



**NASHIK DISTRICT MARATHA VIDYA PRASARAK SAMAJ'S**  
**Karmaveer Adv. Baburao Ganpatrao Thakare**  
**College of Engineering**

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**KBTCOE**  
Affiliated to Savitribai Phule Pune University  
& Approved by AICTE New Delhi

## **Dept. of Computer Engineering**

### **CO (Course Outcomes) AY 2018-19**

#### **Vision**

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**

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**

1. To prepare globally competent graduates having strong fundamentals and domain knowledge to provide effective solutions for engineering problems.
2. To prepare the graduates to work as a committed professionals with strong professional ethics and values, sense of responsibilities, understanding of legal, safety, health, societal, cultural and environmental issues.
3. To prepare committed and motivated graduates with research attitude, lifelong learning, investigative approach, and multidisciplinary thinking.
4. To prepare the graduates with strong managerial and communication skills to work effectively as individual as well as in teams.

## Program Specific Outcomes

A graduate of the Computer Engineering Program will demonstrate-

1. **Professional Skills**-The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying.
2. **Problem-Solving Skills**- The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.
3. **Successful Career and Entrepreneurship**- The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

## Program Outcomes

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
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 the public health and safety, and the cultural, societal, and environmental considerations.
4. **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.
5. **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.
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 a member or leader in diverse teams, and in multidisciplinary settings.

10. **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.

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.

Class: SE (Sem-I)      Subject: Discrete Mathematics (C201)

CO1	Solve real world problems logically using appropriate set.
CO2	Solve real world problems logically by using function and relation models.
CO3	Understand and determine logical possibilities of events.
CO4	Analyze and synthesize the real world problem using graph theory.
CO5	Learn real time application of trees.
CO6	Study of algebraic structures.

Class: SE (Sem-I)      Subject: Digital Electronics and Logic Design (C202)

C202.1	Realize and simplify Boolean Algebraic assignments for designing Combinational digital circuits using K-Maps.
C202.2	To design and implement Sequential digital circuits as per the specifications.
C202.3	To design the simple digital systems using VHDL.
C202.4	To design combinational circuits using PLDs.
C202.5	Apply the knowledge to appropriate IC as per the design specifications.

C202.6	Develop simple embedded system for simple real world application.
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Class: SE (Sem-I) Subject: Data Structures and Algorithms (C203)

CO1	To study the algorithm design strategies to solve the programming problems using suitable data structures
CO2	To discriminate the various data structures and their usage in approaching the problem solution
CO3	To use effective and efficient linked list data structure in solving various Computer Engineering domain problems.
CO4	To analyze the problems to apply suitable algorithm and implement stack as a data structure
CO5	To study and implement queue as a data structure
CO6	To use appropriate algorithmic strategy for better efficiency

Class: SE (Sem-I) Subject: Computer Organization and Architecture (C204)

C204.1	Study Computer Architecture concepts related to structure, function and characteristics of computer systems
C204.2	Demonstrate computer architecture concepts related to design of modern processors and memories.
C204.3	Study concepts related to I/O devices and their different methods.
C204.4	Understand instruction set of processors and addressing modes and their application.
C204.5	Analyze the principles of computer architecture using examples drawn from commercially available computers.
C204.6	Understand concepts related to Basic Processing Unit.

Class: SE (Sem-I) Subject: Object Oriented Programming (C205)

C205.1	Understand the principles of Object Oriented Programming (OOP) and fundamentals of object oriented programming language C++
C205.2	Analyze the strengths of OOP using Polymorphism and Inheritance
C205.3	Design and apply OOP for effective programming using virtual functions
C205.4	Develop programming application to improve reusability and error handling
C205.5	Understand basic concepts of files and streams for data handling
C205.6	Understand Standard Template Library (STL) to simplify applicability of OOP

Class: SE (Sem-I) Subject: Digital Electronics Lab (C206)

C206.1	Design and implement Combinational circuit using different types of gates
C206.2	To design and implement Sequential digital circuits using Flip-flops
C206.3	Design and Simulation of different combinational and sequential circuits using different modeling styles (VHDL).
C206.4	Study of Shift Registers, TTL logic families Microcontroller 8051.

Class: SE (Sem-I) Subject: Data Structures Lab (C207)

CO1	To discriminate the usage of various structures in approaching the problem solution.
CO2	To design the algorithms to solve the programming problems.

CO3	To use effective and efficient data structures in solving various Computer Engineering domain problems
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Class: SE (Sem-I) Subject: Object Oriented Programming Lab (C208)

C208. 1	Install and configure 64 bit Linux Operating Systems.
C208. 2	Write programs using OOP concepts to develop programs for various applications using C++.

Class: SE (Sem-I) Subject: Soft Skills (C209)

C209. 1	Effectively communicate through verbal/oral communication and improve the listening skills
C209. 2	Write precise briefs or reports and technical documents.
C209. 3	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
C209. 4	Become more effective individual through goal/target setting, self motivation and practicing creative thinking.
C209. 5	Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Interpersonal relationships, conflict management and leadership quality.

Class: SE (Sem-I) Subject: Audit Course 1 (C210)

C210.1	Understand social ethics and being helpful to society.
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C210.2	Write precise briefs or reports and technical documents.
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Class: SE (Sem-II) Subject: Engineering Mathematics III (C211)

CO1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
CO2	Solve problems related to Fourier transform, Z-Transform and applications to Signal and Image processing.
CO3	Apply statistical methods like correlation, regression analysis for prediction of a given data as applied to machine intelligence.
CO4	Apply probability theory like Random variables, Mathematical Expectation, Probability density function, Probability distributions for prediction of a given data as applied to machine intelligence.
CO5	Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
CO6	Analyze conformal mappings, transformations and perform contour integration of complex functions required in Image processing, Digital filters and Computer graphics.

Class: SE (Sem-II) Subject: Computer Graphics (C212)

C212.1	Apply mathematics and logic to develop Computer programs for elementary graphic operations
C212.2	Learn the various algorithms for generating and rendering graphical figures
C212.3	Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics
C212.4	Apply the logic to develop animation and gaming programs

C212.5	Understand and apply various methods and techniques regarding shading, illumination and lighting
C212.6	Develop the competency to understand the concepts related to Computer Vision and Virtual reality

Class: SE (Sem-II) Subject: Advanced Data Structures (C213)

CO1	To apply tree as an advanced data structure and apply efficient algorithms to approach the problems of various domain.
CO2	To understand graph as data structures and design the algorithms to solve the programming problems
CO3	To use hashing technique for implementing effective and efficient data structures in solving various Computer Engineering domain problems
CO4	To study search trees and analyze the algorithmic solutions for resource requirements and optimization
CO5	To use appropriate modern tools to understand and analyze the functionalities confined to the data structure usage
CO6	To know the file organization and its use as a data structure in programming problems

Class: SE (Sem-II) Subject: Microprocessor (C214)

C213.1	Study Assembly Language Programming to develop small real time embedded application.
C213.2	Understand the architecture of the advanced processor thoroughly to use the resources for programming
C213.3	Understand architectural concepts like Protection and Multitasking in advanced processor thoroughly to use the resources for programming.
C213.4	Study working of Input-Output, Exceptions and Interrupts in 80386DX and apply them in programming.

C213.5	Understand debugging and testing techniques confined to 80386 DX.
C213.6	Understand concepts of 80386DX Signals, Bus Cycles and 80387 Coprocessor.

Class: SE (Sem-II) Subject: Principles of Programming Languages (C215)

C215.1	Analyze the strengths and weaknesses of programming languages for effective and efficient program development
C215.2	Inculcate the principles underlying the programming languages enabling to learn new programming languages
C215.3	Grasp structuring of program and different programming paradigms
C215.4	Use fundamental concepts in the object oriented programming paradigm effectively in application development using Java
C215.5	Learn inheritance, polymorphism and encapsulation in Java and apply the knowledge for application development
C215.6	Implement exception handling and manage IO in Java

Class: SE (Sem-II) Subject: Computer Graphics Lab (C216)

C216.1	Write programs using object oriented programming language C++ to develop Computer programs for elementary graphic operations.
C216.2	Write programs using scientific and strategic approach to solve complex problems in the domain of Computer Graphics
C216.3	Write programs to understand the practical implementation of modeling, rendering, and Virtual reality

Class: SE (Sem-II) Subject: Advanced Data Structures Lab (C217)

CO1	To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain.
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CO2	To use effective and efficient data structures in solving various Computer Engineering domain problems.
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Class: SE (Sem-II) Subject: Microprocessor Lab (C218)

C217.1	To understand 64 bit application instruction set and logic to build assembly language programs.
C217.2	To apply the assembly language programming to develop small application.
C217.3	To learn use of open source tools for 64 bit assembly language programming.

Class: SE (Sem-II) Subject: Audit Course 2 (C219)

C210.1	Understand social ethics and being helpful to society.
C210.2	Write precise briefs or reports and technical documents.

Class: TE (Sem-I) Subject: **Theory of Computation** (C301)

C301.1	Apply linguistic theory
C301.2	Solve problems using NFA and DFA
C301.3	Subdivide problems space based on input subdivision using constraints and design grammar for languages

C301.4	Design deterministic and nondeterministic Turing machine for all input all output
C301.5	Solve problems using Pushdown automata
C301.6	Understand the basic concepts of complexity theory for NP Complete and NP Hard

Class: TE (Sem-I) Subject: **Database Management Systems (DBMS)** (C302)

CO-1	Design E-R Model for given requirements and convert the same into database tables
CO-2	Use database techniques such as SQL & PL/SQL
CO-3	To give systematic database design approaches covering Relational Database Design
CO-4	Explain transaction Management in relational database System
CO-5	Describe different database architecture and analyses the use of appropriate architecture in real time environment.
CO-6	Use advanced database Programming concepts and techniques such as NOSQL

Class: TE (Sem-I) Subject: **Software Engineering & Project Management** (C303)

CO1	To analyze the problem statement (SRS) and choose proper design technique for designing web based/ desktop application
CO2	To design and analyze an application using UML modeling as fundamental tool
CO3	To design and analyze dynamic model
CO4	To design and apply appropriate modern tools for architectural designing and modeling
CO5	To apply design patterns to understand reusability in OO design
CO6	To decide and apply appropriate modern testing tool for testing web-based/desktop application tools.

Class: TE (Sem-I) Subject: **Information Systems & Engineering Economics** (C304)

C304.1	Understand the need, usage and importance of an Information System to an organization.
C304.2	Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization.
C304.3	Be aware of various Information System solutions like ERP, CRM and the issues in successful implementation of these technology solutions in any organizations
C304.4	Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry.
C304.5	Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives.
C304 .6	Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.

Class: TE (Sem-I)    Subject: **Computer Networks** (CN) (C305)

C305.1	To Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies
C305.2	To demonstrate design flow control and error control
305.3	To Study the various channel allocation protocol.
C305.4	To Demonstrate different routing and switching algorithms
C305.5	To Analyze data flow between TCP/IP models using Transport Layer.
C305.6	To understand data flow between TCP/IP models using application Layer.

Class: TE (Sem-I) Subject: **Skills Development Lab** (C306)

C306.1	Evaluate problems and analyze data using current technologies in a wide variety of business and organizational contexts.
C306.2	Create data-driven web applications
C306.3	Incorporate best practices for building applications
C306.4	Employ Integrated Development Environment(IDE) for implementing and testing of software solution
C306.5	Construct software solutions by evaluating alternate architectural patterns.

Class: TE (Sem-I) Subject: **DBMS Lab** (C307)

CO1	Develop the ability to handle databases of varying complexities
CO2	Use advanced database Programming concepts

Class: TE (Sem-I) Subject: **CN Lab** (C308)

C308.1	Demonstrate LAN and WAN protocol behavior using Modern Tools.
C308.2	Demonstrate design flow control and error control
C308.3	Analyze data flow between peer to peer in an IP network using Network Layer Protocols and Demonstrate basic configuration of switches and routers.
C308.4	Analyze data flow between peer to peer in an IP network using transport Layer Protocols
C308.5	Develop Client-Server architectures and prototypes by the means of correct standards and technology.

Class: TE (Sem-I) Subject: **Audit Course 3** (C309)

**AC3-I Cyber Security**

C309.1	Understand social ethics and being helpful to society.
C309.2	Write precise briefs or reports and technical documents.

Class: TE (Sem-II) Subject: **Design & Analysis of Algorithms** (C310)

C310.1	Understand fundamentals of Algorithms
C310.2	Formulate the problem using computational models
C310.3	Design an algorithm using algorithmic strategies to solve problems and find an optimal solution by applying various methods
C310.4	Analyze the asymptotic performance of algorithms and Understand P and NP classes
C310.5	Perform Amortized Analysis of various data structure algorithms and understand Randomized, Approximate and Embedded Algorithms
C310.6	Understand Multithreaded, Distributed and String Matching Algorithms

Class: TE (Sem-II) Subject: **Systems Programming & Operating System** (SP & OS) (C311)

<b>C311.1</b>	Analyze and synthesize system software and design of an assembler
<b>C311.2</b>	Learn and understand data structures for design of macro preprocessor, linker and loader
<b>C311.3</b>	Study the basics of compilers and use tools like LEX & YACC
<b>C311.4</b>	Implement operating system functions
<b>C311.5</b>	Study Memory Management techniques and implement page replacement schemes

<b>C311.6</b>	Understand I/O Management techniques
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Class: TE (Sem-II) Subject: **Embedded Systems & Internet of Things (ES & IoT)** (C312)

<b>C312.1</b>	Introduction to Embedded System and Internet of Things
<b>C312.2</b>	Implement an architectural design for IoT for specified requirement
<b>C312.3</b>	Study the given societal challenge using IoT and choose between available technologies and devices for stated IoT challenge
<b>C312.4</b>	Learn and understand IoT Protocols and Security
<b>C312.5</b>	Study available technologies for Web of Things and Cloud of Things
<b>C312.6</b>	Solve the given societal challenge using IoT

Class: TE (Sem-II) Subject: **Software Modeling and Design** (C313)

C313.1	To analyze the problem statement (SRS) and choose proper design technique for designing web based/ desktop application
C313.2	To design and analyze an application using UML modeling as fundamental tool
C313.3	To design and analyze dynamic model
C313.4	To design and apply appropriate modern tools for architectural designing and modeling
C313.5	To apply design patterns to understand reusability in OO design
C313.6	To decide and apply appropriate modern testing tool for testing web-based/desktop application tools.

Class: TE (Sem-II) Subject: **Web Technology** (C314)

C314.1	Understand Web Development Process and Front End Tools
C314.2	Develop web based application using suitable client side web technologies
C314.3	Develop web based application using suitable server side web technologies using servlet and jsp
C314.4	Develop web based application using suitable server side web technologies using PHP
C314.5	Develop and analyze solution to complex problems using appropriate web development and design methodology and frameworks
C314.6	Understand web services and content management for solving problems

Class: TE (Sem-II) Subject: **Seminar & Technical Communication (C315)**

C315.1	be able to be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.
C315.2	be able to improve skills to read, understand, and interpret material on technology.
C315.3	improve communication and writing skills

Class: TE (Sem-II) Subject: **Web Technology Lab (C316)**

C316.1	Use Front End Tools for Web Development
C316.2	Develop web based application using suitable client side web technologies
C316.3	Develop web based application using suitable server side web technologies using servlet and jsp

C316.4	Develop web based application using suitable server side web technologies using PHP
C316.5	Develop and analyze solution to complex problems using appropriate web development and design methodology and frameworks
C316.6	Implement basic web services and content management

Class: TE (Sem-II) Subject: **SP & OS Lab** (C317)

C317.1	Implement the basic operations of language translators.
C317.2	Handle tools like LEX & YACC.
C317.3	Implement the Operating System functionalities.

Class: TE (Sem-II) Subject: **ES & IoT Lab** (C318)

C318.1	Design minimum system for sensor based applications
C318.2	Solve the problems related to the primitive needs using IoT
C318.3	Develop fully fledged IoT applications for distributed environment

Class: TE (Sem-II) Subject: **Audit Course 4** (C319)

AC4-IV: Leadership and Personality Development

C319.1	Understand social ethics and being helpful to society.
C319.1	Write precise briefs or reports and technical documents.

Class: BE (Sem-I) Subject: High Performance Computing (C401)

C401.1	To study parallel computing hardware and programming models
C401.2	Analyze and measure performance of modern parallel computing systems
C401.3	To understand different parallel architectures, inter-connect networks, programming models
C401.4	To be conversant with performance analysis and modeling of parallel programs
C401.5	To understand the options available to parallelize the programs
C401.6	Develop an efficient parallel algorithm to solve given problem using CUDA.

Class: BE (Sem-I)    Subject: Artificial Intelligence and Robotics (C402)

C402.1	Design smart system using different informed search / uninformed search or heuristic approaches
C402.2	Understand problem decomposition and planning
C402.3	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
C402.4	Apply the suitable algorithms to solve AI problems
C402.5	Acquaint with the fundamentals of mobile robotics

C402.6	Understand robotics in practice
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Class: BE (Sem-I) Subject: Data Analytics (C403)

C403.1	To Study life cycle phases of data Analytics
C403.2	To apply Statistical Methods for Evaluation of problems
C403.3	To learn and apply Association Rules and Regression
C403.4	To solve problems using classification algorithms for various applications
C403.5	To study tools and techniques for big data visualization
C403.6	To Provide problem solutions for multicore or distributed ,concurrent/parallel environments

Class: BE (Sem-I) Subject: Elective I (C404)  
(C404A) Digital Signal Processing

C404A.1	Understand the mathematical models and representations of DT Signals and Systems
C404A.2	Apply different transforms like Fourier Transform from applications point of view.
C404A.3	Apply transforms like Fast Fourier transform and Z-Transform from applications point of view
C404A.4	To explore Design and analysis of Discrete Time (DT) signals and systems
C404A.5	Understand the design and implementation of DT systems as DT filters with filter structures and different transforms
C404A.6	To get acquainted with the DSP Processors and DSP applications

(C401D)

Course title( Elective-I)	Data Mining and Warehousing 410444D
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C401D.1	To understand concepts of data and data preprocessing w.r.t. data mining.
C401D.1	To understand the concept of data warehouse
C401D.1	TO Measuring Data Similarity and Dissimilarity
C401D.1	To apply associations and correlation based data mining for decision making.
C401D.1	To develop programs and methods for classification algorithms for various applications.
C401D.1	To study Multiclass Classification, and Reinforcement learning

Class: BE (Sem-I)      Subject: Elective I- Pervasive And Ubiquitous Computing **410244(C)**

CO1	Design and implement primitive pervasive applications
CO2	Analyze and estimate the impact of pervasive computing on future computing applications and society
CO3	To study various concepts of Voice enabled pervasive computing.
CO4	To learn a preliminary system to meet desired needs within the constraints of a particular problem space
CO5	To Study User Interface Issues in Pervasive Computing applications for society
CO6	To develop sensing activity based Pervasive computing application.

(C405B): Software Testing and Quality Assurance

C405.1	Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance.
C405.2	Design and develop project test plan, design test cases, test data, and conduct test operations
C405.3	Understand fundamental concepts of software automation
C405.4	Apply recent automation tool for various software testing for testing software
C405.5	Apply different approaches of quality management, assurance, and quality standard to software system
C405.6	Apply and analyze effectiveness Software Quality Tools

**Distributed Systems**

CO1	To learn and apply the concept of remote method invocation and Remote Procedure Calls
CO2	To study and implement various Distributed Algorithms
CO3	To understand Distributed Snapshot
CO4	To get acquainted with Distributed Consensus
CO5	To learn communication methodology in distributed systems.
CO6	To demonstrate and understand the challenges faced by distributed systems

(C405C) Operations Research

C405C.1	Identify the characteristics of different types of decision-making environments
C405C.2	Use appropriate decision making approaches and tools
C405C.3	Build various dynamic and adaptive models
C405C.4	Develop critical thinking and objective analysis of decision problems
C405C.5	Apply the OR techniques for efficacy

C405C.6	Use of optimization approaches and fundamental solutions for solving business decision problems and goals
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Class: BE (Sem-I) Subject: Laboratory Practice I (C406)

C406.1	To implement solutions for multi-core or distributed, concurrent/Parallel environments
C406.2	Apply the suitable algorithms to solve AI problems

Class: BE (Sem-I) Subject: Laboratory Practice II (C407)

C407.1	Design and implement pervasive or distributed applications
C407.2	Apply various methods, techniques and algorithms in data mining
C407.3	Apply recent automation tool for various software testing for testing software

Class: BE (Sem-I) Subject: Project Work Stage I (C408)

CO1	<b>Knowledge Application &amp; Independent Learning:</b> Solve real life problems by applying knowledge and skills keeping eye on current technologies and inculcating the practice of lifelong learning
CO2	<b>Problem Solving Skills:</b> Analyze alternative approaches, apply and use most appropriate one for feasible solution exhibiting project management skills
CO3	<b>Communication:</b> Demonstrate effective communication at various levels and write precise reports and technical documents in a nutshell
CO4	<b>Collaboration:</b> Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality

CO5	<b>Ethics:</b> Provide solution to problems considering social, safety, environmental, ethical and legal issues
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Class: BE (Sem-I) Subject: Audit Course 5 (C409)

C409.1	Discover how you can manage your emotions, and positively influence yourself and others
C409.2	Positively influence and motivate colleagues, team members, managers

Class: BE (Sem-II) Subject: Machine Learning (C410)

C410.1	Understand and distinguish different learning based applications
C410.2	Apply different preprocessing methods to prepare training data set for machine learning.
C410.3	Design and implement supervised and unsupervised machine learning algorithm.
C410.4	Design and implement unsupervised machine learning algorithm.
C410.5	Implement different learning models
C410.6	Learn Meta classifiers and deep learning concepts

Class: BE (Sem-II) Subject: Information and Cyber Security (C411)

C411.1	Gauge the security protections and limitations provided by today's technology.
C411.2	To learn the symmetric key cryptography techniques.
C411.3	To learn the public key cryptography & authentication techniques.
C411.4	To study different security protocols

C411.5	Identify information security and cyber security threats.
C411.6	To enhance awareness about Personally Identifiable Information (PII), Information Management, cyber forensics

Class: BE (Sem-II) Subject: Cloud computing Elective IV (C412)  
(C412A)

CO1	To understand cloud computing concepts
CO2	To learn cloud based file system and security
CO3	To know virtualization concepts
CO4	To study components of Amazon web services (AWS)
CO5	To explore the applications based on cloud computing
CO6	To explore future trends of cloud computing

(C412B)

Class: BE (Sem-II) Subject: Elective IV (C413)  
(C413B) Human Computer Interface

C413C.1	Study the basics of human and computational abilities and limitations.
C413C.2	Understand design process of HCI.
C413C.3	Understand tools and techniques in HCI.
C413C.4	Apply the fundamental aspects of designing and evaluating interfaces.
C413C.5	Apply cognitive models for predicting human computer interactions.
C413C.6	Learn task model and usability testing.

(C413C)

Embedded and Real Time Operating System(410252 C) Elective-III

C412.1	Understand the basics of Embedded System
C412.2	Understand different processors required for embedded system and networked embedded systems
C412.3	Recognize communication bus protocols used for embedded and real-time systems
C412.4	Classify and demonstrate scheduling algorithms in RTOS
C412.5	Understand the Inter process communication for RTOS
C412.6	Apply software development process to a given RTOS application

Class: BE (Sem-II) Subject: Elective III (C412)  
Soft Computing and optimization Algorithms (410252 D)

CO1	To study soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy inference systems and genetic algorithms
CO2	To apply concept of fuzzy sets and logic for developing applications
CO3	To design scientific applications using fuzzy systems
CO4	To study evolutionary computing
CO5	To use genetic algorithms for developing applications.
CO6	To know particle swarm optimization as an optimization technique

Class: BE (Sem-II) Subject: Laboratory Practice III (C414)

CO1	To implement supervised and unsupervised machine learning algorithm
CO2	To implement standard cryptography algorithms

Class: BE (Sem-II) Subject: Laboratory Practice IV (C415)

C415.1	Design and modeling of a Embedded / Real-Time System
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C415.2	Design and development of application using computational neural network models, fuzzy models/genetic algorithms in specific applications.
C415.3	To install cloud computing environments.
C415.4	To develop any one type of cloud
C415.5	Apply appropriate HCI techniques to design systems that are usable by people

Class: BE (Sem-II) Subject: Project Work Stage II (C416)

C416.1	<b>Knowledge Application &amp; Independent Learning:</b> Solve real life problems by applying knowledge and skills keeping eye on current technologies and inculcating the practice of lifelong learning
C416.2	<b>Problem Solving Skills:</b> Analyze alternative approaches, apply and use most appropriate one for feasible solution exhibiting project management skills
C416.3	<b>Communication:</b> Demonstrate effective communication at various levels and write precise reports and technical documents in a nutshell
C416.4	<b>Collaboration:</b> Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality
C416.5	<b>Ethics:</b> Provide solution to problems considering social, safety, environmental, ethical and legal issues

Class: BE (Sem-II) Subject: Audit Course 6 (C417)

C417.1	Understand and use the concepts of data warehousing wherever necessary
C417.2	Study the concepts of Business Intelligence in real world applications