**Vision**

To offer quality education in Computer Engineering.

**Mission**

M1: To provide globally competent computer professionals to serve the needs of society.

M2: To promote research culture

**Programme Educational Objectives (PEOs)**

1. To develop core competencies in the field of Computer Engineering.
2. To inculcate technical and professional skills.
3. To develop an ability for professional growth

**Programme Outcomes (POs)**

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
4. Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis & interpretation of data and synthesis of the information to provide valid conclusions.
5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.
6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: Communicate effectively on complex engineering activities with the engineering community and with t h e 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.
11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Life-long learning: 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.

**Course Outcome:**

| SE SEM I | | | | |
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| **Sr. No.** | **Course Code** | **Course Name** | **CO No.** | **CO Statement** |
| 1 | 210241 | Discrete Mathematics | CO210241.1 | Student will be able to apply techniques for constructing mathematical proofs and make use of appropriate set operations, propositional logic to solve problems |
| | | | CO210241.2 | Student will be able to use functions or relation models to interpret associated relationship |
| | | | CO210241.3 | Student will be able to apply basic counting techniques to solve combinatorial problem |
| | | | CO210241.4 | Student will be able to use graph concepts as a tool to visualize and solve problems. |
| | | | CO210241.5 | Student will be able to build minimum spanning tree for a given graph and to prefix code for a given tree |
| | | | CO210241.6 | Student will be able to use concepts of groups and rings to solve given problem |
| 2 | 210242/46 | Digital Electronics and Logic Design | CO210242/46.1 | Students will able to design and implement combinational circuits using ICs, breadboard etc as per given specifications |
| | | | CO210242/46.2 | Students will able to design and implement sequential circuits using ICs, breadboard etc as per given specifications |
| | | | CO210242/46.3 | Students will able to design and implement combinational and sequential circuits using VHDL,ASM Charts and use simulator tool Xilinx for the same |
| | | | CO210242/46.4 | Students will able to describe characteristics of digital ICs, TTL and CMOS devices. |

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| | | | CO210242/46.5 | Students will able to describe characteristics , functionalities and applications of microcontroller(8051). |
| | | | CO210242/46.6 | Students will be able to test, inspect combinational and sequential circuits for fault detection |
| 3 | 210243/47 | Data Structures and Algorithm and Data Structure Lab | CO210243/47.1 | Students will be able to construct abstract data type of various linear data structures such as arrays, linked list, stack, queue |
| | | | CO210243/47.2 | Students will be able to choose the appropriate linear data structure and to design an algorithm to solve a given problem |
| | | | CO210243/47.3 | Students will be able to design and develop recursive methods to solve a problem |
| | | | CO210243/47.4 | Students will be able to make use of object oriented features and structured programming features as per requirements of an algorithm to implement and test it |
| | | | CO210243/47.5 | Students will be able to analyse an algorithm and determine the efficiency of it |
| | | | CO210243/47.6 | Students will be able to implement various kinds of searching and sorting techniques and know when to choose which technique |
| 4 | 210244 | Computer Organisation and Architechture | CO210244.1 | Students will be able to explain organization of digital computers and evaluate the performance of CPU |
| | | | CO210244.2 | Students will be able to explain the function of each element of memory hierarchy |
| | | | CO210244.3 | Students will be able to demonstrate computer architecture concepts related to design of processor and I/O |
| | | | CO210244.4 | Students will be able to explain the elements of modern instruction set and explain their impact on |

