COURSE OUTCOMES

B.TECH. CSE

(2018 BATCH ONWARDS)

Subject Code: PCCS-101

Subject Name: Object Oriented Programming

CO#	Course Outcomes (CO)
1	Develop an understanding of object oriented programming principles and object oriented design.
2	Use of operators, control structures, and data types with their methods.
3	Make use of arrays and string handling methods.
4	Design user defined functions, modules, and packages.
5	Investigate and implement polymorphism, inheritance, dynamic memory management and exception handling techniques to solve problems.
6	Create and handle files in object oriented programming.

Subject Code: PCCS-102

Subject Name: Computer Networks

CO#	Course Outcomes (CO)
1	Develop an understanding of modern network architectures from a design and performance.
2	Understand the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
3	Analyze various protocols to develop network related applications for future needs.
4	Apply the knowledge of different network designs and various logical models of networking to solve problems of communication over different medium.
5	Utilize knowledge of routing and congestion control algorithms to overcome various issues over different complex networking structures.
6	Discuss algorithms for medium access sub layer to avoid collision and error problems over different types of networks.

<p style="text-align:center">Subject Code: ESCS-101</p>
<p style="text-align:center">Subject Name: Digital Electronics</p>

CO#	Course Outcomes (CO)
1	Understand the relationships between Boolean algebra, combinational logic, and sequential logic.
2	Solve combinational logic problem formulation and logic optimization.
3	Construct digital logic circuits using gates and state-of-the art MUX, ROM, PLA and PAL units
4	Create profound analysis and design of synchronous and asynchronous sequential circuits
5	Design and inspect digital circuits to meet desired needs within realistic constraints.
6	Develop skills to build and troubleshoot digital circuits.

<p style="text-align:center">Subject Code: BSCS-101</p>
<p style="text-align:center">Subject Name: Mathematics III</p>

CO#	Course Outcomes (CO)
1	Understand Partial Differential Equations and their solutions techniques.
2	Understand Analytic functions and evaluation of derivative of functions of complex variable.
3	Evaluate integration of functions of complex variables.
4	Analyze probability spaces, random variables and different probability distribution.
5	Fit the given data into best fit curve.
6	Apply statistical methods for analyzing experimental data.

<p style="text-align:center">Subject Code: HSMCS-101</p>
<p style="text-align:center">Subject Name: Human values and Professional Ethics</p>

CO#	Course Outcomes (CO)
1	Discriminate between valuable and superficial in the life.
2	Encourages students to discover what they consider valuable.
3	Understand the value required to be a good human being and apply these values in real life.
4	Evaluate and modify the behavior.
5	Understand fundamental and organizational duties and protect individual and social rights.
6	Know about professional behavior, values and guiding principles.

Subject Code: LPCCS-101

Subject Name: Object Oriented Programming Laboratory

CO#	Course Outcomes (CO)
1	Compare and contrast object oriented programming paradigm with procedure oriented programming paradigm.
2	Design and implement efficient programs to solve computing problems in a high level programming language.
3	Utilize knowledge of different object oriented principles to identify and apply the appropriate techniques in problem solving.
4	Apply the knowledge acquired to troubleshoot programming related problems.
5	Utilize the knowledge and principles of object oriented programming while working in multidisciplinary teams.
6	Design and develop projects using object oriented tools and techniques.

Subject Code: LPCCS-102

Subject Name: Computer Networks Laboratory

CO#	Course Outcomes (CO)
1	Analyze and configure protocols concerning various network technologies over different mediums and layers.
2	Apply the knowledge of different network components, transmission mediums and tools to solve various problems of communication.
3	Design and develop different network design and logical models of networking to solve network related problems.
4	Utilize knowledge of modern network simulation tools to propose solution for efficient working of networks for real world problems.
5	Make use of various troubleshooting methods to overcome networking problems.
6	Function in multidisciplinary teams through groups while working in different network environments with the help of resource sharing.

