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

Department of Information Technology

Course Outcomes (COs)

SE (Information Technology) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
214441	Discrete Structures	❑ Students will be able to use the permutation and combination technique to solve discrete and conditional probability problems. ❑ Apply the propositional logic, and set theory concepts to solve computational problems. ❑ Apply knowledge of relations and functions to formulate mathematical models for real life situations ❑ Apply concepts of graph theory to design computational problems and optimization techniques ❑ Use tree concepts in searching, scheduling and classification problems. ❑ Able to form coding and decoding systems by using various algebraic structures
214442	Computer Organization & Architecture	❑ Solve problems based on computer arithmetic. ❑ Explain processor structure & its functions. ❑ Obtain knowledge about micro-programming of a processor. ❑ Understand concepts related to memory & IO organization. ❑ Acquire knowledge about instruction level parallelism & parallel organization of multiprocessors & multi core systems
214443	Digital Electronics and Logic Design	❑ Spectacle an awareness and apply knowledge of number systems, codes, Boolean algebra and use necessary A.C, D.C Loading characteristics as well as functioning while designing with logic gates. ❑ Use logic function representation for simplification with K-Maps and analyze as well as design Combinational logic circuits using SSI & MSI chips. ❑ Analyze Sequential circuits like Flip-Flops (Truth Table, Excitation table), their conversion & design the applications. ❑ Identify the Digital Circuits, Input/Outputs to replace by FPGA ❑ Use VHDL programming technique with different modeling styles for any digital circuits

214444	Fundamental of data structures	❑ Student will be able to apply appropriate constructs of C language, coding standards for application development. ❑ Students will be to use dynamic memory allocation concepts and file handling in various application developments. ❑ Students will be able to perform basic analysis of algorithms with respect to time and space complexity. ❑ Students will be able to select appropriate searching and/or sorting techniques in the application development. ❑ Students will be able to select and use appropriate data structures for problem solving and programming. ❑ Students will be able to use algorithmic foundations for solving problems and programming.
214445	Problem Solving and Object Oriented programming	❑ Develop algorithms for solving problems by using modular programming concepts ❑ Abstract data and entities from the problem domain, build object models and design software solutions using object-oriented principles and strategies ❑ Discover, explore and apply tools and best practices in object-oriented programming ❑ Develop programs that appropriately utilize key object-oriented concepts ❑ Analyze the strengths of Object Oriented Programming ❑ Develop programming application using object oriented programming language C++
214446	Digital Laboratory	❑ Spectacle an awareness and apply knowledge and concepts and methods of digital system design techniques as hands-on experiments with the use of necessary A.C, D.C Loading characteristics. ❑ Use logic function representation for simplification with K-Maps and analyze as well as design Combinational logic circuits using SSI & MSI chips. ❑ Analyze Sequential circuits like Flip-Flops (Truth Table, Excitation table) & design the applications like Asynchronous and Synchronous Counters. ❑ Design Sequential Logic circuits: Sequence generators, MOD counters with registers/Counters using synchronous /asynchronous counters. ❑ Understand the need of skills, techniques and learn state-of-the-art engineering tools through hands-on experimentation on the Xilinx tools for design as well as the basics of VHDL. ❑ Understand and implement the design Steps, main programming technique with different modeling styles for any digital circuits with VHDL Programming.
214447	Programming Laboratory	❑ Student will be able to apply appropriate constructs of C language, coding standards for application development. ❑ Students will be able to use dynamic memory allocation concepts and file handling in various application developments. ❑ Students will be able to select appropriate searching and/or sorting techniques in the application development and able to do analysis of algorithm.

