



## Department of Computer Engineering

### Vision of Computer Department

To be the center for excellence for training the world-class engineers to work with multidisciplinary domain based on the state-of-the-art of technology enabled academic system blended with industrial and business practices

### Mission of Computer Department

To educate and train undergraduate students in Computer Engineering by instilling excellence to fulfill professional and social requirements in business and industry on the platform of scientifically designed academic processes

### Program Educational Objectives

PEO1	To inculcate computational and programming skills in the field of Computer Engineering.
PEO2	To prepare the graduates to fulfill professional requirements in industry.
PEO3	To develop the graduates to solve problems related to the society

### Program Outcomes (PO)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	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 the public health and safety, and the cultural, societal, and environmental
PO4	Conduct investigations of complex problems: 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.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	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.
PO7	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.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with 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.
PO11	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.
PO12	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.

## Program Specific Outcomes (PSO)

PSO1	To apply mathematical and Computer Engineering fundamentals.
PSO2	To apply standard practices and strategies for software development and project management
PSO3	To adapt programming languages, modern computer tools and technologies and soft skills for career enrichment.

## Course Outcomes

**Class: Second Year Engineering (SE) 2019 Pattern**

**Semester- I**

**Subject : Discrete Mathematics (DM)**

**Subject 210241 (C201)**

C201.1	Solve problems by applying set theory, propositional logic and formal proof techniques.
C201.2	Illustrate problems logically by using function and relation models.
C201.3	Analyze numbers of possible outcomes using permutations and combinations
C201.4	Solve computing problems using appropriate graph algorithms.
C201.5	Solve computing problems using appropriate tree algorithms.
C201.6	Evaluate algebraic structures and coding theory

**Subject: Fundamentals of Data structures**

**Subject Code 210242 (C202)**

C202.1	Select the algorithm design strategies and data structures for programming problems
C202.2	Discriminate sequential data structures to store and process data in problem solving
C202.3	Use appropriate searching and sorting technique for better efficiency
C202.4	Apply linked list data structure for solving problems
C202.5	Solve problems using stack data structure
C202.6	Apply queue data structure to solve problems

**Subject: Object oriented Programming**

**Subject Code 210243 (C203)**

C203.1	Describe the principles of Object Oriented Programming (OOP) and fundamentals of OOP language C++
C203.2	Apply OOP concept of Inheritance and concept of Pointers
C203.3	Apply virtual functions and polymorphism in programming situations
C203.4	Illustrate basic concepts of files and streams for data handling
C203.5	Develop programming application to improve reusability and error handling
C203.6	Analyze and apply Standard Template Library (STL) to simplify applicability of OOP

**Subject: Computer Graphics****Subject Code 210244 (C204)**

C204.1	operations
C204.2	Apply the concepts of windowing and clipping algorithms to fill and clip polygons.
C204.3	Apply the core concepts of computer graphics, including transformation in two and three dimensions.
C204.4	Describe methods and techniques for Light, Color, Shading and Hidden Surfaces
C204.5	Apply mathematics using the concepts of Curves and Fractals for implementing computer graphics programs
C204.6	Develop the applications using the concepts of animation and gaming.

**Subject: Digital Electronics and Logic Design****Subject Code 210245 (C205)**

C205.1	Solve Boolean Expressions using K Map.
C205.2	Design combinational digital circuits.
C205.3	Design sequential digital circuits.
C205.4	Design simple digital system using ASM and PLD.
C205.5	Apply appropriate logic families IC packages as per the given design specifications.
C205.6	Illustrate organization and architecture of computer system

**Subject: Data Structures Laboratory****Subject Code 210246 (C206)**

C206.1	Write programs for linear data structures using arrays and linked list.
C206.2	Develop real time applications using Stack and Queue
C206.3	Write programs using searching and sorting techniques.

**Subject: OOP and CG Laboratory****Subject Code 210247 (C207)**

C207.1	Apply the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable
C207.2	Apply the concept of file for storing and retrieving the data from secondary storages.
C207.3	Apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts.
C207.4	Apply algorithms based on the concept of windowing and clipping to fill and clip polygons.
C207.5	Apply logic to implement, curves, fractals, transformation, animation and gaming programs.