Subject Code: LESCS-101

Subject Name: Digital Electronics Laboratory

CO#	Course Outcomes (CO)
1	Identify and apply the knowledge of logic gates and integrated circuits to solve related problems.
2	Design and implement combinational & sequential circuits for engineering problems.
3	Choose and compare the usage of appropriate techniques and tools to solve digital circuits problem.
4	Apply the knowledge acquired to demonstrate the usage of digital circuits in computers at large.
5	Utilize the knowledge and principles of digital electronics while working in multidisciplinary team formation.
6	Design simple digital systems based on these digital abstractions, using the "digital paradigm".

Subject Code: PRCS-101

Subject Name: Seminar and Technical Report Writing for Engineers

CO#	Course Outcomes (CO)
1.	Understand the basic components of definitions, descriptions, process explanations, and other common forms of technical writing.
2.	Analyze and critique various speech techniques, content, purpose, strengths and weaknesses.
3.	Reference and quote correctly, and not infringe copyright.
4.	Practice the unique qualities of professional rhetoric, writing and presentation style.
5.	Use a technical report to communicate information.
6.	Follow the stages of the writing process (prewriting/writing/rewriting) and apply them to technical and workplace writing tasks.

Subject Code: PCCS-103

Subject Name: Discrete Mathematics

CO#	Course Outcomes (CO)
1	Apply knowledge of mathematical proofs, techniques and algorithms to solve complex engineering problem.
2	Prove elementary properties of modular arithmetic and explain their application in analysis and interpretation of data and synthesis of information to provide valid conclusions.
3	Create, select and apply appropriate techniques to model real world problems using graphs.
4	Identify and formulate solutions of engineering problems related to counting and probability theory.
5	Utilize the importance of discrete structures towards simulation of problems in multidisciplinary environments.
6	Formulate a logical statement in terms of a symbolic expression and evaluate the truth value of compound statement.

Subject Code: PCCS-104

Subject Name: Computer Architecture and Microprocessors

CO#	Course Outcomes (CO)
CO1	Identify computer systems, memory organization, Microprocessor and assembly language programming.
CO2	Clarify instruction formats, RISC and CISC architecture and different addressing Modes.
CO3	Solve basic binary math operations by using the instructions of microprocessor.
CO4	Compare between pipelining and parallelism.
CO5	Design structured, well commented, understandable assembly language programs to provide solutions to real-world problems.
CO6	Classify the trends and developments of microprocessor technology.

Subject Code: PCCS-105
Subject Name: Operating Systems

CO#	Course Outcomes (CO)
1	Understand the mechanisms of OS to handle processes and threads and their communication.
2	Compare and contrast the mechanisms involved in memory management techniques
3	Use the components of Operating System in OS design
4	Evaluate different scheduling Techniques.
5	Investigate basic concepts towards process synchronization and related issues.
6	Understand the structure and organization of file system.

Subject Code: PCCS-106
Subject Name: Data Structures

CO#	Course Outcomes (CO)
1	Apply knowledge of statistics and programming skills to solve complex engineering problems related to data structures.
2	Make use of research based knowledge to identify the appropriate data structure and provide better solution to reduce space and time complexity.
3	Identify, formulate and analyse data structure to develop skills and understand their applications to perform operations on it.
4	Design appropriate algorithm for autonomous realization of sub-programs to model complex engineering activities.
5	Demonstrate various methods of organizing large amounts of data and recognize systematic way to retrieve data and solve problems.
6	Formulate new solutions for programming problems or improve existing code using learned algorithms and data structures.

Subject Code: PCCS-107

Subject Name: Software Engineering

CO#	Course Outcomes (CO)
1	Plan a software engineering process life cycle, including the specification, design, and implementation.
2	Elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project.
3	Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.
4	Develop the code from the design and effectively apply relevant standards for quality management and practice.
5	Formulate a testing strategy for a software system, employing techniques such as unit testing, test driven development and functional testing.
6	Identify modern engineering tools necessary for software reengineering and reverse engineering.

Subject Code: LPCCS-103

Subject Name: Computer Architecture and Microprocessors Laboratory

CO#	Course Outcomes (CO)
1	Utilize the concept of binary & hexadecimal number systems including computer arithmetic.
2	Demonstrate the error detection & correction mechanism in computer architecture.
3	Understand the functional units of the processor such as the register file and arithmetic logical unit.
4	Examine the fundamentals of assembly language programming.
5	Understand the concept of computer arithmetic instruction set by designing code for arithmetic, logical and data transfer operations.
6	Solve basic binary math operations by using the instructions of microprocessor.