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| | | | | processor design |
| | | | CO210244.5 | Students will be able to list the characteristics of pipelining and evaluate various design alternatives in processor organization |
| | | | CO210244.6 | Students will be able to explain how arithmetic and logical operations are performed by computers and differentiate between micro programmed and hardwired control unit |
| 5 | 210245/48 | Object Oriented Programming & Laboratory | CO210245/48.1 | Apply Object Oriented Programming concepts to solve various computing problems |
| | | | CO210245/48.2 | Make use of object oriented features like inheritance, data abstraction, encapsulation, and polymorphism to design simple class |
| | | | CO210245/48.3 | Design and develop an application using the concept of Compile time and Runtime Polymorphism |
| | | | CO210245/48.4 | Design an application using generic programming and exception handling |
| | | | CO210245/48.5 | Make use of suitable methods for storing and retrieving data from files to develop an application |
| | | | CO210245/48.6 | Construct real world applications using object-oriented concepts |
| 6 | 210249 | Soft Skills | CO210249.1 | Student will be able to analyze strengths,weaknesses,opportunities and threats. |
| | | | CO210249.2 | Student will be able to demonstrate their skill of presentation and public speaking |
| | | | CO210249.3 | Student will be able to express their views in group discussion |
| | | | CO210249.4 | Student will be able to communicate effectively |
| | | | CO210249.5 | Student will be able to develop skill to maximize personal effectiveness |

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| 7 | 210251/55 | Computer Graphics & Laboratory | CO210251/55.1 | Explain basic concepts of computer graphics to generate line, circle and polygon |
| | | | CO210251/55.2 | Use polygon filling and polygon clipping algorithms |
| | | | CO210251/55.3 | Apply geometric transformations on 2D and 3D objects |
| | | | CO210251/55.4 | Explain illumination, color models and shading algorithms |
| | | | CO210251/55.5 | Design graphical applications using Curves and Fractals |
| | | | CO210251/55.6 | Use different techniques and tools to create animation |
| **SE SEM II** | | | | |
| 8 | 210252 | Advanced Data Structures | CO210252.1 | Students will be able to explain the abstract properties of various data structures such as stacks, queues, lists, trees, graphs and hash tables |
| | | | CO210252.2 | Students will be able to design a solution for a problem, involving graphs, trees, heaps and hashing |
| | | | CO210252.3 | Students will be able to design an algorithm to solve a given problem using suitable data structure and will be able to analyse it and determine its efficiency. |
| | | | CO210252.4 | Students will be able to make use of different representations of symbol tables |
| | | | CO210252.5 | Students will be able to apply file handling and different indexing techniques |
| | | | CO210252.6 | Students will be able to compare different implementations of linear and non linear data structures and to recognize the advantages and disadvantages of the different implementations |
| 9 | 210253/57 | Microprocessor & Laboratory | CO210253/57.1 | Students will be able to develop an application using programming model and instruction set of 80386DX |

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| | | | CO210253/57.2 | Students will be able to make use of memory management and architectural features of 80386DX |
| | | | CO210253/57.3 | Students will be able to analyze need of protection and explain multitasking of 80386DX |
| | | | CO210253/57.4 | Students will be able to design and develop terminate but stay resident routine using exceptions and interrupts in 80386DX |
| | | | CO210253/57.5 | Students will be able to compare operating modes of 80386DX |
| | | | CO210253/57.6 | Students will be able to explain architecture of 80387 Numeric data processor and compose assembly language programs for arithmetic operations |
| 10 | 210254 | Principles of Programming Language | CO210254.1 | Student will be able to explain the features and paradigms of different programming languages. |
| | | | CO210254.2 | Student will be able to describe control flow, data types and execution of programming languages. |
| | | | CO210254.3 | Student will be able to select appropriate language for given applications |
| | | | CO210254.4 | Student will be able to analyze the strengths and weakness of programming languages for effective and efficient program development |
| | | | CO210254.5 | Student will be able to use object oriented features to solve given problem |
| | | | CO210254.6 | Student will be able to engage in lifelong learning with new programming languages and paradigms |
| 11 | 210256 | Advanced Data Structures Laboratory | CO210256.1 | Students will be able to demonstrate undersanding of major data structures and related algorithms |
| | | | CO210256.2 | Students will be able to select effective and efficient data structure |