**Subject: Digital Electronics Laboratory****Subject Code 210248 (C208)**

C208.1	Design and implement combinational circuit using different types of gates.
C208.2	Design and implement sequential digital circuits using Flip-flops.
C208.3	Design digital system using shift registers.

**Subject: Business Communication Skills****Subject Code 210249 (C209)**

C209.1	Demonstrate verbal/oral communication and listening skills
C209.2	Write precise briefs or reports and technical documents.
C209.3	Demonstrate skills in group discussion / meetings / interviews and deliver presentations.
C209.4	Explore goal/target setting, self-motivation and practicing creative thinking
C209.5	Operate effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities

**Subject: Humanities and Social Science****Subject Code 210250 (C210)**

C210.1	Discuss issues concerning humans and society
C210.2	Describe about their responsibilities towards society.
C210.3	Show sensitivity about issues regarding the social, cultural, economic and human aspects
C210.4	Discuss the nature of the individual, values, beliefs and the relationship between self and the community.

**Subject: Audit Course -III (Green Construction and Design)****Subject Code 210251 (C211)**

C211.1	Understand the importance of environment friendly society.
C211.2	Apply primary measures to reduce carbon emissions from their surroundings.
C211.3	Learn role of IT solutions in design of green buildings.
C211.4	Understand the use of software systems to complete statutory compliances involved in the design of a new home or office building through green construction.

**Semester- II****Subject : Engineering Mathematics -III****Subject Code 207003 (C212)**

C212.1	Solve higher order linear differential equations.
C212.2	Solve problems related to Fourier transform, Z –Transform to solve difference equations.
C212.3	Apply statistics methods like correlation, regression analysis in analyzing, interpreting experimental data.
C212.4	Apply Probability Distribution like binomial, Poisson, Normal for testing the given data.
C212.5	Solve algebraic and transcendental equations and system of linear equations using Numerical techniques.

C212.6	Numerical methods to compute integration and differential equations.
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**Subject: Data structures and Algorithm**

**Subject Code 210252 (C213)**

C213.1	Apply hashing techniques for implementing data structures
C213.2	Solve problems based on tree data structure
C213.3	Solve problems based on graph data structure
C213.4	Implement OBST and AVL search trees
C213.5	Use efficient indexing methods and multiway search techniques to store and maintain data.
C213.6	Use functionalities related to file organization

**Subject: Software Engineering**

**Subject Code 210253 (C214)**

C214.1	Identify software process models for developing a software project
C214.2	Analyze software requirements to design the solutions for software.
C214.3	Determine the estimation for software projects and its scheduling.
C214.4	Apply design engineering in software project development.
C214.5	Identify and handle risk management and software configuration management
C214.6	Discuss software testing approaches for software verification and validation

**Subject: Microprocessor**

**Subject Code 210254 (C215)**

C215.1	Use Assembly Language Programming to develop application.
C215.2	Explain processor architecture and bus cycles
C215.3	Explain memory management in 80386DX
C215.4	Describe architectural concepts like Protection in processor
C215.5	Explain multitasking and processor Mode in 80386DX
C215.6	Differentiate between microprocessors and microcontrollers

**Subject: Principles of Programming Languages**

**Subject Code 210255 (C216)**

C216.1	Discuss the principles underlying the programming languages
C216.2	Explain structuring of program and programming paradigms
C216.3	Apply fundamental concepts in the object oriented programming using Java
C216.4	Develop application using inheritance, packages and exceptional handling in Java
C216.5	Demonstrate Multithreading in Java
C216.6	Develop a simple program using basic concepts of Functional and Logical programming paradigm.

**Subject: Data Structures and Algorithm lab****Subject Code 210256 (C217)**

C217.1	Use the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem
C217.2	Apply non linear data structures to solve real world complex problems.
C217.3	Apply algorithm design techniques for indexing, sorting, multi-way searching, file organization

**Subject: Microprocessor Lab****Subject Code 210257 (C218)**

C218.1	Apply addressing modes and 64 bit instruction set to implement assembly language programs
C218.2	Apply logic for processor mode of operation
C218.3	Explain the working of motherboard and its components.

