



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 2017

Semester - I		
Course Code & Course Name	Course outcome	
HS8151 & Communicative English	CO1	Use the development in sharing information about family and friends
	CO2	Distinguish general comprehending skills and present lucid skills in free writing
	CO3	Analyze the basic grammar techniques and utilize it in enhancing language
	CO4	Discover an environment for reading and develop good language skills
	CO5	Prepare flair for any kind of writing with rich vocabulary and proper syntax
MA8151 & Engineering Mathematics – I	CO1	Use both the limit definition and rules of differentiation to differentiate functions.
	CO2	Solve differentiation to maxima and minima problems.
	CO3	Locate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus and improper integral.
	CO4	Solve integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
	CO5	Relate various techniques in solving differential equations
PH8151 & Engineering Physics	CO1	Understand the basics in properties of matter and its applications
	CO2	Interprets on the concepts of waves and optical devices and their applications in fibre optics
	CO3	Outlines the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
	CO4	Understands & Apply Quantum concepts in tunnelling microscope.
	CO5	Understand the basics of Crystal structures and different crystal growth techniques
CY8151 & Engineering Chemistry	CO1	Identified the sources available for the treatment of Water
	CO2	Demystify the Surface chemistry to Facilitate better understanding on Adsorption of Gases and Catalysis.
	CO3	Apply the Phase rule and better understanding on Making Alloys.
	CO4	Interpret the types of fuels and better understanding on combustion process.
	CO5	List out the Energy resources and Explain the construction, working principles and uses of Batteries



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GE8151 & Problem Solving and Python Programming	CO1	Develop algorithmic solutions to simple computational problems.
	CO2	Apply basic python programming concepts to solve simple problems.
	CO3	Design Solution for engineering problem using conditionals and looping statements in Python
	CO4	Manipulate compound data using List, Tuple and Dictionaries to design efficient and organized data structures with appropriate data representations
	CO5	Develop Python program by formulating Modules, packages and files to create reusable and well-organized code structures
GE8152 & Engineering Graphics	CO1	Create the geometrical constructions of conics, cycloids and Involutives
	CO2	Construct the orthographic projection and isometric views of objects
	CO3	Construct the projections of points, lines and plane surfaces
	CO4	Construct the projections of simple regular polyhedral, truncated solids and section of solids
	CO5	Construct the development of lateral surfaces of simple solids and isometric and perspective projection of simple solids
GE8161 & Problem Solving and Python Programming Laboratory	CO1	Demonstrate Python programs using modern tool and record it in observation/record and present the result as an individual.
	CO2	Implement searching, sorting algorithms with appropriate consideration and record it in observation/record and present the result as an individual.
	CO3	Demonstrate Python programs for matrix multiplication, word count and present the result as an individual
	CO4	Build the programs for file operations in Python with appropriate consideration of exception handling, organizing and managing files.
	CO5	Implement game logic and mechanics to Develop a gaming application with UI design principle using Pygame
BS8161 & Physics and Chemistry Laboratory	CO1	Calculate the young's modulus and Rigidity modulus by applying principles of elasticity. Find the thermal conductivity of bad conductor.
	CO2	Understand laser concepts and applies it to find the particle size. Determine the thickness of the thin material using interference concept.
	CO3	Determine the velocity of sound waves in liquid and estimates the band gap of Semiconductor
	CO4	Determine of water quality parameters through volumetric and instrumental analysis
	CO5	Determine the Strength of Acids through volumetric and instrumental analysis
Semester – II		
HS8251	CO1	Relate the ideas into its elementary constituents, analyze and act after a meaningful thought process



