Society for Computer Technology and Research's

Pune Institute of Computer Technology
Department of Computer Engineering

Course Outcomes

Final Year (2019 Pattern) Semester I

410241: Design and Analysis of Algorithms	
Students will be able to	
410241.1	Illustrate and Solve different iterative and recursive algorithms for searching problems and Tower of Hanoi problem.
410241.2	Analyse and compare the performance of polynomial time algorithms in terms of their worst, best and average case behaviour.
410241.3	Design & evaluate Job Scheduling problem and 0/1 Knapsack problem specific to greedy and dynamic programming approaches respectively.
410241.4	Apply the relevant algorithmic strategies to solve 8 queens problem / graph colouring problem / TSP
410241.5	Analyze and Apply Scheduling and Sorting Algorithms for embedded systems.
410241.6	Solve problems for multicore or distributed environment.

410242: Machine Learning	
Students will be able to	
410242.1	Understand the needs and challenges of machine learning for real time applications.
410242.2	Apply various data pre-processing techniques to simplify and speed up machine learning algorithms/Feature selection
410242.3	Select and apply appropriate supervised machine learning algorithms for real time applications such as stock market price prediction.
410242.4	Analyze variants of multi-class classifier and measure its performance.
410242.5	Compare and contrast different clustering algorithms such as Density-based clustering, Spectrial Clustring.
410242.6	Idetify the need of neural network for solving problems such as recommendation system.

410243: Blockchain Technology	
Students will be able to	
410243.1	Understand and compare the asymmetric and symmetric encryption algorithms.
410243.2	Compare the working of Ethereum and Hyper-ledger blockchain platforms.
410243.3	Demonstrate the use of a crypto wallet for cryptocurrency-based transactions.
410243.4	Explore the importance of Blockchain in finding the solution to real- world problems.
410243.5	Analyse Ethereum public blockchain platform.
410243.6	Identify relative applications where blockchain technology can be effectively

	used and implemented.

410244(B): Multimedia Techniques [Elective-I]

Students will be able to	
410244(B).1	Illustrate the media using supporting devices commonly associated with multimedia information and systems.
410244(B).2	Demonstrate the use of content-based information analysis in a multimedia information system.
410244(B).3	Critique multimedia presentations in terms of their appropriate use of audio, video, graphics, color and other information presentation concepts.
410244(B).4	Implement a multimedia application using an authoring system.
410244(B).5	Understand the technologies for tracking, navigation and gestural control.
410244(B).6	To understand & model the Multimedia Internet of Things Architectures.

410244(C): Cyber Security And Digital Forensics [Elective-I]

Students will be able to	
410244(C).1	Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.
410244(C).2	Build appropriate security solutions against cyber-attacks.
410244(C).3	Underline the need of digital forensic and role of digital evidences.
410244(C).4	Explain rules and types of evidence collection.
410244(C).5	Analyze, validate and process crime scenes.
410244(C).6	Identify the methods to generate legal evidence and supporting investigation reports.

410244(D): Object Oriented Modeling And Design [Elective-I]

Students will be able to	
410244(D).1	Apply the object-oriented concepts and design basic class models.
410244(D).2	Design class diagrams, sequence diagrams and interaction diagrams for ATM system.
410244(D).3	Identify architecture style for ATM system and analyze the performance.
410244(D).4	Apply suitable steps of implementation modeling for ATM system.
410244(D).5	Apply Design Patterns for ATM system.

410245(A): Information Retrieval[Elective-II]

Students will be able to	
410245(A).1	Demonstrate the basic techniques and tokens of the Information Retrieval.
410245(A).2	Demonstrate the usage of different query processing techniques in building computational search engines.

410245(A).3	Apply techniques such as classification, clustering, and filtering over multimedia to analyze the information.
410245(A).4	Evaluate and analyze effectiveness and efficiency of retrieved information.
410245(A).5	Apply Parallel information retrieving and explain web structure using python scrappy.
410245(C): Mobile Computing [Elective-II]	
Students will be able to	
410245(C).1	Illustrate the fundamentals of mobile network and service architecture.
410245(C).2	Apply Routing protocols for wireless network communication.
410245(C).3	Implement security algorithms of GSM architecture for Mobile Communications.
410245(C).4	Apply VLR and HLR identification algorithms.
410245(C).5	Compare network and transport layer communication protocols for mobile communication.
410245(C).6	Design mobile applications using GSM, WAP in 3G/4G technology.
410245(D): Software Testing And Quality Assurance [Elective-II]	
Students will be able to	
410245(D).1	Describe fundamental concepts in software testing viz manual testing, automation testing and software quality assurance.
410245(D).2	Design and develop project test plan, design test cases, test data, and conduct test operations for www.pict.edu.
410245(D).3	Describe Selenium IDE for various software testing application.
410245(D).4	Explain different approaches of quality management, assurance, and quality standard for software product.
410245(D).5	Compare effectiveness of Software Quality Tools.
410245(D).6	Demonstrate tools necessary for efficient testing framework.
410246: Laboratory Practice III	
Students will be able to	
410246.1	Analyze performance of an algorithm.
410246.2	Implement an algorithm that follows one of the following algorithm design strategies: divide and conquer, greedy, dynamic programming, backtracking, branch and bound.
410246.3	Implement and Analyse linear regression, random forest algorithm for uber rides price prediction.
410246.4	Apply and Evaluate K-nearest neighbor and K means clustering techniques for Email spam detection
410246.5	Illustrate the cryptocurrency-based transactions using a crypto wallet