		❑ Students will be able to select and use appropriate data structures for problem solving and programming and able to do analysis of algorithm. ❑ Students will be able to use algorithmic foundations for solving problems and programming.
214448	Object Oriented programming Lab.	❑ Break a problem into logical pieces and develop algorithms for solving simple problems. ❑ Abstract data and entities from the problem domain, build object models and design software solutions using object-oriented principles and strategies. ❑ Discover, explore and apply tools and best practices in object-oriented programming. ❑ Develop programs that appropriately utilize key object-oriented concepts.
214449	Communication Skills	❑ Provides an ability to understand, analyze and interpret the essentiality of grammar and its proper usage. ❑ Build the students' vocabulary by means of communication via web, direct Communication and indirect communication. ❑ Improves Students' Pronunciation skills and understanding between various phonetic sounds during communication ❑ Understanding the various rules and means of written communication ❑ Effective communication with active listening, facing problems while communication and how to overcome it.
207003	Engineering Mathematics -III	❑ Solve higher order linear differential equations to understand appropriate techniques of modelling and analyzing electrical circuits. ❑ Solve problems related to Fourier transform, Z-transform and applications to signal and image processing. ❑ Apply statistical methods like correlation and regression analysis, Measures of central tendency and its applications. ❑ Understand probability theory and its applications. Probability distributions. Analysis and prediction of data as applied to machine intelligence ❑ Perform vector differentiation and integration to analyse the vector fields and apply to compute line, surface and volume integrals. ❑ Analyze conformal mappings, transformations and perform contour integration of complex functions required in image processing, digital filters and computer graphics.
214450	Computer Graphics	❑ Apply mathematics and logic to develop Computer programs for elementary graphic operations ❑ Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics ❑ Develop the competency to understand the concepts related to Computer Vision ❑ Develop the competency to understand the concepts related to Virtual reality ❑ Apply the logic to develop animation ❑ Apply the logic to develop gaming programs

214451	Processor Architecture and Interfacing	❑ Learn architectural details of 80386 microprocessor ❑ Understand memory management and multitasking of 80386 microprocessor ❑ Understand architecture and memory organization of 8051microcontroller ❑ Explain timers and interrupts of 8051 microcontroller and its interfacing with I/O devices.
214452	Data Structures & Files	❑ Basic ability to analyze algorithms and to determine algorithm correctness and time efficiency class. ❑ Understand different advanced abstract data type (ADT) and data structures and their implementations. ❑ Understand different algorithm design techniques (brute - force, divide and conquer, greedy, etc.) and their implementation ❑ Ability to apply and implement learned algorithm design techniques and data structures to solve problems
214453	Foundations of Communication and Computer Network	❑ Understand data/signal transmission over communication media ❑ Recognize usage of various modulation techniques in communication ❑ Analyze various spread spectrum and multiplexing techniques ❑ Use concepts of data communication to solve various related problems ❑ Understand error correction and detection techniques ❑ Acquaint with transmission media and their standards
214454	Processor Interfacing Laboratory	❑ Learn and apply concepts related to assembly language programming ❑ Write and execute assembly language program to perform array addition, code conversion, block transfer, sorting and string operations ❑ Learn and apply interfacing of real world input and output devices to 8051 microcontroller
214455	Data Structure and Files Laboratory	❑ Analyze algorithms and to determine algorithm correctness and time efficiency class ❑ Understand different advanced abstract data type (ADT) and data structures and their implementations ❑ Understand different algorithm design techniques (brute - force, divide and conquer, greedy, etc.) and their implementation ❑ Apply and implement learned algorithm design techniques and data structures to solve problems.
214456	Computer Graphics Laboratory	❑ Apply mathematics and logic to develop Computer programs for elementary graphic operations. ❑ Develop scientific and strategic approach to solve complex problems in the domain of Computer Graphics. ❑ Develop the competency to understand the concepts related to Computer Vision and Virtual reality ❑ Apply the logic to develop animation and gaming programs

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Course Outcomes (COs)

