

## Department of Information Technology

### Course Outcomes

SE – 2019 Course			
Semester – III			
Course Code	Course Name	Course Outcomes	
214441	<b>Discrete Mathematics</b>	CO1	Formulate and apply formal proof techniques and solve the problems with logical reasoning.
		CO2	Analyze and evaluate the combinatorial problems by using probability theory.
		CO3	Apply the concepts of graph theory to devise mathematical models.
		CO4	Analyze types of relations and functions to provide solution to computational problems.
		CO5	Identify techniques of number theory and its application.
		CO6	Identify fundamental algebraic structures.
214442	<b>Logic Design &amp; Computer Organization</b>	CO1	Perform basic binary arithmetic & simplify logic expressions.
		CO2	Grasp the operations of logic ICs and Implement combinational logic functions using ICs.
		CO3	Comprehend the operations of basic memory cell types and Implement sequential logic functions using ICs.
		CO4	Elucidate the functions & organization of various blocks of CPU.
		CO5	Understand CPU instruction characteristics, enhancement features of CPU.
		CO6	Describe an assortment of memory types (with their characteristics) used in computer systems and basic principle of interfacing input, output devices.
214443	<b>Data Structure &amp; Algorithms</b>	CO1	Perform basic analysis of algorithms with respect to time and space complexity.

		CO2	Select appropriate searching and/or sorting techniques in the application development.
		CO3	Implement abstract data type (ADT) and data structures for given application.
		CO4	Design algorithms based on techniques like brute - force, divide and conquer, greedy, etc.
		CO5	Apply implement learned algorithm design techniques and data structures to solve problems.
		CO6	Design different hashing functions and use files organizations.
<b>214444</b>	<b>Object-Oriented Programming</b>	CO1	Differentiate various programming paradigms.
		CO2	Identify classes, objects, methods, and handle object creation, initialization, and Destruction to model real-world problems
		CO3	Identify relationship among objects using inheritance and polymorphism principles.
		CO4	Handle different types of exceptions and perform generic programming.
		CO5	Use of files for persistent data storage for real world application.
		CO6	Apply appropriate design patterns to provide object-oriented solutions.
<b>214445</b>	<b>Basics of Computer Network</b>	CO1	Understand and explain the concepts of communication theory and compare functions of OSI and TCP/IP model
		CO2	Analyze data link layer services, error detection and correction, linear block codes, cyclic Codes, framing and flow control protocols.
		CO3	Compare different access techniques, channelization and IEEE standards.
		CO4	Apply the skills of subnetting, supernetting and routing mechanisms
		CO5	Differentiate IPv4 and IPv6.
		CO6	Illustrate services and protocols used at transport

			layer.
214446	<b>Logic Design &amp; Computer Organization Lab</b>	CO1	Use logic function representation for simplification with K-Maps and design Combinational logic circuits using SSI & MSI chips.
		CO2	Design Sequential Logic circuits: MOD counters using synchronous counters.
		CO3	Understand the basics of simulator tool & to simulate basic blocks such as ALU & memory.
214447	<b>Data Structure &amp; Algorithms Lab</b>	CO1	Analyze algorithms and to determine algorithm correctness and time efficiency class.
		CO2	Implement abstract data type (ADT) and data structures for given application
		CO3	Design algorithms based on techniques like brute - force, divide and conquer, greedy, etc.).
		CO4	Solve problems using algorithmic design techniques and data structures.
		CO5	Analyze of algorithms with respect to time and space complexity.
214448	<b>Object Oriented Programming Lab</b>	CO1	Differentiate various programming paradigms and apply basic concepts of OOP.
		CO2	Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
		CO3	Identify relationship among objects using inheritance and polymorphism.
		CO4	Execute different types of exceptions and perform generic programming.
		CO5	Use file handling for real world application.
		CO6	Apply appropriate design patterns to provide object-oriented solutions.
214449	<b>Soft Skill Lab</b>	CO1	Introspect about individual's goals, aspirations by evaluating one's SWOC and think creatively.
		CO2	Develop effective communication skills including Listening, Reading, Writing and Speaking.