410246.6	Design and demonstrate the transaction protocol (smart contract) in Blockchain.

410247: Laboratory Practice IV	
Students will be able to	
410247.1	Apply android application development for solving real life problems
410247.2	Design and develop system using various multimedia components
410247.3	Identify various vulnerabilities and demonstrate using various tools.
410247.4	Apply information retrieval tools for natural language processing
410247.5	Develop an application using open source GPU programming languages
410247.6	Apply software testing tools to perform automated testing

410248: Project Stage I	
Students will be able to	
410248.1	Select real life problems to be solved by using computer engineering fundamentals.
410248.2	Review recent research articles related to the problem selected and analyze the gap.
410248.3	Design alternative approaches to solve the identified problem and select the appropriate one based on feasibility study.
410248.4	Create the technical document to present the design for the selected problem.

410249: Audit Course 7	
Students will be able to	
410249.1	Understand and acquire additional knowledge and skill
410249.2	Understand the legalities in product development and process of IPR
410249.3	Identify and distinguish drafting technologies and 3d modeling software
410249.4	Apply the safety and security norms in the industry

Final Year (2019 Pattern) Semester II

410250: High Performance Computing	
Students will be able to	
410250.1	Understand various Parallel Paradigm
410250.2	Design and Develop an efficient parallel algorithm to solve given problem
410250.3	Illustrate data communication operations on various parallel architecture
410250.4	Analyze and measure performance of modern parallel computing systems
410250.5	Apply CUDA architecture for parallel programming
410250.6	Analyze the performance of HPC applications

410251: Deep Learning	
Students will be able to	
410251.1	To understand the essentials of deep learning and apply tools in effect of deep learning applications.
410251.2	To analyze the effectiveness of deep learning models(including Activation Functions, Hyper parameters, and test error estimation.)
410251.3	To Understand and apply the technique/methods of Convolution (CNN) for implementing Deep Learning model.
410251.4	To analyze and implement techniques of Convolution (CNN)and RNN for deep generative models.
410251.5	To understand deep generative models.
410251.6	To understand the reinforcement learning process and apply the reinforcement learning algorithms.

410252(A): Natural Language Processing	
Students will be able to	
410252(A).1	Describe the fundamental concepts, challenges and issues in NLP and apply it for the Text Processing such as Tokenization, Stemming and Lemmatization.
410252(A).2	Describe & Analyze Natural Languages Morphologically, Syntactically and Semantically.
410252(A).3	Illustrate various language modelling techniques such as Probabilistic, Topic, and N-gram.
410252(A).4	Combine the NLP techniques for the Information Extraction and Retrieval task.
410252(A).5	Identify the use of NLP tools to demonstrate the NLP techniques for text-based processing of linguistic resources of natural languages.
410252(A).6	Design and Develop real world NLP applications using NLP tools and techniques.

410252(B): Image Processing

Students will be able to	
410252(B).1	Enlist and illustrate basic digital image processing steps
410252(B).2	Understand and demonstrate Special and Frequency Domain Method for Image Enhancement.
410252(B).3	Compare algorithmic approaches for Image segmentation
410252(B).4	Compare and select the methods of Image Compression and Object Recognition.
410252(B).5	Analyze the Image Restoration Techniques.
410252(B).6	Analyze role of image processing in Medical and Satellite Image Processing Applications

410253: Business Intelligence

Students will be able to	
410253.1	Differentiate the concepts of Decision Support System & Business Intelligence.
410253.2	Design a BI system by using Data Warehouse & Business Architecture.
410253.3	Build graphical reports viz. charts, graphs.
410253.4	Apply different data pre-processing techniques on dataset viz. data cleaning, data reduction, data transformation etc.
410253.5	Compare and select appropriate classification algorithm (Naive Bayes algorithm, Logistic Regression, KNN, SVM, Decision Tree) and clustering algorithm (Partition clustering, Density-based clustering, Distribution-based Clustering, Hierarchical Clustering) as per business needs.
410253.6	Identify role of BI in marketing, logistics, finance and telecommunication sector.

