



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) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
210241	Discrete Mathematics	<ul style="list-style-type: none"><input type="checkbox"/> Student will able to solve real world problems logically using appropriate set, function, and relation, relation models.<input type="checkbox"/> Student will able to interpret the associated operations and terminologies in context.<input type="checkbox"/> Student will able to analyze the real world problems using discrete mathematics.<input type="checkbox"/> Student will able to synthesize the real world problems using discrete mathematics.<input type="checkbox"/> Student will able to formulate problems precisely using discrete mathematics.<input type="checkbox"/> Student will able to apply formal proof techniques and explain the reasoning.
210242	Digital Electronics & Logic Design	<ul style="list-style-type: none"><input type="checkbox"/> Realize and simplify Boolean Algebraic assignments for designing digital circuits using KMaps.<input type="checkbox"/> Design and implement Sequential and Combinational digital circuits as per the specifications.<input type="checkbox"/> Apply the knowledge to select the logic families IC packages as per the design specifications.<input type="checkbox"/> Design the minimum systems using VHDL.<input type="checkbox"/> Develop minimum embedded system for simple real world application.<input type="checkbox"/> To develop skill to build and troubleshoot digital circuit
210243	Data Structures & Algorithms	<ul style="list-style-type: none"><input type="checkbox"/> To Explain the basic concepts like Algorithms, Algorithmic Strategies and Data Structures<input type="checkbox"/> To illustrate Data Structures Using Sequential Organization<input type="checkbox"/> To Describe Linear Data Structures Using Linked Organization<input type="checkbox"/> To Express Stack as LIFO data structure<input type="checkbox"/> To Express Queue as FIFO data structure
210244	Computer Organization & Architecture	<ul style="list-style-type: none"><input type="checkbox"/> To understand the structure, function and characteristics of computer systems.<input type="checkbox"/> To understand the design of the various functional units

		<p>and components of digital computers.</p> <ul style="list-style-type: none"> ❑ To identify the elements of modern instructions sets and explain their impact on processor design. ❑ To explain the function of each element of a memory hierarchy, identify and compare different methods for computer I/O. ❑ To compare simple computer architectures and organizations based on established performance metrics. ❑ To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point arithmetic.
210245	Object Oriented Programming	<ul style="list-style-type: none"> ❑ Analyze the strengths of object oriented programming ❑ Design and apply OOP principles for effective programming ❑ Develop programming application using object oriented programming language C++ ❑ Percept the utility and applicability of OOP ❑ To implement File handling using object-oriented programming. ❑ Able to analyse, design and construct sophisticated software applications to industry standards
210246	Digital Electronics lab	<ul style="list-style-type: none"> ❑ Apply knowledge and concepts and methods of digital system design techniques ❑ 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
210247	Data Structures Lab	<ul style="list-style-type: none"> ❑ To explain Linear Data Structures. ❑ To apply stack to the given application. ❑ To apply queue to the given application. ❑ To compute various sorting algorithms.
210248	Object oriented Programming Lab	<ul style="list-style-type: none"> ❑ Able to know basic architecture, memory system of 64 bit Linux operating system ❑ Implement and analysis the concept of function and polymorphism by using C++ programming I ❑ Implement the concept of exception and file handling

		<ul style="list-style-type: none"> ❑ Implement the various data structure using C++ programming ❑ Design and implement the application software using C++.
210249	Soft Skills	<ul style="list-style-type: none"> ❑ Effectively communicate through verbal/oral communication and improve the listening skills ❑ Write precise briefs or reports and technical documents. ❑ Actively participate in group discussion / meetings / interviews and prepare & deliver presentations. ❑ Become more effective individual through goal/target setting, self motivation and practicing creative thinking. ❑ Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, interpersonal relationships, conflict management and leadership quality.
SEM-II		
207003	Engineering Mathematics-3	<ul style="list-style-type: none"> ❑ Student will able to solve higher order linear differential equations to understand appropriate techniques of modeling and analyzing electrical circuits. ❑ Student will able to solve problems related to Fourier transform, Z-transform and applications to signal and image processing. ❑ Student will able to apply statistical methods like correlation and regression analysis, Measures of central tendency and its applications.. ❑ Student will able to understand probability theory and its applications. Probability distributions. Analysis and prediction of data as applied to machine intelligence. ❑ Student will able to perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals. ❑ Student will able to analyze conformal mappings, transformations and perform contour integration of complex functions required in image processing, digital filters and computer graphics.
210251	Computer Graphics	<ul style="list-style-type: none"> ❑ Introduce and give exposure to fundamental of computer graphics and various Applications in computer graphics. ❑ To understand scan conversion of line, Circle, and ellipse. ❑ To understand polygon clipping and windowing clipping. ❑ To understand 2-D and 3-D transformation. ❑ To provide basis modeling of object with curves, fractals and hidden Surfaces ❑ To understand segments, Animation, gaming platforms with interactive graphics usage tools
210252	Advanced Data Structures	<ul style="list-style-type: none"> ❑ To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain. ❑ To design the algorithms to solve the programming

