



## **Course Outcomes**

### **Academic Year 2017-18**

	<b>Discrete Structures</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>Data Structures and Problem Solving</b>
C202.1	Experiment with appropriate advanced data structure like stack, queue, tree and graph.
C202.2	Solve problems using sequential, linked list and GLL Concepts of data structure.
C202.3	Compare and Make use of different searching and sorting technique based on space and time complexity of the algorithm.
C202.4	Implement solutions for real world problems using hash tables, heap and search trees.
C202.5	Solve the problems of various parallel algorithms.



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	<b>Digital Electronics and Logic Design</b>
C203.1	Relate and Compare the functionality of Combinational and Sequential Circuits.
C203.2	Define the concept of ASM charts and Analyze the digital circuits using VHDL
C203.3	Apply and compare the functionalities, applicability of Logic Families and programmable logic devices.
C203.4	Illustrate concepts of Microcontroller 8051 and Programming Model.

	<b>Soft Skills</b>
C206.1	Establish effective communication among Peers.
C206.2	Prepare effective reports, technical documents and presentations.
C206.3	Cope with stress, possess human values, morals and ethics.
C206.4	Express inter personal skills and soft skills.



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	<b>Engineering Maths - III</b>
C207.1	Solve higher order linear Differential equations and model L-C-R electrical circuits.
C207.2	Evaluate Fourier Transform, Inverse Fourier Transform, Z-transform, and Inverse Z-transform.
C207.3	Analyze given data using measures of central tendency, dispersion, moments, skewness, kurtosis, correlation-regression.
C207.4	Apply techniques of Probability, Probability Distributions and Chi-Square Test to analyze given data
C207.5	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.
C207.6	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>Object Oriented and Multicore Programming</b>
C208.1	Define concepts of Object Oriented Programming.
C208.2	Write programming applications using inheritance, polymorphism and virtual function.
C208.3	Explain templates, Standard Template Library and exception handling in C++ programming.
C208.4	Explain concepts of multicore programming, multithreading, synchronization.



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	<b>Computer Graphics and Gaming</b>
C210.1	Define Graphics primitives and Explain polygon clipping algorithms
C210.2	Illustrate 2D and 3D Transformations and Projections in the domain of Computer Graphics.
C210.3	Explain Illumination models and shading algorithm.
C210.4	Apply the logic to implement animation and gaming programs.

	<b>Computer Organizations</b>
C211.1	Explain Von Neumann and dataflow Architecture block diagrams.
C211.2	Explain Internal block diagram and functioning of CPU, ALU.
C211.3	Summarize control design, Memory and I/O organization.
C211.4	Draw AMD, IA-64 computer organization models.



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	<b>Programming Laboratory</b>
C212.1	Emulate CPU Architecture.
C212.2	Develop polygon filling and clipping algorithms.
C212.3	Explain and Implement line drawing and circle drawing algorithms in computer graphics.
C212.4	Demonstrate advanced technology programming.

	<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.



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	<b>Operating System Design</b>
C302.1	Illustrate basics of Unix operating system.
C302.2	Explain & analyze process structure, its management and process sub system.
C302.3	Explain & analyze memory management sub system and explain need of IPC.
C302.4	Explain use of various tools for booting of O.S. and modern utilities.
C302.5	Explain different database architecture.

	<b>Data Communication and Wireless Sensor Networks</b>
C303.1	Illustrate various data communication concepts and classify modulation and multiplexing techniques.
C303.2	Explain the basics of Wireless Communication and Wireless Sensor Networks and demonstrate its working in real time applications.
C303.3	Classify various data link layer protocols and apply the various framing techniques.
C303.4	Infer the routing protocols for Wireless Sensor Networks.
C303.5	Demonstrate the establishment process of WSN by considering various parameters.



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	<b>Database Management Systems Applications</b>
C304.1	Interpret data models, normalization theory and SQL/NOSQL concepts for database systems
C304.2	Summarize Database Transactions and Transaction Management.
C304.3	Experiment with Database connectivity and Web Technologies
C304.4	Inspect advanced storage technologies like Cassandra and hadoop and data warehousing
C304.5	Explain the effects of depreciation, income taxes, inflation and price change in engineering economics.

	<b>Computer Forensic and Cyber Applications</b>
C305.1	Identify some of the current techniques and tools for forensic examination.
C305.2	Apply forensic tools in different situations.
C305.3	Examine, analyze and report digital investigation that confirm to professional standard.
C305.4	Evaluate the legal, ethical and global impact of cybercrime on private, public and personal computing infrastructure.



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	<b>Programming Lab-II</b>
C307.1	Apply the concepts of data communication and networking to implement programming solutions for various real life scenarios.
C307.2	Analyze the real life scenario for WSN and develop a programming solution for it.
C307.3	Apply the concepts of cyber forensic to implement various programs to determine cyber-attacks
C307.4	Analyze the possibilities of various cyber-attacks and develop a solution to minimize those attacks.

