ROEVER ENGINEERING COLLEGE

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
(Inclusion under Sections 2(F) and 12(B) of the UGC Act, 1956)
Elambalur, Perambalur – 621 220.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Outcome
Regulation 2021

Semester - I		
Course Code & Course Name	**Course outcome**	
HS3152 & Professional English - I	CO1	Listen and recognize main ideas from different discourses in different accents.
	CO2	Speak clearly, confidently, comprehensively, and communicate with one or many listeners using appropriate communicative strategies.
	CO3	Read different genres of text adopting various reading strategies.
	CO4	Write cohesively and coherently by using a wide range of vocabulary and organize ideas logically on a topic without grammatical errors
	CO5	Determine the main and subordinate ideas, draw conclusions and summarize information from written material
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.
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.
CY3151 & Engineering Chemistry	CO1	Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water..
	CO2	Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
	CO3	Apply the knowledge of phase rule and composites for material selection requirements
	CO4	Recommend suitable fuels for engineering processes and applications.

	CO5	Recognize different forms of energy resources and apply them for suitable applications in energy sectors
GE3151 & Problem Solving and Python Programming	CO1	Develop algorithmic solutions to simple computational problems.
	CO2	Demonstrate programs using simple Python statements and expressions.
	CO3	Explain control flow and functions concept in Python for solving problems.
	CO4	Use Python data structures- lists, tuples & dictionaries for representing Compound data.
	CO5	Explain files, exception, modules and packages in Python for solving problems.
GE3171 & 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	Utilize Python packages in developing software applications.
BS3171 & Physics 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
BS3171 & Chemistry Laboratory	CO1	To analyses the quality of water samples with respect to their acidity, alkalinity, hardness and DO
	CO2	To determine the amount of metal ions through volumetric and spectroscopic techniques
	CO3	To analyze and determine the composition of alloys.
	CO4	To learn simple method of synthesis of nanoparticles
	CO5	To quantitatively analyze the impurities in solution by electroanalytical techniques
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 – II		
HS3252 & Professional English - II	CO1	Compare and contrast products and ideas in technical texts.
	CO2	Identify and report cause and effects in events, industrial processes through technical texts
	CO3	Analyse 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
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	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
	CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
	CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
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 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 and basics of quantum computing
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
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.
	CO1	Recall basic C Programming constructs to solve problem that meet specific needs

CS3251 & Programming in C	CO2	Apply string and array operations to solve programming problems
	CO3	Utilize functions and pointers to implement modular programming and manipulate data.
	CO4	Apply structures to solve real-world problems that represent complex data entities and use structures to organize and manipulate data effectively.
	CO5	Develop C program by formulating files to create reusable and well-organized code structures
GE3271 & Engineering Practices Laboratory	CO1	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. Assemble simple mechanical assembly of common household equipment’s
	CO2	Wire various electrical joints in common household electrical wire work
	CO3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, and tapping in parts; Make a tray out of metal sheet using sheet metal work.
	CO4	Solder and test simple electronic circuits
	CO5	Assemble and test simple electronic components on PCB.
CS3271 & Programming in C Laboratory	CO1	Demonstrate C programs using basic C concepts and record it in observation/record and present the result as an individual.
	CO2	Implement the C program by applying the concept of Arrays, functions for user defined problems
	CO3	Implement the C program by applying the concept of structures, pointers for user defined problems
	CO4	Develop the C program to read and write files using sequential, random access file processing
	CO5	Create C application with knowledge and understanding of the engineering and management principles as an individual
GE3272 & Communication Laboratory	CO1	Speak effectively in group discussions held in a formal/semi-formal contexts.
	CO2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
	CO3	Write emails, letters and effective job applications
	CO4	Write critical reports to convey data and information with clarity and precision
	CO5	Give appropriate instructions and recommendations for safe execution of tasks
Semester – III		
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	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.
	CO4	Be aware of the counting principles

