



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

Course Outcomes

Third Year (2019 Pattern) Semester I

310241: Database Management Systems	
Students will be able to	
310241.1	Explain the basic concepts of data modelling and construct Entity-Relationship model for Bank/University database.
310241.2	Explain and write relational database queries, programs using SQL and PL/SQL for Bank/University database.
310241.3	Understand, identify and apply 1NF, 2NF, 3NF and BCNF normal forms to design Bank/University database.
310241.4	Explain the concept of transaction processing and concurrency control concepts in banking application.
310241.5	Explain and write NOSQL queries, aggregate and map reduce functions using MongoDB for Movie Reviews.
310241.6	Explain complex data types.
310242: Theory of Computation	
Students will be able to	
310242.1	Apply the knowledge of formal languages and design Finite Automata & its variants for problems on strings.
310242.2	Construct Regular Expressions to represent Regular language of three or four symbols and compare alternatives.
310242.3	Design Context Free Grammar (CFG) for string matching problems & language constructs.
310242.4	Design and analyze PDA for formal languages up to three variables.
310242.5	Design and analyze deterministic Turing Machine for formal languages.
310242.6	To Demonstrate the understanding of key notions such as computability, decidability, undecidability, complexity, classes through examples.
310243: Systems Programming and Operating System	
Students will be able to	
310243.1	Analyze and synthesize basic System Software and its functionality
310243.2	Identify suitable data structures and Design & Implement various System Software



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310243.3	Compare different loading schemes and contrast the working of linker and loader.
310243.4	Implement and Analyze the performance of process scheduling algorithms
310243.5	Identify the mechanism to deal with deadlock and concurrency issues
310243.6	Demonstrate memory organization and memory management policies
310244: Computer Networks and Security	
Students will be able to	
310244.1	Summarize fundamental concepts of Computer Networks, architectures, protocols and technologies.
310244.2	Illustrate the working and functions of data link layer.
310244.3	Compare and illustrate the working of different routing protocols and mechanisms.
310244.4	Write client-server applications using TCP and UDP sockets and Illustrate role of application layer with its protocols
310244.5	Comprehend the fundamental concepts of Network Security and protocols.
310245A: Elective I- Internet of Things and Embedded Systems	
Students will be able to	
310245(A).1	Understand the fundamentals and need of Embedded Systems for the Internet of Things
310245(A).2	Identify IoT enabling technologies for developing IoT systems
310245(A).3	Apply design methodology for designing and implementing IoT applications
310245(A).4	Analyze IoT protocols for making IoT devices communication
310245(A).5	Design cloud based IoT systems
310245(A).6	Design and develop secured IoT applications
310245B: Elective I- Human Computer Interface	
Students will be able to	
310245(B).1	Design a prototype for effective Human-Computer-Interfaces like registration form design or other systems for all kinds of users
310245(B).2	Apply and analyze the user-interface with respect to golden rules of interface design
310245(B).3	Analyze and evaluate the effectiveness of a user-interface design



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310245(B).4	Apply the principles & guidelines to model interactive designs for feasible data search and retrieval
310245(B).5	Analyze the scope of HCI in various paradigms like ubiquitous computing, virtual reality, multi-media, World wide web related environments
310245(B).6	Analyze and identify user models, user support, and stakeholder requirements of HCI systems
310245C: Elective I- Distributed Systems	
Students will be able to	
310245(C).1	Analyze distributed system types and architectural styles.
310245(C).2	Apply communication mechanisms in distributed systems.
310245(C).3	Use synchronization algorithms in distributed system applications.
310245(C).4	Analyze components of distributed file systems.
310245(C).5	Apply replication techniques and consistency models in distributed systems.
310245(C).6	Build a fault tolerant distributed system.
310246: Database Management Systems Laboratory	
Students will be able to	
310246.1	Design E-R model for given requirements using ERD Plus/ERWin tool and convert the same into database tables and apply normalization
310246.2	Understand and implement the given schema, database queries and PL/SQL programs for 2-tier architecture using MySQL.
310246.3	Implement NoSQL queries, aggregate and map reduce functions for given requirements using MongoDB.
310246.4	Design and develop database application using database connectivity.
310247: Computer Networks and Security Laboratory	
Students will be able to	
310247.1	Analyze the requirements of network types, topology and transmission media.
310247.2	Demonstrate error control, flow control techniques and protocols and analyze them.
310247.3	Demonstrate the Subnet formation with IP allocation mechanism and apply various routing algorithms.