		<p>problems.</p> <ul style="list-style-type: none"> <input type="checkbox"/> To use effective and efficient data structures in solving various Computer Engineering domain problems. <input type="checkbox"/> To analyze the algorithmic solutions for resource requirements and optimization <input type="checkbox"/> To use appropriate modern tools to understand and analyze the functionalities confined to the data structure usage.
210253	Microprocessor	<ul style="list-style-type: none"> <input type="checkbox"/> Apply the assembly language programming to develop small real life embedded application. <input type="checkbox"/> Understand the architecture of the advanced processor thoroughly to use the resources for programming <input type="checkbox"/> Understand the higher processor architectures descended from 80386 architecture <input type="checkbox"/> Understand debugging and testing techniques <input type="checkbox"/> Understand processor's various modes of operation and mode switching <input type="checkbox"/> Understand Numeric data processor and its working with main processor
210254	Principles of Programming Languages	<ul style="list-style-type: none"> <input type="checkbox"/> To analyze the strengths and weaknesses of programming languages for effective and efficient program development. <input type="checkbox"/> To inculcate the principles underlying the programming languages enabling to learn new programming languages <input type="checkbox"/> To use the programming paradigms effectively in application development. <input type="checkbox"/> To understand the fundamentals of Java <input type="checkbox"/> To understand the Web development features of Java
210255	Computer Graphics lab	<ul style="list-style-type: none"> <input type="checkbox"/> Understand the basic concepts of computer graphics. <input type="checkbox"/> Design scan conversion problems using C++ programming. <input type="checkbox"/> Apply clipping and filling techniques for modifying an object. <input type="checkbox"/> Understand the concepts of different type of geometric transformation of objects in 2D and 3D. <input type="checkbox"/> Understand the practical implementation of modeling, rendering, viewing of objects in 2D & 3D. <input type="checkbox"/> Understanding different fractal structures and implementation of Koch & Hilbert curves and animation sequences.
210256	Advanced Data Structures Lab	<ul style="list-style-type: none"> <input type="checkbox"/> To apply appropriate advanced data structure and efficient algorithms to approach the problems of various domain. <input type="checkbox"/> To design the algorithms to solve the programming problems. <input type="checkbox"/> To use effective and efficient data structures in solving various Computer Engineering domain problems. <input type="checkbox"/> To analyze the algorithmic solutions for resource requirements and optimization <input type="checkbox"/> To use appropriate modern tools to understand and analyze

		the functionalities confined to the data structure usage.
210257	Microprocessor Lab	<ul style="list-style-type: none">❑ To perform various numerical computations using assembly language programming.❑ To explain various types of 80386 modes and switching among them.❑ To Describe the recursion technique in assembly language programming❑ To Understand implementation of various DOS Commands.❑ To Understand Numeric data processor and its working with main processor.❑ To Analyse the Terminate but Stay Resident (TSR) program.



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Department of Computer Engineering

Course Outcomes (COs)

