CAYMET's

Siddhant College of Engineering

Savitribai Phule Pune University, Pune

Third Year Information Technology Engineering (2019 Course)

COURSE OBJECTIVE & OUTCOMES

SEM I

Subject Code &Name -314441: Theory of Computation

Course Objectives

1. To know the applicability of the model of computation to different problems.
2. To understand in detail the relationship among formal languages, formal grammars and automata.
3. To learn the design of Finite Automata, Pushdown Automata and Turing Machine for processing of formal languages.
4. To study the theory of computability and complexity for algorithm design.

Course Outcomes

On completion of the course, students will be able to–

1. Construct finite automata and its variants to solve computing problems.
2. Write regular expressions for the regular languages and finite automata.
3. Identify types of grammar, design and simplify Context Free Grammar.
4. Construct Pushdown Automata machine for the Context Free Language.
5. Design and analyze Turing machines for formal languages.
6. Understand decidable and undecidable problems, analyze complexity classes.

Subject Code &Name -314442: Operating Systems

Course Objectives

1. To introduce basic concepts and functions of modern operating systems.
2. To understand the concept of process, thread management and scheduling.
3. To learn the concept of concurrency control.
4. To study various Memory Management techniques.
5. To know the concept of I/O and File management.
6. To learn concept of system software.

Course Outcomes

On completion of the course, students will be able to–

1. Explain the role of Modern Operating Systems.
2. Apply the concepts of process and thread scheduling.
3. Illustrate the concept of process synchronization, mutual exclusion and the deadlock.
4. Implement the concepts of various memory management techniques.
5. Make use of concept of I/O management and File system.
6. Understand Importance of System software.

Subject Code &Name -314443: Machine Learning

Course Objectives

1. To understand the basic concepts of machine learning and apply them for the various problems.
2. To learn various machine learning types and use it for the various machine learning tasks.
3. To optimize the machine learning model and generalize it.

Course Outcomes

On completion of the course, students will be able to–

1. Apply basic concepts of machine learning and different types of machine learning algorithms.

2. Differentiate various regression techniques and evaluate their performance.
3. Compare different types of classification models and their relevant application.
4. Illustrate the tree-based and probabilistic machine learning algorithms.
5. Identify different unsupervised learning algorithms for the related real-world problems.
6. Apply fundamental concepts of ANN.

Subject Code &Name -<u>314444: Human Computer Interaction</u>

Course Objectives

1. To introduce to the field of human-computer-interaction study.
2. To gain an understanding of the human part of human-computer-interactions.
3. To learn to do design and evaluate effective human-computer-interactions.
4. To study HCI models and theories.
5. To understand HCI design processes.
6. To apply HCI to real life use cases.

Course Outcomes

On completion of the course, students will be able to–

1. Explain importance of HCI study and principles of user-centered design (UCD) approach.
2. Develop understanding of human factors in HCI design.
3. Develop understanding of models, paradigms, and context of interactions.
4. Design effective user-interfaces following a structured and organized UCD process.
5. Evaluate usability of a user-interface design.
6. Apply cognitive models for predicting human-computer-interactions.

Subject Code &Name-<u>314445(A): Elective -I: Design and Analysis of Algorithm</u>

Course Objectives

1. To understand the problem solving and problem classification.
2. To know the basics of computational complexity analysis of various algorithms.
3. To provide students with foundations to deal with a variety of computational problems using different design strategies.
4. To select appropriate algorithm design strategies to solve real world problems.
5. To understand the concept of nondeterministic polynomial algorithms.

Course Outcomes

On completion of the course, students will be able to–

1. Calculate computational complexity using asymptotic notations for various algorithms.
2. Apply Divide & Conquer as well as Greedy approach to design algorithms.
3. Understand and analyze optimization problems using dynamic programming.
4. Illustrate different problems using Backtracking.
5. Compare different methods of Branch and Bound strategy.
6. Classify P, NP, NP-complete, NP-Hard problems.

Subject Code &Name -<u>314445(B): Elective -I: Advanced Database Management System</u>

Course Objectives

1. To understand the fundamental concepts of Relational and Object-oriented databases.
2. To learn and understand various Parallel and Distributed Database Architectures and Applications.
3. To understand and apply the basic concepts, categories and tools of NoSQL Database.
4. To learn and understand Data warehouse and OLAP Architectures and Applications.
5. To learn data mining architecture, algorithms, software tools and applications.
6. To learn enhanced data models for advanced database applications.