**Subject: Project based learning****Subject Code 210258 (C219)**

C219.1	Identify the real life problem from societal need point of view
C219.2	Choose and compare alternative approaches to select most feasible one
C219.3	Analyze and synthesize the identified problem from technological perspective
C219.4	Design the reliable and scalable solution to meet challenges
C219.5	Evaluate the solution based on the criteria specified
C219.6	Inculcate long life learning attitude towards the societal problems

**Subject: Code of Conduct****Subject Code 210259 (C220)**

C220.1	Explain the basic perception of profession, professional ethics, various moral and social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
C220.2	Describe professional rights and responsibilities of an engineer for safety and risk benefit analysis
C220.3	Explain the impact of the professional Engineering solutions in societal and Environmental contexts, and also the knowledge of, and need for sustainable development.

**Subject: Audit Course -4 (Intellectual Property Rights)****Subject Code 210260 (C221)**

C221.1	Understand the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition
C221.2	Identify, apply and assess principles of law relating to each of these areas of intellectual property
C221.3	Apply the appropriate ownership rules to intellectual property you have been involved in creating

**Class: Second Year Engineering (SE) 2015 Pattern**

**Semester- I**

**Subject : Discrete Mathematics (DM)**

<b>Subject Code</b>	<b>210241 (C201)</b>
C201.1	Solve problems by applying set theory, propositional logic and formal proof techniques.
C201.2	Illustrate problems logically by using function and relation models.
C201.3	Analyze numbers of possible outcomes using permutations and combinations
C201.4	Solve computing problems using appropriate graph algorithms.
C201.5	Solve computing problems using appropriate tree algorithms.
C201.6	Evaluate algebraic structures and coding theory

**Subject: Digital electronics and logic design (DELD)**

<b>Subject Code</b>	<b>210242(C202)</b>
C202.1	Design combinational digital circuits.
C202.2	Design sequential digital circuits.
C202.3	Design simple digital system using ASM and VHDL.
C202.4	Design combinational circuits using PLDs.
C202.5	Apply the knowledge of logic families to design digital system.
C202.6	Explain 8051 Microcontroller system.

**Subject: Data Structures and Algorithm**

<b>Subject Code</b>	<b>210243 (C203)</b>
C203.1	Select the algorithm design strategies and data structures for programming problems
C203.2	Discriminate sequential data structures to store and process data in problem solving
C203.3	Apply linked list data structure for solving problems
C203.4	Solve problems using stack data structure
C203.5	Apply queue data structure to solve problems
C203.6	Use appropriate searching and sorting technique for better efficiency

**Subject: Computer Organization and Architecture**

<b>Subject Code</b>	<b>210244 (C204)</b>
C204.1	Explain Computer Architecture concepts related to structure, function and characteristics of computer systems
C204.2	Describe computer architecture concepts related to computer memories.
C204.3	Describe concepts related to I/O devices and their methods.
C204.4	Illustrate instruction set of processor and their addressing modes .
C204.5	Explain the principles of computer architecture for commercially available computers.
C204.6	Discuss concepts related to control Unit.



**Subject: Object Oriented Programming (OOP)**

<b>Subject Code</b>	<b>210245 (C205)</b>
C205.1	Apply the principles of Object Oriented Programming (OOP) in C++
C205.2	Apply OOP concepts of Polymorphism and Inheritance
C205.3	Apply virtual functions in programming situations
C205.4	Write programming applications using templates and exception
C205.5	Illustrate basic concepts of files and streams for data handling
C205.6	Apply Standard Template Library (STL) to simplify applicability of OOP

**Subject: Digital electronics Lab**

<b>Subject Code</b>	<b>210246(C206)</b>
C206.1	Design and implement combinational circuit using different types of gates.
C206.2	Design and implement sequential digital circuits using Flip-flops.
C206.3	Design combinational and sequential circuits using different modelling
C206.4	Write the functionalities, properties and applicability of logic families

**Subject: Data Structures Lab**

<b>Subject Code</b>	<b>210247(C207)</b>
C207.1	Write programs for linear data structures using arrays and linked list.
C207.2	Develop real time applications using Stack and Queue
C207.3	Write programs using searching and sorting techniques.