TE (Computer Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
310241	Theory of Computation	<ul style="list-style-type: none"><input type="checkbox"/> Design DFA, NFA & e-NFA for the given problem<input type="checkbox"/> Convert RE to Automata & vice-versa<input type="checkbox"/> Design grammar for context free and regular languages.<input type="checkbox"/> Design Pushdown Automata for context free language.<input type="checkbox"/> Design deterministic or non deterministic Turing machine for all input all output , NP Complete or NP Hard<input type="checkbox"/> Identify the decidability of the problem statement.
310242	Database Managements System	<ul style="list-style-type: none"><input type="checkbox"/> Design E-R Model for given requirements and convert the same into database tables.<input type="checkbox"/> Use database techniques such as SQL & PL/SQL<input type="checkbox"/> Design relational databases for real life problems using conceptual or logical design processes<input type="checkbox"/> Explain transaction Management in relational database System.<input type="checkbox"/> Describe different database architecture and analyze the use of appropriate architecture in real time environment<input type="checkbox"/> Use modern database techniques and advanced database Programming concepts such as NOSQL and Big Data
310243	Software Engineering & Project Management	<ul style="list-style-type: none"><input type="checkbox"/> Decide on a process model for a developing a software project<input type="checkbox"/> Classify software applications and Identify unique features of various domains<input type="checkbox"/> Design test cases of a software system<input type="checkbox"/> Understand basics of IT Project management<input type="checkbox"/> Plan, schedule and execute a project considering the risk management<input type="checkbox"/> Apply quality attributes in software development life cycle
310244	Information Systems & Engineering Economics	<ul style="list-style-type: none"><input type="checkbox"/> Understand the need, usage and importance of an Information System to an organization.<input type="checkbox"/> Perform and evaluate present worth, future worth and annual worth analysis on one or more economic alternatives.<input type="checkbox"/> Understand the activities that are undertaken while managing, designing, planning, implementation, and

		<p>deployment of computerized information system in an organization.</p> <ul style="list-style-type: none"> ❑ Student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations. ❑ Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry. ❑ Be able to carry out and evaluate benefit/cost, life cycle and breakeven analysis on one or more economic alternatives.
310245	Computer Networks	<ul style="list-style-type: none"> ❑ Learn to use Network Related commands and configuration files in Linux Operating System. ❑ Learn to Develop Network Application Programs. ❑ Analyze Network Traffic using network Monitoring Tools ❑ Illustrate client-server architectures and protocols by the means of correct standards and technology. ❑ Demonstrate different routing and switching algorithms and simulation programming.
310246	Skill Development Lab	<ul style="list-style-type: none"> ❑ Evaluate problems and analyze data using current technologies in a wide variety of business and organizational contexts. ❑ Create data-driven web applications ❑ Incorporate best practices for building applications. ❑ Employ Integrated Development Environment(IDE) for implementing and testing of software solution ❑ Construct software solutions by evaluating alternate architectural patterns. ❑ Understand and to use data advanced analytic tools
310247	DBMS Lab	<ul style="list-style-type: none"> ❑ Understand working of MySQL relational database and handle SQL objects such as Table, View, Index, Sequence, Synonym ❑ Populate and query relational databases using SQL DML statements for various database applications ❑ Use PL/SQL Programming concepts such as Cursors, Control structure and Exception handling Stored Procedures and Triggers for various database applications ❑ Understand working of MongoDB - NoSQL database and design basic MongoDB queries, Aggregation, Indexing & Map Reduce operations ❑ Design and develop Database navigation operations using various databases with front end technologies
310248	CN Lab	<ul style="list-style-type: none"> ❑ Analyze the requirements for a given organizational structure to select the most appropriate networking architectures, topologies, transmission medium and technologies. ❑ Demonstrate design issues, flow control and error control. ❑ Analyze data flow between TCP/IP model using Application, Transport and Network layer protocols.