Course Outcomes

On completion of the course, students will be able to–

1. Differentiate relational and object-oriented databases.
2. Illustrate parallel &distributed database architectures.

3. Apply concepts of NoSQL Databases.
4. Explain concepts ofdata warehouse and OLAP technologies.
5. Apply data mining algorithms and various software tools.
6. Comprehend emerging and enhanced data models for advanced applications.

Subject Code &Name - 314445(C): Elective -I: Design Thinking

Course Objectives

1. To learn the Design thinking basic concepts.
2. To identify the opportunities and challenges for design thinking innovation.
3. To describe the define and ideate process of design thinking.
4. To summarize the prototyping techniques.
5. To enlist the activities carried out in Test and reflect phase of design thinking.
6. To Interpret Design Thinking case studies.

Course Outcomes

On completion of the course, students will be able to–

1. Identify need and features of design thinking.
2. Identify the opportunities and challenges for design thinking innovation.
3. Learn the process of design thinking using various tools.
4. Summarize and learn the various prototyping techniques.
5. Enlist the activities carried out in Test and reflect phase of design thinking.
6. Interpret the design thinking disruptive innovations through case studies.

Subject Code &Name - 314446: Operating Systems Lab

Course Objectives

1. To introduce and learn Linux commands required for administration.
2. To learn shell programming concepts and applications.
3. To demonstrate the functioning of OS basic building blocks like processes, threads under the LINUX.
4. To demonstrate the functioning of OS concepts in user space like concurrency control (process synchronization, mutual exclusion), CPU Scheduling, Memory Management and Disk Scheduling in LINUX.
5. To demonstrate the functioning of Inter Process Communication under LINUX.
6. To study the functioning of OS concepts in kernel space like embedding the system call in any LINUX Kernel.

Course Outcomes

On completion of the course, students will be able to–

1. Apply the basics of Linux commands.
2. Build shell scripts for various applications.
3. Implement basic building blocks like processes, threads under the Linux.
4. 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.
5. Develop system programs for Inter Process Communication in Linux

Subject Code & Name - 314447: Human Computer Interaction Laboratory

Course Objectives

1. To study the field of human-computer-interaction.
2. To gain an understanding of the human part of human-computer-interactions.
3. To learn to do design and evaluate effective human-computer-interactions.
4. To study HCI models and theories.
5. To understand HCI design processes.
6. To apply HCI to real life use cases.

Course Outcomes

On completion of the course, students will be able to–

1. Differentiate between good design and bad design.
2. Analyze creative design in the surrounding.
3. Assess design based on feedback and constraint.
4. Design paper-based prototypes and use wire frame.
5. Implement user-interface design using web technology.
6. Evaluate user-interface design using HCI evaluation techniques.

Subject Code & Name -<u>314448 (A): Laboratory Practice-I (Design and Analysis of Algorithm)</u>

Course Objectives

1. To learn the various algorithmic design strategies.
2. To apply efficiently in problem solving.

Course Outcomes

On completion of the course, students will be able to–

1. Implement the various algorithmic design strategies and use it to solve real time problems/ applications
2. Apply Divide & Conquer as well as Greedy approach to design algorithms.
3. **A**nalyze optimization problems using dynamic programming.

Subject Code &Name -<u>314448 (B): Laboratory Practice-I (ADBMS)</u>

Course Objectives

1. To learn and understand Database Modeling, Architectures.
2. To learn and understand Advanced Database Programming Frameworks.
3. To learn NoSQL Databases (Open source) such as MongoDB.
4. To design and develop application using NoSQL Database.
5. To design data warehouse schema for given system.

Course Outcomes

On completion of the course, students will be able to

1. Apply advanced Database Programming Languages.
2. Apply the concepts of NoSQL Databases.
3. Install and configure database systems.
4. Populate and query a database using MongoDB commands.
5. Design data warehouse schema of any one real-time: CASE STUDY

Subject Code &Name -<u>314448 (C): Laboratory Practice-I (Design Thinking)</u>

Course Objectives

1. To identify the opportunities and challenges for design thinking innovation and empathize and ideate for it.
2. To describe the solution by prototyping the design.