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& Technical English	CO2	Apply the phrase and passage and explicitly pass on the ideas meaningfully
	CO3	Prepare to interpret the given phrase or the graphical rendering and review the contents well individually or as a group
	CO4	Demonstrate on the communication aspects of complicated ideas and respond positively
	CO5	Illustrate the issues and find the rudiments of the problem individually and as a group
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.
PH8252 & Physics for Information Science	CO1	Summarize the concepts of classical and quantum electron theories, and energy band Structures
	CO2	Apply the concept of semiconductor in various devices by understanding basic concepts various devices
	CO3	Outlines the magnetic properties of materials and their applications in data storage devices.
	CO4	Interpret the functioning of optical materials for optoelectronics
	CO5	Understand the basics of quantum structures and their applications in carbon nanotubes.
BE8255 & Basic Electrical, Electronics and Measurement Engineering	CO1	Apply the concept of electric circuit laws, network reduction theorems.
	CO2	Understand the basic operation of electrical machines and transformers
	CO3	Illustrate the operation of renewable energy sources, lamps, batteries and protective devices.
	CO4	Analyze the operations and characteristics of various electronic devices
	CO5	Determine various types of errors present in measurements and explain the operating principles of different meters, transducers.
GE8291 & Environmental Science and Engineering	CO1	Summarize the Environment interrelationship and biodiversity
	CO2	Interpret the various Environmental Pollution and prevention
	CO3	Illustrate Various Natural Resources and its ill effects
	CO4	Analyze social issues and Environmental Laws
	CO5	Classify in Population explosion among the world and their problems



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CS8251 & Programming in C	CO1	Recall basic C Programming constructs to solve problem that meet specific needs
	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
GE8261 & Engineering Practices Laboratory	CO1	Understand plumbing and carpentry components of residential and industrial buildings
	CO2	Create models by welding, turning, sheet metal, smithy and foundry operations
	CO3	Demonstrate the operation of centrifugal pumps and air conditioners, leading to a comprehensive understanding of their functions
	CO4	Make electrical wiring and measure electrical quantities
	CO5	Investigate AC signals and ripple factor.
CS8261 & C Programming 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
Semester – III		
MA8351 & 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.
CS8351 & Digital Principles and	CO1	Recall digital circuits using simplified Boolean functions.
	CO2	Demonstrate the various combinational digital circuits using logic gates.



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System Design	CO3	Examine the various synchronous and asynchronous sequential circuits.
	CO4	Analyze the various semiconductor memories and related technology.
	CO5	Develop HDL code for combinational and sequential circuits.
CS8391 & 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
CS8392 & Object Oriented Programming	CO1	Produce a variety of potential design solutions on Object Oriented Programming and develop Java programs using OOP principles for professional development.
	CO2	Design and develop Java programs for the concepts inheritance and interfaces with appropriate procedures/methodologies to apply current real time problems.
	CO3	Use appropriate procedures, tools and techniques to develop Java applications for exceptions and I/O streams for sustainable program development.
	CO4	Choose appropriate procedure/algorithm to develop Java applications for threads and generics classes.
	CO5	Define a problem for purposes of investigation, its scope and importance. Develop interactive Java programs using AWT and swings for new developments.
EC8395 & Communication Engineering	CO1	Develop an analog modulation technique in communication system
	CO2	Develop a pulse modulation technique in communication system
	CO3	Develop a various digital modulation and transmission technique in communication system
	CO4	Examine the principles behind the Source and Error control coding.
	CO5	Develop the spread spectrum and multiple access in communication system
CS8381 & 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
CS8383	CO1	Develop Java programs with appropriate procedure for simple applications that make use of classes, packages,



