

**Department of Computer Science and Engineering**  
**Program Outcomes (POs) & Program Specific Outcomes (PSOs)**

<b>Program Outcomes (POs)</b> <b>Computer Science and Engineering graduates will be able to:</b>	
<b>PO1</b>	<b>Engineering Knowledge:</b>
	Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to find the solution of complex engineering problems in the major areas of Computer Science and Engineering.
<b>PO2</b>	<b>Problem Analysis:</b>
	Identify, formulate, research literature and analyze complex Computer Science engineering problems and reaching substantiated conclusions using the first principles of mathematics, natural sciences and engineering sciences.
<b>PO3</b>	<b>Design / Development of Solution:</b>
	Design solutions for complex Computer Science and Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
<b>PO4</b>	<b>Conduct investigations of complex problems:</b>
	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
<b>PO5</b>	<b>Modern Tool Usage:</b>
	Create, select, and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with the understanding of limitations.
<b>PO6</b>	<b>The Engineer and Society:</b>
	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Computer Science and Engineering practice.
<b>PO7</b>	<b>Environment and Sustainability:</b>
	Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and the need for sustainable development.
<b>PO8</b>	<b>Ethics:</b>
	Apply ethical principles and commit to professional ethics and responsibilities and norms of the Computer Science and Engineering practice.
<b>PO9</b>	<b>Individual and team work:</b>
	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
<b>PO10</b>	<b>Communication:</b>

<b>Program Outcomes (POs)</b> <b>Computer Science and Engineering graduates will be able to:</b>	
	Communicate effectively on complex engineering activities with the engineering community and society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
<b>PO11</b>	<b>Project Management and Finance:</b>
	Demonstrate the knowledge and understanding of the engineering and the management principles and apply these to one's own work, as a member and a leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12</b>	<b>Life-Long Learning skill:</b>
	Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

<b>Program Specific Outcomes (PSOs)</b>	
<b>PSO 1</b>	Applying the mathematical and the computing knowledge to identify and provide solutions for solving computing problems.
<b>PSO 2</b>	Involving enthusiastically in software development, software testing, storage, computing and business intelligence sectors.
<b>PSO 3</b>	Use their technical expertise in the latest technologies and update their knowledge continuously in Computer Science and Engineering to excel in their career.

**Department of Computer Science and Engineering**

**Course Outcomes (COs)**

**YEAR:I**

**SEMESTER:I**

**SUBJECT: Communicative English**

CO1	At the end of the course, learners will be able to: Read articles of a general kind in magazines and newspapers.
CO2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
CO3	Comprehend conversations and short talks delivered in English.
CO4	Write short essays of a general kind and personal letters and emails in English.
CO5	Students should become adept in their use of written word for informational, possessive and creative purposes.

**SUBJECT: Engineering Mathematics**

CO1	Use both the limit definition and rules of differentiation to differentiate functions and apply differentiation to solve maxima and minima problems
CO2	Demonstrate the tools for solving Partial differential equations and maxima, minima for functions of several variables
CO3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus and Evaluate integrals using techniques of integration, such as substitution, partial fraction and integration by parts
CO4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables
CO5	Apply various techniques in solving differential equations

**SUBJECT: Engineering Chemistry**

CO1	Interpret basics of hardness of water, boiler feed water problems and its treatment process in specific reverse osmosis process
CO2	Interpret basics of hardness of water, boiler feed water problems and its treatment process in specific reverse osmosis process
CO3	Illustrate the concepts of phase rule and the properties of alloys
CO4	Identify the types of fuels and their usage in the life span
CO5	Plan for renewable energy utilization in the twenty first century

**SUBJECT: Engineering Graphics**

CO1	Students will be able to familiarize with the fundamentals and standards of engineering graphics
CO2	Students will be able to perform freehand sketching of basic geometrical constructions and multiple views of objects
CO3	Students will be able to draw orthographic projections of lines and plane surfaces
CO4	Students will be able to draw projections of solids and development of surfaces
CO5	Students will be able to visualize and project isometric and perspective sections of simple solids

