MEENAKSHI COLLEGE OF ENGINEERING
No-12, Vembuli Amman Koil Street, West K.K Nagar,
Chennai-600078

DEPARTMENTOF ARTIFICIAL INTELLIGENCE &DATA SCIENCE
REGULATION-2021
COURSE OUTCOMES

SEMESTER-1

Course Name: HS3151/Professional English I

CO1	To use appropriate words in a professional context
CO2	To gain understanding of basic grammatical structures and use them in right context.
CO3	To read and infer the denotative and connotative meanings of technical texts
CO4	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

CourseName: PH3151/Engineering Physics

CO1	Understand the importance of mechanics
CO2	Express their knowledge in electromagnetic waves
CO3	Demonstrate a strong foundational knowledge in oscillations,opticsandlasers
CO4	Understand the importance of quantum physics
CO5	Comprehendandapplyquantummechanicalprinciplestowardstheformationof energy bands

Course Name: CY3151/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 concept sofnanoscienceand nanotechnology in Designing the synthesis of nano materials for engineering and technology applications
CO3	To apply the knowledge of phaseruleandcompositesfor 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

CourseName: GE3152/Heritage Tamils

CO1	Discuss the Tamil Language and Literature
CO2	Discuss about the paintings modern Art Sculpture
CO3	Illustrate the folk martial arts
CO4	Understand the Sang mage through Tamil Literature
CO5	Discuss the contribution of Tamil literature in Indian Civilization

Course Name: GE3151/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,dictionariesetc
CO6	Read and write data from/to files in Python program

PRATICALS

Course Name: GE3171/Python 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 loop 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: BS3171 **/** 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

Course Name: GE3172 **/** English Laboratory

CO1	To listen to and comprehend general as well as complex academic information
CO2	To listen to and understand different points of view in a discussion
CO3	To speak fluently and accurately in formal and informal communicative contexts
CO4	To describe products and processes and explain their uses and purposes clearly and accurately
CO5	To express their opinions effectively in both formal and informal discussions

SEMESTER-2

THEORY

Course Name: HS3252/Professional English-II

CO1	To compare and contrast products and ideas in technical texts
CO2	To identify and report cause and effects in events, industrial processes Through technical texts
CO3	To analyze problems in order to arrive at feasible solutions and communicate them in the written format
CO4	To present their ideas and opinions in a planned and logical manner
CO5	To draft effective resumes in the context of job search

Course Name: MA3251/Statistics and Numerical Methods

CO1	Apply the concept of testing of hypothesis for small and large samples in real life problems
CO2	Apply the basic concepts of classifications of design of experiments in the field of agriculture
CO3	Appreciatethenumericaltechniquesofinterpolationinvariousintervalsand apply the numerical techniques of differentiation and integration for engineering problems
CO4	Understandtheknowledgeofvarioustechniquesandmethodsforsolvingfirst and second order ordinary differential equations
CO5	Solvethepartialandordinarydifferentialequationswithinitialandboundary conditions by using certain techniques with engineering applications

Course Name: PH3256/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 knowledgeonmagneticpropertiesofmaterialsandtheirapplicationsindata storage
CO4	Have the necessary understanding on the functioning of optical materials for opt electronics
CO5	Understand the basics of quantum structures and their applications and basics of quantum computing

Course Name: GE3251/Engineering Graphics

CO1	Use BIS conventions and specifications for engineering drawing
CO2	Construct the conic curves, involutes and cycloid
CO3	Solve practical problems involving projection of lines
CO4	Draw the orthographic, isometric and perspective projections of simple solids
CO5	Draw the development of simple solids

Course Name: BE3251/Basic Electrical and Electronics Engineering

CO1	Compute the electric circuit parameters for simple problems
CO2	Explain the working principle and applications of electrical machines
CO3	Analyze the characteristics of analog electronic devices
CO4	Explain the basic concepts of digital electronics
CO5	Explain the operating principles of measuring instruments

Course Name: GE3252/Tamils and technology

CO1	Learn about weaving and ceramic methods in Sangam period
CO2	Experience about art and sculpture in Sangam period
CO3	Make and use of metals in Sangam period
CO4	Apply the knowledge on water management in SangamPeriod
CO5	Implementing the digitization in Tamil

Course Name: AD3251/Data Structures and Design

CO1	To understand the concepts of ADTs
CO2	To design linear data structures – lists, stacks, and queues
CO3	To understand sorting, searching and hashing algorithms
CO4	To apply Tree and Graph structures

PRATICALS

Course Name: GE3271/Engineering Practices Laboratory

CO1	Draw pipe line plan; lay and connect various pipe fittings used in common House hold plumbing work;Saw;plan; make points in wood materials used in common household wood work
CO2	Wire various electrical joints in common house hold electrical wirework
CO3	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 equipment's; Make atrayoutof Metal sheet using sheet metal work
CO4	Solder and test simple electronic circuits; Assemble and tests impel electronic components on PCB