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& Object Oriented Programming Laboratory		interfaces,arraylist, exception handling and multithreading as an individual or a team.
	CO2	Design and develop a java program using appropriate procedures/methodologies using file processing, generic programming and event handling
	CO3	Demonstrate the concepts of polymorphism and inheritance.
	CO4	Write Java programs to implement error handling techniques using exception handling.
	CO5	Write Java application programs using OOP principles and proper program structuring.
CS8382 & Digital Systems Laboratory	CO1	Examine the various basic logic gates using Boolean theorems.
	CO2	Make use of basic logic gates and MSI devices to develop various combinational circuits.
	CO3	Make use of basic logic gates and MSI devices to develop various sequential circuits.
	CO4	Develop combinational and sequential circuits using HDL.
	CO5	Design a simple digital system for real time application.
HS8381 & Interpersonal Skills/Listening &Speaking	CO1	Recognize Listening and responding appropriately
	CO2	Discuss in group discussions
	CO3	Express effective presentations
	CO4	Produce both formal and informal conversations in confidently and appropriately
	CO5	Apply primary emphasis on academic speaking and listening skills
Semester – IV		
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 queueing models.
	CO5	Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner
CS8491 & Computer Architecture	CO1	Explore the basic structure of computers, operations, instructions and Addressing mode.
	CO2	Demonstrate an arithmetic and logic unit, implementation of fixed-point and floating-point arithmetic unit and solve arithmetic operations.
	CO3	Design data path and control unit, verify data path functionalities, apply problem-solving skills to improve the pipelined execution architecture



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	CO4	Understand and work with parallel processing architectures with knowledge of memory and I/O
	CO5	Identify feasibility, viability, sustainability on various memory systems and I/O communication
CS8492 & Database Management Systems	CO1	Describe the fundamentals of relational database system and SQL.
	CO2	Construct ER model, Relational model and Normalization.
	CO3	Examine the concepts of transaction processing concurrency control and recovery.
	CO4	Compare the various internal storage structures and indexing techniques.
	CO5	Explore the advanced concepts in databases, enabling a deep understanding and proficiency in their application and implementation.
CS8451 & Design and Analysis of Algorithms	CO1	Analyse different algorithms for various computing problems.
	CO2	Categorize the complexity and efficiency of Brute Force method and Divide and Conquer method.
	CO3	Build dynamic programming and greedy techniques for a given problem.
	CO4	Identify problems can be solved using iterative method
	CO5	Analyse the power and limitation in various algorithms
CS8493 & Operating Systems	CO1	Explore and synthesize the fundamental concepts and Identify historic points of technological advance in Operating Systems.
	CO2	Analyze various scheduling algorithms stating possible errors and limitations for process management.
	CO3	Analyze the various page replacement algorithms. Compare and contrast various memory management schemes
	CO4	Comprehend technical literature and other credible sources of information analyze the performance on disk scheduling algorithms. Understand the functionality of file systems and I/O management.
	CO5	Explore knowledge in ability to source information on Linux servers and distinguish iOS and Android OS
CS8494 & Software Engineering	CO1	Identify the key activities in managing a software project and compare different process models.
	CO2	Describe the fundament concepts of requirements engineering and analysis modelling.
	CO3	Apply systematic procedure for software design and deployment.
	CO4	Compare and contrast the various testing and maintenance.
	CO5	Organise the project schedule, estimate project cost and effort required
CS8481 & Database Management Systems	CO1	Illustrate typical data definitions and manipulation commands.
	CO2	Apply applications to test Nested and Join Queries
	CO3	Construct simple applications that use views, procedures, triggers and exception handling



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Laboratory	CO4	Build different applications using front-end tool
	CO5	Develop database applications using tables, views, functions and procedures
CS8461 & Operating Systems Laboratory	CO1	Execute Unix commands and shell programming
	CO2	Compare the performance of various CPU Scheduling Algorithms
	CO3	Create processes and implement IPC
	CO4	Interpret deadlock avoidance, detection algorithms, threading and synchronization
	CO5	Analyze various memory management and File Allocation Strategies
HS8461 & Advanced Reading and Writing	CO1	Describe different types of essays.
	CO2	Differentiate winning job applications
	CO3	Extend Reading and evaluating texts critically
	CO4	Interpret critical thinking in various professional contexts
	CO5	Apply primary emphasis on academic reading and writing skills
Semester – V		
MA8551 & Algebra and Number Theory	CO1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
	CO2	Understand 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.
CS8591 & 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.
EC8691	CO1	Analyze and Design of internal architecture of 8086 Microprocessor



