Hope Foundation's
International Institute of Information Technology
P-14, Rajiv Gandhi Info Tech Park, Phase – 1, Hinjawadi, Pune – 411 057
Department of Computer Engineering

Course Outcomes (COs)

SE (Computer Engineering) -2019 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
SEM I		
210241	Discrete Mathematics	❑ Design and analyze real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction. ❑ Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve problems in both familiar and unfamiliar situations including those in real-life contexts. ❑ Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics. ❑ Model and solve computing problem using graph and apply appropriate algorithms to solve problems in both familiar and unfamiliar situations including those in real-life contexts. ❑ Model and solve computing problem using tree and apply appropriate algorithms to solve problems in both familiar and unfamiliar situations including those in real-life contexts. ❑ Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.

210242	Fundamentals of Data Structures	❑ Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity. ❑ Demonstrate use of sequential data structures- Array to store and process data. ❑ Analyze the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application. ❑ Compare and contrast different implementations of data structures (dynamic and static). ❑ Implement and apply principles of data structures-stack to solve computational problems. ❑ Implement and apply principles of data structures-queue to solve computational problems.
210243	Object Oriented Programming	❑ Apply constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software. ❑ Design object-oriented solutions for small systems involving multiple objects. ❑ Use operator overloading, virtual and pure virtual function in C++. ❑ Implement File handling using object-oriented programming. ❑ Design and implement generic classes with C++ templates and use exception handling in C++ programs. ❑ Implement Object Oriented Programs using generic classes available in C++ Standard Template Library
210244	Computer Graphics	❑ Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics. ❑ Apply mathematics to develop Computer programs for elementary graphic operations. ❑ Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons. ❑ Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection. ❑ Understand the concepts of color models, lighting, shading models and hidden surface elimination. ❑ Create effective programs using concepts of curves, fractals, animation and gaming.

210245	Digital Electronics & Logic Design	❑ Simplify Boolean Expressions using K Map. ❑ Design and implement combinational circuits. ❑ Design and implement sequential circuits. ❑ Develop simple real-world application using ASM and PLD. ❑ Differentiate and Choose appropriate logic families IC packages as per the given design specifications. ❑ Explain organization and architecture of computer system
210246	Data Structures Laboratory	❑ Use algorithms on various linear data structure using sequential organization to solve real life problems. ❑ Analyze problems to apply suitable searching and sorting algorithm to various applications. ❑ Analyze problems to use variants of linked list and solve various real life problems. ❑ Designing and implement data structures and algorithms for solving different kinds of problems. ❑ Apply and analyze stack implementation to solve real life problems. ❑ Apply and analyze queue implementation to solve real life problems.
210247	OOP and Computer Graphics Laboratory	❑ Understand and apply the concepts like constructors, inheritance, polymorphism, operator overloading, exception handling and generic structures for implementing reusable programming codes. ❑ Analyze the concept of file and apply it while storing and retrieving the data from secondary storages. ❑ Design and implement generic classes and use C++ Standard Template Library to reuse available templates. ❑ Analyze and apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts. ❑ Comprehend the concept of windowing and clipping and apply various algorithms to fill and clip polygons. ❑ Apply logic to implement, curves, fractals, animation and gaming programs.

210248	Digital Electronics Laboratory	❑ Understand the working of digital electronic circuits. ❑ Apply the knowledge to appropriate IC as per the design specifications. ❑ Design Sequential digital circuits as per the specifications.
210249	Business Communication Skills	❑ Express effectively through verbal / non-verbal communication and improve listening skills ❑ Write precise briefs or reports and technical documents. ❑ Prepare for group discussion / meetings / interviews and presentations. ❑ Explore goal/target setting, self-motivation and practicing creative thinking. ❑ Operate effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities. ❑ Learn and enhance effective Language Skills
210250	Humanity and Social Science	❑ Be aware of various issues concerning humans and society ❑ Be aware of students' responsibility towards society ❑ Be sensitized about broader issues regarding social, cultural, economical and human aspects, involved in social changes ❑ Be able to understand major ideas values, believes and experiences, that have shared human history and cultures ❑ Be able to understand the nature of the individual and the relationship between self and the community ❑ Develop characteristics that encourage personal and professional fulfillment and be responsible citizen
210251	Audit Course 3 (Smart Cities)	❑ Understand the dynamic behavior of the urban system by going beyond the physical appearance and by focusing on representations, properties and impact factors ❑ Explore the city as the most complex human-made organism with a metabolism that can be modeled in terms of stocks and flows ❑ Knowledge about data-informed approaches for the development of the future city, based on crowd sourcing and sensing ❑ Knowledge about the latest research results in for the development and management of future cities ❑ Understand how citizens can benefit from data-informed design to develop smart and responsive cities