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| | | | | to solve a given problem |
| | | | CO210256.3 | Students will be able to develop an algorithm to solve a given problem using linear or non linear data structures |
| | | | CO210256.4 | Students will be able to develop and test a program and able to observe its efficiency |
| | | | CO210256.5 | Students will be able to design and develop an application using structured and object oriented programming features |
| | | | CO210256.6 | Students will be able to design and develop a program using template and exception handling in java |
| **TE SEM I** | | | | |
| 12 | 310241 | Theory of Computation | CO310241.1 | Students will be able to describe languages using Regular Expressions |
| | | | CO310241.2 | Students will be able to design Finite Automata, pushdown automata, turing machine and post machine |
| | | | CO310241.3 | Students will be able to apply the concepts of grammar for solving real world problems of lexical analysis and parsing |
| | | | CO310241.4 | Students will be able to list, compare and translate given grammar from one form to another |
| | | | CO310241.5 | Students will be able to identify ambiguity in a given grammar |
| | | | CO310241.6 | Students will be able to analyse given problem for undecidability and computational complexity |
| 13 | 310242/47 | Database Management System & Laboratory | CO310242/47.1 | Students will be able to create logical design of database |
| | | | CO310242/47.2 | Students will be able to formulate queries for database and construct database application |

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| | | | CO310242/47.3 | Students will be able to apply normalization technique to database |
| | | | CO310242/47.4 | Students will be able to recognize the need of transaction and concurrency control protocols in transaction management |
| | | | CO310242/47.5 | Students will be able to choose appropriate database system architecture for a given problem |
| | | | CO310242/47.6 | Students will be able to describe data models of NOSQL database and use NOSQL databases |
| 14 | 310243 | Software Engineering and Project Management | CO310243.1 | Student will be able to apply process models to design software |
| | | | CO310243.2 | Student will be able to analyze software requirements for a given application |
| | | | CO310243.3 | Student will be able to adapt software design methodologies to develop a system |
| | | | CO310243.4 | Student will be able to apply project management principles to develop a system |
| | | | CO310243.5 | Student will be able to identify and analyze risk involved in project development |
| | | | CO310243.6 | Student will be able to test developed system |
| 15 | 310244 | Information Systems and Engineering Economics | CO310244.1 | Explain the concepts, role of information systems & its challenges in organizations |
| | | | CO310244.2 | Describe Management information systems, its ethical & social issues |
| | | | CO310244.3 | Explain information system development , management of project, data resources & business process management |
| | | | CO310244.4 | Analyze time value of money & its management |
| | | | CO310244.5 | Perform & evaluate calculations under inflation, present worth analysis, annual equivalence analysis |
| | | | CO310244.6 | Analyze cash flow analysis & taxes |

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| 16 | 310245/48 | Computer Networks and Laboratory | CO310245/48.1 | Students will be able to analyze the requirements for a given organization and select appropriate networking topologies, transmission mediums, architecture and technologies to setup local area network |
| | | | CO310245/48.2 | Students will be able to design and develop an application to detect and correct error in communication and analyze using tool |
| | | | CO310245/48.3 | Students will be able to compare various Multiple access protocols and ethernet standards |
| | | | CO310245/48.4 | Students will be able to design and develop an application to demonstrate functionality of network layer and analyze using tool |
| | | | CO310245/48.5 | Students will be able to design and develop an application using socket programming and transport layer protocols |
| | | | CO310245/48.6 | Students will be able to find uniform resource locator using domain name system and install software on remote machine using dynamic host configuration protocol |
| 17 | 310246 | Skill Development Laboratory | CO310246.1 | Evaluate problems and analyze data using current technologies in a wide variety of business and organizational contexts |
| | | | CO310246.2 | Design and develop application by applying data preprocessing, exploratory analysis and visualization techniques |
| | | | CO310246.3 | Apply norms of best practices for building applications |
| | | | CO310246.4 | Make use of Integrated Development Environment(IDE) for implementing and testing of software solution |
| | | | CO310246.5 | Make use of machine learning techniques to analyze data |