**SUBJECT: Engineering Physics**

CO1	Students will be able to acquire the knowledge of elastic materials and illustrate the applications in various fields
CO2	Describe the basics of oscillatory physics, working of laser and propagation of light in optical fibers
CO3	Describe the knowledge of quantifying the thermal properties of materials and students will be able analyze the materials based on thermal conductivity
CO4	Summarize the importance of free electrons in determining the properties of metals to understand the concept of Fermi energy and apply the knowledge of quantum mechanics
CO5	Students will be able to recognize various planes in a crystal and describe the structure determination

**SUBJECT: Problem Solving and Python Programming**

CO1	Develop algorithmic solutions to simple computational problems.
CO2	Read, write, execute by hand simple Python programs
CO3	Structure simple Python programs for solving problems.
CO4	Decompose a Python program into functions.
CO5	Represent compound data using Python lists, tuple and dictionaries.
CO6	Read and write data from/to files in Python Programs

**SUBJECT: Physics Laboratory**

CO1	Understand the quantitative chemical analysis of water quality related parameters such as alkalinity and hardness
CO2	DO content in water eco system
CO3	Permissible limit of chloride content in potable water
CO4	Apply redox reaction to analyse iron content through potentiometric titration
CO5	Make use of neutralization reaction by instrumental analysis

**SUBJECT: Chemistry Laboratory**

CO1	Interpret basics of hardness of water, boiler feed water problems and its treatment process in specific reverse osmosis process.
CO2	Distinguish the different adsorption techniques, catalysis along with Michaelis-Menten equation
CO3	Illustrate the concepts of phase rule and the properties of alloys.
CO4	Identify the types of fuels and their usage in the life span.
CO5	Plan for renewable energy utilization in the twenty first century

**SUBJECT: Problem Solving and Python Programming Laboratory**

CO1	Write, test, and debug simple Python programs.
CO2	Implement Python programs with conditionals and loops.
CO3	Develop Python programs step-wise by defining functions and calling them.
CO4	Use Python lists, tuples, dictionaries for representing compound data.
CO5	Read and write data from/to files in Python.

## SEMESTER:II

### SUBJECT: Technical English

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

### SUBJECT: Engineering Mathematics II

CO1	Matric Algebra: Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices
CO2	Vector Calculus: Gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification
CO3	Analytic functions and conformal mappings
CO4	Complex integration, Taylor's and Laurent's series and Residue theorems
CO5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients

### SUBJECT: Physics for information science

CO1	Acquire the knowledge of conducting materials and illustrate the application in various fields
CO2	Gain knowledge on basics of semiconductor physics and its applications
CO3	Classify the properties of magnetic materials
CO4	Understand on the function of optical materials for data storage techniques
CO5	Recognize various structure in quantum and describe the structure determination

**SUBJECT: Environmental Science and Engineering**

CO1	Analyse relationship between biotic and abiotic components, bio diversity and its functions
CO2	Apply knowledge to solve environmental problems
CO3	Interpret about the natural resources and its conservation and the features of the earth's interior and surface
CO4	Compare the role of human beings in solving social issues
CO5	Understand about impacts of exponential growth of population

**SUBJECT: Basic Electrical, Electronics and Measurement Engineering**

CO1	Summarize the fundamental laws, theorems of electrical circuits and also to analyze them
CO2	Analyze the basic principles and operation of electrical machines
CO3	Describe the different energy sources, protective devices and their field applications
CO4	Investigate the fundamentals of electronic circuits
CO5	Discuss the principles and operation of measuring instruments and transducers

**SUBJECT: Programming In C**

CO1	Develop simple applications in C using basic constructs
CO2	Design and implement applications using arrays and strings
CO3	Develop and implement applications in C using functions and pointers.
CO4	Develop applications in C using structures.
CO5	Design applications using sequential and random access file processing.