SEMESTER II		
207003	Engineering Mathematics-III	❑ Solve Linear differential equations, essential in modelling and design of computer-based systems. ❑ Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing. ❑ Apply Statistical methods like correlation and regression analysis for data analysis and predictions in machine learning. ❑ Apply probability theory for data analysis and predictions in machine learning. ❑ Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques. ❑ Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
210252	Data Structures and Algorithms	❑ Identify and articulate the complexity goals and benefits of a good hashing scheme for real- world applications. ❑ Apply non-linear data structures for solving problems of various domain. ❑ Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language ❑ Analyze the algorithmic solutions for resource requirements and optimization ❑ Use efficient indexing methods and multiway search techniques to store and maintain data. ❑ Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage
210253	Software Engineering	❑ Understand different Software Engineering Fundamentals & Process Models ❑ Analyze software requirements and formulate design solution for a software. ❑ Apply appropriate techniques and tools to estimate and schedule for the project as project planning process ❑ Prepare design for software using different methods so as to support further phases of SDL like implementation, testing and maintenance. ❑ Identify and handle risk management and software configuration management. ❑ Utilize knowledge of software testing approaches, approaches to verification and validation.

210254	Microprocessor	❑ Exhibit skill of assembly language programming for the application ❑ Classify Processor architectures. ❑ Compare and contrast different processor modes. ❑ Use interrupts mechanism in applications ❑ Differentiate between Microprocessors and Microcontrollers. ❑ Identify and analyze the tools and techniques used to design, implement, and debug microprocessor-based systems.
210255	Principles of ProgrammingLanguage	❑ Make use of basic principles of programming languages. ❑ Develop a program with Data representation and Computations. ❑ Develop programs using Object Oriented Programming language : Java. ❑ Develop application using inheritance, encapsulation, and polymorphism. ❑ Demonstrate Multithreading for robust application development. ❑ Develop a simple program using basic concepts of Functional and Logical programming paradigm
210256	Data Structures and AlgorithmsLaboratory	❑ Apply ADT/libraries, hash tables and dictionary to design algorithms for a specific problem. ❑ Apply and analyze Trees non linear data structures to solve real world complex problems. ❑ Choose most appropriate data structures and apply algorithms for graphical solutions of the problems. ❑ Analyze the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations. ❑ Apply and analyze algorithm design techniques for indexing, sorting, multi-way searching. ❑ Apply and analyze algorithm design techniques for file organization.
210257	Microprocessor Laboratory	❑ Understand and apply various addressing modes and instruction set ❑ Apply logic to implement code conversion ❑ Analyze and apply logic to demonstrate processor mode of operation
210258	Project Based Learning II	❑ Identify the real life problem from societal need point of view ❑ Choose and compare alternative approaches to select most feasible one ❑ Analyze and synthesize the identified problem from technological perspective ❑ Design the reliable and scalable solution to meet challenges ❑ Evaluate the solution based on the criteria specified ❑ Inculcate long life learning attitude towards the societal problems
		❑ Understand 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. ❑ Aware of professional rights and responsibilities of an

210259	Code of Conduct	engineer,for safety and risk benefit analysis towards society ❑ Understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development. ❑ Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives ❑ Develop understanding of engineer's rights and responsibilities act in morally desirable ways, towards moral commitment and responsible conduct ❑ Able to identify and resolve ethical as well as conflict of interest issues as part of their professional lives
210260	Audit Course-4 Intellectual Property Rightsand Patents	❑ Understand the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition ❑ Identify, apply and assess principles of law relating to each ofthese areas of intellectual property ❑ Apply the appropriate ownership rules to intellectual propertyyou have been involved in creating