Subject Code: LPCCS-104

Subject Name: Operating Systems Laboratory

CO#	Course Outcomes (CO)
1	Analyse the services, architectures and principles used in the design of modern operating systems.
2	Execute Linux commands for files and directories, creating and viewing files, File comparisons and Disk related commands.
3	Utilize the concept of virtualization for creating a virtual machine and installing operating system on virtual machine.
4	Demonstrate shell programming by using shell variables and shell keywords for automated system tasks.
5	Identify the key characteristics of multiple approaches used for the design and development of the operating system.
6	Apply system commands for performing the file manipulation, program execution, and printing text.

Subject Code: LPCCS-105

Subject Name: Data Structures Laboratory

CO#	Course Outcomes(CO)
1	Apply knowledge of mathematics and programming skills to implement and analyze different data structures.
2	Evaluate and analyze the time and space complexity of linear and non linear data structures.
3	Design and implement efficient algorithms to solve computing problems in a high level programming language.
4	Utilize knowledge of different data structures to identify and apply the appropriate data structures to solve a real world problem.
5	Compare and analyze different solutions of complex engineering activities with an understanding of their advantages and limitations.
6	Developing an awareness of the data structure for storing data and handling various operations on different applications in the broadest context of technology change.

Subject Code: MCCS-101

Subject Name: Environmental Sciences

CO#	Course Outcomes (CO)
1	Measure environmental variables and interpret results.
2	Evaluate local, regional and global environment topics related to resource use and management.
3	Propose solutions to environmental problems related to resource use and management.
4	Interpret the results of scientific studies of environmental problems.
5	Describe threats to global biodiversity, their implications and potential solutions.

Subject Code: PCCS-108

Subject Name: Artificial Intelligence

CO#	Course Outcomes(CO)
1.	Understand the concept of Artificial Intelligence, Agents, their types and structure.
2.	Apply and analyze search strategies to solve the informed and uninformed problems.
3.	Design and evaluate intelligent expert models for perception and prediction from intelligent environment.
4.	Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.
5.	Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area.
6.	Examine the issues involved in knowledge bases, reasoning systems and planning.

Subject Code: PCCS-109

Subject Name: Database Management Systems

CO#	Course Outcomes(CO)
1	Analyze the Information Systems as socio-technical systems, its need and advantages as compared to traditional file based systems.
2	To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
3	Analyze Database design using E-R data model by identifying entities, attributes, relationships, generalization and specialization along with relational algebra.
4	To understand and use data manipulation language to query, update, and manage a database.
5	Apply and create Relational Database Design process with Normalization and De-normalization of data.
6	To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency.

Subject Code: PCCS-110

Subject Name: Formal Language and Automata Theory

CO#	Course Outcomes(CO)
1	Apply the knowledge of mathematics and statistics to solve complex engineering problems related to automata theory.
2	Identify, formulate and analyze uses and Constraints of various computational models used in engineering practice.
3	Make use of research-based knowledge to abstract the models of computing and their powers to recognize the grammars.
4	Design and evaluate abstract machines that demonstrate the properties of physical machines and be able to specify the possible inputs, processes and outputs of these machines.
5	Compare and analyze different computational models including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	Recognize and comprehend formal reasoning about machines and languages to engage in independent and life-long learning in the broadest context of technological change.

Subject Code: PCCS-111

Subject Name: Design and Analysis of Algorithms

CO#	Course Outcomes(CO)
1	Understand and learn the fundamental techniques for designing algorithms.
2	Learn various advanced techniques to design algorithms for solving complex problems.
3	Design the algorithms using basic and advanced algorithm design techniques.
4	Identify and design various existing algorithms based on advanced techniques.
5	Analyze the algorithms based on time and space complexity to find optimal algorithm for a given problem.
6	Categorize various problems based on the complexity and properties of algorithms that solves these problems.