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| | | | CO310246.6 | Design and develop software solutions for real time problems by demonstrating projects |
| **TE SEM II** | | | | |
| 18 | 310250 | Design & Analysis of Algorithms | CO310250.1 | Design Algorithm for the given problem |
| | | | CO310250.2 | Select and apply problem solving approach for given problem |
| | | | CO310250.3 | Identify and apply algorithmic strategies to solve given problem |
| | | | CO310250.4 | Analyse and identify complexity class for a given problem |
| | | | CO310250.5 | Use embedded algorithm to solve a given problem |
| | | | CO310250.6 | Design multithreaded and distributed algorithms |
| 19 | 310251/57 | System Programming & Operating System & Laboratory | CO310251/57.1 | Students will be able to design assembler and macroprocessor by using various needed data structures . |
| | | | CO310251/57.2 | Students will be able to explain functionaliities of Linker, Loaders and develop dynamic link library for a given problem |
| | | | CO310251/57.3 | Students will be able to describe and use language translators like Lex and Yacc |
| | | | CO310251/57.4 | Students will be able to make use of process management, scheduling and deadlock detection to develop an application |
| | | | CO310251/57.5 | Students will be able to apply memory management technique for paging simulation |
| | | | CO310251/57.6 | Students will be able to illustrate I/O and file management policies |
| 20 | 310252/58 | Embedded Systems & Internet of Things & Laboatory | CO310252/58.1 | Students will be able to describe the fundamentals of IoT and embedded system |
| | | | CO310252/58.2 | Students will be able to design and construct IoT application for specified requirement |

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| | | | CO310252/58.3 | Students will be able to apply various IoT protocols for communication between different endpoints to develop client server application |
| | | | CO310252/58.4 | Students will be able to describe various elements of IoT Securities |
| | | | CO310252/58.5 | Students will be able to compare Internet of things,Web of Things and Cloud of Things and to develop an application to upload data on cloud |
| | | | CO310252/58.6 | Students will be able to identify between available technologies and devices for given IoT application |
| 21 | 310253 | Software Modeling & Design | CO310253.1 | Student will be able to compare and decide suitable architecture and design methodology for given application |
| | | | CO310253.2 | Student will be able to use object oriented methodology in software design |
| | | | CO310253.3 | Student will be able to model dynamic behaviour while designing a system |
| | | | CO310253.4 | Student will be able to design software using suitable architecture |
| | | | CO310253.5 | Student will be able to apply different design patterns to develop a system |
| | | | CO310253.6 | Student will be able to apply different testing strategies to improve the quality of software |
| 22 | 310254/56 | Web Technology & Laboratory | CO310254/56.1 | Design websites by employing basic web designing elements using HTML, CSS and XML |
| | | | CO310254/56.2 | Apply Javascript and Jquery to validate client side scripting |
| | | | CO310254/56.3 | Prepare server side web application using Servlets and JSP |
| | | | CO310254/56.4 | Construct server side web application using servlets, PHP, MySQL and AJAX |

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| | | | CO310254/56.5 | Design web site by combining suitable client side and server side web technologies for given requirement |
| | | | CO310254/56.6 | Prepare content management system by applying suitable web servies technology |
| **BE SEM I** | | | | |
| 23 | 410241 | High Performance Computing | CO410241.1 | Students will be able to describe the scope of parallel computing and architectures |
| | | | CO410241.2 | Students will be able to describe parallel algorithm principles and models |
| | | | CO410241.3 | Students will be able to describe & compare various communication operations on various parallel architecture |
| | | | CO410241.4 | Students will be able to identify performance parameter for parallel computing system |
| | | | CO410241.5 | Students will be able to apply parallel algorithms on sorting problems and graphs |
| | | | CO410241.6 | Students will be able to explain CUDA architecture & its applications in parallel programming |
| 24 | 410242 | Artificial Intelligence & Robotics | CO410242.1 | Design smart system using different informed search / uninformed search or heuristic approaches |
| | | | CO410242.2 | Identify planning strategy for given problem |
| | | | CO410242.3 | Apply knowledge based reasoning to restate given problem |
| | | | CO410242.4 | Design smart system using different learning methodologies |
| | | | CO410242.5 | Explain fundamentals of robotics |
| | | | CO410242.6 | Identify design issues of a robot for given application |
| 25 | 410243 | Data Analytics | CO410243.1 | Design a system by following data analytic life cycle |