410254: Laboratory Practice V

Students will be able to	
410254.1	Analyze and measure performance of sequential and parallel algorithms.
410254.2	Design and Implement solutions for multicore/Distributed/parallel environment.
410254.3	Identify and apply the suitable algorithms to solve AI/ML problems.
410254.4	Apply the technique of Deep Neural network for implementing Linear regression and classification.
410254.5	Apply the technique of Convolution (CNN) for implementing Deep Learning models.
410254.6	Design and develop Recurrent Neural Network (RNN) for prediction.

410255: Laboratory Practice VI

Students will be able to	
410255.1	Apply different data pre-processing techniques on data-set viz. data cleaning,

	data reduction, data transformation etc.
410255.2	Design and develop real world NLP applications using NLP tools and techniques.
410255.3	Analyze and apply statistical measures like bag of words and TF-IDF on a given data.
410255.4	Design and implement algorithms that perform basic image processing (e.g. Display the histogram, Equalized histogram, contrast stretching, intensity level slicing).
410255.5	Implement image processing techniques such as representation, edge detection, image segmentation and image compression.
410255.6	Identify and apply the suitable algorithms to solve Pattern Recognition problems.
410255.7	Implement image segmentation (grey and colour) image data-set and sentiment analysis on text data-set
410255.8	Implement machine learning algorithms such as data classification using classification algorithm, data Clustering using clustering algorithm as per business needs.
410255.9	Analyze multi-dimensional cube on ROLAP, MOLAP and HOLAP model.

410256: Project Work Stage-II	
Students will be able to	
410256.1	Design test cases for the correctness of the solution for the chosen problem
410256.2	Implement the solution for the chosen problem
410256.3	Validate the implementation with designed test cases
410256.4	Demonstrate the work carried out and create the report for presentation.

410257: Audit Course 8	
Students will be able to	
410257.1	Analyze and identify the latest digital marketing trend.
410257.2	Understand and acquire additional knowledge and skill
410257.3	Understand emotional intelligence and apply for positive effectiveness among society.

Final Year (2015 Pattern) Semester I

410241: High Performance Computing	
Students will be able to	
410241.1	Identify and compare different parallel architectures, communication and programming models for a sorting application.
410241.2	Design an efficient parallel algorithm for searching problems and compare with the sequential algorithm.
410241.3	Analyze the performance of parallel computing systems for clusters in terms of Execution Time, Total Parallel Overhead, and Speedup.
410241.4	Design parallel algorithm for applications based on linear data structures using CUDA architecture.

410242: Artificial Intelligence and Robotics	
Students will be able to	
410242.1	Identify and apply suitable Intelligence agents for various AI applications.
410242.2	Design smart system using different informed search/ uniformed search or heuristic approaches.
410242.3	Indentify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
410242.4	Apply suitable algorithms to solve AI problems.

410243: Data Analytics	
Students will be able to	
410243.1	Develop analytical ability to solve business problem and use of relevant mathematics for it.
410243.2	Apply algorithmic strategies while solving business problem.
410243.3	Identify data visualization techniques for given problem.
410243.4	Study distributed system for data analytics.

410244(D): Data Mining and Warehousing [Elective-I]

Students will be able to	
410244(D).1	Apply basic, intermediate and advanced techniques to mine the data.
410244(D).2	Analyze the output generated by the process of data mining.
410244(D).3	Explore the hidden patterns in the data.
410244(D).4	Choose appropriate data mining technique.

410245(A): Distributed Systems [Elective-II]

Students will be able to	
410245(A).1	Apply the concept of remote method invocation and remote procedure calls for distributed applications.
410245(A).2	Apply the mechanism of peer to peer systems and Distributed File Systems.
410245(A).3	Demonstrate an understanding of the challenges faced by current and future distributed systems.
410245(A).4	Analyze the security requirements of a distributed system.

410245(C): Operational Research [Elective-II]

Students will be able to	
410245(C).1	Identify the characteristics of different types of decision-making environments.
410245(C).2	Determine appropriate decision making approaches and tools to solve decision problems like LPP.
410245(C).3	Build and solve Transportation Models and Assignment Models.
410245(C).4	Practical and subject specific skills (Transferable Skills). - Be able to implement practical cases, by using TORA.
410245(C).5	Develop critical thinking and objective analysis of decision problems.