Course Name: AD3271/ Data Structures and Design Laboratory

CO1	To apply Tree and Graph structures
CO2	To design and implement linear data structures – lists, stacks, and queues
CO3	To implement sorting, searching and hashing algorithms
C04	To solve problems using tree and graph structures

Course Name: GE3272/ Communication Laboratory

CO1	Speak effectively in group discussions held in formal/semi formal contexts.
CO2	Discuss, analyze and present concepts and problems from various perspectives to arrive at suitable solutions
CO3	Write emails, letters and effective job applications.
C04	Write critical reports to convey data and information with clarity and precision
CO5	Give appropriate instructions and recommendations for safe execution of tasks

SEMESTER-3

THEORY

Course Name: MA3354/Discrete Mathematics

CO1	Have knowledge of the concepts needed to test the logic of a program
CO2	Have an understanding in identifying structures on many levels
CO3	Beawareofaclassoffunctionswhichtransforma finite set into another finite set which relates to input and output functions
CO4	Beware ofthecountingprinciples
CO5	Beexposedto conceptsandpropertiesofalgebraic structuressuchasgroups, rings and fields

CourseName: CS3351/Digital Principles and Computer Organization

CO1	Design various combinational digital circuits using logic gates
CO2	Design sequential circuits and analyze the design procedures
CO3	State the fundamentals of computer systems and analyze the execution of an Instruction
CO4	Analyze different types of control design and identify hazards
CO5	Identify the characteristics of various memory systems and I/O Communication

Course Name: AD3391/DATABASE DESIGN AND MANAGEMENT

CO1	Understand the database development life cycle and apply conceptual modeling
CO2	Apply SQL and programming in SQL to create, manipulate and query the database
CO3	Apply the conceptual-to-relational mapping and normalization to design relational database
CO4	Determine the serializability of any non-serial schedule using concurrency techniques
CO5	Apply the data model and querying in Object-relational and No-SQL databases.

CourseName: AD331 / DESIGN AND ANALYSIS OF ALGORITHMS

CO1	Analyze the efficiency of recursive and non-recursive algorithms mathematically
CO2	Analyze the efficiency of brute force, divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques
CO3	Implement and analyze the problems using dynamic programming and greedy algorithmic techniques
CO4	Solve the problems using iterative improvement techniques for optimization.
CO5	Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques.

Course Name: AD3301/DATA EXPLORATION AND VISUALIZATION

CO1	Understand the fundamentals of exploratory data analysis.
CO2	Implement the data visualization using Matplotlib.
CO3	Perform univariate data exploration and analysis.
CO4	Apply bivariate data exploration and analysis.
CO5	Use Data exploration and visualization techniques for multivariate and time series data.

Course Name: AL3391/Artificial Intelligence

CO1	Explain intelligent agent frameworks
CO2	Apply problem solving techniques
CO3	Apply game playing and CSP techniques
CO4	Perform logical reasoning
CO5	Perform probabilistic reasoning under uncertainty.

PRATICALS

Course Name: AD3381/DATABASE DESIGN AND MANAGEMENT LABORATORY

CO1	Understand the database development life cycle
CO2	Design relational database using conceptual-to-relational mapping, Normalization
CO3	Apply SQL for creation, manipulation and retrieval of data
CO4	Develop a database applications for real-time problems
C05	Design and query object-relational databases

Course Name: AD3311/ARTIFICIAL INTELLIGENCE LABORATORY

CO1	Design and implement search strategies
CO2	Implement game playing and CSP techniques
CO3	Develop logical reasoning systems
CO4	Develop probabilistic reasoning systems

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-4

THEORY

Course Name: MA3391/PROBABILITY AND STATISTICS

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 testing of hypothesis for small and large samples in real life problems.
CO4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
CO5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

Course Name: AL3452/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: AL3451/MACHINE LEARNING

CO1	Explain the basic concepts of machine learning.
CO2	Construct supervised learning models.
CO3	Construct unsupervised learning algorithms.
CO4	Evaluate and compare different models

Course Name: AD3491/FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS

CO1	Explain the data analytics pipeline
CO2	Describe and visualize data
CO3	Perform statistical inferences from data
CO4	Analyze the variance in the data
CO5	Build models for predictive analytics

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: 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 understand in go f 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

PRATICALS

Course Name: AD3411/DATA SCIENCE AND ANALYTICS LABORATORY

CO1	Write python programs to handle data using Numpy and Pandas
CO2	Perform descriptive analytics
CO3	Perform data exploration using Matplotlib
CO4	Perform inferential data analytics
CO5	Build models of predictive analytics

Course Name: AL3461/MACHINE LEARNING LABORATORY

CO1	Apply suitable algorithms for selecting the appropriate features for analysis.
CO2	Implement supervised machine learning algorithms on standard datasets and evaluate the performance.
CO3	Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance.
CO4	Build the graph based learning models for standard data sets.
CO5	Assess and compare the performance of different ML algorithms and select the suitable one based on the application.