**Subject: Object Oriented Programming Lab**

<b>Subject Code</b>	<b>210248 (C208)</b>
C208.1	Write programs using basic OOP concepts and polymorphism for application development.
C208.2	Write programs using exception handling.
C208.3	Write programs for file handling operations.
C208.4	Write programs using templates and STL.

**Subject: Soft Skills**

<b>Subject Code</b>	<b>210249 (C209)</b>
C209.1	Demonstrate verbal/oral communication and listening skills
C209.2	Write precise briefs or reports and technical documents.
C209.3	Demonstrate skills in group discussion / meetings / interviews and deliver presentations.
C209.4	Explore goal/target setting, self-motivation and practicing creative

**Subject: Audit Course -I (Road Safety)**

<b>Subject Code</b>	<b>210250 (C210)</b>
C210.1	Discuss rules and regulations of Road Safety
C210.2	Explain causes & remedies of road accidents

**Semester- II****Subject : Engineering Mathematics -III****Subject Code 207003 (C211)**

C211.1	Solve higher order linear differential equations.
C211.2	Solve problems related to Fourier transform, Z –Transform to solve difference equation.
C211.3	Apply statistics methods like correlation, regression analysis in analyzing, interpreting experimental data.
C211.4	Apply Probability Distribution like binomial, Poisson, Normal for
C211.5	Use Vector differentiation and Integration to solve vector fields and apply to compute Line Surface and volume integrals.
C211.6	Use Complex differentiation to check analytic function and perform

**Subject: Computer Graphics****Subject Code 210251 (C212)**

C212.1	Apply mathematics to develop computer programs for elementary graphics operations
C212.2	Apply the concepts of windowing and clipping algorithms to fill and clip polygons.
C212.3	Apply the core concepts of computer graphics, including transformation in two and three dimensions.
C212.4	Explain the concept of segment, animation and colour models .
C212.5	Describe methods and techniques for shading, illumination and
C212.6	Develop the applications using the concepts of Curves and Fractals

**Subject: Advanced Data Structures****Subject Code 210252 (C213)**

C213.1	Solve problems based on tree data structure
C213.2	Solve problems based on graph data structure
C213.3	Apply hashing techniques for implementing data structures
C213.4	Implement OBST and AVL search trees
C213.5	Use efficient indexing methods and multiway search techniques to
C213.6	Use functionalities related to file organization

**Subject: Microprocessor****Subject Code 210253 (C214)**

C214.1	Use Assembly Language Programming to develop small real time
C214.2	Explain the architecture of the advanced processor thoroughly to use
C214.3	Describe architectural concepts like Protection and Multitasking in
C214.4	Identify working of Input-Output, Exceptions and Interrupts in 80386DX and apply them in programming.
C214.5	Illustrate debugging and testing techniques confined to 80386 DX.
C214.6	Describe concepts of 80386DX Signals, Bus Cycles and 80387

**Subject: Principles of Programming Languages****Subject Code 210254 (C215)**

C215.1	Explain the strengths and weaknesses of programming languages for
C215.2	Discuss the principles underlying the programming languages
C215.3	Explain structuring of program and programming paradigms

C215.4	Apply fundamental concepts in the object oriented programming using Java
C215.5	Apply inheritance, polymorphism and encapsulation in Java
C215.6	Use exception handling and manage IO in Java

**Subject: Computer Graphics Lab**

**Subject Code 210255 (C216)**

C216.1	Write programs using object oriented programming for elementary
C216.2	Write programs using transformations, curves and fractals for

**Subject: Advanced Data Structures Lab**

**Subject Code 210256 (C217)**

C217.1	Apply non linear data structures to solve real world problems.
C217.2	Use hash tables and dictionary to design algorithms for a specific
C217.3	Apply algorithm design techniques for indexing, sorting, multi-way

**Subject: MPL**

**Subject Code 210257 (C218)**

C218.1	Apply addressing modes and 64 bit instruction set to implement assembly language programs
C218.2	Apply logic for processor mode of operation
C218.3	Write 80387 NDP assembly language program

**Subject: Audit Course -II : Intellectual Property Rights**

**Subject Code 210258 (C219)**

C219.1	Describe the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition
C219.2	Identify principles of law relating to each of these areas of intellectual

**Class: Third Year Engineering (TE) 2015 Pattern**

**Semester- I**

**Subject: Theory of Computation**

**Subject Code 310241 (C301)**

C301.1	Design deterministic and nondeterministic finite automata.
C301.2	Construct regular expressions to present regular languages.
C301.3	Design context free grammar for context free languages.
C301.4	Design Turing machine for computational problems.
C301.5	Construct deterministic and nondeterministic pushdown automata.
C301.6	Describe the basic concepts of computation such as decidability, reducibility, complexity theory, intractable problems.