Course Outcomes

On completion of the course, students will be able to–

1. Frame and Design Challenge by performing STEEP Analysis, Conduct Interviews, design and ask 5x Why and 5W+H questions.
2. Demonstrate the activities to empathize with the users by creation of Empathy Map, Persona Development, Customer Journey Map.
3. Define and ideate process of design thinking and perform brainstorming, selection of ideas, create a storyboard and design paper prototyping or digital prototyping for chosen design challenge.

Subject Code &Name -<u>314448 (D): Laboratory Practice-I (Internet of Things)</u>

Course Objectives

1. To learn interfacing of sensor and actuators using Arduino Uno/Raspberry Pi
2. To learn and understand IoT platforms and its significance for real time applications
3. To learn and understand the steps involved in python programming for IoT applications

Course Outcomes

On completion of the course, students will be able to–

1. Design and implement real time applications with sensors and actuators.
2. Design and develop real time IoT based application by cloud interfacing.

Subject Code &Name -<u>314449: Seminar</u>

Course Objectives

Seminar should make the student attain skills like:

1. To gather the literature of specific area in a focused manner.
2. To summarize the literature to find state-of-the-art in proposed area.
3. To identify scope for future work.
4. To present the case for the intended work to be done as project.
5. To report literature review and proposed work in scientific way.

Course Outcomes

On completion of the course, students will be able to–

1. Understand, interpret and summarize technical literature.
2. Demonstrate the techniques used in the paper.
3. Distinguish the various techniques required to accomplish the task.
4. Identify intended future work based on the technical review.
5. Prepare and present the content through various presentation tools and techniques in effective manner.
6. Keep audience engaged through improved interpersonal skills.

SEM-II

Subject Code &Name -314451: Computer Network and Security

Course Objectives

To familiarize students with-

1. The application layer services, responsibilities and protocol.
2. Fathom wireless network and different wireless standards
3. Differences in different wireless networks and to learn different mechanism used at layers of wireless network.
4. The concept of network security.
5. Basic cryptographic techniques in application development.
6. Cyber security vulnerabilities & study typical threatsto modern digital systems.

Course Outcomes

On completion of the course, students will be able to–

1. Explain Responsibilities, services offered and protocol used at application layer of network
2. Apply concepts of wireless network and different wireless standards.
3. Recognize the Adhoc Network's MAC layer, routing protocol and Sensor network architecture.
4. Implement the principal concepts of network security and Understand network security threats, security services, and countermeasures
5. Apply basic cryptographic techniques in application development.
6. Gain a good comprehension of the landscape of cyber security Vulnerabilities & describe typical threats to modern digital systems.

Subject Code &Name -314452: Data Science and Big Data Analytics

Course Objectives

1. To introduce basic need of Big Data and Data science to handle huge amount of data.
2. To understand the basic mathematics behind the Big data.
3. To understand the different Big data processing technologies.
4. To understand and apply the Analytical concept of Big data using Python.
5. To visualize the Big Data using different tools.
6. To understand the application and impact of Big Data.

Course Outcomes

On completion of the course, students will be able to–

1. Understand Big Data primitives.
2. Learn and apply different mathematical models for Big Data.
3. Demonstrate Big Data learning skills by developing industry or research applications.
4. Analyze and apply each learning model comes from a different algorithmic approach and it will perform differently under different datasets.
5. Understand, apply and analyze needs, challenges and techniques for big data visualization.
6. Learn different programming platforms for big data analytics.

Subject Code & Name -314453: Web Application Development

Course Objectives

1. To familiarize students with Web Programming basic concepts
2. To learn and understand Web scripting languages.
3. To explore the Front end& Backend web programming skills.
4. To understand and learn Mobile web development.
5. To understand and learn Web application deployment.

Course Outcomes

On completion of the course, students will be able to–

1. Develop Static and Dynamic website using technologies like HTML, CSS, Bootstrap.
2. Demonstrate the use of web scripting languages.

3. Develop web application with Front End & Back End Technologies.
4. Develop mobile website using JQuery Mobile.
5. Deploy web application on cloud using AWS

Subject Code &Name -<u>314454 (A): Elective-II (Artificial Intelligence)</u>

Course Objectives

1. To understand Fundamental concepts of Artificial Intelligence and different search strategies.
2. To explore various knowledge representations and reasoning schemes.
3. To understand Fundamentals of NLP and Game Theory.
4. To explore of AI applications.