Subject Code: LPCCS-106

Subject Name: Artificial Intelligence Laboratory

CO#	Course Outcomes(CO)
1	Design and implement efficient Uninformed search techniques to solve problems.
2	Apply the knowledge of different informed search to identify and implement the appropriate techniques in problem solving
3	Utilize knowledge and techniques of game playing to develop single player game.
4	Handle uncertainty by designing the Bayesian network and inferring from the given data.
5	Utilize the knowledge and techniques of Artificial Intelligence while working in multidisciplinary teams.
6	Design and develop projects using Artificial Intelligence tools and techniques.

Subject Code: LPCCS-107

Subject Name: Database Management Systems Laboratory

CO#	Course Outcomes(CO)
1	Understand, analyze and apply common SQL statements including DDL, DML and DCL statements to perform different operations.
2	Design different views of tables for different users and to apply embedded and nested queries.
3	Design and implement a database for a given problem according to well known design principles that balance data retrieval performance with data consistency.
4	Demonstrate and understand relational algebra in Database which is helpful to design related database software components.
5	Identify the user requirements from a typical business situation, and to document them.
6	Emphasize on team work and developing database applications using modern database tools

Subject Code: LPCCS-108

Subject Name: Design and Analysis of Algorithms Laboratory

CO#	Course Outcomes(CO)
1	Construct algorithms using basic design techniques for searching, sorting and graph algorithms.
2	Design algorithm using advanced techniques for solving complex problems.
3	Identify the given problem and formulate and design algorithm for solving given problem.
4	Use modern engineering tools and latest programming language to implement the designed algorithms.
5	Apply knowledge and function on multi-disciplinary teams through mini projects based on various problems.
6	Analyse the performance of various algorithms to choose the optimum algorithm

Subject Code: PCCS-112

Subject Name: Compiler Design

CO#	Course Outcomes(CO)
1.	Apply knowledge of system programming and mathematics to solve problems related to language translation.
2.	Identify, formulate and solve engineering problems in the area of language translation and compiler design.
3.	Formulate machine code by considering the system design components and functionalities involved in compilation.
4.	Inspect runtime structure used to represent constructs of programming language during compilation process.
5.	Use of compiler phases to develop an understanding of their use in building tools used for engineering practice.
6.	Developing an awareness of the functionality and complexity of modern compilers to engage in independent and life-long learning in the broadest context of technological change.

Subject Code: PCCS-113

Subject Name: Computer Graphics

CO#	Course Outcomes (CO)
1.	Apply the concepts of mathematical foundations and programming to solve diverse problems related to computer graphics.
2.	Compare and contrast various computer graphic algorithms and their suitability to real world problems.
3.	Utilize models for transformation of 2D and 3D objects.
4.	Identify the areas of computer graphics to apply advance algorithmic techniques for changing the formations of geometrical objects.
5.	Apply mathematics and physics in the design and development of graphics applications.
6.	Justify the application of computer graphics concepts in the development of computer games, information visualization, and business applications.

Subject Code: PCCS-114

Subject Name: Machine Learning

CO#	Course Outcomes(CO)
1.	Implement probability concepts in learning problems with hypothesis and version spaces.
2.	Illustrate the features and algorithms of machine learning with real world problems.
3.	Characterize the machine learning algorithms as supervised learning and unsupervised learning and apply and analyze the various algorithms of supervised and unsupervised learning.
4.	Analyze the concept of neural networks for learning linear and non-linear activation functions.
5.	Apply the concepts of Bayesian analysis from probability models and methods.
6.	Explain and design genetic algorithms for engineering problems with their analysis using evaluation measures.

Subject Code: PCCS-115

Subject Name: Cyber Security

CO#	Course Outcomes (CO)
1	Analyze and illustrate the security policies, as well as protocols to implement security features.
2	Analyze the network and system attacks, defences against them.
3	Incorporate the approaches for risk management and needful practices.
4	Classify the principles of web security.
5	Determine computer networks and examine secure software practices.
6	Design key terms and concepts in cyber security, protect intellectual property and decrease cyber-crimes.

Subject Code: LPCCS-109
Subject Name: Computer Graphics Laboratory

CO#	Course Outcomes(CO)
1	Apply mathematics and logic to develop computer programs for elementary graphic operations.
2	Implement scan conversion problems using a programming language.
3	Outline the concepts of different type of geometric transformation of objects in 2D and 3D.
4	Implement clipping and filling techniques for modifying an object.
5	Gain experience in creating interactive graphics applications using one or more graphics application programming interfaces.
6	Develop scientific and strategic approach to solve complex problems in the domain of computer graphics.