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310247.4	Develop Client-Server architectures and prototypes.
310247.5	Implement web applications and services using application layer protocols.
310247.6	Use network security services and mechanisms.
310248: Laboratory Practice I	
Students will be able to	
310248.1	Implement system software viz. assembler, macro processor for pseudo machine.
310248.2	Demonstrate the process management functionalities of an operating system by implementing FCFS (non-preemptive), SJF (preemptive), Round Robin (preemptive), Priority (non-preemptive) algorithms for process scheduling and synchronization by using mutex and semaphores (software solution).
310248.3	Demonstrate memory management functionalities by simulating best fit, first fit, next fit, worst fit memory placement scenarios and FIFO, LRU, Optimal page replacement policies.
310248.4	Implement Internet of Things and embedded system-based applications.
310248.5	Develop an Internet of Things application based on a cloud environment.
310248.6	Design and implement interactive user interface for selected system or application.
310248.7	Analyze and evaluate the effectiveness of user interface design.
310248.8	Demonstrate IPC and RPC in a Distributed System.
310248.9	Apply the principles of bully and ring election algorithm in Distributed System.
310248.10	Design, build and test application program on Distributed System.
310249: Seminar and Technical Communication	
Students will be able to	
310249.1	Explain the emerging trends in selected domain using oral presentation
310249.2	Compare the efforts taken by other researchers to solve the problem and summarize it in the form of short written survey
310249.3	Apply the technical writing in the form of a report for the purpose of technical communication.
310249.4	Author/Create a presentation on selected topics and demonstrate the technical communication skill by oral communication.
310250: Audit Course 5: A : Cyber Security C: Learn New Skills Full Stack Developer	
Students will be able to	



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310250A.1	Understand and classify various cybercrimes
310250A.2	Understand how criminals plan for the cybercrimes
310250A.3	Analyze the examples of few case studies of cyber crimes
310250C.1	Design web application
310250C.2	Develop web application



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Third Year (2019 Pattern) Semester II

310251: Data Science and Big Data Analytics	
Students will be able to	
310251.1	Analyze needs and challenges for Data Science Big Data Analytics
310251.2	Apply statistics for Big Data Analytics
310251.3	Apply the lifecycle of Big Data analytics to real world problems
310251.4	Implement Big Data Analytics using Python programming
310251.5	Implement data visualization using visualization tools in Python programming
310251.6	Design and implement Big Databases using the Hadoop ecosystem
310252: Web Technology	
Students will be able to	
310252.1	Design and analyze behavior of web pages using HTML and CSS
310252.2	Apply the client side technologies for web development
310252.3	Compare technical differences between Servlet and JSP
310252.4	Understand the use web services and frameworks
310252.5	Apply the server side technologies for web development
310252.6	Understand the latest web development platform
310253: Artificial Intelligence	
Students will be able to	
310253.1	Identify and apply suitable Intelligent agents for various AI applications
310253.2	Design and develop intelligent agent for solving toy problem.
310253.3	Understand adversarial search algorithm and apply to solve gaming problem.
310253.4	Design and develop knowledge base agent to solve substitution problem.
310253.5	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem
310253.6	Apply planning algorithm to solve nondeterministic problem.
310254C: Elective II- Cloud Computing	
Students will be able to	



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310254C.1	Understand the different Cloud Computing environment to design holistic cloud computing reference model.
310254C.2	Understand and apply data storage technique such as DAS, SAN, NAS and grid for Cloud application.
310254C.3	Analyze and compare virtualization technology – XEN and VMWare.
310254C.4	Select amazon simple DB, EC2 and Dynamo DB from AWS to create multiplayer online gaming application.
310254C.5	Identify risks involved with cloud computing and analyze security for cloud application using Acunetix tool.
310254C.6	Illustrate various cloud techniques for mobile cloud, multimedia cloud and IoT based cloud.
310255: Internship	
Students will be able to	
310255.1	To demonstrate professional competence through industry internship.
310255.2	To apply knowledge gained through internships to complete academic activities in a professional manner.
310255.3	To choose appropriate technology and tools to solve given problem.
310255.4	To demonstrate abilities of a responsible professional and use ethical practices in day to day life.
310255.5	Creating networks and social circles, and developing relationships with industry people.
310256: Data Science and Big Data Analytics Laboratory	
Students will be able to	
310256.1	Apply principles of Data Science for the analysis of real time problems
310256.2	Implement data representation using statistical methods
310256.3	Implement and evaluate data analytics algorithms
310256.4	Perform text preprocessing
310256.5	Implement data visualization techniques
310256.6	Use cutting edge tools and technologies to analyze Big Data