**SUBJECT: C Programming Laboratory**

CO1	Develop C programs for simple applications making use of basic constructs
CO2	Develop C programs for simple applications making use of arrays and strings.
CO3	Develop C programs involving recursion and functions.
CO4	Develop C programs involving pointers and structures.
CO5	Design applications using sequential and random access file processing.

**SUBJECT: Engineering Practices Laboratory**

CO1	Fabricate carpentry components and pipe connections including plumbing works
CO2	Use welding equipments to join the structures
CO3	Carry out the basic machining operations
CO4	Make the models using sheet metal works
CO5	Illustrate on centrifugal pump and Air conditioner. Students will be able to demonstrate smithy, foundry and fittings

**YEAR:II**

**SEMESTER: III**

**SUBJECT: 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.

**SUBJECT: DIGITAL PRINCIPLES AND SYSTEM DESIGN**

CO1	Simplify Boolean functions using K-Map.
CO2	Design and Analyze Combinational and Sequential Circuits.
CO3	Design and Analyze synchronous and asynchronous sequential circuits
CO4	Implement designs using Programmable Logic Devices.
CO5	Write HDL code for combinational and sequential circuits.

**SUBJECT: DATA STRUCTURES**

CO1	Implement abstract data types for linear data structures.
CO2	Apply the different linear and non-linear data structures to problem solutions.
CO3	Critically analyze the various sorting algorithms.
CO4	Analyze the usage of different Searching techniques.
CO5	Implement the Heaping methods for problem solving.

**SUBJECT: OBJECT ORIENTED PROGRAMMING**

CO1	Develop Java programs using OOP principles
CO2	Develop Java programs with the concepts inheritance and interfaces
CO3	Build Java applications using exceptions and I/O streams
CO4	Develop Java applications with threads and generics classes
CO5	Develop interactive Java programs using swings

**SUBJECT: COMMUNICATION ENGINEERING**

CO1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world
CO2	Apply analog and digital communication techniques
CO3	Use data and pulse communication techniques
CO4	Analyze Source and Error control coding
CO5	Students will be able to identify the key activities in managing new communication techniques.

**SUBJECT: Data Structures Laboratory**

CO1	Write functions to implement linear and non-linear data structure operations.
CO2	Suggest appropriate linear / non-linear data structure operations for solving a given problem.
CO3	Appropriately use the linear / non-linear data structure operations for a given problem.
CO4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.

**SUBJECT: OBJECT ORIENTED PROGRAMMING LABORATORY**

CO1	Develop and implement Java programs for simple applications that make use of classes
CO2	Develop and implement Java programs with array list

CO3	Design applications using file processing
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**SUBJECT: DIGITAL LABORATORY**

CO1	Implement simplified combinational circuits using basic logic gates
CO2	Implement combinational circuits using MSI devices.
CO3	Implement sequential circuits like registers and counters
CO4	Simulate combinational circuits using HDL
CO5	Simulate sequential circuits using HDL

**SUBJECT: INTERPERSONAL SKILLS/LISTENING AND SPEAKING**

CO1	Listen and respond appropriately
CO2	Participate in group discussions
CO3	Make effective presentations
CO4	Participate confidently and appropriately in conversations both formal and informal

## SEMESTER: IV

### SUBJECT: PROBABILITY AND QUEUING 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

### SUBJECT: COMPUTER ARCHITECTURE

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

### SUBJECT: DATABASE MANAGEMENT SYSTEMS

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

**SUBJECT: DESIGN AND ANALYSIS OF ALGORITHMS**

CO1	Design algorithms for various computing problems.
CO2	Analyze the time and space complexity of algorithms.
CO3	Critically analyze the different algorithm design techniques for a given problem.
CO4	Modify existing algorithms to improve efficiency.
CO5	Design algorithms for branch and bound and backtracking technique.