	<b>Employability Skills Development Lab</b>
C308.1	Build the SRS document by gathering the information related to problem statement.
C308.2	Analyze need of technical competencies required for problem solving.
C308.3	Develop a real time application by applying engineering knowledge and make use of various modern tools ethically to solve real life problem.
C308.4	Apply various administrative skills and responsibilities in teamwork.
C308.5	Compile the report (document) of an implemented application and demonstrate and present the working of an application.





	<b>Principles of Concurrent and Distributed Programming</b>
C309.1	Classify different computational models and explain LEX and YACC utilities for parsing.
C309.2	Illustrate the GPU architecture and parallel architectures and apply the concepts of parallelism to solve problems.
C309.3	Compare DCS models and list the issues in designing DOS.
C309.4	Explain the need of virtualization and describe the working of Xen hypervisor.
C309.5	Explain the concepts of mobile computing and cloud computing.

	<b>Embedded Operating System</b>
C310.1	Explain operating systems and classify the scheduling algorithms
C310.2	Illustrate architecture of Embedded system processors and apply the concepts of ARM ALP
C310.3	Explain Embedded Linux and build new kernel image
C310.4	Outline software components of embedded Linux and make use of development tools
C310.5	Illustrate the concepts of embedded Android.



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	<b>Computer Networks</b>
C311.1	<b>Define</b> the application layer protocols, <b>Identify</b> and <b>compare</b> the services and features of connectionless and connection oriented protocol.
C311.2	<b>Explain</b> network layer protocols and routing algorithms.
C311.3	<b>Distinguish</b> and <b>interpret</b> wireless application protocols and technologies.
C311.4	<b>Apply</b> and <b>demonstrate</b> Advanced Network Technologies.

	<b>Software Engineering</b>
C312.1	Classify the process models, analyze and model the software requirements for a software system to be developed.
C312.2	Illustrate the architecture and develop the design for a software system based on the type of system to be developed.
C312.3	Evaluate quality of the software being developed by identifying type of testing to be done and recommend their test cases.
C312.4	Determine risks and estimate the project cost and schedule for a software being developed.



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	<b>Digital Signal Processing and Applications</b>
C313.1	Summarize the concepts of signals and systems using mathematical theories.
C313.2	Identify the proper transforms (Fourier and Z-Transform) for Digital Signal Processing and its variation.
C313.3	Analyze digital filter system.
C313.4	Illustrate the concepts of DSP Processor.
C313.5	Summarize the concepts of Audio Processing and Image Foundation and Identify the algorithm for Speech Processing and Image Processing.

	<b>Programming Laboratory – III</b>
C314.1	Compare the performance of concurrent programming with serial programming.
C314.2	Apply parallel programming methods using CUDA for GPUs and OPENMP.
C314.3	Develop ARM architecture based applications.
C314.4	Develop robotics applications using Beagle Board.
C314.5	Analyze requirements for the problem and construct UML diagrams.



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	<b>Programming Laboratory – IV</b>
C315.1	Design and setup sub network.
C315.2	Develop different servers and protocols by using socket programming.
C315.3	Simulate a network by using network simulator
C315.4	Apply DSP concepts in image processing.

	<b>Seminar and Technical Communication Laboratory</b>
C316.1	Identify & Choose the appropriate domain (area).
C316.2	Summarize the literature survey on problems and deduce the problem statement.
C316.3	Compile the documents for an identified problem.
C316.4	Express the idea, concepts and solution of the selected problem ethically as an individual.



	<b>Design &amp; Analysis of Algorithms</b>
C401.1	<b>Explain</b> problem solving abilities using mathematical theories.
C401.2	<b>Identify</b> the appropriate algorithmic strategy to solve problems.
C401.3	<b>Analyze</b> the time and space complexity of efficient algorithms.
C401.4	<b>Interpret and explain</b> the concepts of Parallel and Concurrent Algorithms.
C401.5	<b>Explain</b> the concepts of Distributed, Embedded Algorithms and <b>Identify</b> the algorithm for Multicore, Distributed, Parallel and Embedded base problems.

	<b>Principles of Modern Compiler Design</b>
C402.1	Apply the knowledge of LEX and YACC to develop lexer and parser
C402.2	Construct different types of grammar and apply it for code generation.
C402.3	Describe process of language specific compilation.
C402.4	Explain parallel programming, dynamic compilation and cross compilation.



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	<b>Smart System Design and Applications</b>
C403.1	Choose a search strategy and apply it to solve problems.
C403.2	Analyze and solve problems related to certain and uncertain knowledge and reasoning.
C403.3	Compare the various machine learning techniques and choose an algorithm and recommend its application in the real world.
C403.4	Infer robot actions and explain how robots perceive and act in real world.
C403.5	Explain significance of natural language processing and information retrieval.

	<b>Advanced Computer Programming</b>
C404C.1	Interpret the method to write the services and distributed programs that can make use of the services.
C404C.2	Explain advanced programming concepts in java.
C404C.3	Select the technology to create service for distributed environment.
C404C.4	Make use of various technologies to develop web applications for distributed environment.
C404C.5	Analyze and test the Apache Hadoop system for map-reduce and Pig programs.