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310257: Web Technology Laboratory	
Students will be able to	
310257.1	Understand the importance of website planning and website design issues.
310257.2	Apply the client side and server side technologies for web application development.
310257.3	Analyze the web technology languages, frameworks and services.
310257.4	Create three tier web based applications.
310258: Laboratory Practice II	
Students will be able to	
310258.1	Design system using different informed search / uninformed search or heuristic approaches
310258.2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning
310258.3	Design and develop an expert system
310258.4	Apply basic/classical cryptography techniques to modify/encrypt/ decrypt the given plain/cipher text message
310258.5	Apply symmetric key cryptography algorithms to encrypt/ decrypt the given plain/cipher text message
310258.6	Apply cryptography techniques for message digest/key exchange/ encryption/ decryption of the given text message
310258.7	Use tools and techniques in the area of Augmented and Virtual Reality
310258.8	Use the knowledge of Augmented and Virtual Reality for problem solving
310258.9	Apply the concepts of Augmented and Virtual Reality to design and develop applications
310258.10	Create and demonstrate virtual machines on Azure/ AWS cloud platform.
310258.11	Implement and demonstrate an application using Apex programming Language on cloud.
310258.12	Design and develop custom Application using Sales force Cloud.
310259: Audit Course 6	
Students will be able to	
310259(A).1	Understand the fundamentals and importance of digital marketing.
310259(A).2	Use the power of social media for business marketing.
310259(A).3	Analyze the effectiveness of digital marketing and social media over traditional processes.



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Third Year (2015 Pattern) Semester I

310241: Theory of Computation	
Students will be able to	
310241.1	Design NFA/DFA for pattern matching.
310241.2	Apply specified well defined rules for syntax verification.
310241.3	Design and analyze PDA, Deterministic Turing Machine for formal languages.
310241.4	Demonstrate the understanding of key notions such as computability, decidability, undecidability, complexity classes through examples.
310242: : Database Management Systems	
Students will be able to	
310242.1	Demonstrate structured and unstructured database using FOSS tools.
310242.2	Design E-R model for given problem statement & convert the same into database tables & apply normalization.
310242.3	Identify & apply SQL queries for the given problem.
310242.4	Use modern database techniques such as NOSQL.
310242.5	Design relational database system using translation management.
310242.6	Gain knowledge of different database architectures.
310242.7	Use advanced database programming concept.
310243: Software Engineering & Project Management	
Students will be able to	
310243.1	Compare and chose a process model for a software project development.
310243.2	Analyze and model software requirements of a software system.
310243.3	Design and Modeling of a software system using open source tools.
310243.4	Prepare the SRS, Design document, Project plan for a given software system.
310243.5	Prepare a project management report mitigating risks involved, using soft



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	skills.
310243.6	Designing automated test cases for a software model.
310244: Information Systems & Engineering Economics	
Students will be able to	
310244.1	Exemplify the activities that are undertaken while managing, designing, planning, implementation and deployment of computerized information system in an organization.
310244.2	Identify issues in successful implementation of various Information System solutions like ERP, CRM and SCM.
310244.3	Analyze various parameters like past history, present position and expected performance of a company engaged in engineering practice or in the computer industry to design Information System.
310244.4	Evaluate present worth, future worth and annual worth analyses on different economic alternatives (like independent/ mutually exclusive projects).
310245: Computer Networks	
Students will be able to	
310245.1	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture and technologies.
310245.2	Demonstrate LAN and WAN protocol behavior using Tools.
310245.3	Analyze data flow in TCP/IP network using Application, Transport and Network Layer Protocols.
310245.4	Illustrate applications of Computer Network and usage for various sectors of user community.
310245.5	Design Client-Server architectures by the means of Socket programming API's.
310246: Skills Development Lab	
Students will be able to	
310246.1	Demonstrate concepts of generics, collections, multithreading and