**SUBJECT: OPERATING SYSTEMS**

CO1	Understand the basic concepts and functions of operating systems.
CO2	Understand processes and threads Analyze various scheduling algorithms and concept of deadlock
CO3	Compare and contrast various memory management schemes.
CO4	Understand the functionality of file systems
CO5	Perform administrative tasks on Linux Servers and compare iOS and Android operating systems.

**SUBJECT: SOFTWARE ENGINEERING**

CO1	Students will be able to compare different process models.
CO2	Students have gained knowledge about the concepts of requirements engineering and Analysis Modelling.
CO3	Students will be able to apply systematic procedure for software design and deployment
CO4	The students will be able to compare and contrast the various testing and maintenance
CO5	Students will be able to identify the key activities in managing a software project.

**SUBJECT: DATABASE MANAGEMENT SYSTEMS LABORATORY**

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

**SUBJECT: OPERATING SYSTEMS LABORATORY**

CO1	Understand the basic concepts and functions of operating systems.
CO2	Understand processes and threads Analyze various scheduling algorithms and concept of deadlock.
CO3	Compare and contrast various memory management schemes.
CO4	Understand the functionality of file systems.
CO5	Perform administrative tasks on Linux Servers and compare iOS and Android operating systems.

**SUBJECT: ADVANCED READING AND WRITING**

CO1	Listen and respond appropriately.
CO2	Participate in group discussions
CO3	Make effective presentations
CO4	Participate confidently and appropriately in conversations both formal and informal

**YEAR: III**

**SEMESTER: V**

**SUBJECT: ALGEBRA AND NUMBER THEORY**

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

**SUBJECT: COMPUTER NETWORKS**

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

**SUBJECT: MICROPROCESSOR AND MICROCONTROLLER**

CO1	Develop C programs for simple applications making use of basic constructs.
CO2	Develop C programs for simple applications making use of arrays and strings.
CO3	Develop C programs involving recursion and functions.
CO4	Develop C programs involving pointers and structures.
CO5	Design applications using sequential and random access file processing.

**SUBJECT: THEORY OF COMPUTATION**

CO1	Illustrate the finite state machine and regular expression.
CO2	Explain the types of grammar.
CO3	Construct the push down automata for the language.
CO4	Outline the concept of Turing machine.
CO5	Demonstrate the decidability and un-decidability of various

**SUBJECT: OBJECT ORIENTED ANALYSIS AND DESIGN**

CO1	To design and implement projects using OO concepts
CO2	To use the UML analysis and design diagrams
CO3	To apply appropriate design patterns
CO4	To create code from design
CO5	To compare and contrast various testing techniques

**SUBJECT : AIR POLLUTION AND CONTROL ENGINEERING ( OPEN ELECTIVE I)**

CO1	To understand the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management.
CO2	To identify, formulate and solve air and noise pollution.
CO3	To design stacks and particulate air pollution control devices to meet applicable standards.
CO4	To select control equipments.
CO5	To ensure quality, control and preventive measures.

**SUBJECT: MICROPROCESSOR AND MICROCONTROLLER LABORATORY**

CO1	To Write ALP Programmes for fixed and Floating Point and Arithmetic operations.
CO2	To Interface different I/Os with processor..
CO3	To generate waveforms using Microprocessors.
CO4	To execute Programs in 8051.
CO5	To explain the difference between simulator and Emulator.

**SUBJECT: OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY**

CO1	Design and implement projects using OO concepts
CO2	Use the UML analysis and design diagrams.
CO3	Apply appropriate design patterns
CO4	Create code from design.
CO5	Compare and contrast various testing techniques.

**SUBJECT: NETWORKS LABORATORY**

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

**SEMESTER : VI**

**SUBJECT: INTERNET PROGRAMMING**

CO1	The student should be able to implement Java Programs.
CO2	The student should be able to create a basic website using HTML and Cascading Style Sheets.
CO3	The student should be able to design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
CO4	The student should be able to design and Implement simple web page in PHP, and to present data in XML format.
CO5	The student should be able to design and Implement server side programs using Servlets and JSP.
CO6	The student should be able to design rich client presentation using AJAX.