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& Microprocessors and Microcontrollers		
	CO2	Infer the design of system bus structure of 8086 Microprocessor
	CO3	Create and examine the various interfacing modules with 8086 Microprocessor
	CO4	Analyze and Design of of 8051 microcontroller
	CO5	Create and Investigate various interfacing modules with 8051 microcontroller
CS8501 & Theory of Computation	CO1	Outline the fundamental concepts in automata theory, formal languages and different formal proofs, design finite automata.
	CO2	Construct regular expression for any pattern.
	CO3	Design of context free grammar and demonstrate the pushdown automata for the given language.
	CO4	Apply normal forms of CFG and solve simple computational problems by using Turing Machine.
	CO5	Interpret whether a problem is decidable or not
CS8592 & Object Oriented Analysis and Design	CO1	Express the software design concept with UML diagram.
	CO2	Construct static UML diagrams to various use case scenarios
	CO3	Build UML dynamic and implementation diagrams to various use case scenarios.
	CO4	Transform UML based software design into pattern based design using design patterns.
	CO5	Illuminate the diverse testing methodologies employed for object-oriented software, providing a clear understanding of their principles, techniques, and applicability to ensure the robustness and quality of software systems
OMD551 & Basics of Biomedical Instrumentation	CO1	Learn the different bio potential and its propagation.
	CO2	Illustrate the different electrode placement for various physiological recording
	CO3	Design bio amplifier for various physiological recording
	CO4	Understand various technique non electrical physiological measurements
	CO5	Understand the different biochemical measurements
OCE551 & Air Pollution and Control Engineering	CO1	Understand of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
	CO2	Identify formulate and solve air and noise pollution problems
	CO3	Design stacks and particulate air pollution control devices to meet applicable standards.
	CO4	Examine the principle and design of control of gaseous air pollutant
	CO5	Discuss the quality, control and preventive measures.



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EC8681 & Microprocessors and Microcontrollers Laboratory	CO1	Determine ALP concepts, features and Coding methods
	CO2	Design ALP Programs for fixed and Floating Point and Arithmetic operations in 8086 and 8051
	CO3	Develop waveforms using Microprocessors Interface
	CO4	Develop Interfacing units between different I/Os and processor
	CO5	Create the difference between simulator and Emulator
CS8582 & Object Oriented Analysis and Design Laboratory	CO1	Summarize the requirements specification for an intended software system.
	CO2	Sketch different UML diagrams for the given specification.
	CO3	Demonstrate UML mapping
	CO4	Examine the software system thoroughly for all scenarios.
	CO5	Implement the appropriate design patterns.
CS8581 & Networks Laboratory	CO1	Demonstrate various network related commands
	CO2	Compare the performance of different transport layer protocols.
	CO3	Use simulation tools to compare the performance of various network protocols.
	CO4	Analyze various routing algorithms.
	CO5	Implement error correction codes.
Semester – VI		
CS8651 & Internet Programming	CO1	Construct simple website by identifying and analyzing user requirements using HTML and Cascading Style Sheets.
	CO2	Design dynamic web page by identifying and formulating public needs using the knowledge of JavaScript programming concepts
	CO3	Build interactive web page with the knowledge of Servlets and JSP.
	CO4	Design simple web pages with the knowledge of PHP and represent data in XML format.
	CO5	Use AJAX and web services to develop interactive web applications
CS8691 & Artificial Intelligence	CO1	Understand the characteristics and types of intelligent agents
	CO2	Interpret search algorithms for any AI problem
	CO3	Implement problem using first order and predicate logic
	CO4	Develop software agents to solve a problem
	CO5	Demonstrate applications for NLP that use Artificial Intelligence.
CS8601 & Mobile Computing	CO1	Identify the fundamental principles of mobile telecommunication systems.
	CO2	Clarify the technological changes of various generations of telecommunication systems in wireless networks.