TE (Information Technology) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
314441	Theory of Computation	❑ To understand problem classification and problem solving by machines. ❑ To understand the basics of automata theory and its operations. ❑ To study computing machines by describing, classifying and comparing different types of computational models. ❑ To study computing machines by describing, classifying and comparing different types of computational models. ❑ To understand the P and NP class problems and its classification. ❑ To understand the fundamentals of problem decidability and reducibility.
314442	Database Management Systems	❑ To define basic functions of DBMS & RDBMS. ❑ To analyze database models & entity relationship models. ❑ To design and implement a database schema for a given problem-domain. ❑ To populate and query a database using SQL DML/DDL commands. ❑ Do Programming in PL/SQL including stored procedures, stored functions, cursors and packages. ❑ To appreciate the impact of analytics and big data on the information industry and the external ecosystem for analytical and data services.
314443	Software Engineering & Project Management	❑ To identify unique features of various software application domains and classify software applications as well as to choose and apply appropriate lifecycle model of software development. ❑ To analyze software requirements by applying various modeling techniques. ❑ To understand project planning, scheduling, cost and effort estimation using various tools ❑ To describe principles of agile development, discuss the SCRUM process and distinguish agile process model from other process models. ❑ To understand IT project management through life cycle of the project and future trends in IT Project Management. ❑ To list and classify CASE tools and discuss recent trends and research in software engineering.

314444	Operating System	❑ Fundamental understanding of the role of Operating Systems ❑ To understand the concepts of a process and thread & to apply the concept of process/thread scheduling. ❑ To apply the concept of process synchronization, mutual exclusion and the deadlock. ❑ To realize the concept of I/O management and File system. ❑ To understand the various memory management techniques. ❑ To understand working of LINUX operating system.
314445	Human-Computer Interaction	❑ To explain importance of HCI study and principles of user-centered design (UCD) approach ❑ To develop understanding of human factors in HCI design ❑ To develop understanding of models, paradigms and context of interactions. ❑ To design effective user-interfaces following a structured and organized UCD process. ❑ To evaluate usability of a user-interface design. ❑ To apply cognitive models for predicting human-computer-interactions.
314446	Software Laboratory-I	❑ To install and configure database systems. ❑ To analyze database models & entity relationship models. ❑ To design and implement a database schema for a given problem-domain ❑ To understand the relational and document type database systems ❑ To populate and query a database using SQL DML/DDL commands ❑ To populate and query a database using MongoDB commands.
314447	Software Laboratory-II	❑ To understand the basics of Linux commands and program the shell of Linux & To develop various system programs for the functioning of operating system. ❑ To implement basic building blocks like processes, threads under the Linux. ❑ To develop various system programs for the functioning of OS concepts in user space like. ❑ To design and implement Linux Kernel Source Code & To develop the system program for the functioning of OS concepts in kernel space like embedding the system call in any Linux kernel.
314448	Software Laboratory-III	❑ To identify the needs of users through requirement gathering ❑ To apply the concepts of Software Engineering process models for project development ❑ To apply the concepts of HCI for user-friendly project development ❑ To deploy website on live webserver and access through URL. ❑ To understand, explore and apply various web technologies ❑ To develop team building for efficient project development ❑

314450	Computer Network Technology	❑ To know Responsibilities, services offered and protocol used at each layer of network. ❑ To understand different addressing techniques used in network ❑ To know the difference between different types of network ❑ To know the different wireless technologies and IEEE standards ❑ To use and apply the standards and protocols learned, for application development ❑ To understand and explore recent trends in network domain
314451	Systems Programming	❑ To learn independently modern software development tools and creates novel solutions for language processing applications. ❑ To design and implement assemblers and macro processors. ❑ To use tool LEX for generation of Lexical Analyzer. ❑ To use YACC tool for generation of syntax analyzer. ❑ To generate output for all the phases of compiler. ❑ To apply code optimization in the compilation process.
314452	Design and Analysis of Algorithms	❑ Apply Knowledge of Mathematics to perform asymptotic analysis of algorithms. ❑ Demonstrate a familiarity with major algorithms and data structures. ❑ Apply important algorithmic design paradigms and methods of analysis. ❑ Synthesize efficient algorithms in common engineering design situations. ❑ Pointing out the importance of designing efficient algorithms by comparing different complexity classes. ❑ Introducing the concept of NP-complete problems and different techniques to deal with them.
314453	Cloud Computing	❑ To understand the need of Cloud based solutions ❑ To understand Security Mechanisms and issues in various Cloud Applications ❑ To explore effective techniques to program Cloud Systems. ❑ To understand current challenges and trade-offs in Cloud Computing ❑ To find challenges in cloud computing and delve into it to effective solutions ❑ To understand emerging trends in cloud computing
314454	Data Science & Big Data Analytics	❑ To understand Big Data primitives. ❑ To learn and apply different mathematical models for Big Data. ❑ To demonstrate their Big Data learning skills by developing industry or research applications. ❑ To analyze each learning model come from a different algorithmic approach and it will perform differently under different datasets. ❑ To understand needs challenges and techniques for big data visualization.