Course Outcomes

On completion of the course, students will be able to –

1. Apply the fundamental concepts of Artificial Intelligence
2. Choose appropriate search strategies for any AI problem
3. Illustrate knowledge reasoning and knowledge representation methods (for solving real world problems)
4. Analyze the suitable techniques of NLP to develop AI applications
5. Correlate the appropriate methods of Game Theory to design AI applications
6. Understand the concept of deep learning and AI applications

Subject Code &Name - <u>314454 (B): Elective-II (Cyber Security)</u>

Course Objectives

1. To learn fundamental concepts of cyber security
2. To learn different types of threats and cyber-crimes.
3. To understand the basics cyber forensics, network forensics, Email forensics, web forensics and crypto currency forensics.
4. To understand the basic digital forensics concepts and techniques for conducting the forensic examination on different digital devices.
5. To analyze how particular social engineering attacks take advantage of specific features of the Internet and of human nature.
6. To learn the IT laws and cyber-crime basics.

Course Outcomes

On completion of the course, students will be able to–

1. Develop basic understanding of cyber security.
2. Differentiate among different types of cyber threats and cyber-crimes.
3. Illustrate cyber forensic techniques to identify the criminal activities.
4. Apply forensic analysis tools to recover important evidence for identifying computer crime
5. Distinguish and classify the forms of cybercriminal activity and the technological and social engineering' methods used to undertake such crimes
6. Evaluate the effectiveness of cyber-security, cyber-laws and other countermeasures against Cybercrime

Subject Code &Name -<u>314454 (C): Elective-II- (Cloud Computing)</u>

Course Objectives

1. To provide students with the fundamentals and essentials of cloud computing
2. To learn basics of virtualization and its importance
3. To provide students a sound foundation of the cloud computing so that they are able to start using and adopting cloud computing services and tools in their real life scenarios
4. To enable students exploring some important cloud computing driven commercial systems and applications
5. To understand cloud storage technologies and relevant file systems
6. To be exposed to Ubiquitous Cloud and Internet of Things

Course Outcomes

On completion of the course, students will be able to–

1. Articulate the main concepts, key technologies and fundamentals of cloud computing.
2. Understand cloud enabling technologies and virtualization.
3. Analyze various cloud programming models and apply them to solve problems on the cloud.
4. Explain data storage and major security issues in the cloud.
5. Understand trends in ubiquitous cloud and internet of things.
6. Explore future trends of cloud computing.

Subject Code & Name - 314454 (D): Elective –II (Software Modeling and Design)

Course Objectives

1. To understand and use of UML to arrive at a design solution for real world problems.
2. To understand basics of object-oriented Modeling.
3. To learn Design concepts to Model for real world problems using object modeling.
4. To explore Interaction and behavior modeling.
5. To understand Software design principles and patterns.
6. To explore the architectural design guidelines in various type of application development.

Course Outcomes

On completion of the course, students will be able to–

1. Understand basics of object oriented methodologies and Unified Modeling Language (UML).
2. Apply analysis process, use case modeling, domain/class modeling
3. Design and apply interaction and behavior modeling on a given system.
4. Comprehend OO design process and business, access and view layer class design.
5. Recognize the software design principles and pattern to be applied on system.
6. Illustrate architectural design principles and guidelines in the various type of application development.

Subject Code &Name - 314455: Internship

Course Objectives

1. To encourage and provide opportunities for students to get professional/personal experience through internships.
2. To learn and apply the technical knowledge gained from academics /classroom learning in real life/industrial situations.
3. To get familiar with various tools and technologies used in industries and their applications.
4. To enable students to develop professional skills and expand their professional network with the development of employer-valued skills like teamwork, communication.
5. To apply the experience gained from industrial internship to the academic course completion project.
6. To nurture professional and societal ethics in students
7. Understand the social, economic and administrative considerations that influence the working environment of industrial organizations

Course Outcomes

On completion of the internship, learner will be able to –

1. Develop professional competence through industry internship.
2. Apply academic knowledge in a personal and professional environment
3. Build the professional network and expose students to future employees.
4. Apply professional and societal ethics in their day-to-day life.
5. Become a responsible professional having social, economic and administrative considerations.
6. Make own career goals and personal aspirations

Subject Code &Name - 314456: Computer Network Security Lab

Course Objectives

1. To design and implement small size network and to understand various networking commands.

2. To learn various client/server environments to use application layer protocols.
3. To understand network layer routing protocols and its implementations.
4. To understand the network security by using public key cryptography algorithms.