	CO5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields
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
CS3352 & Foundations of Data Science	CO1	Define the data science process.
	CO2	Understand different types of data description for data science process.
	CO3	Gain knowledge on relationships between data.
	CO4	Use the Python Libraries for Data Wrangling.
	CO5	Apply visualization Libraries in Python to interpret and explore data.
CS3301 & Data Structures	CO1	Design and develop appropriate methodologies for linear Data Structure and its operations using array and list
	CO2	Able to choose appropriate algorithm for Linear data structures like stack and Queue to implement applications
	CO3	Define a problem for purposes of investigation, its scope and importance to implement applications using Tree structure
	CO4	Represent data to facilitate analysis and explanation of the data, and implement the applications of graph
	CO5	Interpret various sorting, searching and hashing techniques for a given problem
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
CS3311 & Data Structures Laboratory	CO1	Demonstrate various operations for linear data structure-list
	CO2	Implement stack and queue structures and its applications
	CO3	Examine tree structures and implement the applications of trees
	CO4	Explore Graph traversal algorithm and applications of graph
	CO5	Implement various sorting, searching algorithms and Hashing techniques
CS3381 & Object Oriented	CO1	Design and develop java programs using object oriented programming concepts
	CO2	Develop simple applications using object oriented concepts such as package, exception

Programming Laboratory	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
CS3361 & Data Science Laboratory	CO1	Make use of the python libraries for data science CO2:. CO3:. CO4: Perform correlation and regression analytics on standard data sets CO5: Present and interpret data using visualization packages in Python.
	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.
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		
CS3452 & Theory of Computation	CO1	Review the fundamental concepts in automata theory, formal languages and different formal proofs to formulate finite automata.
	CO2	Construct regular expression for any pattern and verify a language to be regular language
	CO3	Design a context free grammar and demonstrate pushdown automata for the given language
	CO4	Apply normal forms for context free languages (CFG) and solve simple computational problems by using Turing Machine
	CO5	Verify the problem is decidable or not with the help of recursive enumerable language
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
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.
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
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.
GE3451 & Environmental Sciences and Sustainability	CO1	Understand the functions of environment, ecosystems and biodiversity and their conservation
	CO2	Identify the causes, effects of environmental pollution and natural disasters and contributeto the preventive measures in the society.
	CO3	Apply the understanding of renewable and non-renewable resources andcontribute to the sustainable measures to preserve them for future generations
	CO4	Recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
	CO5	Demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
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.
CS3481 & Database Management	CO1	Create databases with different types of key constraints

Systems Laboratory		
	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	Create and manipulate data using NOSQL database
Semester – V		
CS3591 & Computer Networks	CO1	Recall the fundamentals of layered design in a networking system and its functions of computer networks Investigate the performance for professional development.
	CO2	Choose appropriate IEEE standard for data link layer protocols and analyze technical information for feasibility, viability, sustainability, etc.
	CO3	Choose appropriate IEEE standard and produce a design solution for technological advancement using routing algorithms to implement network layer protocols
	CO4	Verify the functionalities and validate the design in transport layer protocols as defined by IEEE standard
	CO5	Apply various application layer protocols for various functions in the computer network for professional development
CS3501 & Compiler Design	CO1	Design a lexical analyzer for a sample language by understanding different phases of compiler.
	CO2	Develop/Create a parse tree by applying different parsing algorithm.
	CO3	Analyse and synthesise different representations of intermediate code and syntax directed translations
	CO4	Design a code generator by analyzing storage and data structure of a computer system.
	CO5	Implement the code optimization techniques to generate efficient target code by applying data flow analysis.
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 cybercrimes and cyber security
CS3551 & Distributed	CO1	Outline the foundations of distributed systems
	CO2	Solve synchronization and state consistency problems