**Subject: Database Management Systems**

**Subject Code 310242 (C302)**

C302.1	Design E-R Model for given requirements and convert the same into
C302.2	Use database techniques SQL & PL/SQL.
C302.3	Identify systematic database design approaches covering Relational

C302.4	Illustrate transaction management in relational database System.
C302.5	Differentiate different database architecture for real time environment.
C302.6	Apply advanced NOSQL database programming concepts and

**Subject: Software Engineering and Project Management**

**Subject Code 310243 (C303)**

C303.1	Identify software process models for developing a software project
C303.2	Analyze software requirements to design the solutions for software.
C303.3	Apply quality attributes in software development life cycle.
C303.4	Analyze basics of IT Project management.
C303.5	Identify Risk Management, Configuration Management, Maintenance
C303.6	Discuss software testing approaches for software verification and validation

**Subject: Information System and Engineering Economics**

**Subject Code 310244 (C304)**

C304.1	Describe the basic knowledge of an Information System.
C304.2	Classify managerial issues relating to management information
C304.3	Discuss Information System solutions for E-governance
C304.4	Explain the concept of money management
C304.5	Evaluate present worth, future worth and annual worth analysis of economic domain
C304.6	Recognize cash flow analysis and taxes

**Subject: Computer Networks**

**Subject Code 310245 (C305)**

C305.1	Discuss the OSI model and its layer responsibilities in detail
C305.2	Determine design issue, flow control and error control
C305.3	Illustrate the channel allocation protocol
C305.4	Demonstrate different routing and switching algorithms for network
C305.5	Analyze data flow between TCP/IP model using Transport layer
C305.6	Illustrate Client-Server architectures and prototypes by the means of

**Subject: Skills Development Lab**

**Subject Code 310246 (C306)**

C306.1	Apply concepts of advance java/android/python/R-programming
C306.2	Construct software solutions for building applications and particular

**Subject: DBMS Lab**

**Subject Code 310247 (C307)**

C307.1	Develop the ability to handle databases of varying complexities
C307.2	Use advanced database Programming concepts

**Subject: Computer Network Lab**

**Subject Code 310248 (C308)**

C308.1	Demonstrate LAN and WAN protocol behavior using modern tools
C308.2	Examine the design issue, flow control and error control
C308.3	illustrate the channel allocation protocol

C308.4	Demonstrate basic configuration of switches and routers.
C308.5	Analyze data flow between peer to peer in IP network using transport
C308.6	Analyze data flow between peer to peer in IP network using Application Layer

**Subject: Audit Course -III- Cyber security**

**Subject Code 310249 (C309)**

C309.1	Understand social ethics and being helpful to society.
C309.2	Evaluate the role of strategy and policy in determining the success of information security

**Semester- II**

**Subject: Design and Analysis of Algorithm**

**Subject Code 310250 (C310)**

C310.1	Describe fundamental concepts of algorithms
C310.2	algorithms
C310.3	Discuss algorithmic strategies in order to find an optimal solution
C310.4	Analyze the asymptotic performance of algorithms belonging to P and NP classes
C310.5	Analyze amortized performance of data structures and algorithms
C310.6	Explain multithreaded, distributed and string matching Algorithms

**Subject: System Programming and Operating System**

**Subject Code 310252 (C311)**

C311.1	Analyze the design of an assembler
C311.2	Discuss data structures for the design of macro preprocessor, linker
C311.3	Explain the basics of compiler
C311.4	Discuss operating system functions
C311.5	Describe memory management techniques
C311.6	Describe I/O and file management techniques

**Subject: Embedded Systems and Internet of Things**

**Subject Code 310252 (C312)**

C312.1	Discuss Embedded System and Internet of Things
C312.2	Explain design methodologies for IoT platform
C312.3	Describe available technologies and devices for IoT
C312.4	Demonstrate IoT Protocols and Security
C312.5	Use the architecture for Web of Things and Cloud of Things
C312.6	Solve the given societal challenge using IoT

**Subject: Software Modeling and Design**

**Subject Code 310253 (C313)**

C313.1	Analyze design techniques for designing web based/ desktop applications.
C313.2	Design applications using static modeling.
C313.3	Design applications using dynamic modeling.
C313.4	Discuss architectural design

C313.5	Apply design patterns for object oriented concept of reusability
C313.6	Describe testing techniques for web-based/desktop applications.