		<ul style="list-style-type: none"> <input type="checkbox"/> Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community. <input type="checkbox"/> Illustrate client-server architectures and protocols by the means of correct standards and technology. <input type="checkbox"/> Demonstrate different routing and switching algorithms.
SEM-II		
310250	Design & Analysis of Algorithm	<ul style="list-style-type: none"> <input type="checkbox"/> To survey algorithmic strategies give presentation using open source documentation tools like Latex and soft skill methodologies <input type="checkbox"/> To write mathematical modeling of algorithms for problem solving <input type="checkbox"/> To solve problems for multi core or distributed or concurrent/parallel/embedded environments. <input type="checkbox"/> To solve real world problems by using optimization algorithms. <input type="checkbox"/> To apply the mathematical modeling, adaptive, dynamic and numerical analysis in IOT
310251	Systems Programming & Operating Systems	<ul style="list-style-type: none"> <input type="checkbox"/> Analyze and synthesize role played various system software <input type="checkbox"/> Apply techniques to develop macros, loaders and linkers <input type="checkbox"/> To use tools like LEX & YACC for designing a compiler for an elementary language grammar <input type="checkbox"/> To understand and analyze process management in operating systems including scheduling & deadlocks. <input type="checkbox"/> To understand various memory-management techniques, including paging and segmentation. <input type="checkbox"/> To discuss file system design including access methods, file sharing, locking and directory structure.
310252	Embedded Systems & IoT	<ul style="list-style-type: none"> <input type="checkbox"/> Implement an architectural design for IoT for specified requirement <input type="checkbox"/> Solve the given societal challenge using IoT <input type="checkbox"/> Choose between available technologies and devices for stated IoT challenge <input type="checkbox"/> learn the Key features required for IoT security <input type="checkbox"/> Understand the Architecture of WoT and its specification <input type="checkbox"/> Understand the architecture of Cloud of Things
310253	Software Modeling & Design	<ul style="list-style-type: none"> <input type="checkbox"/> Analyze the problem statement (SRS) and choose proper design technique for designing web-based/ desktop application <input type="checkbox"/> Design and analyze an application using UML modeling as fundamental tool <input type="checkbox"/> Apply design patterns to understand reusability in OO design <input type="checkbox"/> Decide and apply appropriate modern tool for designing and modeling <input type="checkbox"/> Decide and apply appropriate modern testing tool for testing web-based/desktop application
310254	Web Technologies	<ul style="list-style-type: none"> <input type="checkbox"/> Analyze given assignment to select sustainable web development and design methodology.

		<ul style="list-style-type: none"> <input type="checkbox"/> Develop and deploy web based application using suitable client side web technologies. <input type="checkbox"/> Develop and deploy web based application using suitable server side web technologies. <input type="checkbox"/> Develop web based application using suitable client and server side web technologies with form and database handling. <input type="checkbox"/> Design and deploy the emerging client and server side frameworks. <input type="checkbox"/> Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management.
310255	Seminar & Technical Communication	<p>On completion of the course, student will–</p> <ul style="list-style-type: none"> <input type="checkbox"/> Be able to be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation. <input type="checkbox"/> Be able to improve skills to read, understand, and interpret material on technology. <input type="checkbox"/> improve communication and writing skills
310256	WT Lab	<ul style="list-style-type: none"> <input type="checkbox"/> Installation, configuration of Web Servers and Developing Web Page using HTML, CSS and XML. <input type="checkbox"/> To Study validation of web page Contents <input type="checkbox"/> To study Dynamic Web Page Creation using Servlet and JSP <input type="checkbox"/> To study Dynamic Web Page Creation using PHP, Mysql and AJAX <input type="checkbox"/> Develop solution to complex problems using appropriate method, technologies, frameworks <input type="checkbox"/> Develop web based application using suitable client side and server side web technologies web services and content management
310257	SP&OS Lab	<ul style="list-style-type: none"> <input type="checkbox"/> Design and evaluate assembler Pass-I & Pass-II <input type="checkbox"/> Design and evaluate macro Pass-I & Pass-II <input type="checkbox"/> Create lexical analyzer using lex tool <input type="checkbox"/> Create syntax analyzer using YAAC tool <input type="checkbox"/> Create and use dynamic link libraries <input type="checkbox"/> Understand and implement process scheduling mechanisms <input type="checkbox"/> Understand and implement memory management functionalities in operating system
310258	ES & IoT Lab	<ul style="list-style-type: none"> <input type="checkbox"/> To understand functionalities of various single board embedded platforms fundamentals <input type="checkbox"/> To develop comprehensive approach towards building small low cost embedded IoT system <input type="checkbox"/> To understand different sensory inputs <input type="checkbox"/> To develop remote controlled smart system <input type="checkbox"/> To understand the process to store sensor data on cloud <input type="checkbox"/> To develop smart surveillance system



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Department of Computer Engineering

Course Outcomes (COs)