410246: Laboratory Practice I

Students will be able to	

410246.1	Develop an efficient parallel algorithm to solve given problem and analyze and measure performance of modern parallel computing systems.
410246.2	Build the logic to parallelize the programming task.
410246.3	Identify and apply suitable Intelligent agents for various AI applications.
410246.4	Design smart system using different informed search, uninformed search, heuristic approaches and apply the suitable algorithms to solve AI problems.
410246.5	Develop solutions using Business Analytic and Intelligence using mathematical models.
410246.6	Provide problem solutions for multi-core or distributed, concurrent/Parallel environments.
410247: Laboratory Practice II	
Students will be able to	
410247.1	Implement classification & regression analysis for Health care domain for predicting disease.
410247.2	Simulate and implement a given algorithm for distributed system application like Byzantine General problem.
410247.3	Build various dynamic & adaptive models for LPP problem.
410247.4	Design decision making problem using tool like TORA.

Final Year (2015 Pattern) Semester II

410250: Machine Learning	
Students will be able to	
410250.1	Distinguish different learning-based applications.
410250.2	Apply different pre-processing methods to prepare training data set for machine learning.
410250.3	Design and implement supervised and unsupervised machine learning algorithm.
410250.4	Implement different learning models.
410250.5	Learn Meta classifiers and deep learning concepts.

410251: Information and Cyber Security	
Students will be able to	
410251.1	Select and apply security protection mechanisms (symmetric/asymmetric cryptographic algorithms) to ensure data confidentiality.
410251.2	Demonstrate information security and cyber security threats for a given use case.
410251.3	Design a solution to safeguard personal identifiable information from cyber-attacks (phishing/SQL injection).
410251.4	Implement security solutions (message digest) to provide data integrity.

410252(B): Compilers [Elective-III]	
410252(B).1	Design and implement a lexical analyzer and a syntax analyzer.
410252(B).2	Specify appropriate translations to generate intermediate code for the given programming language construct.
410252(B).3	Compare and contrast different storage management schemes.
410252(B).4	Identify Sources for code optimization.

410252(C): Embedded and Real Time Operating System [Elective-III]	
Students will be able to	
410252(C).1	Identify the software & hardware requirement for application based on Home Appliances.
410252(C).2	Apply the Wi-Fi / USB based protocol for communication among two devices.
410252(C).3	For real time application find out the suitable scheduling algorithm like RM, EDF.
410252(C).4	Design and implement small application like Traffic control system and black line controller.

410252(D): Software Computing and Optimization Algorithms [Elective-III]	
Students will be able to	
410252.1	Distinguish soft computing and hard computing with features of genetic algorithms, fuzzy logic and neural networks soft computing methods.
410252.2	Apply fuzzy model for an application with given data.
410252.3	Apply genetic model for an application with given data.
410252.4	Design and optimize an application using ACO and PSO algorithm.

410253(B): Human Computer Interface [Elective-IV]	
Students will be able to	
410253(B).1	Evaluate the basics of human and computational abilities & limitations for human Computer Interaction.
410253(B).2	Inculcate design principles, rules & techniques of HCI by analyzing the stakeholder requirements for given application.
410253(B).3	Apply appropriate HCI techniques to design systems that are usable by people.
410253(B).4	Discuss to evaluate the usability of designed interface for given application.

410253(C): Cloud Computing [Elective-IV]

Students will be able to	
410253(C):1	Install cloud computing environments.
410253(C):2	Demonstrate creating a virtual machine on cloud.
410253(C):3	Demonstrate any one type of cloud.
410253(C):4	Explore future trends of cloud computing.

410254: Laboratory Practice III

Students will be able to	
410254.1	For a given dataset, find the best fit equation and best scenario using linear regression and decision tree classifier algorithm respectively.
410254.2	For a given data points, use k-NN classification to find the best class.
410254.3	Cluster the given collection of points using K-Means clustering algorithm to identify points and their parent clusters.
410254.4	Implement DES/AES/Diffie-Hellman key exchange algorithm to provide secure transmission of data on a network medium.
410254.5	Apply RSA/ECC public-key cryptographic algorithms to transmit the data over an insecure network.

410255: Laboratory Practice IV

Students will be able to	
410255.1	Understand the Fuzzy Sets and Logic.
410255.2	Apply soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy inference systems and genetic algorithms.
410255.3	Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications and genetic algorithms in specified applications.

410255.4	Apply the fundamental aspects of designing and evaluating interfaces.
410255.5	Apply appropriate HCI techniques to design systems that are usable by people.