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| | | | CO410243.2 | Apply basic data analytic methods to develop an application |
| | | | CO410243.3 | Design a system for given application using association rules and regression techniques |
| | | | CO410243.4 | Design a decision making system based on suitable classification techniques |
| | | | CO410243.5 | Identify and select appropriate tools / techniques for big data visualization |
| | | | CO410243.6 | Apply advanced analytic technologies/ tools for unstructured data |
| 26 | 410244 | Elective I: Data Mining & Warehousing | CO410244.1 | Define the architecture & process of Data Mining |
| | | | CO410244.2 | Define the architecture & components of data warehousing |
| | | | CO410244.3 | Apply appropriate pre-processing methods |
| | | | CO410244.4 | Compare & contrast methods for association rule mining & classification techniques |
| | | | CO410244.5 | Analyze performance of classifiers |
| | | | CO410244.6 | Identify applications for multiclass, semi supervised classification & reinforcement learning |
| 27 | 410245 | Elective II:Distributed Systems | CO410245.1 | Student will be able to illustrate challenges of distributed system |
| | | | CO410245.2 | Student will be able to explain how system models describe underlying properties of distributed system |
| | | | CO410245.3 | Student will be able to illustrate synchronization issues in distributed environment |
| | | | CO410245.4 | Student will be able to apply Distributed deadlock detection Algorithms |
| | | | CO410245.5 | Student will be able to describe approaches to achieve fault tolerance |
| | | | CO410245.6 | Student will be able to explain issues and solution for group communication |

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| | | | CO410245.7 | Student will be able to analyse security aspects in distributed system |
| 28 | 410245 | Elective II:Mobile Communication | CO410245.1 | Students will be able to explain personal communication system architecture |
| | | | CO410245.2 | Students will be able to interpret concepts of cellular network design |
| | | | CO410245.3 | Students will be able to classify protocols of medium access control |
| | | | CO410245.4 | Students will be able to illustrate different modulation techniques in medium access control |
| | | | CO410245.5 | Students will be able to illustrate GSM architecture & support services |
| | | | CO410245.6 | Students will be able to explain current 3G & 4G technologies for GSM & CDMA |
| | | | CO410245.7 | Students will be able to analyse the requirements of next generation mobile network & mobile applications |
| 29 | 410245 | Software Testing & Quality Assurance | CO410245.1 | Define core components of software quality |
| | | | CO410245.2 | Define fundamental concepts of software testing |
| | | | CO410245.3 | Design and Develop test cases and test plan |
| | | | CO410245.4 | Select and apply automation tools for testing software |
| | | | CO410245.5 | Compare and contrast different selenium tools for software testing |
| | | | CO410245.6 | Explain quality standadards for software quality assurance |
| | | | CO410245.7 | Analyse effectiveness of different software quality tools |
| 30 | 410246 | Laboratory Practice-I | CO410246.1 | Students will be able to identify suitable parallel computing model for a given problem |
| | | | CO410246.2 | Students will be able to implement various algorithms using parallel |