BE (Computer Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
410241	High Performance Computing	<ul style="list-style-type: none"> <input type="checkbox"/> Describe different parallel architectures, interconnect networks, programming models <input type="checkbox"/> Develop an efficient parallel algorithm to solve given problem <input type="checkbox"/> Analyze and measure performance of modern parallel computing systems <input type="checkbox"/> Build the logic to parallelize the programming task <input type="checkbox"/> An ability to apply design and development principles of parallelization in the construction of software systems of varying complexity. <input type="checkbox"/> Understand the CUDA programming models and Parallelize sequential tasks.
410242	Artificial Intelligence and Robotics	<p>On completion of the course, student will be able to–</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify and apply suitable Intelligent agents for various AI applications <input type="checkbox"/> Design smart system using different informed search / uninformed search or heuristic approaches. <input type="checkbox"/> Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem. <input type="checkbox"/> Apply the suitable algorithms to solve AI problems.
410243	Data Analytics	<p>On completion of the course, student will be able to–</p> <ul style="list-style-type: none"> <input type="checkbox"/> Write case studies in Business Analytic and Intelligence using mathematical models <input type="checkbox"/> Present a survey on applications for Business Analytic and Intelligence <input type="checkbox"/> Provide problem solutions for multi-core or distributed, concurrent/Parallel environments
410244(D)	Ele-1:Data Mining and Warehousing	<p>On completion of the course the student should be able to-</p> <ul style="list-style-type: none"> <input type="checkbox"/> Apply basic, intermediate and advanced techniques to mine the data <input type="checkbox"/> Analyze the output generated by the process of data mining <input type="checkbox"/> Explore the hidden patterns in the data <input type="checkbox"/> Optimize the mining process by choosing best data mining

		technique
410245(B)	Ele-2:Software Testing and Quality Assurance	<p>On completion of the course, student will be able to–</p> <ul style="list-style-type: none"> <input type="checkbox"/> Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance. <input type="checkbox"/> Design and develop project test plan, design test cases, test data, and conduct test operations <input type="checkbox"/> Apply recent automation tool for various software testing for testing software <input type="checkbox"/> Apply different approaches of quality management, assurance, and quality standard to software system <input type="checkbox"/> Apply and analyze effectiveness Software Quality Tools
410245(A)	Distributed Systems	<p>On completion of the course, student will be able to–</p> <ul style="list-style-type: none"> <input type="checkbox"/> Able to learn and apply the concept of remote method invocation and Remote Procedure Calls <input type="checkbox"/> Able to analyze the mechanism of peer to peer systems and Distributed File Systems <input type="checkbox"/> Demonstrate an understanding of the challenges faced by current and future distributed systems
410246	Laboratory Practice I	<ul style="list-style-type: none"> <input type="checkbox"/> Build the logic to parallelize the programming task <input type="checkbox"/> Analyze and measure performance of modern parallel computing systems <input type="checkbox"/> Identify and apply suitable Intelligent agents for various AI applications <input type="checkbox"/> "Design smart system using different informed search / uninformed search or heuristic approaches" <input type="checkbox"/> Understand the statistics and Mathematics use to solve big data analytics problem. <input type="checkbox"/> Understand the impact of big data for business decisions and strategy
410247	Laboratory Practice II	<ul style="list-style-type: none"> <input type="checkbox"/> Able to learn and apply the concept of remote method invocation and Remote Procedure Calls. <input type="checkbox"/> Learn and apply the concept of Inter-process Communication. <input type="checkbox"/> Analyze the different distributed algorithm. <input type="checkbox"/> Analyze the mechanism of peer to peer systems and Distributed File Systems. <input type="checkbox"/> Learn and apply the concept of Time, Global state and coordination. <input type="checkbox"/> Demonstrate an understanding of the challenges faced by current and future distributed systems. <input type="checkbox"/> Implement the mini projects based on software testing framework.
SEM-II		
410250	Machine Learning	<p>On completion of the course, student will be able to–</p> <ul style="list-style-type: none"> <input type="checkbox"/> Distinguish different learning based applications <input type="checkbox"/> Apply different preprocessing methods to prepare training data set for machine learning.

		<ul style="list-style-type: none"> <input type="checkbox"/> Design and implement supervised and unsupervised machine learning algorithm. <input type="checkbox"/> Implement different learning models <input type="checkbox"/> Learn Meta classifiers and deep learning concepts
410251	Information and Cyber Security	<p>On completion of the course, student will be able to–</p> <ul style="list-style-type: none"> <input type="checkbox"/> Gauge the security protections and limitations provided by today's technology. <input type="checkbox"/> Identify information security and cyber security threats. <input type="checkbox"/> Analyze threats in order to protect or defend it in cyberspace from cyber-attacks. <input type="checkbox"/> Build appropriate security solutions against cyber-attacks.