**Subject: Web Technology**

**Subject Code 310254 (C314)**

C314.1	Discuss web development process and front end tools
C314.2	Apply JavaScript and jQuery to Validate the client side scripting
C314.3	Construct web based application using servlet and JSP for server side web technology
C314.4	Construct web based application using PHP for server side web technology
C314.5	Solve the complex problem using client and server side framework
C314.6	Identify web services and content management for solving problem

**Subject: Seminar**

**Subject Code 310255 (C315)**

C315.1	Identify basic technical writing concepts and terms, such as format,
C315.2	Improve skills to read, understand, and interpret material on technology.
C315.3	Develop communication and writing skills

**Subject: Web Technology Lab**

**Subject Code 310256 (C316)**

C316.1	Develop web based application using suitable client side and server
C316.2	Develop solution to complex problem using appropriate method

**Subject: SPOS Lab**

**Subject Code 310257 (C317)**

C317.1	Develop the basic operations of language translators.
C317.2	Write programs to perform the Operating System functionalities.

**Subject: ESIoT Lab**

**Subject Code 310258 (C318)**

C318.1	Design system for sensor based applications
C318.2	Solve the problems related to the primitive needs using IoT
C318.3	Develop IoT applications for distributed environment
C318.4	Develop a simple web interface for Raspberry pi/ Beagle board to

**Subject: Audit Course IV (Digital and social media marketing)**

**Subject Code 310259 (C319)**

C319.1	Use Social Listening tools to create timely, relevant content
C319.2	Discuss Social Media policies that combine business objectives with

**Class: Final Year Engineering (BE) 2015 Pattern**

**Semester- I**

**Subject: High Performance Computing**

**Subject Code 410241 (C401)**

C401.1	Describe parallel computing hardware and programming models
C401.2	Explain performance of modern parallel computing systems
C401.3	programming models
C401.4	Analyze models of parallel programs
C401.5	Solve a given problem using parallel algorithm
C401.6	Write parallel algorithm for a given problem using CUDA

**Subject: Artificial Intelligence and Robotics**

**Subject Code: 410242 (C402)**

C402.1	Design smart system using informed search / uninformed search or
C402.2	Solve problem using problem decomposition and planning
C402.3	Apply knowledge based reasoning to solve the problems
C402.4	Apply concept of natural language processing to problems leading to
C402.5	Explain fundamentals of mobile robotics
C402.6	Identify design issues of a robot for robotics applications

**Subject: Data Analytics**

**Subject Code 410243 (C403)**

C403.1	Describe life cycle phases of data Analytics
C403.2	Apply Statistical Methods for Evaluation of problems
C403.3	Apply Association Rules and Regression
C403.4	Solve problems using classification algorithms.
C403.5	Illustrate tools and techniques for big data visualization
C403.6	environments

**Subject: Elective -I Data Mining and Warehousing**

**Subject Code 410244D (C404D)**

C404D.1	Discuss concepts of data and data preprocessing .
C404D.2	Describe the concept of data warehouse
C404D.3	Solve problems based on data similarity and dissimilarity
C404D.4	Apply associations rules based data mining for decision making.
C404D.5	Apply classification algorithms.
C404D.6	Explain classifier performance using metrics.