Subject Code: LPCCS-110
Subject Name: Machine Learning Laboratory

CO#	Course Outcomes(CO)
1.	Develop, analyze and visualize the implementation of machine learning algorithms
2.	Design and develop various algorithms for specific problems with appropriate datasets
3.	Analyze and identify the need for machine learning techniques for specific domain
4.	Develop solutions of real time problems with the prediction and visualization
5.	Apply and analyze Genetic Algorithms for optimization of engineering solutions
6.	Develop and analyze Genetic Algorithms for optimization of engineering solutions

Subject Code: PECS-101

Subject Name: Software Project Management

CO#	Course Outcomes(CO)
1.	Understand and apply the activities involved in the management of software projects.
2.	Analyse the various software development environments and risk management.
3.	Develop and apply the key strategies to monitor, control and quality assurance of software projects.
4.	Select the appropriate planning and estimation models to better evaluate the software projects.
5.	Create a strong working knowledge of ethics and professional responsibility.
6.	Develop effective organisational, leadership and change skills for managing projects, teams and stakeholders.

Subject Code: PECS-102

Subject Name: Software Testing and Quality Assurance

CO#	Course Outcomes(CO)
1.	Test the software by applying testing techniques to deliver a product free from bugs.
2.	Investigate the scenario and to select the proper testing technique.
3.	Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics.
4.	Test the software by applying testing techniques to deliver a product free from bugs.
5.	Choose appropriate quality assurance models and develop quality.
6.	Ability to conduct formal inspections, record and evaluate results of inspections.

Subject Code: LPECS-101

Subject Name: Software Testing and Quality Assurance Laboratory

CO#	Course Outcomes(CO)
1	Ability to conduct formal inspections, record and evaluate results of inspections.
2	Adapt to various test processes, types of errors and fault models and methods of test generation from requirements for continuous quality improvement of the software system along with Software Quality best practices usage.
3	Apply software testing cycle in relation to software development and project management focusing incidents.
4	Apply risks management within a project towards efficient delivery of software solutions.
5	Implement improvements in the software development processes by making use of standards and baselines.
6	Test the software by applying testing techniques to deliver a product free from bugs.

Subject Code: PECS-107
Subject Name: Advanced Computer Networks

CO #	Course Outcomes(CO)
1.	Understand the core ideas of networks thoroughly with network architecture and performance metrics for network designing.
2.	Apply the knowledge of various modes of communication to solve problems of data communication over different medium using various technologies.
3.	Understand and utilize various communication protocols that provide reliable, ordered, and error-checked delivery of a stream of octets.
4.	Design and implement various algorithms of network to ease the communication problems over different geographical areas.
5.	Compare different routing protocols and propose the optimal solution concerning different structures of networks.
6.	Design and implementation of routing and transport layer protocols for advanced multi hop networks for smooth flow of data over different networks.

Subject Code: PECS-108

Subject Name: Network Security and Cryptography

CO #	Course Outcomes(CO)
1.	Apply the knowledge of existing authentication protocols and key management techniques to provide security solutions.
2.	Identify and analyze network security attacks and counter measures to prevent those attacks.
3.	Evaluate network security models using available solutions such as PGP, SSL, IPSec to provide robust framework for security threats.
4.	Assess impact of system and web security threats to ensure secure transmission of data.
5.	Analyze the security requirements and solutions for maintaining Data integrity using modern techniques for data transmission.
6.	Testing and verification of cryptography aspects by integrating people, processes and technologies.

Subject Code: LPECS-104

Subject Name: Network Security and Cryptography Laboratory

CO #	Course Outcomes(CO)
1.	Implement encryption and decryption techniques for providing security solutions.
2.	Analyze the impact of public key cryptosystems for secure exchange of information.
3.	Analyze and design Network Security protocols for information exchange over unsecure network.
4.	Apply security principles for implementing authentication applications.
5.	Analyze the security requirements and solutions for maintaining Data integrity using modern techniques for data transmission.
6.	Testing and verification of cryptography aspects by integrating people, processes and technologies.