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	CO3	Recall the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network.
	CO4	Explore the functionality of Transport and Application layers in mobile application systems.
	CO5	Apply appropriate technique in modern mobile applications using android/blackberry/ IOS /Windows SDK.
CS8602 & Compiler Design	CO1	Demonstrate proficiency in different phases of compiler and Design lexical analyzer
	CO2	Design appropriate methodologies to construct different parsing algorithm for sample languages.
	CO3	Discuss limitations and validate tools, techniques and use appropriate procedures for intermediate code and syntax directed translation
	CO4	Identify modern engineering tools and develop appropriate procedures/methodologies for code generator and run-time environment
	CO5	Use appropriate procedures, modern tools and techniques to build code optimization techniques.
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	Interpret the Mutual Exclusion and Deadlock detection algorithms in distributed systems.
	CO4	Analyze the agreement protocols and fault tolerance mechanisms in distributed systems.
	CO5	Discuss the features of peer-to-peer and distributed shared memory systems.
GE8075 & Intellectual Property Rights	CO1	Identify the legal principles of in Intellectual Property Rights in engineering innovations
	CO2	Apply principles of preventive engineering and sustainable development In social, environmental context and commit to professional ethics
	CO3	Interpret legislation, regulations, codes, and standards of International, National policies and explain its contribution to the protection of the public.
	CO4	Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at the global, regional and local level for digital products.
	CO5	Identify risks/impacts in the life-cycle of an engineering product measures and issues for enforcement of Intellectual Property Rights.
IT8076 & Software Testing	CO1	Design test cases suitable for a software development for different domains.
	CO2	Identify suitable tests to be carried out.
	CO3	Prepare test planning based on the document.



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	CO4	Document test plans and test cases designed.
	CO5	Use automatic testing tools, Develop and validate a test plan.
CS8661 & Internet Programming Laboratory	CO1	Design Web pages using HTML/XML and style sheets and exposed to creation of user interfaces using Javascript.
	CO2	Build dynamic web pages using server side programming.
	CO3	Create Client Server applications
	CO4	Develop web applications using PHP programming
	CO5	Construct web applications using AJAX and web services
CS8662 & Mobile Application Development Laboratory	CO1	Develop a program that make use of GUI components and Layouts in mobile applications
	CO2	Design and develop a program for android mobile applications using Event Listener.
	CO3	Produce a design solution and develop a program for database related mobile applications using android studio.
	CO4	Construct mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS.
	CO5	Design and develop appropriate procedures/methodologies analyse and discover own mobile application for simple user needs.
CS8611 & Mini Project	CO1	Understand the problem and find out a solution by requirement analysis
	CO2	Layout the System Model
	CO3	Enable to implement the system with the specified tools
	CO4	Review the product and accept changes if needed
	CO5	Enable documentation of the whole process
HS8581 & Professional Communicatio n	CO1	Recognize the Employability and career skills
	CO2	Express effective presentations
	CO3	Discuss confidently in Group Discussions.
	CO4	Prepare their job interviews and be successful in them
	CO5	Apply adequate Soft Skills required for the workplace
Semester – VII		
MG8591 & Principles of Management	CO1	Summarize the evolution of management and Organizations.
	CO2	Classify the types of Planning and decision making methodologies.
	CO3	Explore the Organization structure and Human Resources activities.
	CO4	Compare the leadership skills, Motivation, behavior and communication for effective directing.
	CO5	Show the various controlling techniques to sustain standards in Organizations.



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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
CS8791 & Cloud Computing	CO1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
	CO2	Describe the key and enabling technologies that help in the development of cloud.
	CO3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models
	CO4	Identify the core issues of cloud computing such as resource management and security.
	CO5	Use current cloud technologies and Choose the appropriate technologies, algorithms and approaches for implementation.
OCH752 & Energy Technology	CO1	Understand the fundamentals of energy and its classification
	CO2	Illustrate conventional Energy sources with its merits and demerits
	CO3	Learn about Non- conventional Energy sources and its applications
	CO4	Identify biomass sources and develop design parameters for equipment to be used in Chemical process industries
	CO5	Understand energy conservation in process industries
OEE752 & Introduction to Renewable Energy Systems	CO1	Understand the various types of renewable energy sources
	CO2	Analyze the design and performance of IG,PMSG,SCIG AND DFIG
	CO3	Illustrate and investigate different power converters namely AC to DC,DC to DC and AC to AC converters for renewable energy sources
	CO4	Examine the investigation process of various operating modes of wind electrical generators and solar energy systems
	CO5	Create and investigate the maximum power point tracking algorithms
OBM752 & Hospital Management	CO1	Explain the principles of Hospital administration.
	CO2	Identify the importance of Human resource management.
	CO3	List various marketing research techniques.
	CO4	Identify Information management systems and its uses.



