO4	To gain knowledge on hacking options available in Web and wireless applications
CO5	To acquire knowledge on the options for network protection
CO6	To use tools to perform ethical hacking to expose the vulnerabilities.

Course Name: MX3084 -DISASTER RISK REDUCTION AND MANAGEMENT

CO1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)
CO2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction
CO3	To develop disaster response skills by adopting relevant tools and technology
CO4	Enhance awareness of institutional processes for Disaster response in the country
CO5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

Course Name: MX3081 -INTRODUCTION TO WOMEN AND GENDER STUDIES

CO1	To understand and articulate key concepts related to gender.
CO2	To be familiar with major feminist theories and apply these frameworks to analyze gender issues.
CO3	To understand the development and impact of women's movements globally and locally.
CO4	To evaluate how gender is represented in advertising.
CO5	To develop skills in researching gender-related topics.

SEMESTER - VI

Course Name: CCS356 - OBJECT ORIENTED SOFTWARE ENGINEERING

CO1	Compare various Software Development Lifecycle Models
CO2	Evaluate project management approaches as well as cost and schedule estimation strategies.
CO3	Perform formal analysis on specifications. .
CO4	Use UML diagrams for analysis and design.
CO5	Architect and design using architectural styles and design patterns, and test the system

Course Name: CS3691 - EMBEDDED SYSTEMS AND IOT

CO1	Compare various Software Development Lifecycle Models
CO2	Evaluate project management approaches as well as cost and schedule estimation strategies.
CO3	Perform formal analysis on specifications. .
CO4	Use UML diagrams for analysis and design.
CO5	Architect and design using architectural styles and design patterns, and test the system

Course Name: CCS355 – NEURAL NETWORKS AND DEEP LEARNING

CO1	Apply Convolution Neural Network for image processing.
CO2	Understand the basics of associative memory and unsupervised learning networks.
CO3	Apply CNN and its variants for suitable applications.
CO4	Analyze the key computations underlying deep learning and use them to build and train deep neural networks for various tasks.
CO5	Apply autoencoders and generative models for suitable applications.

Course Name: CCS365 - SOFTWARE DEFINED NETWORKS

CO1	Describe the motivation behind SDN
CO2	Identify the functions of the data plane and control plane.
CO3	Design and develop network applications using SDN.
CO4	Orchestrate network services using NFV
CO5	Explain various use cases of SDN and NFV

Course Name: CCS366 - SOFTWARE TESTING AND AUTOMATION

CO1	Understand the basic concepts of software testing and the need for software testing
CO2	Design Test planning and different activities involved in test planning
CO3	Design effective test cases that can uncover critical defects in the application
CO4	Carry out advanced types of testing
CO5	Automate the software testing using Selenium and TestNG

Course Name: CCS342 – DEVOPS

CO1	Understand different actions performed through Version control tools like Git
CO2	Perform Continuous Integration and Continuous Testing and Continuous Deployment using Jenkins by building and automating test cases using Maven & Gradle.
CO3	Ability to Perform Automated Continuous Deployment.
CO4	Ability to do configuration management using Ansible
CO5	Understand to leverage Cloud-based DevOps tools using Azure DevOps

Course Name: MX3085 – WELL BEING WITH TRADITIONAL PRACTICES –
YOGA, AYURVEDA AND SIDDHA

CO1	Learn the importance of different components of health
CO2	Gain confidence to lead a healthy life
CO3	Learn new techniques to prevent lifestyle health disorders
CO4	Understand the importance of diet and workouts in maintaining health

SEMESTER – VII/VIII

Course Name: GE3791 – HUMAN VALUES AND ETHICS

CO1	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life
CO2	Practice democratic and scientific values in both their personal and professional life.
CO3	Find rational solutions to social problems.
CO4	Behave in an ethical manner in society
CO5	Practice critical thinking and the pursuit of truth.

Course Name: GE3752 – TOTAL QUALITY MANAGEMENT

CO1	Ability to apply TQM concepts in a selected enterprise.
CO2	Ability to apply TQM principles in a selected enterprise.
CO3	Ability to understand Six Sigma and apply Traditional tools, New tools, Benchmarking and FMEA.
CO4	Ability to understand Taguchi's Quality Loss Function, Performance Measures and apply QFD, TPM, COQ and BPR.
CO5	Ability to apply QMS and EMS in any organization.

Course Name: AI3021 – IT IN AGRICULTURAL SYSTEM

CO1	The students shall be able to understand the applications of IT in remote sensing applications such as Drones etc.
CO2	The students will be able to get a clear understanding of how a greenhouse can be automated and its advantages.
CO3	The students will be able to apply IT principles and concepts for management of field operations.
CO4	The students will get an understanding about weather models, their inputs and applications.
CO5	The students will get an understanding of how IT can be used for e-governance in agriculture.

Course Name: OHS352 – PROJECT REPORT WRITING

CO1	Write effective project reports.
CO2	Use statistical tools with confidence.
CO3	Explain the purpose and intension of the proposed project coherently and with clarity.
CO4	Create writing texts to suit achieve the intended purpose.
CO5	Master the art of writing winning proposals and projects.

Course Name: CS3711 – SUMMER INTERNSHIP

CO1	Industry Practices, Processes, Techniques, technology, automation and other core aspects of software industry.
CO2	Analyze, Design solutions to complex business problems.
CO3	Build and deploy solutions for target platform.
CO4	Preparation of Technical reports and presentation.

Course Name: CS3811 – PROJECT WORK / INTERNSHIP

CO1	Gain Domain knowledge and technical skill set required for solving industry / research problems
CO2	Provide solution architecture, module level designs, algorithms
CO3	Implement, test and deploy the solution for the target platform
CO4	Prepare detailed technical report, demonstrate and present the work