Subject Code: PECS-111

Subject Name: Statistics for Data Science

CO #	Course Outcomes(CO)
1.	Able to understand the basic knowledge on fundamental probability concepts, probability of an event, additive rules and conditional probability, Bayes' Theorem, Combinatorial Analysis, Permutations ,Combinations, Binomial Coefficients.
2.	Understand the concept of random variables, properties of common types of random variables, how to identify them and apply them to solve probabilistic problems.
3.	Apply the knowledge of various sampling distributions to compute confidence intervals for the population parameters.
4.	Solve different types of Statistics related problems with well-defined solutions, and tackle open-ended problems that belong to the disciplinary-area boundaries;
5.	Understand basic components of hypothesis testing and perform hypothesis tests on population means, variances and proportions.
6.	Perform Statistical analysis in several circumstances and interprets the results in an applied context.

Subject Code: PECS-114

Subject Name: Advanced Database Management Systems

CO#	Course Outcomes(CO)
1	Implement PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers. (Change from Level-2 to Level 3 or above)
2	Apply and Relate the concept of transaction, concurrency control and recovery in database.
3	Recognize the purpose of query processing and optimization and also demonstrate the basic of query evaluation.
4	Illustrate the concept of object oriented database and have experience with object oriented modeling, design and implementation. (Change from Level-2 to Level 3 or above)
5	List the principles of distributed systems and describe the problems and challenges associated with these principles.
6	Evaluate the association rules for mining the data.

Subject Code: LPECS-107
Subject Name: Advanced Database Management Systems Laboratory

CO#	Course Outcomes(CO)
1	Implement PL/SQL programming using concept of Cursor Management, Error Handling, Package and Triggers. (Change from Level-2 to Level 3 or above)
2	Apply and Relate the concept of transaction, concurrency control and recovery in database.
3	Recognize the purpose of query processing and optimization and also demonstrate the basic of query evaluation.
4	Illustrate the concept of object oriented database and have experience with object oriented modeling, design and implementation. (Change from Level-2 to Level 3 or above)
5	List the principles of distributed systems and describe the problems and challenges associated with these principles.
6	Evaluate the association rules for mining the data.

Subject Code: PECS-119
Subject Name: Information Retrieval

CO #	Course Outcomes(CO)
1.	Outline basic terminology and components in information retrieval systems.
2.	Understand the issues involved in providing an IR service on a web Scale.
3.	Compare and contrast information retrieval models and internal mechanisms.
4.	Evaluate information retrieval algorithms and give an account of the difficulties of evaluation.
5.	Identify and analyze the various aspects of a specific problem and apply the concepts of information retrieval to develop a model.
6.	Develop the ability to develop a complete IR system from scratch.

CO#	Course Outcomes(CO)
1.	Apply the knowledge of mathematics and engineering to understand the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
2.	Examine natural language processing models and algorithms using both the traditional symbolic and the more recent statistical approaches.
3.	Discuss the key concepts from natural language processing and to describe and analyze language, POS tagging and context free grammar for English language.
4.	Discover the capabilities and limitations of current natural language technologies, and some of the algorithms and techniques that underlie these technologies.
5.	Recognize the significance of models and methods of statistical natural language processing for common NLP tasks.
6.	Illustrate the concepts of morphology, syntactic analysis, semantic interpretation and pragmatics of the language, demonstrating them with different approaches.

Subject Code: LPECS-110

Subject Name: Natural Language Processing Laboratory

CO#	Course Outcomes(CO)
1.	Apply the knowledge of engineering to understand the computational properties of natural languages and to implement the algorithms for processing linguistic information.
2.	Utilize the models and methods of statistical natural language processing for common NLP tasks such as speech recognition, machine translation, text classification, spell checking etc.
3.	Understand the key concepts of morphology, syntactic analysis for implementing POS tagging algorithms and context free grammar for English language.
4.	Identify and apply natural language processing algorithms to solve real world problems
5.	Understanding semantics and pragmatics of English language for processing.
6.	Implement, and apply state-of-the-art techniques to novel problems involving natural language data.