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| | | | | programming concepts |
| | | | CO410246.3 | Students will be able to apply heuristic search techniques for a given problem |
| | | | CO410246.4 | Students will be able to implement an expert system for real life application |
| | | | CO410246.5 | Students will be able to analyse given data using WEKA |
| | | | CO410246.6 | Students will be able to implement Map and Reduce framework for a given problem using Hadoop |
| 31 | 410247 | Laboratory Practice-II with Elective I | CO410247.1 | Extract, transform and load the data from a given dataset using rapid miner tool |
| | | | CO410247.2 | Apply clustering techniques on given dataset and visualise the clusters using 'R' tool |
| | | | CO410247.3 | Apply a-priori algorithm to find frequently occurring items and evaluate association rules using support and confidence thresholds |
| | | | CO410247.4 | Design a system for text classification and evaluate using precision and recall |
| | | | CO410247.5 | Build a classifier and validate results |
| | | | CO410247.6 | Design and develop android based mobile application |
| | | | CO410247.7 | Prepare a test report of android based mobile application |
| | | | CO410247.8 | Compose a test scenario to evaluate android based mobile application |
| 32 | 410247 | Laboratory Practice-II with Elective II (A) | CO410247.1 | Extract, transform and load the data from a given dataset using rapid miner tool |
| | | | CO410247.2 | Apply clustering techniques on given dataset and visualise the clusters using 'R' tool |

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| | | | CO410247.3 | Apply a-priori algorithm to find frequently occurring items and evaluate association rules using support and confidence thresholds |
| | | | CO410247.4 | Design a system for text classification and evaluate using precision and recall |
| | | | CO410247.5 | Build a classifier and validate results |
| | | | CO410247.6 | Create a computer based application by selecting relevant system environment/ platform. |
| | | | CO410247.7 | Prepare test cases to test a computer based application. |
| | | | CO410247.8 | Identify testing scenarios to test a given system. |
| | | | CO410247.9 | Apply test procedures to test a computer based system. |
| | | | CO410247.10 | Identify the bugs using in a computer based application using selenium web driver. |
| | | | CO410247.11 | Prepare a test report of computer based system |
| 33 | 410247 | Laboratory Practice-II with Elective II (B) | CO410247.1 | Extract, transform and load the data from a given dataset using rapid miner tool |
| | | | CO410247.2 | Apply clustering techniques on given dataset and visualise the clusters using ‘R’ tool |
| | | | CO410247.3 | Apply a-priori algorithm to find frequently occurring items and evaluate association rules using support and confidence thresholds |
| | | | CO410247.4 | Design a system for text classification and evaluate using precision and recall |
| | | | CO410247.5 | Build a classifier and validate results |
| | | | CO410247.6 | Design and develop a basic prototype distributed system |
| | | | CO410247.7 | Design and develop client server application using RPC/ RMI mechanism |
| | | | CO410247.8 | Apply a clock synchronization algorithm for prototype distributed system |

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| | | | CO410247.9 | Apply Ring or Bully election algorithm for prototype distributed system |
| | | | CO410247.10 | Apply Ricart Agrawal's distributed algorithm for mutual exclusion. |
| | | | CO410247.11 | Apply Wait-die and Wait –wound scheme for deadlock prevention. |
| | | | CO410247.12 | Apply Wait for Graph based Centralized or Hierarchical or Distributed algorithm for deadlock detection. |
| | | | CO410247.13 | Design and develop a system to solve 2PC / Byzantine Generals Problem |
| | | | CO410247.14 | Design, develop and test a distributed system to solve a given problem |
| 34 | 410248 | Project Stage I | CO410248.1 | Analyze the problem at hand and define problem statement. |
| | | | CO410248.2 | Prepare comprehensive document of requirement specification, plan and estimate of the system to be developed. |
| | | | CO410248.3 | Identify social, legal and ethical issues related to the system to be developed. |
| | | | CO410248.4 | Apply algorithmic strategies to develop proposed system |
| | | | CO410248.5 | Design mathematical model for the proposed system |
| | | | CO410248.6 | Design the proposed system |
| | | | CO410248.7 | Work in a team and handle individual responsibilities |
| | | | CO410248.8 | Prepare technical paper based on literature survey |
| | | | CO410248.9 | Demonstrate their presentation and communication skills by participating in conferences |
| **BE SEM II** | | | | |