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	serialization.
310246.2	Design and develop Java application with GUI for management systems using OOP principles and Java programming constructs.
310246.3	Incorporate best practices for building Java applications.
310246.4	Employ Integrated Development Environment (IDE) for implementing and testing of software solution.
310246.5	Apply Java programming concepts to Android mobile application development.
310247: DBMS Lab	
Students will be able to	
310247.1	Implement the given instructions of structured databases in 2-tier architecture to demonstrate results and verification of Codd's rules for SQL using database connectivity, aggregation and indexing.
310247.2	Write advanced SQL and NoSQL database programs using open source technologies and tools.
310247.3	Design and develop database application.
310248: CN Lab	
Students will be able to	
310248.1	Demonstrate LAN and WAN protocol behavior using Modern Tools.
310248.2	Analyze data flow between peer to peer in an IP network using Application, Transport and Network Layer Protocols.
310248.3	Demonstrate basic configuration of switches and routers.
310248.4	Develop Client-Server architectures and prototypes by the means of correct standards and technology.



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Third Year (2015 Pattern) Semester II

310250: Design and Analysis of Algorithms

Students will be able to

310250.1	Formulate the problem to provide solution for binary multiplication method and analyze need of imperative and functional programming.
310250.2	Analyze the asymptotic performance of algorithms with worst case analysis.
310250.3	Write a solution to recommend scheme of sale for the products in a mall using knapsack problem by formulating project teams and present using Latex media presentation.
310250.4	Compute optimal solution for loss less string compression and find the effectiveness of the same in applications resulting in Go Green Initiative.

310251: Systems Programming and Operating System

Students will be able to

310251.1	Design and develop algorithm for limiting scope of assembler (Imperative Statements, Assembler Directives, Declaration Statements, Literal handling) & Macro processor (simple macros, nested macros) features by analyzing and synthesizing system software.
310251.2	Analyze system software such as linker, loader and design absolute loader & direct- linking loader.
310251.3	Given features of C/ JAVA language and subset of English language, implement pattern matching algorithm using LEX tool and writing grammar for syntax checking using YACC tool.
310251.4	Illustrate the algorithms for CPU scheduling, page replacement, I/O, and deadlock avoidance and solve problems based on algorithms.

310252: Embedded Systems and Internet of Things

Students will be able to

310252.1	Demonstrate use of IoT for solving engineering problems.
310252.2	Design a protocol stack for given application.
310252.3	Design and solving societal challenging problems using IoT.



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310252.4	Analyze the problem to identify IoT deployment levels.
310253: Software Modeling and Design	
Students will be able to	
310253.1	Analyze the problem statement (SRS) and choose proper design technique for designing web-based/ desktop application.
310253.2	Design and analyze an application using UML modeling as fundamental tool.
310253.3	Apply design patterns to understand reusability in OO design.
310253.4	Decide and apply appropriate modern tool for designing and modeling.
	Decide and apply appropriate modern testing tool for testing web-based/desktop application.
310254: Web Technology	
Students will be able to	
310254.1	Apply user interface development programming languages (HTML,CSS,XML)
310254.2	Design web applications using client side and server side technologies (JavaScript, JQuery, Servlet, JSP,PHP)
310254.3	Analyze and apply solutions to complex problems using web technology frameworks.
310254.4	Configure open source web servers and to deploy applications into it.
310255: STC	
Students will be able to	
310255.1	Be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.
310255.2	Be able to improve skills to read, understand, and interpret material on technology.
310255.3	Improve communication and writing skills.



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310256: Web Technology Lab	
Students will be able to	
310256.1	Develop web based application using suitable client side and server side web techniques.
310256.2	Develop solution to complex problems using appropriate method, techniques, frame works.
310256.3	Develop web-services and content management systems.
310256.4	Use Java frameworks – Spring, Hibernate.
310257: SP & OS Lab	
Students will be able to	
310257.1	Implement language translator (assembler, macro processor) for a given assembly language program.
310257.2	Implement lexical analysis & syntax analysis phase of compiler using LEX & YACC tools for subset of English language & features of C/ JAVA language.
310257.3	Demonstrate the implementation and use of DLL.
310257.4	Implement operating system algorithms for CPU scheduling, page replacement, and deadlock avoidance.
310258: ES & IOT Lab	
Students will be able to	
310258.1	Design the minimum system for sensor-based applications.
310258.2	Solve the problems related to the primitive needs using IoT.
310258.3	Develop full-fledged IoT application for distributed environment.