



## Course Outcomes

### Academic Year 2018-19

	<b>Discrete Mathematics</b>
C201.1	Explain and apply Set theory, Logic, Relation and Function to solve problems.
C201.2	Calculate number of possible outcomes of elementary combinatorial processes.
C201.3	Analyze mathematical data structures, Tree and Graph to solve problems.
C201.4	Explain and solve problems on algebraic structure and coding theory using mathematical methods.

	<b>Digital Electronics and Logic Design</b>
C202.1	Relate and Compare the functionality of Combinational and Sequential Circuits.
C202.2	Define the concept of ASM charts and Analyze the digital circuits using VHDL
C202.3	Apply and compare the functionalities, applicability of Logic Families and programmable logic devices.
C202.4	Illustrate concepts of Microcontroller 8051 and Programming Model.



	<b>Data Structures and Algorithms</b>
C203.1	Relate and Solve time complexities of various algorithms and recurrence relations.
C203.2	Solve problems using sequential, linked list and GLL Concepts of data structure.
C203.3	Develop algorithms using the concepts of data structure such as stack and queue.
C203.4	Compare and Make use of different searching and sorting technique based on space and time complexity of the algorithm.

	<b>Computer Organization and Architecture</b>
204.1	Illustrate computer architecture design and solve problems of arithmetic operations.
204.2	Explain computer memory system and I/O systems.
204.3	Explain instruction set architecture of a processor.
204.4	Differentiate and illustrate design alternatives in the processor organization.



	<b>Object Oriented Programming</b>
C205.1	<b>Define</b> concepts of OOP.
C205.2	Write programming applications using inheritance, polymorphism and virtual function.
C205.3	<b>Explain</b> templates, Standard Template Library and exception handling in C++ programming.
C205.4	<b>Explain</b> concepts of file handling in Object Oriented Programming.

	<b>Digital Electronics Lab</b>
C206.1	<b>Simplify</b> and Implement Boolean expressions for designing digital circuits using K-Maps.
C206.2	<b>Design and implement</b> Sequential and Combinational digital circuits as per the specifications.
C206.3	<b>Design</b> simple digital circuits using VHDL
C206.4	<b>Compare</b> the functionalities, properties and applicability of Logic Families.



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	<b>Data Structures Lab</b>
C207.1	Experiment with various set operations and matrix operations using Array.
C207.2	Construct real world problems using singly and doubly linear data structure.
C207.3	Test for “Expression is well parenthesized or not” and Expression conversion using Stack concepts.
C207.4	Simplify applications based on the concept of Simple and circular queue.
C207.5	Compare Searching and Sorting techniques based on time complexity.

	<b>Object Oriented Programming Lab</b>
C208.1	<b>Analyze</b> and <b>develop</b> solutions for real time problems using features of OOP in C++.
C208.2	<b>Develop</b> programs using templates, exception handling and file handling concepts of OOPs.
C208.3	<b>Utilize</b> STL to develop C++ program for linked and sequential organisation.
C208.4	<b>Design</b> and <b>develop</b> mini project using features of OOP.



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	<b>Soft Skills</b>
C209.1	Establish effective communication among Peers.
C209.2	Prepare effective reports, technical documents and presentations.
C209.3	Cope with stress, possess human values, morals and ethics.
C209.4	Express inter personal skills and soft skills.

	<b>Audit Course 1</b>
C210.1	Describe the basics of German language.
C210.2	Express the knowledge in German language.
C210.3	Developed interest to pursue professional German language course.



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	<b>Engineering Maths - III</b>
C211.1	Solve higher order linear Differential equations and model L-C-R electrical circuits.
C211.2	Evaluate Fourier Transform, Inverse Fourier Transform, Z-transform, and Inverse Z-transform.
C211.3	Analyze given data using measures of central tendency, dispersion, moments, skewness, kurtosis, correlation-regression.
C211.4	Apply techniques of Probability, Probability Distributions and Chi-Square Test to analyze given data
C211.5	Apply vector differential operators to deal with Directional Derivatives, Vector Identities, Scalar Potential, Solenoidal, Irrotational and Conservative Fields, Greens, Gauss divergence, Stokes theorem to evaluate Line integral, Surface integral, volume integrals and solve problems in Electromagnetic fields.
C211.6	Check analytic functions using Cauchy Riemann Theorem, evaluate bilinear transformation and apply Cauchy's integral theorem, residue theorem to evaluate line integrals in the complex plane.