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	CO5	Understand safety procedures followed in hospitals
CS8082 & Machine Learning Techniques	CO1	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
	CO2	Discuss the decision tree algorithm and identify and overcome the problem of over fitting
	CO3	Discuss and use the back propagation algorithm and genetic algorithms to various problems
	CO4	Use the Bayesian concepts to machine learning
	CO5	Examine and suggest appropriate machine learning approaches for various types of problems
CS8091 & Big Data Analytics	CO1	Understand the Fundamental Concepts of Big Data and Analytics to solve complex engineering problems
	CO2	Analyze data by utilizing clustering and classification algorithms that meet the specify needs with appropriate consideration for the societal and environmental considerations
	CO3	Apply engineering fundamentals of different mining algorithms and recommendation systems for large volumes of data in multidisciplinary environments
	CO4	Perform Analysis and interpretation of data analytics on data streams to provide valid conclusions for various real time application problems
	CO5	Use NOSQL data management for big data and create visualizations for effective data analysis with modern engineering tools
GE8074 & Human Rights	CO1	Acquire the basic knowledge of human rights
	CO2	Understand the evolution and declaration of human rights
	CO3	Illustrate the laws and compliance of human rights
	CO4	Understand the Constitutional Provisions / Guarantees
	CO5	Know the National and State Human Rights Commission
HX8001 & Professional Readiness for Innovation , Employability and Entrepreneurship	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	Test the product and increment if necessary
	CO5	Document the whole process and deliver the system
CS8088 & Wireless Adhoc and Sensor Networks	CO1	Identify different issues in wireless ad hoc and sensor networks
	CO2	To analyze protocols developed for ad hoc and sensor networks
	CO3	Illustrate the application and challenges in Wireless Sensor Networks
	CO4	Understand the Transport Layer and QoS in Wireless Sensor Networks



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Elambalur, Perambalur – 621 220.

	CO5	To identify and understand security issues in ad hoc and sensor networks.
CS8711 & Cloud Computing Laboratory	CO1	Configure and demonstrate various virtualization tools such as VirtualBox, VMware workstation and execute simple C programs
	CO2	Design and deploy a web application in a PaaS environment
	CO3	Demonstrate how to simulate a cloud environment to implement new schedulers
	CO4	Summarize the procedure for file sharing and how to launch virtual machine using trystack
	CO5	Organize large datasets in a parallel environment
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		
CS8085 & Social Network Analysis	CO1	Ability to develop semantic web related applications.
	CO2	Ability to represent knowledge using ontology.
	CO3	Capability to Predict human behavior in social web and related communities.
	CO4	Capability to Visualize social networks.
	CO5	Ability to analyze the social network application.
CS8074 & Cyber Forensics	CO1	Express 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
GE8076 & Professional Ethics in Engineering	CO1	Illustrate the human values with regard to the individual life style for society.
	CO2	Define the role of ethics to the engineering field
	CO3	Describe how engineering is applied in association with ethics based on engineering experimentation
	CO4	Explain the engineering ethics based safety responsibilities and rights
	CO5	Discuss the global issues of professional ethics in engineering .
CS8080	CO1	Analyze UI, how People Search with the basics of Information Retrieval



ROEVER ENGINEERING COLLEGE

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Elambalur, Perambalur – 621 220.