Course Outcomes

On completion of the course, students will be able to–

1. Design and configure small size network and associated networking commands.
2. Understand various client/server environments to use application layer protocols.
3. Use basic cryptographic techniques in software and system design.
4. Apply methods for authentication, access control, intrusion detection.

Subject Code &Name - 314457: DS & BDA Lab

Course Objectives

1. To understand Big data primitives and fundamentals.
2. To understand the different Big data processing techniques.
3. To understand and apply the Analytical concept of Big data using Python.
4. To understand different data visualization techniques for Big Data.
5. To understand the application and impact of Big Data.
6. To understand emerging trends in Big data analytics.

Course Outcomes

On completion of the course, students will be able to–

1. Apply Big data primitives and fundamentals for application development.
2. Explore different Big data processing techniques with use cases.
3. Apply the Analytical concept of Big data using Python.
4. Visualize the Big Data using Tableau.
5. Design algorithms and techniques for Big data analytics.
6. Design and develop Big data analytic application for emerging trends.

Subject Code & Name - 314458: Laboratory Practice-II (Web Application Development)

Course Objectives

1. To understand basic concepts of web programming and scripting languages.
2. To learn Version Control Environment.
3. To learn front end technologies and back end technologies.
4. To understand mobile web development.
5. To comprehend web application deployment.

Course Outcomes

On completion of the course, students will be able to–

1. Develop Static and Dynamic responsive website using technologies HTML, CSS, Bootstrapand AJAX.
2. Create Version Control Environment.
3. Develop an application using front end and backend technologies.
4. Develop mobile website using JQuery Mobile.
5. Deploy web application on cloud using AWS.

Subject Code &Name - 314458: Lab Practice – II (Artificial Intelligence)

Course Objectives

1. To develop real world problem solving ability
2. To enable the student to apply AI techniques in applications which involve perception, reasoning and planning
3. To work in team to build industry compliant AI applications

Course Outcomes

On completion of the course, students will be able to–

1. Evaluate and apply core knowledge of AI on various real world problems.
2. Illustrate and demonstrate AI tools for different dynamic applications.

Subject Code &Name -<u>314458: Lab Practice –II (Cyber Security)</u>

Course Objectives

1. To develop and understand the placement of packet-sniffer in networking and internetworking environment.
2. To implement the cyber-attacks.
3. To implement intrusion detection and basic mail spamming.

Course Outcomes

On completion of the course, students will be able to–

1. To know the different guidelines for Packet Sniffing in networking and internetworking environment.
2. To know the different types of cyber-attacks and will be able analyze theattacks.
3. Apply the knowledge of IDS to secure network and performing analysis of IDS attack on network.

Subject Code &Name - <u>314458: Laboratory Practice-II (Cloud Computing)</u>

Course Objectives

1. To develop web applications in cloud.
2. To learn the design and development process involved in creating a cloud based application.

Course Outcomes

On completion of the course, students will be able to–

1. To design and develop cloud-based applications.
2. To Simulate a cloud scenario using Cloud Sim.
3. To design and deploy web applications in cloud environment.

Subject Code &Name - <u>314458: Laboratory Practice-II (Software Modeling Design)</u>

Course Objectives

1. To teach the student Unified Modeling Language (UML 2.0)
2. To teach the student how to identify different software artifacts at analysis and design phase.
3. To explore and analyze use case modeling.
4. To explore and analyze domain/ class modeling.
5. To develop a system with design and modeling concepts.

Course Outcomes

On completion of the course, students will be able to–

1. Develop use case model with the help of UML notations.
2. Develop and implement analysis model and design model.
3. Develop and implement Interaction and behavior Model.

Subject Code &Name - <u>314459 (A): Green and Unconventional Energy</u>

Course Objectives

1. To know the importance of the energy and the the basic infrastructures for the economic development of the country.
2. To know about the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of -the-art energy systems.
3. To understand the application of non-conventional energy technologies.

Course Outcomes

On completion of the course, students will be able to–

1. List and explain the main sources of energy and their primary applications in the India, and The world.

2. Describe the challenges and problems associated with the use of various energy sources and It conservation.
3. List and describe the primary renewable energy resources and technologies.
4. Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.

*****