**Subject: Elective -II Software Testing and Quality Assurance**

**Subject Code 410245B (C405B)**

C405B.1	Describe fundamental concepts of software quality assurance.
C405B.2	Explain test planning and its management.
C405B.3	Use concepts of software test automation
C405B.4	Apply Selenium automation tool for testing web based application
C405B.5	Discuss quality management, assurance, and quality standards
C405B.6	Explain Software Quality Tools and their effectiveness

**Subject: Laboratory Practice -I**

**Subject Code C406**

C406.1	Develop parallel algorithms to solve problem
C406.2	Apply AI techniques to solve problems
C406.3	Solve problem using data analytics tools

**Subject: Laboratory Practice -II****Subject Code 410247 (C407)**

C407.1	Develop pervasive or distributed applications
C407.2	Solve problems using data mining techniques.
C407.3	Apply recent automation tool for software testing.

**Subject: Project Work Stage -I****Subject Code 410248 (C408)**

C408.1	Knowledge Application & Independent Learning: Solve real life
C408.2	Problem Solving Skills: Analyze alternative approaches, apply and use
C408.3	Communication: Demonstrate effective communication at various
C408.4	Collaboration: Participate effectively in multi-disciplinary and
C408.5	Ethics: Provide solution to problems considering social, safety,

**Subject: Audit Course -V****Subject Code 410249 (C409)**

C409.1	Understand the legalities in product development.
C409.2	Understand and apply functional plans.
C409.3	Manage Entrepreneurial Finance.
C409.4	Inculcate managerial skill as an entrepreneur

**Semester- II****Subject: Machine Learning****Subject Code 410250 (C410)**

C410.1	Describe machine learning concepts
C410.2	Apply preprocessing methods to prepare training data sets for machine
C410.3	Solve problems using regression techniques
C410.4	Solve problems using supervised machine learning algorithms
C410.5	Differentiate learning models
C410.6	Solve problems using unsupervised machine learning algorithms

**Subject: Information and Cyber Security****Subject Code 410251 (C411)**

C411.1	Describe the concepts of Network and Information Security
C411.2	Apply the classical cipher & symmetric key cryptography techniques
C411.3	Differentiate cryptography and authentication techniques
C411.4	enhance the security against cyber-attacks.
C411.5	systems
C411.6	information protection laws.

**Subject: Elective -III Embedded and Realtime Operating System****Subject Code 410252C (C412C)**



C412C.1	Illustrate embedded and real-time systems
C412C.2	Explain processors required for embedded and networked embedded
C412C.3	Use communication bus protocols for embedded and real-time systems
C412C.4	Classify scheduling algorithms in RTOS
C412C.5	Describe the Inter process communication for RTOS
C412C.6	Discuss multiprocessor scheduling and software development process

**Subject: Elective - III Soft Computing and Optimization Algorithms**

**Subject Code: 410252D (C412D)**

C412D.1	Explain soft computing methodologies.
C412D.2	Describe fuzzy sets and logic.
C412D.3	Discuss fuzzy systems
C412D.4	Explain evolutionary computing
C412D.5	Apply genetic algorithms for developing applications.
C412D.6	Apply particle swarm optimization technique

**Subject: Elective -IV Human Computer Interface**

**Subject Code 410253B (C413B)**

C413B.1	Explain the foundations of Human–Computer Interaction (HCI)
C413B.2	Discuss design process of human computer interactions.
C413B.3	Describe tools used in human computer interactions.
C413B.4	Apply the fundamental aspects for designing and evaluating interfaces.
C413B.5	Apply users models for human computer interactions.
C413B.6	Discuss task model and usability testing.

**Subject: Laboratory Practice-III**

**Subject Code 410254 (C414)**

C414.1	Solve problems using supervised and unsupervised machine learning
C414.2	Demonstrate symmetric and asymmetric cryptography algorithms

**Subject: Laboratory Practice -IV**

**Subject Code 410455 (C415)**

C415.1	Illustrate the concept of Embedded and real time OS/Soft
C415.2	Construct system based on Embedded and real time OS/Soft

**Subject: Project Work Stage -II**

**Subject Code 410256 (C416)**

C416.1	Knowledge Application & Independent Learning: Solve real life
C416.2	Problem Solving Skills: Analyze alternative approaches, apply and use
C416.3	Communication: Demonstrate effective communication at various
C416.4	Collaboration: Participate effectively in multi-disciplinary and
C416.5	Ethics: Provide solution to problems considering social, safety,

**Subject: Audit Course VI**

**Subject Code 410257 (C417) (MOOC-Learn New Skill)**

C417.1	Use open source tools for self learning
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