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Savitribai Phule Pune University

Second Year of Artificial Intelligence and Data Science (2020 Course)

210241: Discrete Mathematics

Course Outcomes:

On completion of the course, learner will be able to

CO1:Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.

CO2:Apply appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.

CO3:Design and analyze real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction.

CO4:Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems.

CO5:Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics.

CO6:Model and solve computing problem using tree and graph and solve problems using appropriate algorithms.

CO7:Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.

210242: Fundamentals of Data Structures

Course Outcomes:

On completion of the course, learner will be able to

CO1:Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity.

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CO2:Discriminate the usage of various structures, Design/Program/Implement the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution.

CO3:Demonstrate use of sequential data structures- Array and Linked lists to store and process data.

CO4:Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.

CO5:Compare and contrast different implementations of data structures (dynamic and static).

CO6:Understand, Implement and apply principles of data structures-stack and queue to solve computational problems.

210243: Object Oriented Programming(OOP)

Course Outcomes:

On completion of the course, learner will be able to

CO1: Apply constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.

CO2: Design object-oriented solutions for small systems involving multiple objects.

CO3: Use virtual and pure virtual function and complex programming situations.

CO4: Apply object-oriented software principles in problem solving.

CO5: Analyze the strengths of object-oriented programming.

CO6: Develop the application using object oriented programming language(C++).

210244: Computer Graphics

Course Outcomes:

On completion of the course, learner will be able to

CO1:Identify the basic terminologies of Computer Graphics and interpret the mathematical

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foundation of the concepts of computer graphics.

CO2:Apply mathematics to develop Computer programs for elementary graphic operations.

CO3:Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons.

CO4:Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.

CO5:Understand the concepts of color models, lighting, shading models and hidden surface elimination.

CO6:Create effective programs using concepts of curves, fractals, animation and gaming

217521: Operating Systems

Course Outcomes:

On completion of the course, learner will be able to

CO1: Enlist functions of OS and types of system calls

CO2: Apply process scheduling algorithms to solve a given problem

CO3: Illustrate deadlock prevention, avoidance and recovery

CO4: Explain memory management technique

CO5: Illustrate I/O and file management policies

CO6: Describe Linux process management

217522: Data Structures LaboratoryCourse Outcomes:

On completion of the course, learner will be able to

CO1: Use algorithms on various linear data structure using sequential organization to solve real life problems.

CO2: Analyze problems to apply suitable searching and sorting algorithm to various applications.

CO3: Analyze problems to use variants of linked list and solve various real life problems.

CO4: Designing and implement data structures and algorithms for solving different kinds of Problems

217523: OOP and Computer Graphics Laboratory

Course Outcomes:

On completion of the course, learner will be able to

CO1: Understand and apply the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable programming codes.

CO2: Analyze the concept of file and apply it while storing and retrieving the data from secondary storages.

CO3: Analyze and apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts.

CO4: Understand the concept of windowing and clipping and apply various algorithms to fill and clip polygons.

CO5: Apply logic to implement, curves, fractals, animation and gaming programs.

217524: Operating Systems Laboratory

Course Outcomes:

On completion of the course, learner will be able to

CO1: Choose the best CPU scheduling algorithm for a given problem instance

CO2: Demonstrate interprocess communication

CO3: Apply deadlock avoidance algorithm

CO4: Compare performance of page replacement algorithms

CO5: Demonstrate the fundamental UNIX commands & system calls

217525: Business Communication SkillsCourse Outcomes:

On completion of the course, learner will be able to

CO1: Express effectively through verbal/oral communication and improve listening skills

CO2: Write precise briefs or reports and technical documents.

CO3: Prepare for group discussion / meetings / interviews and presentations.

CO4: Explore goal/target setting, self-motivation and practicing creative thinking.

CO5: Operate effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities.

217526: Humanity and Social ScienceCourse Outcomes:

On completion of the course, learner will be

CO1: Aware of the various issues concerning humans and society.

CO2: Aware about their responsibilities towards society.

CO3: Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.

CO4: Able to understand the nature of the individual and the relationship between self and the community.

CO5: Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures

217527-I: Green Construction and Design

Course Outcomes:

On completion of the course, learner will be able to

CO1: Understand the importance of environment friendly society.

CO2: Apply primary measures to reduce carbon emissions from their surroundings.

CO3: Learn role of IT solutions in design of green buildings.

CO4: Understand the use of software systems to complete statutory compliances involved in the

design of a new home or office building through green construction.

217527-II: Social Awareness and Governance Program

Course Outcomes:

On completion of the course, learner will be able to

CO1: Understand social issues and responsibilities as member of society.

CO2: Apply social values and ethics in decision making at social or organizational level

CO3:Promote obstacles in national integration and role of youth for National Integration

CO4: Demonstrate basic features of Indian Constitution.

217527-IV: Smart CitiesCourse Objectives

To identify urban problems

To study Effective and feasible ways to coordinate urban technologies.

To study models and methods for effective implementation of Smart Cities.

To study new technologies for Communication and Dissemination.

To study new forms of Urban Governance and Organization.

217527-V: Foreign Language- Japanese (Module 1)

On completion of the course learner will able toCO1: Will have ability of basic communication.

CO2: Will have the knowledge of Japanese script.