	<b>Computer Graphics</b>
C212.1	<b>Define</b> Graphics primitives and <b>Explain</b> polygon clipping algorithms
C212.2	<b>Illustrate</b> 2D and 3D Transformations and Projections in the domain of Computer Graphics.
C212.3	<b>Explain</b> Illumination models and shading algorithm.
C212.4	<b>Apply</b> the logic to implement animation and gaming programs.



	<b>Advanced Data Structures</b>
C213.1	<b>Experiment with</b> appropriate advanced data structure like tree and graph.
C213.2	<b>Implement solutions for</b> real world problems using hash tables and search trees
C213.3	<b>Explain</b> different indexing techniques and multiway trees.
C213.4	<b>Organize data</b> using different file organizations.

	<b>Microprocessor</b>
C214.1	Illustrate basic model, system architecture and memory management of 80386DX microprocessor.
C214.2	Explain concepts of multitasking, protection, Exception and Interrupt handling of 80386DX.
C214.3	Find errors and Debug programs written in assembly language.
C214.4	Explain signals and bus cycles of 80386 and Illustrate the architecture of 80387 coprocessor.



	<b>Principles of Programming Languages</b>
C215.1	<b>Explain Significance of</b> syntax and semantics for programming languages to write efficient and effective programs.
C215.2	<b>Explain</b> various data types, programming structure and different programming paradigms
C215.3	<b>Describe and Apply</b> OOP features in JAVA programming.
C215.4	<b>Discuss</b> exception handling and basics of Applet in JAVA.

	<b>Computer Graphics Lab</b>
C216.1	<b>Explain and Implement</b> line drawing and circle drawing algorithms in computer graphics.
C216.2	<b>Develop</b> polygon filling and clipping algorithms.
C216.3	<b>Explain and Implement</b> Curve Generation algorithms using concept of fractals.
C216.4	<b>Apply</b> 2D and 3D transformations for objects.





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	<b>Advanced Data Structures Lab</b>
C217.1	<b>Apply</b> the concepts of tree and graph to solve real world problems.
C217.2	<b>Implement</b> hash tables and search trees.
C217.3	<b>Design and implement</b> different STLs to solve the problems of various domains.
C217.4	<b>Write</b> programs using Java Concepts.

	<b>Microprocessor Lab</b>
C218.1	Write and execute assembly language programs (ALP) to perform data transfer operations.
C218.2	Experiment with processor and coprocessor by writing ALPs to perform arithmetic operations.
C218.3	Develop ALPs to perform logical operations.
C218.4	Experiment with control instructions to write ALPs to control operations of the processor.



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	<b>Audit Course 2</b>
C219.1	Compare the importance of gym and yoga
C219.2	Explain the significance of stress management
C219.3	Explain the power of concentration, focus and awareness
C219.4	Identify the influence of ayurveda in healthcare



	<b>Theory of Computation</b>
C301.1	Interpret basic concepts of formal language theory and finite automata.
C301.2	Analyze and construct the finite automata for regular expression.
C301.3	Utilize Context Free Grammar to define language.
C301.4	Construct Turing machines for different languages.
C301.5	Build a Push Down Automata for a given Context Free Language.
C301.6	Analyze the algorithmic problems into P and NP.

	<b>Database Management Systems (DBMS)</b>
C302.1	Illustrate the basic concepts of DBMS and Construct E-R Model.
C302.2	Develop queries using Structure Query Language SQL and PL/ SQL for creation and manipulation of Database.
C302.3	Analyze and apply the concepts of normalization in relational database System.
C302.4	Demonstrate Database Transactions and Transaction Management.
C302.5	Explain different database architecture.



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	<b>Software Engineering &amp; Project Management</b>
C303.1	Choose the process model, analyze the software requirements.
C303.2	Design a software system and Explain the architecture, user interface, components for a software system.
C303.3	Determine risks and estimate the project cost and schedule for Software being developed.
C303.4	Explain a testing strategy for software system and write test cases.

	<b>Information Systems &amp; Engineering Economics</b>
C304.1	<b>Explain</b> various forms of information systems & its applications in an organization.
C304.2	<b>Explain</b> the role of the major types of information systems in a business environment and their relationship to each other.
C304.3	<b>Solve</b> problems on time value of money.
C304.4	<b>Apply</b> the appropriate engineering economics and <b>analyze</b> the software enterprises from similar domains.
C304.5	<b>Explain</b> the effects of depreciation, income taxes, inflation and price change in engineering economics.



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	<b>Computer Networks (CN)</b>
C305.1	Explain the fundamental concepts of wired and wireless Networks.
C305.2	Solve the design issues related to sub layers of Data Link Layer.
C305.3	Identify different routing protocols at Network Layer.
C305.4	Analyze data flow through transport and application layers of TCP/IP model.

	<b>Skills Development Lab</b>
C306.1	<b>Make use of</b> data structures and collection framework to <b>develop</b> a system.
C306.2	<b>Apply</b> socket programming, JDBC, multithreading concept to develop a system.
C306.3	<b>Develop</b> a real-time application in team and demonstrate it.
C306.4	<b>Solve</b> problems of critical thinking, logical ability and vocabulary skills



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	<b>DBMS Lab</b>
C307.1	<b>Design and implement</b> database using SQL queries.
C307.2	<b>Solve real</b> world problems using PL/SQL for creation and manipulation of Database.
C307.3	<b>Compile</b> queries for NOSQL databases.
C307.4	<b>Build a</b> database application using basic and advanced database concepts.

	<b>CN Lab</b>
C308.1	<b>Assess</b> the network for data transfer, error control and flow control.
C308.2	<b>Construct</b> routing algorithm with the help of modern tools.
C308.3	<b>Analyze</b> socket programming at transport layer.
C308.4	<b>Elaborate</b> the services provided by application layer across the network.



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	<b>Audit Course 3</b>
C309.1	Explain the elements of Information security and models of N/W security.
C309.2	Classify different authentication methods, protocols and services.
C309.3	List different standards for electronic mail security and web security.
C309.4	Explain intrusion detection system, firewall and hacking.

	<b>Design &amp; Analysis of Algorithms</b>
C310.1	<b>Explain</b> the fundamentals of algorithm using design methods.
C310.2	<b>Apply</b> the appropriate algorithmic strategy to solve problems.
C310.3	<b>Analyze</b> the time and space complexity of various algorithms and problems.
C310.4	<b>Explain</b> the concepts of Multithreaded and Distributed Algorithms.

	<b>Systems Programming &amp; Operating System (SP&amp;OS)</b>
C311.1	<b>Relate</b> and <b>Explain</b> the functioning of system software.
C311.2	<b>Analyze</b> Language Translators.
C311.3	<b>Explain</b> and <b>Analyze</b> process structure, its management and process sub system.
C311.4	<b>Explain</b> memory management and I/O management.



	<b>Embedded Systems &amp; Internet of Things</b>
C312.1	Explain basics of embedded system and internet of things.
C312.2	Describe various IoT platform specifications & Explain basic building blocks of IoT devices.
C312.3	List and Explain IoT Protocols and Security for real time applications.
C312.4	Explain IoT physical servers and web services.

	<b>Software Modeling and Design</b>
C313.1	Compare Software Methodologies and Model a software system using unified Modeling Language.
C313.2	Illustrate the architecture of the software to be developed.
C313.3	Identify design patterns in software systems and discover the best suited pattern for a particular System.
C313.4	Identify test cases for various applications and Evaluate the quality of software system.





	<b>Web Technology</b>
C314.1	Explain web development process and Develop web applications using front end tools
C314.2	Explain client side, server side technologies and Develop web applications using it.
C314.3	Compare client side frameworks with server side frameworks and Develop web applications using it.
C314.4	Develop web applications using web services and Content Management System.

	<b>Seminar &amp; Technical Communication</b>
C315.1	<b>Identify &amp; Choose</b> the appropriate domain (area).
C315.2	<b>Summarize</b> the literature survey on problems and <b>deduce</b> the problem statement.
C315.3	<b>Compile</b> the documents for an identified problem.
C315.4	<b>Express</b> the idea, concepts and solution of the selected problem ethically as an individual.



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	<b>Web Technology Lab</b>
C316.1	Apply the concepts of web server installation, configuration and Design & Develop a web application using Front End Tools.
C316.2	Design & Develop a web application using suitable client side and server side web technologies.
C316.3	Develop a web application using Client and Server Side Frameworks.
C316.4	Design & Develop a web application using Web Services or Content Management System.

	<b>SP &amp; OS Lab</b>
C317.1	Design and Develop pass – I and pass – II of two pass assembler and macroprocessor.
C317.2	Construct lexical analyzer and parsers using Lex and YACC tools.
C317.3	Write a program to create Dynamic Link Libraries.
C317.4	Compare and Develop various scheduling schemes.



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	<b>ES &amp; IoT Lab</b>
C318.1	Compare the different ARM based micro controllers and demonstrate the connectivity with peripherals.
C318.2	Develop real time application using Raspberry-Pi, Peripherals and sensors
C318.3	Develop web applications using Zigbee module and cloud on Raspberry-Pi/Beagle board.
C318.4	<b>Develop</b> an IoT based Real time application in a team.

	<b>Audit Course 4</b>
C319.1	Create blogs to manage content distribution.
C319.2	Utilize Social Listening tools to create timely, relevant content.
C319.3	Understand Social Media policies that combine business objectives with appropriate use of social media channels and content.
C319.4	Create content calendar for social media platforms.



	<b>High Performance Computing</b>
C401.1	<b>Explain</b> the basics of parallel computing.
C401.2	<b>Develop</b> an efficient parallel algorithm to solve a problem.
C401.3	<b>Analyze</b> and measure performance of parallel programs.
C401.4	<b>Explain</b> the logic to parallelize the sorting and graph algorithms.

	<b>Artificial Intelligence and Robotics</b>
C402.1	Choose a search strategy and apply it to solve uninformed/ informed/ heuristic search.
C402.2	Analyze and solve problems related to planning and constraint satisfaction.
C402.3	Represent and solve problems related to certain knowledge and reasoning.
C402.4	Explain significance of natural language processing, information retrieval and types of learning.
C402.5	Explain concepts of robot components and real world robot applications.



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	<b>Data Analytics</b>
C403.1	<b>Explain</b> the basic concept of Data Analytics.
C403.2	<b>Apply</b> an appropriate algorithmic strategy to solve problems of data.
C403.3	<b>Analyze</b> and Compare various algorithmic strategy related to data.
C403.4	<b>Explain</b> the basics of Tools used for unstructured data.

	<b>Data Mining and Warehousing</b>
C404D.1	Explain data Mining concepts and Apply pre-processing techniques.
C404D.2	Explain data warehouse concept and architecture and make use of various OLAP operations.
C404D.3	Identify and Choose data similarity and dissimilarity techniques.
C404D.4	Apply Association rule mining techniques and Analyze patterns.
C404D.5	Apply classification algorithms and Analyse it's performance.



	<b>Software Testing and Quality Assurance</b>
C405B.1	Explain basic concepts in software testing and quality assurance.
C405B.2	Prepare project test plan and write test cases for testing.
C405B.3	Make use of recent automation tool for software testing.
C405B.4	Explain quality management and identify the software quality tools to be used for a system.

	<b>Laboratory Practice I</b>
C406.1	Develop and analyze various parallel programs.
C406.2	Implement AI algorithmic strategies for solving various problems.
C406.3	Analyze various datasets using data analytics techniques and tool.
C406.4	Design and develop the applications based on the concepts of parallel algorithm, robotics and data analysis.



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	<b>Laboratory Practice II</b>
C407.1	Apply data mining techniques for given data set using data mining Tools.
C407.2	Analyze classification algorithms using data mining Tool.
C407.3	Develop an application and Apply black box, white box testing.
C407.4	Apply automation tool on web based application and generate test reports.

	<b>Project Work Stage I</b>
C408.1	Choose the members of the team and select the domain for project work.
C408.2	Summarize the literature survey on techniques / algorithms for the domain and decide the problem statement of the project.
C408.3	Analyze the problem statement and compile the SRS, plan and design solution to the problem and estimate the project cost.
C408.4	Inculcate confidence, ethics and present themselves in a professional manner as a team.



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	<b>Audit Course 5</b>
C409.1	Apply professional and technical skills.
C409.2	Make use of modern technologies.
C409.3	Extend self-directed learning for advanced courses.

	<b>Machine Learning</b>
C410.1	Apply preprocessing methods to prepare training data set for machine learning.
C410.2	Explain and apply regression techniques.
C410.3	Explain and apply supervised machine learning.
C410.4	Explain clustering techniques and deep network.





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	<b>Information and Cyber Security</b>
C411.1	Inspect Network security architecture.
C411.2	Analyze and compare symmetric key & asymmetric key.
C411.3	Evaluate various cryptography measures to ensure privacy & confidentiality.
C411.4	Classify the Indian cyber laws.

	<b>Compilers</b>
C412B.1	Apply the knowledge of LEX and YACC to Develop LEX and parser.
C412B.2	Construct different types of grammar and Apply it for intermediate code generation.
C412B.3	Compare and Contrast different storage management schemes.
C412B.4	Explain Code generation and Identify sources for code optimization.

	<b>Cloud Computing</b>
C413C.1	<b>Explain</b> the basic concept of Cloud Computing & <b>Compare</b> different types of parser
C413C.2	<b>Make use of</b> Virtualization technique
C413C.3	<b>Select</b> appropriate AWS Services & <b>Explain</b> role of IOT in Cloud Computing
C413C.4	<b>Explain</b> future cloud computing techniques & Dockers Workflow.



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	<b>Business Intelligence</b>
C413D.1	Apply basics of Business Intelligence and Knowledge Delivery techniques to analyze the data.
C413D.2	Explain concepts, techniques and applications of Decision Support System.
C413D.3	Explain & Apply various data Pre-processing techniques.
C413D.4	Apply various Data Mining Techniques and explain business intelligence applications in various sectors.

	<b>Laboratory Practice III</b>
C414.1	Analyze the data set and apply different supervised Learning techniques.
C414.2	Analyze the data set and apply different unsupervised Learning techniques.
C414.3	Apply standard encryption techniques to provide Security.
C414.4	Apply an algorithm for authentication and Confidentiality.



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	<b>Laboratory Practice IV</b>
C415.1	Construct Lexical analyzer and Parsers using LEX and YACC tools.
C415.2	Make use of various code optimization and generation algorithms to build the compiler.
C415.3	Apply BIA techniques to analyze the data. / Install, configure and develop a Cloud.
C415.4	Analyze the data set using Business Intelligence tools. / Implement virtualization in cloud computing.

	<b>Project Work Stage II</b>
C416.1	Make use of various modern technologies / tools required to develop the project.
C416.2	Evaluate quality and performance of the project, and ensure environmental context and sustainability.
C416.3	Compile the project report and demonstrate the working of the project.
C416.4	Inculcate confidence, ethics and present themselves in a professional manner as a team.



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	<b>Audit Course 6</b>
C417.1	Apply professional and technical skills.
C417.2	Make use of modern technologies.
C417.3	Extend self-directed learning for advanced courses.



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