Subject Code: PECS-121

Subject Name: System Programming

CO #	Course Outcomes(CO)
1.	Understand the relationship between system software and machine architecture.
2.	Study the architecture of a hypothetical machine, its assembly language and macro language.
3.	Identify the need and implementation of macro processor, linkers and loaders.
4.	Determine the basics of compiler design and their applications in programming languages.
5.	Analyze the process of scanning and parsing techniques.
6.	Identify the most common pitfalls of code using debuggers and be able to locate, analyze, and fix the errors.

Subject Code: PECS-126

Subject Name: Java Programming

CO#	Course Outcomes(CO)
1.	Apply object oriented programming techniques to propose solution pertaining to real world problems.
2.	Identify and analyze the various aspects of a specific problem and apply the concepts of classes and objects to develop object oriented model.
3.	Utilize the concept of inheritance and polymorphism to formulate a solution for complex analytical problem.
4.	Examine the errors in the developed system and resolve them by applying the knowledge of exception handling.
5.	Design console based, GUI based and web based applications by implementing various concepts like event handling, applets and database connectivity.
6.	Utilize the concept of networking to develop systems for establishing communication between client and server.

<p align="center">**Subject Code:** LPECS-113</p>
<p align="center">**Subject Name:** Java Programming Laboratory</p>

CO#	Course Outcomes(CO)
1.	Apply the knowledge of JAVA language syntax and semantics to write and execute Java programs.
2.	Create Java programs based on object oriented principles like classes, objects, constructors and inheritance.
3.	Implement the concept of applets and event handling with development of GUI interfaces for a computer program to interact with users and event based GUI handling principles.
4.	Implement exception handling techniques to make the system bug free.
5.	Apply the knowledge of event handling, applets, networking features and database connectivity to develop business oriented web based solution.
6.	Design Java programs to design a system to meet industrial needs and to solve real world problems based on client-server communication.

<p align="center">**Subject Code:** OECS-101</p>
<p align="center">**Subject Name:** Software Project Management</p>

CO#	Course Outcomes(CO)
1	Apply the activities involved in the management of software projects.
2	Analyze the various software development environments and risk management.
3	Develop and apply the key strategies to monitor, control and quality assurance of software projects.
4	Select the appropriate planning and estimation models to better evaluate the software projects.
5	Create a strong working knowledge of ethics and professional responsibility.
6	Develop effective organizational, leadership and change skills for managing projects, teams and stakeholders.

Subject Code: OECS-102

Subject Name: Object Oriented Programming using Java

CO #	Course Outcomes(CO)
1.	Apply object oriented programming techniques to propose solution pertaining to real world problem.
2.	Identify and analyze the various aspects of a specific problem and apply the concepts of classes and objects to develop object oriented model.
3.	Utilize the concept of inheritance and interfaces to formulate a solution for complex analytical problem.
4.	Demonstrate an understanding of multithreaded programming.
5.	Design console based, GUI based and web based applications by implementing various concepts like applets.
6.	Examine the errors in the developed system and resolve them by applying the knowledge of exception handling.

Subject Code: OECS-103

Subject Name: Cyber Laws and Ethics

CO#	Course Outcomes(CO)
1.	Apply the knowledge of cyber security systems to solve the complex problems of cyber crime.
2.	Make use of Intellectual Property Rights and commit to professional ethics and responsibilities and norms of the engineering practice.
3.	Recognize the need for patents and to engage in life-long learning in the broadest context of cyber security.
4.	Identify Professional and ethical issues and responsibilities.
5.	Examine the legal and policy developments in various countries for cyber space and synthesis of the information to provide valid conclusions.
6.	Analyze national and international cyber issues reaching substantiated conclusions using first principles of cyber security.

Subject Code: OECS-104
Subject Name: Data Structures

CO#	Course Outcomes(CO)
1	Apply knowledge of statistics and programming skills to solve complex engineering problems related to data structures.
2	Make use of Research based knowledge to identify the appropriate data structure and provide better solution to reduce space and time complexity.
3	Identify, Formulate and analyse data structure to develop skills and understand their applications to perform operations on it.
4	Design appropriate algorithm for autonomous realization of sub-programs to model complex engineering activities.
5	Demonstrate various methods of organizing large amounts of data and recognize systematic way to retrieve data and solve problems.
6	Formulate new solutions for programming problems or improve existing code using learned algorithms and data structures.