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	<b>Data Mining Techniques and Applications</b>
C404D.1	Illustrate data Mining concepts, data pre-processing techniques and apply the various association rule mining techniques.
C404D.2	Apply and Analyse various classification techniques.
C404D.3	Apply, Analyse and compare various clustering techniques.
C404D.4	Explain concepts and real life applications and Compare techniques in Text mining & Web Mining.
C404D.5	Explain the concepts of Reinforcement Learning and Big Data Mining.

	<b>Pervasive Computing</b>
C405B.1	<b>Summarize</b> the concepts of distributed, mobile, wearable & pervasive computing and <b>analyze</b> its applications in real time environment.
C405B.2	<b>Identify</b> the use of smart devices & their connectivity technology and <b>Explain</b> human computer interaction in pervasive computing world.
C405B.3	<b>Analyze</b> a pervasive system on the basis of context-aware middle ware, adaptation behavior and mobile context awareness.
C405B.4	<b>Compare</b> various defense strategies and <b>interpret</b> challenges which may arise from social context.



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	<b>Computer laboratory-I</b>
C406.1	Develop and analyze various algorithm design techniques.
C406.2	Construct Lexical analyzer and parsers using Lex and Yacc tools.
C406.3	Make use of various code optimization and generation algorithms to build the compiler.
C406.4	Build Programs using different Hadoop technologies OR Develop applications using various data mining algorithms.

	<b>Computer laboratory-II</b>
C407.1	<b>Apply</b> various search strategies to <b>implement</b> various real life problems.
C407.2	<b>Design</b> and <b>implement</b> advanced AI problems.
C407.3	<b>Apply</b> supervised and unsupervised machine learning techniques to solve real life problems.
C407.4	<b>Apply</b> the knowledge of context-aware computing to <b>implement</b> a software application
C407.5	<b>Build</b> a smart mobile application with the use of Android Studio.





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	<b>Project</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.

	<b>Software Design Methodologies &amp; Testing</b>
C409.1	Compare Software Methodologies and Model a software system using unified Modeling Language.
C409.2	Illustrate the architecture of the software to be developed.
C409.3	Identify design patterns in software systems and discover the best suited pattern for a particular System.
C409.4	Identify test cases for various applications and Evaluate the quality of software system.



	<b>High Performance Computing</b>
C410.1	<b>Explain</b> various concepts in parallel processing.
C410.2	<b>Interpret</b> the principles of parallel algorithm design and outline parallel architectures.
C410.3	<b>Utilize</b> programming models to solve problems for multicore or distributed, concurrent/parallel environments.
C410.4	<b>Analyze</b> the design of various parallel algorithms.
C410.5	<b>Discuss</b> advanced technologies in HPC.

	<b>Mobile Computing</b>
C411A.1	Explain the principles of mobile computing.
C411A.2	Illustrate GSM in detail with architecture, protocol, signal processing and security.
C411A.3	Explain the structure and components for Mobile IP.
C411A.4	Explain the concepts and techniques of Data Dissemination and Data Synchronization in Mobile Computing.
C411A.5	Explain basic functionality of mobile operating systems.



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	<b>Cyber Security</b>
C411D.1	Inspect Network security architecture as per principles.
C411D.2	Analyze and compare symmetric key & asymmetric key.
C411D.3	Discuss and evaluate various cryptography measures to ensure privacy & confidentiality.
C411D.4	Use security tools for a network.

	<b>Business Analytic and Intelligence</b>
C412A.1	Define and Illustrate Business Intelligence and Decision Support System Environment, Architecture and Applications.
C412A.2	Apply and Analyze various data warehouse Modeling and design techniques.
C412A.3	Explain& Apply various data Pre-processing and outlier detection techniques.
C412A.4	Discuss BI systems and Explain data mining and business intelligence applications in various sectors.



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	<b>Computer laboratory-III</b>
C413.1	Design software applications as per the requirements with the help of various modeling techniques.
C413.2	Evaluate quality of Software applications being developed with different testing strategies & write test cases.
C413.3	Apply standard encryption techniques to provide security.
C413.4	Choose an algorithm for authentication and confidentiality.

	<b>Laboratory Practice IV</b>
C414.1	<b>Analyze</b> the parallel programs using VTune and GProf.
C414.2	<b>Formulate</b> the parallel design using MPI/OpenMP/POSIX programming model for algorithmic problems.
C414.3	<b>Build</b> a compute cluster and <b>examine</b> the working of parallel programs
C414.4	<b>Develop</b> applications using Business Analytics technologies.



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	<b>Project</b>
C415.1	Make use of various modern technologies / tools required to develop the project.
C415.2	Evaluate quality of the project by testing and measure performance of the project by ensuring environmental context and sustainability.
C415.3	Compile the project report and demonstrate the working of their project.
C415.4	Inculcate confidence, ethics and present themselves in a professional manner as a team.