Computing	CO3	Identify resource sharing techniques in distributed systems
	CO4	Apply working model of consensus and reliability of distributed systems
	CO5	Relate the fundamentals of cloud computing
CCS346 & Exploratory Data Analysis	CO1	Understand the fundamentals and Apply data exploration, transformation techniques using EDA tools.
	CO2	Learn how to effectively handle and analyze data using Pandas, covering indexing, missing data management, hierarchical indexing, dataset merging, aggregation, pivot tables, and string operations.
	CO3	Univariate analysis by understanding distribution variables, summarizing data levels and spreads numerically, applying scaling and standardizing methods, and examining inequality in data.
	CO4	Understand relationships between two variables, analyze percentage and contingency tables, handle multiple batches, and visualize data with scatterplots and resistant lines.
	CO5	Analyze multivariate data with third-variable introduction, causal explanations, TSA basics, time series data traits, data cleaning, time-based indexing, visualization, grouping, and resampling methods.
CCW331 & Business Analytics	CO1	Construct the Analytics life cycle to solve real world business problems and model with analytical solutions
	CO2	Identify the business processes for extracting Business Intelligence
	CO3	Apply various types of predictive analytics for business fore-casting
	CO4	Apply analytics for supply chain and logistics management
	CO5	Use analytics for marketing and sales for different functions of a business
MX3082 & Elements of Literature	CO1	Understand the relevance of literature in human life and appreciate its aspects in developing finer sensibilities.
	CO2	Analyze the fiction modes and patterns
	CO3	Identify the figurative language like simile, metaphor, conceit, symbol etc.
	CO4	Perform the drama as the representational art
	CO5	Able to show their understanding of a particular piece of literature
Semester-VI		
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
CS3691	CO1	Explain the architecture of embedded processors.

& Embedded Systems and IoT	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
CCS372 & Virtualization	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
CCS340 & Cyber Security	CO1	Explain the basics of cyber security, cybercrime and cyber law.
	CO2	Classify various types of attacks and learn the tools to launch the attacks
	CO3	Apply various tools to perform information gathering
	CO4	Apply intrusion techniques to detect intrusion
	CO5	Apply intrusion prevention techniques to prevent intrusion
CCS342 & DevOps	CO1	Understand different actions performed through Version control tools like Git. 132
	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
CCS345 & Ethics And AI	CO1	Understand the effects of morality and ethics in AI on society, psychology, law, the environment and trust.
	CO2	Analyze the global ethical efforts and concerns, survey the case studies like healthcare robots, autonomous vehicles.
	CO3	Develop a systematic approach to integrate AI standards and Regulations like AI Agent, Safe Design of Autonomous and Semi-Autonomous Systems.
	CO4	Inspect the ethical dimensions of robotics, including moral theories, ICT society issues, professional responsibility, and Roboethics Taxonomy, for a holistic understanding of ethical principles in technology.
	CO5	Analyze the challenges, opportunities and ethical dilemmas, with National and International Strategies on AI.
	CO1	Learn the importance of different components of health

MX3085 & Well Being with traditional Practices- Yoga, Ayurveda and Siddha	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
	CO5	Understand the importance of Yoga and prevention of health disorder
Semester-VII		
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.
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
AI3021 & IT in Agricultural System	CO1	Understand the applications of IT in remote sensing applications such as Drones etc.
	CO2	Get a clear understanding of how a greenhouse can be automated and its advantages
	CO3	Apply IT principles and concepts for management of field operations
	CO4	Understanding about weather models, their inputs and applications
	CO5	Understanding of how IT can be used for e-governance in agriculture.
CME365 & Renewable Energy Technologies	CO1	Discuss the Indian and global energy scenario.
	CO2	Describe the various solar energy technologies and its applications
	CO3	Explain the various wind energy technologies
	CO4	Explore the various bio-energy technologies.
	CO5	Learn the ocean and geothermal technologies.
OPE353 & Industrial Safety	CO1	Describe the common work-related diseases and accidents in occupational setting
	CO2	Learn the essential members of the Occupational Health team

	CO3	Apply the roles of community health practitioners play in an Occupational setting to ensure the protection, promotion and maintenance of the health of the employee
	CO4	Able to understand the hazard and risk management
	CO5	Analyze on the impact of Occupational Exposures and their Remedies
CS3711 & Summer internship	CO1	Learn the industry practices, processes, techniques, technology, automation and other core aspects of software industry
	CO2	Analyze, Design solutions to complex business problems
	CO3	Learn the preparation of technical reports and presentation.
	CO4	Develop technical, soft, team skills to cater to the needs of the industry.
	CO5	Get the practical knowledge on product development skill to solve related problem
Semester-VIII		
CS3811 & Project Work / Internship	CO1	Formulate a solution for an engineering problem
	CO2	Analyse and design the system model
	CO3	Implement the system with required software and hardware
	CO4	Demonstrate the product / project
	CO5	Document the whole process and deliver the system

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Outcome
Regulation 2021-PG

Semester - I		
Course Code & Course Name	**Course outcome**	
MA4151 & Applied Probability and Statistics for Computer Science Engineers	CO1	Apply the concepts of Linear Algebra to solve practical problems.
	CO2	Use the ideas of probability and random variables in solving engineering problems
	CO3	Able to familiar with some of the commonly encountered two dimensional random variables and be equipped for a possible extension to multivariate analysis.
	CO4	Use statistical tests in testing hypotheses on data.
	CO5	Develop critical thinking based on empirical evidence and the scientific approach to knowledge development.
RM4151 & Research Methodology and IPR	CO1	Understand research problem formulation
	CO2	Analyze research related information
	CO3	Follow research ethics of data analysis and report.
	CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasise the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
	CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D
CP4151 & Advanced Data Structures And Algorithms	CO1	Design data structures and algorithms to solve computing problems.
	CO2	Choose and implement efficient data structures and apply them to solve problems
	CO3	Design algorithms using graph structure and various string-matching algorithms to solve real-life problems
	CO4	Design one's own algorithm for an unknown problem
	CO5	Apply suitable design strategy for problem solving
CP4152 & Database Practices	CO1	Convert the ER-model to relational tables, populate relational databases and formulate SQL queries on data.
	CO2	Understand and write well-formed XML documents
	CO3	Able to apply methods and techniques for distributed query processing.
	CO4	Design and Implement secure database systems.

	CO5	Use the data control, definition, and manipulation languages of the NoSQL databases
CP4153 & Network Technologies	CO1	Explain basic networking concepts
	CO2	Compare different wireless networking protocols
	CO3	Describe the developments in each generation of mobile data networks
	CO4	Develop SDN based applications
	CO5	Explain the concepts of network function virtualization
CP4154 & Principles of Programming Languages	CO1	Describe syntax and semantics of programming languages
	CO2	Explain data, data types, and basic statements of programming languages
	CO3	Design and implement subprogram constructs
	CO4	Apply object-oriented, concurrency, and event handling programming constructs
	CO5	Develop programs in Scheme, ML, and Prolog and Understand and adopt new programming language
CP4161 & Advanced Data Structures and Algorithms Laboratory	CO1	Design and implement basic and advanced data structures extensively
	CO2	Design algorithms using graph structures
	CO3	Design and develop efficient algorithms with minimum complexity using design techniques
	CO4	Develop programs using various algorithms
	CO5	Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem
Semester - II		
CP4291 & Internet of Things	CO1	Understand the various concept of the IoT and their technologies
	CO2	Develop the IoT application using different hardware platforms
	CO3	Implement the various IoT Protocols
	CO4	Understand the basic principles of cloud computing
	CO5	Develop and deploy the IoT application into cloud environment
CP4292 & Multicore Architecture and Programming	CO1	Describe multicore architectures and identify their characteristics and challenges.
	CO2	Identify the issues in programming Parallel Processors.
	CO3	Able to write the 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.
CP4252 & Machine Learning	CO1	Understand and outline problems for each type of machine learning
	CO2	Design a Decision tree and Random forest for an application
	CO3	Implement Probabilistic Discriminative and Generative algorithms for an application and analyze the results

	CO4	Use a tool to implement typical Clustering algorithms for different types of applications
	CO5	Design and implement an HMM for a Sequence Model type of application and identify applications suitable for different types of Machine Learning with suitable justification
SE4151 & Advanced Software Engineering	CO1	Identify appropriate process models based on the Project requirements
	CO2	Understand the importance of having a good Software Architecture
	CO3	Understand the five important dimensions of dependability, namely, availability, reliability, safety, security, and resilience
	CO4	Understand the basic notions of a web service, web service standards, and service-oriented architecture;
	CO5	Be familiar with various levels of Software testing
CP4093 & Information Retrieval Techniques	CO1	Build an Information Retrieval system using the available tools.
	CO2	Identify and design the various components of an Information Retrieval system.
	CO3	Categorize the different types of IR Models
	CO4	Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval
	CO5	Design an efficient search engine and analyze the Web content structure
MP4092 & Human Computer Interaction	CO1	Understand the basics of human computer interactions via usability engineering and cognitive modeling.
	CO2	Understand the basic design paradigms, complex interaction styles
	CO3	Understand the models and theories for user interaction
	CO4	Examine the evaluation of interaction designs and implementations
	CO5	Elaborate the above issues for web and mobile applications.
CP4212 & Software Engineering Laboratory	CO1	Can produce the requirements and use cases the client wants for the software being Produced.
	CO2	Participate in drawing up the project plan. The plan will include at least extent and work assessments of the project, the schedule,
	CO3	create and specify such a software design based on the requirement specification that the software can be implemented based on the design
	CO4	Can assess the extent and costs of a project with the help of several different assessment methods
	CO5	Able to available resources, and risk management can model and specify the requirements of mid-range software and their architecture
CP4211-Term Paper Writing and seminar	CO1	Develop their scientific and technical reading and writing skills
	CO2	Understand and construct research articles.
	CO3	Able to obtain information from a variety of sources like Journals, dictionaries, reference books etc.
	CO4	Understanding the authors contributions and critically analyzing each paper
	CO5	Ability to write the Final Paper and giving final Presentation

SEMESTER III		
CP4391 & Security Practices	CO1	Understand the core fundamentals of system security
	CO2	Apply the security concepts to wired and wireless networks
	CO3	Implement and Manage the security essentials in IT Sector
	CO4	Explain the concepts of Cyber Security and Cyber forensics
	CO5	Be aware of Privacy and Storage security Issues.
CP4094 & Mobile And Pervasive Computing	CO1	Design a basic architecture for a pervasive computing environment
	CO2	Design and allocate the resources on the 3G-4G wireless networks
	CO3	Analyze the role of sensors in Wireless networks
	CO4	Deploy the location and context information for application development
	CO5	Develop mobile computing applications based on the paradigm of context aware computing and wearable computing
MP4292 & Mobile Application Development	CO1	Identify various concepts of mobile programming that make it unique from programming for other platforms
	CO2	Create, test and debug Android application by setting up Android development
	CO3	Demonstrate methods in storing, sharing and retrieving data in Android applications
	CO4	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces
	CO5	Create interactive applications in android using databases with multiple activities including audio, video and notifications and deploy them in marketplace
OBA433 & Intellectual Property Rights	CO1	Understanding of intellectual property and appreciation of the need to protect it
	CO2	Awareness about the process of patenting
	CO3	Understanding of the statutes related to IPR
	CO4	Ability to apply strategies to protect intellectual property
	CO5	Ability to apply models for making strategic decisions related to IPR
CP4311 & Project Work 1	CO1	Identify and apply the real world and societal importance problems in the technology and its allied area.
	CO2	Identify, analyze, design, implement and handle prototype projects with a complete and organized solution methodologies
	CO3	Apply modern engineering tools for solution
	CO4	Contribute as an individual or in a team in development of technical projects
	CO5	Develop effective communication skills for presentation of project related activities and prepare reports and examination following professional ethics

SEMESTER IV		
CP4311 & Project Work II	CO1	Identify and apply the real world and societal importance problems in the technology and its allied area.
	CO2	Identify, analyze, design, implement and handle prototype projects with a complete and organized solution methodologies
	CO3	Apply modern engineering tools for solution
	CO4	Contribute as an individual or in a team in development of technical projects
	CO5	Develop effective communication skills for presentation of project related activities and prepare reports and examination following professional ethics