		CO3	Constructively participate in group discussion, meetings and prepare and deliver Presentations.
		CO4	Write precise briefs or reports and technical documents.
		CO5	Practice professional etiquette, present oneself confidently and successfully handle personal interviews.
		CO6	Function effectively in multi- disciplinary and heterogeneous teams through the knowledge of team work, Inter- personal relationships, conflict management and leadership quality
<b>214450(C)</b>	<b>Audit Course 3: Language Study Japanese -Module I</b>	CO1	Converse with simple sentences in Japanese
		CO2	Recognize and read simple sentences in Japanese.
		CO3	Write simple sentences in Japanese.
		CO4	Be aware about Japanese society and people.
<b>SE – 2019 Course</b>			
<b>Semester – III</b>			
<b>Course Code</b>	<b>Course Code</b>	<b>Course Outcomes</b>	
<b>207003</b>	<b>Engineering Mathematics III</b>	CO1	Solve Linear differential equations, essential in modelling and design of computer-based systems.
		CO2	Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
		CO3	Apply Statistical methods like correlation & regression analysis and probability theory for data analysis and predictions in machine learning.
		CO4	Solve Algebraic & Transcendental equations and System of linear equations using numerical techniques.
		CO5	Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions

			of ordinary differential equations used in modern scientific computing.
<b>214451</b>	<b>Processor Architecture</b>	CO1	Apprehend architecture and memory organization of PIC 18 microcontroller.
		CO2	Implement embedded C
		CO3	A use concept of timers and interrupts of PIC 18.
		CO4	Demonstrate real life applications using PIC 18.
		CO5	Analyze architectural details of ARM processor.
		CO6	Learn and implement the embedded C in real application.
<b>214452</b>	<b>Database Management System</b>	CO1	Apply fundamental elements of database management systems.
		CO2	Design ER-models to represent simple database application scenarios.
		CO3	Formulate SQL queries on data for relational databases.
		CO4	Improve the database design by normalization & to incorporate query processing.
		CO5	Apply ACID properties for transaction management and concurrency control.
		CO6	Analyze various database architectures and technologies.
<b>214453</b>	<b>Computer Graphics</b>	CO1	Apply mathematical and logical aspects for developing elementary graphics operations like scan conversion of points, lines, circle, and apply it for problem solving.
		CO2	Employ techniques of geometrical transforms to produce, position and manipulate Objects in 2 dimensional and 3-dimensional space respectively
		CO3	Describe mapping from a world coordinates to device coordinates, clipping, and projections in order to produce 3D images on 2D output device.
		CO4	Apply concepts of rendering, shading, animation, curves and fractals using computer graphics tools in

			design, development and testing of 2D, 3D modeling applications.
		CO5	Perceive the concepts of virtual reality.
214454	<b>Software Engineering</b>	CO1	Classify various software application domains.
		CO2	Analyze software requirements by using various modeling techniques.
		CO3	Translate the requirement models into design models.
		CO4	Apply planning and estimation to any project.
		CO5	Use quality attributes and testing principles in software development life cycle
		CO6	Discuss recent trends in Software engineering by using CASE and agile tools
214454	<b>Programming Skill Development Lab</b>	CO1	Apply concepts related to embedded C programming.
		CO2	Develop and Execute embedded C program to perform array addition, block transfer, sorting operations
		CO3	Perform interfacing of real-world input and output devices to PIC18FXXX microcontroller.
		CO4	Use source prototype platform like Raspberry-Pi/Beagle board/Arduino.
214456	<b>Database Management System Lab</b>	CO1	Install and configure database systems.
		CO2	Analyze database models & entity relationship models.
		CO3	Design and implement a database schema for a given problem-domain
		CO4	Implement relational database systems.
		CO5	Populate and query a database using SQL DDL / DML / DCL commands.
		CO6	Design a backend database of any one organization: CASE STUDY
214457	<b>Computer Graphics</b>	CO1	Apply line & circle drawing algorithms to draw the

	<b>Lab</b>		objects.
		CO2	Apply polygon filling methods for the object.
		CO3	Apply polygon clipping algorithms for the object.
		CO4	Apply the 2D transformations on the object.
		CO5	Implement the curve generation algorithms.
		CO6	Demonstrate the animation of any object using animation principles.
<b>214458</b>	<b>Project Based Learning</b>	CO1	Design solution to real life problems and analyze its concerns through shared cognition.
		CO2	Apply learning by doing approach in PBL to promote lifelong learning.
		CO3	Tackle technical challenges for solving real world problems with team efforts.
		CO4	Collaborate and engage in multi- disciplinary learning environments.
<b>214459(B)</b>	<b>Audit course 4 : Language Study Japanese : Module - II</b>	CO1	Have Japanese Communicative competence for primitive Social conversation in Japanese
		CO2	Comprehend Grammar of Japanese Script
		CO3	Translate simple sentences from Japanese to English and vice a versa
		CO4	Be aware about Japanese society and people

## Department of Information Technology

### Course Outcomes

TE – 2019 Course		
Semester –V		
Course Code	Course Name	Course Outcomes
314441	<b>Theory of Computation</b>	CO1 Construct finite automata and its variants to solve computing problems.
		CO2 Write regular expressions for the regular languages and finite automata.
		CO3 Identify types of grammar, design and simplify Context Free Grammar.
		CO4 Construct Pushdown Automata machine for the Context Free Language.
		CO5 To express the understanding of the decidability and decidability problems.
		CO6 To express the understanding of computational complexity.
314442	<b>Operating Systems</b>	CO1 Explain the role of Modern Operating Systems.
		CO2 Apply the concepts of process and thread scheduling.
		CO3 Illustrate the concept of process synchronization, mutual exclusion and the deadlock.
		CO4 Implement the concepts of various memory management techniques
		CO5 Make use of concept of I/O management and File system
		CO6 Understand Importance of System software
314443	<b>Machine Learning</b>	CO1 Apply basic concepts of machine learning and different types of machine learning algorithms.
		CO2 Differentiate various regression techniques and evaluate their performance
		CO3 Compare different types of classification models and their relevant application
		CO4 Illustrate the tree-based and probabilistic machine learning algorithms.



		CO5	Identify different unsupervised learning algorithms for the related real-world problems
		CO6	Apply fundamental concepts of ANN.
314444	<b>Human Computer Interaction</b>	CO1	Explain importance of HCI study and principles of user-centered design (UCD) approach.
		CO2	Develop understanding of human factors in HCI design.
		CO3	Develop understanding of models, paradigms, and context of interactions.
		CO4	Design effective user-interfaces following a structured and organized UCD process.
		CO5	Evaluate usability of a user-interface design.
		CO6	Apply cognitive models for predicting human-computer-interactions.
314445	<b>Elective-I - Advanced Database and Management System</b>	CO1	Differentiate relational and object-oriented databases.
		CO2	Illustrate parallel & distributed database architectures.
		CO3	Apply concepts of NoSQL Databases.
		CO4	Explain concepts of data warehouse and OLAP technologies.
		CO5	Apply data mining algorithms and various software tools.
		CO6	Comprehend emerging and enhanced data models for advanced applications.
303146	<b>Operating Systems Lab</b>	CO1	Apply the basics of Linux commands.
		CO2	Build shell scripts for various applications.
		CO3	Implement basic building blocks like processes, threads under the Linux.
		CO4	Develop various system programs for the functioning of OS concepts in user space like concurrency control, CPU Scheduling, Memory Management and Disk Scheduling in Linux.
		CO5	Develop system programs for Inter Process Communication in Linux.
303147	<b>Human Computer Interaction- Lab</b>	CO1	Differentiate between good design and bad design.
		CO2	Analyze creative design in the surrounding.
		CO3	Assess design based on feedback and constraint.
		CO4	Design paper-based prototypes and use wire frame.
		CO5	Implement user-interface design using web technology.

		CO6	Evaluate user-interface design using HCI evaluation techniques.
303148	Laboratory Practice-I (Machine Learning )	CO1	Implement different supervised and unsupervised learning algorithms.
		CO2	Evaluate performance of machine learning algorithms for real-world applications.
303148(B)	Laboratory Practice-I (ADBMS)	CO1	Apply advanced Database Programming Languages.
		CO2	Apply the concepts of NoSQL Databases.
		CO3	Install and configure database systems.
		CO4	Populate and query a database using MongoDB commands.
		CO5	Design data warehouse schema of any one real-time: CASE STUDY
		CO6	Develop small application with NoSQL Database for back-end.
303149	Seminar	CO1	Understand, interpret and summarize technical literature
		CO2	Demonstrate the techniques used in the paper.
		CO3	Distinguish the various techniques required to accomplish the task.
		CO4	Identify intended future work based on the technical review
		CO5	Prepare and present the content through various presentation tools and techniques in effective manner.
		CO6	Keep audience engaged through improved interpersonal skills.
<b>TE – 2019 Course</b>			
<b>Semester –VI</b>			
<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcomes</b>	
314451	Computer Network and Security	CO1	Explain Responsibilities, services offered and protocol used at application layer of network
		CO2	Apply concepts of wireless network and different wireless standards.
		CO3	Recognize the Adhoc Network's MAC layer, routing protocol and Sensor network architecture.
		CO4	Implement the principal concepts of network security and Understand network security threats, security services, and countermeasures
		CO5	Apply basic cryptographic techniques in application development.

		CO6	Gain a good comprehension of the landscape of cyber security Vulnerabilities & describe typical threats to modern digital systems.
314452	<b>Data Science and Big Data Analytics</b>	CO1	Understand Big Data primitives
		CO2	Learn and apply different mathematical models for Big Data.
		CO3	Demonstrate Big Data learning skills by developing industry or research applications.
		CO4	Analyze and apply each learning model comes from a different algorithmic approach and it will perform differently under different datasets.
		CO5	Understand, apply and analyze needs, challenges and techniques for big data visualization.
		CO6	Learn different programming platforms for big data analytics.
314453	<b>Web Application Development</b>	CO1	Develop Static and Dynamic website using technologies like HTML, CSS, Bootstrap.
		CO2	Demonstrate the use of web scripting languages.
		CO3	Develop web application with Front End & Back End Technologies.
		CO4	Develop mobile website using JQuery Mobile.
		CO5	Deploy web application on cloud using AWS.
314454D	<b>Elective-II - Software Modeling and Design</b>	CO1	Understand basics of object oriented methodologies and Unified Modeling Language (UML).
		CO2	Apply analysis process, use case modeling, domain/class modeling
		CO3	Design and apply interaction and behavior modeling on a given system.
		CO4	Comprehend OO design process and business, access and view layer class design.
		CO5	Recognize the software design principles and patterns to be applied on system.
		CO6	Illustrate architectural design principles and guidelines in the various type of application development.
314455	<b>Internship</b>	CO1	Develop professional competence through industry internship.
		CO2	Apply academic knowledge in a personal and professional environment
		CO3	Build the professional network and expose students to future

			employees.
		CO4	Apply professional and societal ethics in their day-to-day life.
		CO5	Become a responsible professional having social, economic and administrative considerations.
		CO6	Make own career goals and personal aspirations.
314456	<b>Computer Networks &amp; Security-Lab</b>	CO1	Design and configure small size network and associated networking commands.
		CO2	Understand various client/server environments to use application layer protocols.
		CO3	basic cryptographic techniques in software and system design.
		CO4	Apply methods for authentication, access control, intrusion detection.
314457	<b>DS &amp; BDA-Lab</b>	CO1	Apply Big data primitives and fundamentals for application development.
		CO2	Explore different Big data processing techniques with use cases.
		CO3	Apply the Analytical concept of Big data using Python.
		CO4	Visualize the Big Data using Tableau.
		CO5	Design algorithms and techniques for Big data analytics
		CO6	Design and develop Big data analytic application for emerging trends.
314458	<b>Laboratory Practice-II - (Web Application Development)</b>	CO1	Develop Static and Dynamic responsive website using technologies HTML, CSS, Bootstrap and AJAX.
		CO2	Create Version Control Environment.
		CO3	Develop an application using front end and backend technologies.
		CO4	Develop mobile website using JQuery Mobile.
		CO5	Deploy web application on cloud using AWS
314458	<b>Laboratory Practice-II (SMD)</b>	CO1	Develop use case model with the help of UML notations.
		CO2	Develop and implement analysis model and design model.
		CO3	Develop and implement Interaction and behavior Model.



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**College of Engineering Ahmednagar**



DTE College Code: EN-5161

## Department of Information Technology

### Course Outcomes

BE – 2019 Course			
Semester –VII			
Course Code	Course Name	Course Outcomes	
414441	<b>Information and Storage Retrieval</b>	CO1	Understand the concept of Information retrieval and to apply clustering in information retrieval.
		CO2	Use an indexing approach for retrieval of text and multimedia data.
		CO3	Evaluate performance of information retrieval systems.
		CO4	Apply the concepts of multimedia and distributed information retrieval.
		CO5	appropriate tools in analyzing the web information
		CO6	Simulate the working of a search engine and recommender system.
414442	<b>Software Project Management</b>	CO1	Apply the practices and methods for successful Software Project Management
		CO2	Create Design and Evaluate Project
		CO3	Analyze Project Schedule and calculate Risk Management with help of tools.
		CO4	Demonstrate different tools used for Project Tracking, Monitoring & Control.
		CO5	Identify Staff Selection Process and the issues related to Staff Management.
		CO6	Discuss and use modern tools for Software Project Management.
414443	<b>Deep Learning</b>	CO1	Understand the theoretical foundations, algorithms, and methodologies of Deep Learning.
		CO2	Apply the concepts of Convolution Neural Networks and use of popular CNN architectures
		CO3	Compare Feed Forward Neural Network and Recurrent Neural Network and learn modeling the time dimension using RNN and LSTM.
		CO4	Elaborate unsupervised deep learning algorithms like

			Auto encoders.
		CO5	Explore Representation Learning and Transfer Learning techniques using variants of CNN architecture
		CO6	Evaluate the performance of deep learning algorithms and to provide solution for various real-world applications.
414444	<b>Elective III - Mobile Computing</b>	CO1	Understand the basic concepts of mobile computing, MAC and different multiplexing techniques.
		CO2	Understand Protocols, Connection Establishment, Frequency Allocation, Routing of mobile telecommunication system like GSM, GPRS, UMTS.
		CO3	Understand the Generations of Mobile Communication Technologies
		CO4	Learn mobile IP , Adhoc – Network, Reactive Routing protocols, Multicast Routing.
		CO5	Obtaining knowledge of transport layer protocol TCP, File System, and different application layer protocols.
		CO6	Gain knowledge about different mobile platforms, operating Systems, Software Development Kit, Security Issues.
414445	<b>Elective IV - Wireless Communications</b>	CO1	Articulate the fundamental concept of cellular system.
		CO2	Analyse the fundamentals of cellular systems.
		CO3	Illustrate multiple access technique for effective utilization of spectrum.
		CO4	Design and analyse the WAP Programming Model in networking environment.
		CO5	Learn and understand security issues, challenges and tools in wireless communication.
		CO6	Explore the emerging trends and applications in wireless communication.
414446	<b>Lab Practice III</b>	CO1	Understand the concept of Information retrieval and to apply clustering in information retrieval.
		CO2	Use appropriate indexing approach for retrieval of text and multimedia data. Evaluate performance of information retrieval systems
		CO3	Apply appropriate tools in analyzing the web information.
		CO4	Map the concepts of the subject on recent

			developments in the Information retrieval field.
<b>414447</b>	<b>Lab Practice IV</b>	CO1	Learn and Use various Deep Learning tools and packages.
		CO2	Build and train a deep Neural Network models for use in various applications
		CO3	Apply Deep Learning techniques like CNN, RNN Auto encoders to solve real word Problems.
		CO4	Evaluate the performance of the model build using Deep Learning.
<b>414448</b>	<b>Project Phase-I</b>	CO1	To apply knowledge of mathematics, science, and engineering to formulate the Problem statement.
		CO2	To design and conduct experiments, as well as to analyze and interpret data.
		CO3	Understand the professional and ethical responsibility.
		CO4	To communicate effectively
		CO5	Get broad education which is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
		CO6	Recognition of the need for, and an ability to engage in life-long learning.
		CO7	To use the techniques, skills, and modern engineering tools necessary for engineering practices.
		CO8	To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.