& Information Retrieval Techniques	CO2	Comprehend information retrieval modeling principles, conduct query and document modeling, evaluate retrieval effectiveness,
	CO3	Apply appropriate method of classification or clustering
	CO4	Design and implement innovative features in a search engine, enhancing its functionality, user experience
	CO5	Build systems with the skills and knowledge necessary to design, implement, evaluate, and optimize recommender systems in the context of information retrieval
CS8078 & Green Computing	CO1	Explain the fundamentals of Green Computing.
	CO2	Illustrate the concept of Green Assets and Modeling.
	CO3	Examine the Green computing Grid Framework.
	CO4	Summarize the issues related with Green compliance.
	CO5	Develop the various case studies.
CS8811 & Project Work	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



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Elambalur, Perambalur – 621 220.



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING Course Outcome PG- Regulation 2017

Course Code & Course Name	Course outcome	
Semester I		
MA5160 & Applied Probability And Statistics	CO1	Basic probability axioms and rules and the moments of discrete and continuous random variables.
	CO2	Consistency, efficiency and unbiasedness of estimators, method of maximum likelihood estimation and Central Limit Theorem.
	CO3	Use statistical tests in testing hypotheses on data.
	CO4	Perform exploratory analysis of multivariate data, such as multivariate normal density, calculating descriptive statistics, testing for multivariate normality.
	CO5	The students should have the ability to use the appropriate and relevant, fundamental and applied Mathematical and statistical knowledge, methodologies and modern computational tools.
CP5151 Advanced Data Structures And Algorithms	CO1	Understand the basic principles and operations of data structures.
	CO2	Apply the concepts of advanced Trees and Graphs for solving problems effectively.
	CO3	Analyze the given scenario and choose appropriate Data Structure for solving Problems.
	CO4	Apply Algorithm for solving problems like sorting, Searching, insertion and deletion of data.
	CO5	Analyze the given scenario and choose appropriate Data Structure for solving Problems.
CP5152 Advanced Computer Architecture	CO1	Describe the principles of computer design.
	CO2	Compare the performance of different architectures.
	CO3	Improve application performance for different CPU architectures.
	CO4	Compare the performance of different architectures.
	CO5	Demonstrate concepts of parallelism in hardware/software
CP5153 Operating Systems Internals	CO1	Appreciate design issues and concepts underlying some of the well-known operating systems.
	CO2	Understand how any operating system functions as a middle layer between the hardware of a computer and the user programs and the various tasks involved in this
	CO3	Understand the theory of Linux design and operation.



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Elambalur, Perambalur – 621 220.

	CO4	Explain the history and origins of the Linux operating system. Understand the theory of Linux design and operation. Ability to be productive in a Linux environment.
	CO5	Implement basic Linux tools. Configure the Linux environment.
CP5154 Advanced Software Engineering	CO1	How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment
	CO2	An ability to work in one or more significant application domains
	CO3	Work as an individual and as part of a multidisciplinary team to develop and deliver quality software using UML diagrams.
	CO4	Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.
	CO5	Demonstrate an ability to use the techniques and tools necessary for engineering practice. Understand software testing approaches and the advantages of DevOps practices.
CP5191 & Machine Learning Techniques	CO1	Apply structured thinking to unstructured problems understand the basic theory Underlying machine learning.
	CO2	Able to formulate machine learning problems corresponding to different applications.
	CO3	Apply the algorithms to a real-world problem, optimize the models learned and report on the expected Accuracy that can be achieved by applying the models.
	CO4	Design and apply machine-learning algorithms.
	CO5	Understand different types of machine learning and map problems to different classes of machine learning algorithms.
CP5161 & Data Structures Laboratory	CO1	Ability to understand a systematic approach to organizing, writing and debugging programs
	CO2	Ability to implement linear and non-linear data structure operations
	CO3	Ability to solve problems implementing appropriate data structures
	CO4	Ability to implement sorting and searching algorithms using relevant data structures.
	CO5	Design and develop efficient algorithms with minimum complexity using design techniques.
Semester II		
CP5201 & Network Design And Technologies	CO1	Understand the practical approach to advanced network communication protocols.
	CO2	Understand network layers, structure/format and role of each network layer.
	CO3	Able to design and implement various network application such as data transmission between client and server, file transfer, real-time multimedia transmission.
	CO4	Understand <i>the fundamental aspects of wireless networks</i> .
	CO5	Understand the various features of 4G and 5G networks
CP5291 & Security Practices	CO1	Analyze and evaluate the cyber security needs of an organization.
	CO2	Determine and analyze software vulnerabilities and Security Solutions to reduce the risk of exploitation.
	CO3	Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics



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Elambalur, Perambalur – 621 220.

		software/tools.
	CO4	Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators
	CO5	Able to attain a through knowledge in the area of Privacy and Storage security and related Issues.
CP5292 Internet Of Things	CO1	Recognise the factors that contributed to the emergence of IoT
	CO2	Design and program IoT devices
	CO3	Use real IoT protocols for communication
	CO4	Secure the elements of an IoT device
	CO5	Design an IoT device to work with a Cloud Computing infrastructure.
CP5293 & Big Data Analytics	CO1	Understand Big Data and its analytics in the real world
	CO2	Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics
	CO3	Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm
	CO4	Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics
	CO5	Implement Big Data Activities using Hive
CP5092& Cloud Computing Technologies	CO1	Analyze the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
	CO2	Apply the fundamental concepts of virtualization techniques that serve in offering software, computation and storage services on the cloud
	CO3	Examine the technologies that enhance cloud computing such as execution environment virtualization, storage virtualization and distributed storage.
	CO4	Recognize the use of cloud in building IoT systems, sophisticated prediction and recommender systems and smart systems for healthcare, transportation and agriculture.
	CO5	Simulate and create cloud environments using cloudsim and open stack respectively.
CP5093 & Mobile and Pervasive Computing	CO1	Obtain a through understanding of Basic architecture and concepts of till Third Generation Communication systems.
	CO2	Explain the latest 4G Telecommunication System Principles
	CO3	Incorporate the pervasive concepts
	CO4	Implement the HCI in Pervasive environment.
	CO5	Work on the pervasive concepts in mobile environment
	CO1	Process big data using Hadoop framework



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CP5261 & Data Analytics Laboratory	CO2	Build and apply linear and logistic regression models
	CO3	Perform data analysis with machine learning methods
	CO4	Perform graphical data analysis
	CO5	Analyse big data using machine learning techniques such as SVM / Decision tree classification and clustering
CP5281 & 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		
CP5005 Software Quality Assurance And Testing	CO1	Perform functional and nonfunctional tests in the life cycle of the software product.
	CO2	Understand system testing and test execution process.
	CO3	Identify defect prevention techniques and software quality assurance metrics
	CO4	Apply techniques of quality assurance for typical applications
	CO5	Learn the techniques for quality assurance and applying for applications
CP5074 Social Network Analysis	CO1	Work on the internals components of the social network
	CO2	Model and visualize the social network
	CO3	Mine the behaviour of the users in the social network
	CO4	Predict the possible next outcome of the social network
	CO5	Apply social network in real time applications
CP5076 Information Storage Management	CO1	Select from various storage technologies to suit for required application.
	CO2	Apply security measures to safeguard storage & farm
	CO3	Analyse QoS on Storage
	CO4	Learn security aspects of storage & data center.
	CO5	Understand the storage architecture and available technologies
CP5311 Project Work I	CO1	Understand the way of how to write technical report and research paper at national & international level.
	CO2	Analyze the methods to solve the specific research problem.
	CO3	Develop strong communication skills to defend their work in front of technically qualified audience.
	CO4	Develop interpersonal skill to deal with people working in diversified field.
	CO5	Develop effective communication skills for presentation of project related activities and prepare reports and examination following professional ethics



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Semester IV

CP5411& Project Work Phase – 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