**SUBJECT: ARTIFICIAL INTELEGENCE**

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

**SUBJECT: MOBILE COMPUTING**

CO1	Explain the basics of mobile telecommunication systems
CO2	Illustrate the generations of telecommunication systems in wireless networks
CO3	Determine the functionality of MAC network layer and identify routing protocol for a given Ad-hoc network
CO4	Explain the functionality of Transport and Application layers
CO5	Develop a mobile application using Android /blackberry /iOS/ windows SDK.

**SUBJECT: COMPILER DESIGN**

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

**SUBJECT: DISTRIBUTED SYSTEMS**

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

**SUBJECT: SOFTWARE TESTING ( PROFESSIONAL ELECTIVE I)**

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.
CO4	Document test plans and test cases designed.
CO5	Use of automatic testing tools.

**SUBJECT: INTERNET PROGRAMMING LABORATORY**

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

**SUBJECT: MOBILE APPLICATION DEVELOPMENT LABORATORY**

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

**YEAR: IV**

**SEMESTER: VII**

**SUBJECT: PRINCIPLES OF MANAGEMENT**

CO1	Outlines the evolution of Management concepts.
CO2	Apply the functions and principles of planning process in management.
CO3	Apply the different principles of organizing process in management.
CO4	Understand the functions and principles of directing process in management.
CO5	Understand the principles of controlling process in management.

**SUBJECT: CRYPTOGRAPHY AND NETWORK SECURITY**

CO1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
CO2	Learn 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	Be able to install and use current cloud technologies.
CO5	Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud

**SUBJECT: CLOUD COMPUTING**

CO1	Understand various security trends and Cryptographic Techniques
CO2	Interpret the functionalities of public key encryption and number theory concepts.
CO3	Analyze the functions of authentication techniques and hashing.
CO4	Learn network security tools and authentication applications.
CO5	Understand the concepts of system level security, intruders and firewall standards.

## **SUBJECT: SOFTWARE PROJECT MANAGEMENT**

CO1	Students will be able to outline the need for software project management
CO2	Students will be able to describe different project life cycle and effort estimation methods
CO3	Students will be able to understand the major considerations for enterprise integration and deployment.
CO4	The students have gained knowledge about project management principles while developing software.
CO5	Students will be able to identify the right persons for the right job easily.

## **SUBJECT: HUMAN COMPUTER INTERACTION**

CO1	Design effective dialog for HCI.
CO2	Design effective HCI for individuals and persons with disabilities.
CO3	Assess the importance of user feedback.
CO4	Explain the HCI implications for designing multimedia /
CO5	e-commerce/ e-learning Web sites

## **SUBJECT: SYSTEM ENGINEERING**

CO1	The Student must be able to apply systems engineering principles or make decision for optimization
CO2	Hence an understanding of the systems engineering discipline and be able to use the core principles and processes for designing effective system.

## **SUBJECT: CLOUD COMPUTING LABORATORY**

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

**SUBJECT : SECURITY LABORATORY**

CO1	Develop programs in classical cipher techniques.
CO2	Create a design of modern cipher algorithms.
CO3	Gain knowledge about network security tools.
CO4	Install root kits for security.

**YEAR: IV**

**SEMESTER: VIII**

**SUBJECT: INFORMATION RETRIEVAL TECHNIQUES**

CO1	Apply information retrieval models
CO2	Design Web Search Engine
CO3	Use Link Analysis
CO4	Use Hadoop and Map Reduce.
CO5	Apply document text mining techniques

**SUBJECT: PROFESSIONAL ETHICS IN ENGINEERING**

CO1	Students understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.
CO2	The students will understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
CO3	The students will understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
CO4	The students will be aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
CO5	The students will acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives