



Society for Computer Technology and Research's
Pune Institute of Computer Technology
Department of Information Technology

COURSE OUTCOMES

Second Year (2019 Pattern)

C19201 : Discrete Mathematics	
Students will be able to	
C19201.1	formulate problems, apply formal proof techniques precisely and solve the problems with reasoning.
C19201.2	analyze and evaluate the combinatorial problems to solve the different probability models.
C19201.3	analyze and apply the concepts of graph theory in solving real-life problems.
C19201.4	analyze types of relations and functions to provide solution to computational Problems.
C19201.5	apply concepts of number theory to illustrate its application.
C19201.6	identify, describe, and model fundamental algebraic structures such as groups, rings, and fields.
C19202 : Logic Design and Computer Organization	
Students will be able to	
C19202.1	describe digital IC characteristics of TTL and CMOS logic families. Perform basic binary arithmetic operations using 1's and 2's complement representation, conversions of Binary, BCD, octal, hexadecimal, Excess-3, Gray codes & simplify logic expressions using Karnaugh map.
C19202.2	design and implement combinational logic functions using SSI and MSI chips.
C19202.3	compare combinational and sequential logic circuits, comprehend the operations of basic memory cell types (Flip-Flop), also design and implement sequential logic circuit counters using ICs.
C19202.4	describe the architecture, organization, functions, and characteristics of computer systems; elucidate the functions & organization of various blocks of CPU; design the hardwired control unit for a specified control signal and also compose the micro programs for a given instruction.
C19202.5	describe elements of processor instruction; categorize different addressing modes, instructions, operands; summarize instruction pipelining; categorize parallel processor architectures and describe multi-core architecture of Core i7.
C19202.6	describe an assortment of memory types (with their characteristics) used in computer systems and basic principle of interfacing input, output devices. Also, solve numerical on cache mapping techniques.
C19203: Data Structures and Algorithms	
Students will be able to	
C19203.1	define data object, data structure and ADT, classify Primitive and non-primitive data structures, identify need of frequency count and analysis of algorithm, analyze Space and Time complexity of algorithm, describe



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	sequential organization using array and linked organization using linked list, employ single and multidimensional array, Singly Linked list, Circular linked List, doubly linked list.
C19203.2	explain the need of searching and sorting, describe the concept of internal, external sorting and sort stability, demonstrate linear search, binary search, Fibonacci Series, Bubble sort, insertion sort, Quick sort, Merge, shell sort, compare sorting methods, analyze Insertion sort, Quick Sort, binary search for Best, Worst and Average case.
C19203.3	explain concept of stack, Queue, implicit and explicit stack, stack and queue as an ADT using sequential and linked organization, circular queue, double ended queue, demonstrate applications of stack for recursion, converting expressions from infix to postfix or prefix form, evaluating postfix or prefix form, and priority queue as a application of queue.
C19203.4	explain the concept of Trees, binary trees, Expression tree, Binary tree as an ADT, Binary search tree, Binary search tree as ADT, inorder-threaded binary tree, demonstrate binary tree traversals, discuss Applications of trees.
C19203.5	describe Concept and terminologies of Graph as an ADT, represent Graph using adjacency matrix and adjacency list, traverse it using depth first and Breadth first method, create spanning tree using Prim's and Kruskal's methods, estimate shortest path using Dijkstra's algorithm, topological sorting, perform heap sort.
C19203.6	describe Concept and terminologies Notion of Symbol Table, OBST, AVL Trees, Heap data structure, of hashing using Hash Table and scattered tables, describe and select hash function by applying open and close addressing techniques for collision resolution such as linear probing, quadratic probing, rehashing, chaining with and without replacement, perform heap sort.
C19203.7	explain the concept of File, File types and file organization (sequential, index sequential and Direct Access), compare sequential, index sequential and Direct Access file organization.
C19204: Object Oriented Programming	
Students will be able to	
C19204.1	differentiate between various imperative programming paradigms; Define the need and basic concepts of Object-Oriented Programming.
C19204.2	identify and implement classes, objects, methods to model a given problem statement of moderate complexity.
C19204.3	apply concepts of object initialization using constructors and object destruction using garbage collection.
C19204.4	identify relationships among objects and apply inheritance and polymorphism principles.
C19204.5	handle different types of exceptions and define concepts and tools for generic programming.
C19204.6	demonstrate and apply concepts of files for persistent data storage; choose appropriate design patterns to provide object-oriented solutions for real world



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	application.
C19205 : Basics of Computer Network	
Students will be able to	
C19205.1	understand and explain the concepts of communication theory and compare functions of OSI and TCP/IP model.
C19205.2	analyze data link layer services, error detection and correction, linear block codes, cyclic codes, framing and flow control protocols.
C19205.3	compare different access techniques, channelization, and Ethernet standards.
C19205.4	apply the skills of subnetting, supernetting and routing mechanisms.
C19205.5	compare IPv4 and IPv6.
C19205.6	understand services and protocols used at transport layer.
C19206: Logic Design and Computer Organization Laboratory	
Students will be able to	
C19206.1	use logic function representation for simplification with K-Maps and design Combinational logic circuits using SSI & MSI chips.
C19206.2	design Sequential Logic circuits: MOD counters using synchronous counters.
C19206.3	understand the basics of simulator tool & to simulate basic blocks such as ALU & memory.
C19207: Data Structures and Algorithms Laboratory	
Students will be able to	
C19207.1	Implement and demonstrate linear search, binary search, insertion sort, bubble sort, quick sort algorithms and analyze the same with respect to worst, best and average case behaviour of the each of the above algorithms, and select appropriate searching, sorting techniques for a given data set.
C19207.2	execute and implement an application of expression conversion and evaluations by employing linear data structure Stack as an ADT
C19207.3	implement and illustrate the use of linear data structure queue, circular queue.
C19207.4	write and implement a program to construct a nonlinear data structure threaded binary tree, expression tree, binary search tree and perform the various operations like traversals, search, delete, insert, depth of a tree ,mirror of a tree.
C19207.5	create and construct a graph for real time application and implement a code to create minimum spanning tree ,calculate the cost of minimum spanning tree using prims, Kruskal's algorithm , find the shortest path using Dijkstra's graph algorithm.
C19207.6	write and implement a code to create a binary heap tree and perform heap sort on it.



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C19207.7	implement algorithms to create and manipulate database using a file data structure
C19208: Object Oriented Programming Laboratory	
Students will be able to	
C19208.1	identify classes, object methods, and apply object-oriented programming paradigm basic concepts of abstraction, encapsulation
C19208.2	identify relationship among objects and implement using inheritance and polymorphism, dynamic binding, interface.
C19208.3	implement advanced object-oriented concepts like exception handling, generic collection classes.
C19208.4	implement file handling concepts for real world application.
C19208.5	apply Factory and Strategy design patterns to provide object-oriented solutions
C19208.6	design and develop a real time application using Object Oriented concepts.
C19209: Communication Skill Laboratory	
Students will be able to	
C19209.1	introspect about individual's goals, aspirations by evaluating one's SWOC and think creatively
C19209.2	develop effective communication skills including Listening, Reading, Writing and Speaking.
C19209.3	actively participate in group discussion, meetings and prepare and deliver Presentations.
C19209.4	write precise briefs or reports and technical documents.
C19209.5	practice professional etiquette, present oneself confidently and successfully handle personal interviews.
C19209.6	function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.
C19210A: Audit Course: Ethics and Values in Information Technology	
Student will be able to	
C19210A.1	adapt the global ethical principles and modern ethical issues
C19210A.2	apprehend ethics in the business relationships and practices of IT.
C19210A.3	implement trustworthy computing to manage risk and security vulnerabilities.
C19210A.4	analyze concerns of privacy, privacy rights in information-gathering practices in IT.
C19210B: Audit Course: Quantitative Aptitude & Logical Reasoning	



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Student will be able to	
C19210B.1	apply basic concepts of quantitative abilities.
C19210B.2	use logical reasoning for solving real world problems.
C19210B.3	compete in examinations like internships, industry placements, postgraduate admissions, civil services etc..
C19210C: Audit Course: Language Study Japanese -Module I	
Student will be able to	
C19210C.1	converse with simple sentences in Japanese.
C19210C.2	recognize and read simple sentences in Japanese.
C19210C.3	write simple sentences in Japanese.
C19210C.4	be aware about Japanese society and people.
C19210D: Audit Course: Cyber Security and Law	
Student will be able to	
C19210D.1	understand the basic concepts of cyber security and its abilities
C19210D.2	analyze and evaluate the cyber security needs of an organization.
C19210D.3	understand the importance of cyber laws and its practices.
C19210D.4	determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation
C19211: Engineering Mathematics -III	
Students will be able to	
C19211.1	solve linear differential equations, essential in modeling and design of computer-based systems.
C19211.2	obtain Fourier Transform of continuous and discrete functions which is useful in Signal processing. Find Z Transform of discrete functions which is involved in image processing.
C19211.3	explain statistical methods like measures of central tendency, correlation, and regression analysis for data interpretation.
C19211.4	discuss probability theory for analysis and prediction of a given data.
C19211.5	solve algebraic and transcendental equations and systems of linear equations using Numerical techniques.
C19211.6	compute interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
C19212: Processor Architecture	
Students will be able to	
C19212.1	apprehend architecture and memory organization of PIC 18 microcontroller. Compare and contrast MP and MC.
C19212.2	implement embedded C programming for PIC 18. Demonstration with MPLAB
C19212.3	use concepts of timers and interrupts of PIC 18. Programming the timer for given delay.



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C19212.4	demonstrate real life applications using PIC 18. LCD, Keyboard, ADC, DAC interfacing.
C19212.5	analyze architectural details of ARM processor. Describe programmer's model. Create and test assembly programs for ARM processor
C19213: Database Management System	
Students will be able to	
C19213.1	specify fundamentals of database management systems such as the need for database systems, data abstraction, and the overall architecture of DBMS.
C19213.2	use relational data modeling concepts to draw ER/EER models and apply rules for conversion to relational schema.
C19213.3	define characteristics and advantages of SQL and formulate SQL queries for CRUD operation and describe Programmatic SQL such as trigger, procedure, Embedded SQL, Dynamic SQL, ODBC.
C19213.4	design databases using a process of normalization, estimate the query by selection and join operation and define query optimization.
C19213.5	illustrate the concept of transaction management and serializability to maintain consistency and explain concurrency control and crash recovery methods.
C19213.6	explain advanced database architecture such as parallel and distributed databases and summarize emerging database technologies such as cloud databases and mobile databases
C19214: Computer Graphics	
Students will be able to	
C19214.1	apply mathematical and logical aspects for developing elementary graphics operations like scan conversion of points, lines, circle, and apply it for problem solving
C19214.2	employ techniques of geometrical transforms to produce, position and manipulate Objects in 2-dimensional space
C19214.3	employ techniques of geometrical transforms to produce, position and manipulate Objects in 3-dimensional space
C19214.4	describe mapping from a world coordinate to device coordinates, clipping, and projections in order to produce 3D images on 2D output device
C19214.5	apply concepts of rendering, shading, animation, curves and fractals using computer graphics tools in design, development and testing of 2D, 3D modeling applications
C19214.6	perceive the concepts of virtual reality
C19215: Software Engineering	
Students will be able to	
C19215.1	differentiate and identify process model by investigating different software development processes for a particular problem statement
C19215.2	create, analyze and illustrate software requirement specification document by discussing project requirements



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C19215.3	produce design models by understanding requirement documents
C19215.4	plan, organize and estimate project development process using modern management tools for individuals.
C19215.5	use testing tools to judge quality of built software
C19215.6	classify the CASE tools, practice the role of professional ethics, and reveal recent trends and research in software engineering project development.
C19216: Programming Skill Development Laboratory	
Students will be able to	
C19216.1	code XC8 programs for add array numbers, transfer data, arithmetic operations and sorting the numbers.
C19216.2	program the I/O port, timers/ counters, LCD interface and basic I/O devices.
C19216.3	program the PIC18 serial port and control DC motor speed using PWM.
C19216.4	use source prototype platform/ Single board Computer (SBC) like Raspberry-Pi/Beagle board/Arduino.
C19217: Database Management System Laboratory	
Students will be able to	
C19217.1	describe and configure various relational database Management systems based on points like architecture, characteristics, performance and application [Familiar]
C19217.2	demonstrate conceptual data modelling technique using E-R and EER model for any real-time database application. [Usage]
C19217.3	translate the ER/EER-model to relational schema using the appropriate rules for the conversion and apply normalization to remove data redundancy. [Assessment]
C19217.4	construct relational schema using DDL statement, manage data using DML statement and evaluate result of query using DQL statement .[Assessment]
C19217.5	implement triggers procedures and functions by using PL/SQL block. [Usage]
C19217.6	design a backend database of any relational database application: CASE STUDY [Usage]
C19218: Computer Graphics Laboratory	
Students will be able to	
C19218.1	apply line & circle drawing algorithms to draw the objects.
C19218.2	apply polygon filling methods for the object.
C19218.3	apply polygon clipping algorithms for the object.
C19218.4	apply the 2D transformations on the object.
C19218.5	implement the curve generation algorithms.
C19218.6	demonstrate the animation of any object using animation principles.
C19219: Project Based Learning	



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Students will be able to	
C19219.1	collaborate and engage in multi-disciplinary learning environments by identifying and selecting real life problems
C19219.2	gather requirements to the problem and perform feasibility study by assessing complexity
C19219.3	design and formulate solution to real life problems through shared cognition
C19219.4	apply learning by doing approach in PBL to promote lifelong learning
C19219.5	tackle technical challenges for solving real world problems with team efforts
C19220A: Audit Course 4: Water Supply and Management	
Students will be able to	
C19220A.1	relate the relations between the environment and ecology, estimating water requirement for public water supply scheme.
C19220A.2	assess the quality of water as per BIS and select the appropriate treatment method required for the water source.
C19220A.3	analyze the suitable distribution system for a locality and know the appurtenances used.
C19220A.4	summarize the arrangement of water supply and fittings in a building.
C19220A.5	identify the sources of water pollution and suitable control measures.
C19220B: Audit Course 4: Language Study Japanese: Module - II	
Students will be able to	
C19220B.1	have Japanese Communicative competence for primitive Social conversation in Japanese
C19220B.2	comprehend Grammar of Japanese Script
C19220B.3	translate simple sentences from Japanese to English and vice a versa
C19220B.4	be aware about Japanese society and people
C19220C: Audit Course 4: e-Waste Management and Pollution Control	
Students will be able to	
C19220C.1	discuss various types of e-waste sources.
C19220C.2	understand impact of various e-wastes.
C19220C.3	identify characteristics of various e-Waste pollutants.
C19220C.4	understand process of e-Waste Recycling and relevant technologies.
C19220C.5	discuss causes, effects and control measures of different environment pollution.
C19220C.6	demonstrate Safe methods for disposal of e-waste and controlling the pollution.
C19220D: Audit Course 4: Intellectual Property Rights	
Students will be able to	
C19220D.1	exhibit the concepts of Intellectual Property Rights
C19220D.2	differentiate among different IPR
C19220D.3	formulate and characterize innovative ideas and inventions into IPR
C19220D.4	demonstrate knowledge of advances in patent law and IP regulations.