		❑ To learn different programming platforms for big data analytics.
314455	Software Laboratory-IV	❑ To implement small size network and its use of various networking commands ❑ To understand and use various networking and simulations tools ❑ To configure various client/server environments to use application layer protocols ❑ To understand the protocol design at various layers ❑ To explore use of protocols in various wired and wireless applications ❑ To develop applications on emerging trends
314456	Software Laboratory-V	❑ To apply algorithmic strategies for solving various problems ❑ To compare various algorithmic strategies ❑ To analyze the solution using recurrence relation ❑ To design algorithms using the dynamic programming strategy ❑ To design algorithms using the Backtracking strategy ❑ To design algorithms using the Branch and Bound strategy, and recite algorithms that employ this strategy
314457	Software Laboratory-VI	❑ To apply Big data primitives and fundamentals for application development ❑ To explore different big data processing techniques with use cases. ❑ To apply the Analytical concept of Big data using R/Python. ❑ To visualize the Big Data using Tableau. ❑ To design algorithms and techniques for big data analytics. ❑ To design Big data analytic application for emerging trends.

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Department of Information Technology

Course Outcomes (COs)

BE (Information Technology) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
414453	Information and Cyber Security	❑ Understand fundamental of security, various threats faced today ❑ Use basic cryptographic techniques in application development ❑ Apply methods for authentication, access control, intrusion detection and prevention ❑ To apply the scientific method to digital forensics and perform forensic investigations ❑ To develop computer forensics awareness ❑ Ability to use computer forensics tools
414454	Machine Learning and Applications	❑ Model the learning primitives and Build the learning model. ❑ Model the Classification based Learning Models ❑ Model the Regression Learning Models ❑ How Logic and Distance Based Learning Models can be used to understand Human Learning Aspects ❑ Probabilistic Approach to Learn the Human Learning Aspects ❑ Tackle real world problems in the domain of Data Mining and Big Data Analytics, Information Retrieval, Computer vision, Linguistics and Bioinformatics.
414455	Software Design and Modeling	❑ Understand object oriented methodologies, basics of Unified Modeling Language (UML). ❑ Understand analysis process, use case modeling, domain/class modeling ❑ Understand interaction and behavior modeling. ❑ Understand design process and business, access and view layer class design ❑ Get started on study of GRASP principles and GoF design patterns. ❑ Get started on study of architectural design principles and guidelines in the various type of application development.