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| 35 | 410250 | Machine Learning | CO410250.1 | Students will be able to illustrate the concept of machine learning |
| | | | CO410250.2 | Students will be able to apply preprocessing and feature selection/extraction technique for given data set |
| | | | CO410250.3 | Students will be able to apply regresssion technique for given problem |
| | | | CO410250.4 | Students will be able to design a system using naive base classifier / support vector machine/ decision trees |
| | | | CO410250.5 | Students will be able to apply unsupervised machine learning algorithm to solve given problem |
| | | | CO410250.6 | Students will be able to design a recommendation system for given application |
| | | | CO410250.7 | Students will be able to discuss concepts of deep learning |
| 36 | 410251 | Information & Cyber Security | CO410251.1 | Analyze principle concepts, basic approaches in information and cyber security. |
| | | | CO410251.2 | Estimate the security protections and limitations provided by today's technology. |
| | | | CO410251.3 | Identify information and cyber security threats. |
| | | | CO410251.4 | Analyze threats in order to protect or defend it in cyberspace from cyber-attacks. |
| | | | CO410251.5 | Build appropriate security solutions against cyber-attacks. |
| | | | CO410251.6 | Interpret standard algorithms and protocols employed to provide confidentiality, integrity and authenticity. |
| 37 | 410252 | Elective III: Compilers | CO410252.1 | Describe functions of various phases of a compiler. |
| | | | CO410252.2 | Analyze different parsing techniques. |

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| | | | CO410252.3 | Design and specify appropriate translation to generate intermediate code generation for commonly used programming language construct. |
| | | | CO410252.4 | Compare and contrast different storage management schemes. |
| | | | CO410252.5 | Describe issues, concepts and techniques for code generation. |
| | | | CO410252.6 | Identify need for local, global and loop optimization. |
| 38 | 410252 | Elective III: Embedded & Real Time Operating System | CO410252.1 | Students will be able to explain principles and components of embedded system. |
| | | | CO410252.2 | Students will be able to describe architecture of embedded system on chip. |
| | | | CO410252.3 | Students will be able to explain communication bus protocols used for embedded systems |
| | | | CO410252.4 | Students will be able to discuss temporal, functional and resourse parameter of real time operating system |
| | | | CO410252.5 | Students will be able to compare various approaches to real time scheduling. |
| | | | CO410252.6 | Students will be able to discuss resource access control. |
| | | | CO410252.7 | Students will be able to illustrate various inter process communication mechanism used in RTOS environment |
| | | | CO410252.8 | Students will be able to explain multiprocessor scheduling and real time protocols. |
| | | | CO410252.9 | Students will be able to apply software development process to a given RTOS application |
| 39 | 410253 | Elective IV: Human Computer Interface | CO410253.1 | Illustrate basic human abilities and limitations |
| | | | CO410253.2 | Apply principles, rules and hueristic to design HCI |

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| | | | CO410253.3 | Use development tools for web and portable devices |
| | | | CO410253.4 | Evaluate user interfaces based on issues and limitations |
| | | | CO410253.5 | Identify socio-organizational issues and stakeholder requirements to design next generation interfaces |
| | | | CO410253.6 | Analyze design of everyday things (DOET) |
| 40 | 410253D | Elective IV: Open Elective | CO410253.1 | Explain the major concepts of the Infor LN Industrial Machinery Solution. |
| | | | CO410253.2 | Make use of Infor LN screens and analyse the purpose of Dynamic Enterprise modeler and 'DEM content pack'. |
| | | | CO410253.3 | Elaborate the basic data setup for main process flows & item structures. |
| | | | CO410253.4 | List 'Procure to pay' steps to produce purchase order. |
| | | | CO410253.5 | List 'Order to cash' steps to produce sales order. |
| | | | CO410253.6 | Analyse 'Make to order' production strategy, 'Market to Order' processes, 'Plan to Inventory' processes, 'Financial Plan' to Report processes. |
| 41 | 410254 | Laboratory Practice-III | CO410254.1 | Select and implement supervised machine learning algorithm to solve given problem |
| | | | CO410254.2 | Select and implement unsupervised machine learning algorithm to solve given problem |
| | | | CO410254.3 | Design and develop a system using Genetic Algorithm(GA) / Support Vector Machine(SVM) / Principal Component Analysis (PCA). |
| | | | CO410254.4 | Develop an application using cyber security algorithm |
| | | | CO410254.5 | Design a web application which handles SQL Injection attack and Cross Site scripting attack. |