SEMESTER-5

THEORY

Course Name: AD3501/DEEP LEARNING

CO1	Explain the basics in deep neural networks
CO2	Apply Convolution Neural Network for image processing
CO3	Apply Recurrent Neural Network and its variants for text analysis
CO4	Apply Recurrent Neural Network and its variants for text analysis
CO5	Apply auto encoders and generative models for suitable applications

Course Name: CW3551/ DATA AND INFORMATION SECURITY

CO1	Understand the basics of data and information security
CO2	Understand the legal, ethical and professional issues in information security
CO3	Understand the various authentication schemes to simulate different applications.
CO4	Understand various security practices and system security standards
CO5	Understand the Web security protocols for E-Commerce applications

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: CCS334/BIG DATA ANALYTICS

CO1	Describe big data and use cases from selected business domains.
CO2	Explain NoSQL big data management.
CO3	Install, configure, and run Hadoop and HDFS.
CO4	Perform map-reduce analytics using Hadoop.
CO5	Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.

PRATICALS

Course Name: AD3511/DEEP LEARNING LABORATORY

CO1	Apply deep neural network for simple problems
CO2	Apply Convolution Neural Network for image processing
CO3	Apply Recurrent Neural Network and its variants for text analysis
CO4	Apply generative models for data augmentation
CO5	Develop real-world solutions using suitable deep neural networks

SEMESTER-6

Course Name: CCS341/DATA WAREHOUSING

CO1	Design data warehouse architecture for various Problems
CO2	Apply the OLAP Technology
CO3	Analyze the partitioning strategy
CO4	Critically analyze the differentiation of various schema for given problem
CO5	Frame roles of process manager & system manager

Course Name: CCW331/BUSINESS ANALYTICS

CO1	Explain the real world business problems and model with analytical solutions.
CO2	identify the business processes for extracting Business Intelligence
CO3	Apply predictive analytics for business fore-casting
CO4	Apply analytics for supply chain and logistics management
CO5	Use analytics for marketing and sales.

Course Name: CS3691/EMBEDDED SYSTEM AND IOT

CO1	Explain the architecture of embedded processors.
CO2	Write embedded C programs.
CO3	Design simple embedded applications.
CO4	Compare the communication models in IOT
CO5	Design IoT applications using Arduino/Raspberry Pi /open platform.

Course Name: CCS371/VIDEO CREATION AND EDITING

CO1	Compare the strengths and limitations of Nonlinear editing.
CO2	Identify the infrastructure and significance of storytelling
CO3	Apply suitable methods for recording to CDs and VCDs
CO4	Address the core issues of advanced editing and training techniques
CO5	Design and develop projects using AVID XPRESS DV 4

Course Name: CCS354/NETWORK SECURITY

CO1	Classify the encryption techniques
CO2	Illustrate the key management technique and authentication.
CO3	Evaluate the security techniques applied to network and transport laye
CO4	Discuss the application layer security standards
CO5	Apply security practices for real time applications.

Course Name: CCS332/APP DEVELOPMENT

CO1	Develop Native applications with GUI Components.
CO2	Develop hybrid applications with basic event handling.
CO3	Implement cross-platform applications with location and data storage capabilities.
CO4	Implement cross platform applications with basic GUI and event handling.
CO5	Develop web applications with cloud database access.

Course Name: CCS335/CLOUD COMPUTING

CO1	Understand the design challenges in the cloud.
CO2	Apply the concept of virtualization and its types.
CO3	Experiment with virtualization of hardware resources and Docker.
CO4	Develop and deploy services on the cloud and set up a cloud environment.
CO5	Explain security challenges in the cloud environment.

Course Name: MX3089/ INDUSTRIAL SAFETY

CO1	Understand the basic concept of safety.
CO2	Obtain knowledge of Statutory Regulations and standards.
CO3	Know about the safety Activities of the Working Place.
CO4	Analyze on the impact of Occupational Exposures and their Remedies
CO5	Obtain knowledge of Risk Assessment Techniques.

SEMESTER-7

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: GE3751/PRINCIPLES OF MANAGEMENT

CO1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling.
CO2	Have same basic knowledge on international aspect of management.
CO3	Ability to understand management concept of organizing.
CO4	Ability to understand management concept of directing.
CO5	Ability to understand management concept of controlling.

Course Name: OIE352/RESOURCE MANAGEMENT TECHNIQUES

CO1	Understand to formulate linear programming problems and solve LPP using simple algorithm
CO2	Understand to solve networking problems
CO3	Understand to formulate and solve integer programming problems
CO4	Understand to solve Non Linear programming problems
CO5	Understand to understand and solve project management problems.

SEMESTER-8

Course Name: OHS352/ PROJECT REPORT WRITING

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