414456C	Usability Engineering	❑ To familiarize information, interaction and GUI design process for enhancing user-experience ❑ To explain usability engineering lifecycle for designing a user-friendly software ❑ Justify the theory and practice of usability evaluation approaches, methods and techniques ❑ Compare and evaluate strengths and weaknesses of various approaches, methods and techniques for evaluating usability. ❑ Design and implement a usability test plan, based on modeling or requirements specification ❑ Choose appropriate approaches, methods and techniques to evaluate the usability of a specified interactive system.
414456E	Business Analytics and Intelligence	❑ Comprehend the Information Systems and development approaches of Intelligent Systems ❑ Evaluate and rethink business processes using information systems ❑ Propose the Framework for business intelligence ❑ Get acquainted with the Theories, techniques, and considerations for capturing. ❑ Align business intelligence with business strategy ❑ Apply the techniques for implementing business intelligence systems
414457C	Software Testing and Quality Assurance	❑ Test the software by applying testing techniques to deliver a product free from bugs ❑ Investigate the scenario and to select the proper testing technique ❑ Explore the test automation concepts and tools and estimation of cost, schedule based on standard metrics. ❑ Understand how to detect, classify, prevent and remove defects. ❑ Choose appropriate quality assurance models and develop quality. ❑ Ability to conduct formal inspections, record and evaluate results of inspections.
414459	Computer Laboratory-VIII	❑ Draw, discuss different UML 2.0 diagrams, their concepts, notation, advanced notation, forward and reverse engineering aspects. ❑ Identify different software artifacts used to develop use case model from requirements. ❑ Identify different software artifacts used to develop and implement Interaction and behavior Model from requirements. ❑ Identify different software artifacts used to develop and implement analysis model and design model from requirements. ❑ Implement an appropriate design pattern to solve a design problem.
414458	Computer Laboratory-VII	❑ The Students will be able to understand and select appropriate Software tools to implement Complex Machine Learning Problems ❑ The students will be able to implement Naïve Bayes

		Algorithm to Different Machine Learning Problems ❑ The Students will be able to implement and apply Regression techniques various analytical problems ❑ the Students will be able to understand necessity of dimensionality reduction in machine learning tasks ❑ the students will be able to understand how SVM is used to solve classification task ❑ The students will be able to learn and implement kmeans algorithm and clustering using kmeans
414462	Distributed Computing System	❑ Understand the principles and desired properties of distributed systems based on different application areas. ❑ Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving ❑ Recognize the inherent difficulties that arise due to distributed-ness of computing resources ❑ Identify the challenges in developing distributed applications
414463	Ubiquitous Computing	❑ Demonstrate the knowledge of design of Ubicomp and its applications. ❑ Explain smart devices and services used Ubicomp. ❑ Describe the significance of actuators and controllers in real time application design. ❑ Use the concept of HCI to understand the design of automation applications. ❑ Classify Ubicomp privacy and explain the challenges associated with Ubicomp privacy. ❑ Get the knowledge of ubiquitous and service oriented networks along with Ubicomp management
414464B	Information Storage and Retrieval	❑ Student should be able to understand the concept of Information retrieval. ❑ Student should be able to deal with storage and retrieval process of text and multimedia data. ❑ Student should be able to evaluate performance of any information retrieval system. ❑ Students should be able to design user interfaces. ❑ Student should be able to understand importance of recommender system. ❑ Student should be able to understand concept of multimedia and distributed information retrieval
414465	Social Media Analytics	❑ Understand the basics of Social Media Analytics ❑ Explain the significance of Data mining in Social media ❑ Demonstrate the algorithms used for text mining ❑ Apply network measures for social media data ❑ Explain Behavior Analytics techniques used for social media data. ❑ Apply social media analytics for Face book and Twitter kind of applications

414466	Computer laboratory-IX	❑ Demonstrate knowledge of the core concepts and techniques in distributed systems. ❑ Learn how to apply principles of state-of-the-Art Distributed systems in practical application. ❑ Design, build and test application programs on distributed systems
414467	Computer laboratory-X	❑ set up the Android environment and explain the Evolution of cellular networks (BT-2) ❑ develop the User Interfaces using pre-built Android UI components (BT -6) ❑ create applications for performing CURD SQLite database operations using Android(BT-6) ❑ create the smart android applications using the data captured through sensors (BT-6) ❑ implement the authentication protocols between two mobile devices for providing security (BT-3) ❑ analyze the data collected through android sensors using any machine learning algorithm (BT-4).