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| | | | CO410254.6 | Design and develop a system to convert plain text in ciphertext using ECC algorithm |
| 42 | 410255 | Laboratory Practice-IV With Elective III(B-Compilers) and Elective IV(B-HCI) | CO410255.1 | To Build lexical analyzer using lex |
| | | | CO410255.2 | To Build Parser for regular expression grammar using Yacc |
| | | | CO410255.3 | To Construct a symbol table for given input |
| | | | CO410255.4 | To apply Semantic analysis on given input using an attribute translation grammar |
| | | | CO410255.5 | To construct front end of the compiler to generate three address code |
| | | | CO410255.6 | To apply register allocation algorithm on given input |
| | | | CO410255.7 | To apply local and global code optimization techniques on given program |
| | | | CO410255.8 | To design POS tagging for sentence written in any Indian language |
| | | | CO410255.9 | Identify specialized users and related facilities required for given system |
| | | | CO410255.10 | Evaluate an interface prototype for given system |
| | | | CO410255.11 | Conduct a contextual inquiry for selected product/system |
| 43 | 410255 | Laboratory Practice-IV With Elective III(C-ERTOS) and Elective IV(B-HCI) | CO410255.1 | Design and develop embedded system for given application |
| | | | CO410255.2 | Identify specialized users and related facilities required for given system |
| | | | CO410255.3 | Evaluate an interface prototype for given system |
| | | | CO410255.4 | Conduct a contextual inquiry for selected product/system |
| 44 | 410255 | Laboratory Practice-IV With Elective III(B-Compiler) and Elective IV(D-ERP Infor) | CO410255.1 | To Build lexical analyzer using lex |
| | | | CO410255.2 | To Build Parser for regular expression grammar using Yacc |
| | | | CO410255.3 | To Construct a symbol table for given input |
| | | | CO410255.4 | To apply Sementec analysis on given input using an attribute |

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| | | | | translation grammar |
| | | | CO410255.5 | To construct front end of the compiler to generate three address code |
| | | | CO410255.6 | To apply register allocation algorithm on given input |
| | | | CO410255.7 | To apply local and global code optimization techniques on given program |
| | | | CO410255.8 | To design POS tagging for sentence written in any Indian language |
| | | | CO410255.9 | Use the basic methods of access and navigation of Infor LN screens with Infor LN |
| | | | CO410255.10 | Create the basic data setup required to run main process flow& item structures. |
| | | | CO410255.11 | Apply ‘Procure to pay’ processes to produce purchase order |
| | | | CO410255.12 | Apply ‘Order to cash’ processes to produce sales order |
| | | | CO410255.13 | Apply 'Make to Order' process, 'Plan to Inventory' process and analyze 'Financial Plan to Report' process |
| 45 | 410256 | Project Stage II | CO410256.1 | Prepare revised document of requirement specifications, plan and estimate of the system |
| | | | CO410256.2 | Develop the system as per design using appropriate hardware and software |
| | | | CO410256.3 | Demonstrate and analyze the results of developed system |
| | | | CO410256.4 | Test the system by writing test cases and using modern testing tools |
| | | | CO410256.5 | Work in a team and handle individual responsibilities |
| | | | CO410256.6 | Prepare comprehensive document for developed system |
| | | | CO410256.7 | Prepare technical paper based on project results and findings |

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| | | | CO410256.8 | Demonstrate their presentation and communication skills by participating |