CO3: Will get introduced to reading , writing and listening skills

CO4: Will develop interest to pursue professional Japanese Language course.

217528 : Statistics

Course Outcomes:

On completion of the course, learner will be able to

CO1: Identify the use of appropriate statistical terms to describe data

CO2: Use appropriate statistical methods to collect, organize, display, and analyze relevant

data.

CO3: Use distribution functions for random variables

CO4: Distinguish between correlation coefficient and regression

CO5: Understand tests for hypothesis and its significance

217529: Internet of Things

Course Outcomes:

On completion of the course, learner will be able to

CO1: Have a thorough understanding of the structure, function and characteristics of computer systems and Understand the structure of various number systems and its application in digital design.

CO2: Develop the skill set to build IoT systems and sensor interfacing.

CO3: Explain the concept of Internet of Things and identify the technologies that make up the internet of things

CO4: Analyze trade-offs in interconnected wireless embedded device networks. Select Appropriate Protocols for IoT Solutions

CO5: Design a simple IoT system comprising sensors by analyzing the requirements of IoT Application

CO6: Identify the Application of IoT in automation of Commercial and Real World examples

210252: Data Structures and Algorithms

Course Outcomes:

On completion of the course, learner will be able to

CO1: Identify and articulate the complexity goals and benefits of a good hashing scheme for real-world applications.

CO2: Apply non-linear data structures for solving problems of various domain.

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CO3: Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.

CO4: Analyze the algorithmic solutions for resource requirements and optimization

CO5: Use efficient indexing methods and multiway search techniques to store and maintain data.

CO6: Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.

210253: Software Engineering

Course Outcomes:

On completion of the course, learner will be able toCO1: Analyze software requirements and formulate design solution for a software.

CO2: Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.

CO3: Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.

CO4: Model and design User interface and component-level.

CO5: Identify and handle risk management and software configuration management.

CO6: Utilize knowledge of software testing approaches, approaches to verification and validation.

CO7: Construct software of high quality software that is reliable, and that is reasonably easy to understand, modify and maintain efficient, reliable, robust and cost-effective software solutions

217530: Management Information Systems

On completion of the course, learner will be able to

CO1 : Explain the concepts of Management Information System and Business intelligence for MIS.

CO2 : Illustrate the need of information systems in global business and ethical issues.

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CO3 : List the IT infrastructure components and explain security in the Information System.

CO4 : Demonstrate the importance of project management and extend its use in the international information system.

CO5 : Illustrate the concepts of decision support systems for business applications.

CO6 : Relate artificial intelligence and data science for Management Information System

217531: Internet of Things Laboratory

217532: Data Structures and Algorithms Laboratory

On completion of the course, learner will be able to

CO1: Understand the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem.

CO2: Choose most appropriate data structures and apply algorithms for graphical solutions of the problems.

CO3: Apply and analyze non linear data structures to solve real world complex problems.

CO4: Apply and analyze algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression.

CO5: Analyze the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations

217533: Project Based Learning II

CO1: Identify the real life problem from societal need point of view

CO2: Choose and compare alternative approaches to select most feasible one

CO3: Analyze and synthesize the identified problem from technological perspective

CO4: Design the reliable and scalable solution to meet challenges

CO5: Evaluate the solution based on the criteria specified

CO6: Inculcate long life learning attitude towards the societal problems

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217534: Code of Conduct

To promote ethics, honesty and professionalism.To set standards that are expected to follow and to be aware that If one acts unethically what are the consequences.

To provide basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues

To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards, Exposure to Safety and Risk, Risk Benefit Analysis

To have an idea about the Collegiality and Loyalty, Collective Bargaining, Confidentiality, Occupational Crime, Professional, Employee, Intellectual Property Rights.

217535: Audit Course 4

On completion of the course, learner will be able to

CO1: Understand the global water cycle and its various processes

CO2: Understand climate change and their effects on water systems

CO3: Understand Drinking treatment and quality of groundwater and surface water

CO4: Understand the Physical, chemical, and biological processes involved in water treatment and distribution

217535-II: Intellectual Property Rights and PatCourse Outcomes:

On completion of the course, learner will be able to

CO1: Understand the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition

CO2: Identify, apply and assess principles of law relating to each of these areas of intellectual property

CO3: Apply the appropriate ownership rules to intellectual property you have been involved

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217535-III: The Science of Happiness

On completion of the course, learner will be able to

CO1: Understand what happiness is and why it matters to you

CO2: Learn how to increase your own happiness

CO3: Understand of the power of social connections and the science of empathy

CO4: Understand what is mindfulness and its real world applications

217535-IV: Yoga and Meditation

On completion of the course, learner will be able to

CO1: Understand philosophy and religion as well as daily life issues will be challenged and enhanced.

CO2: Enhances the immune system.

CO3: Intellectual and philosophical understanding of the theory of yoga and basic related Hindu scriptures will be developed.

CO4: Powers of concentration, focus, and awareness will be heightened.

217535-V: Foreign Language (Japanese) Module 2

On completion of the course learner will1. have ability of basic communication.

2. have the knowledge of Japanese script.

3. get introduced to reading , writing and listening skills

4. develop interest to pursue professional Japanese Language course.

Date: 31/1/2023

Prof. Sneha S. Salvekar

Head, AI&DS Department

Anantrao Pawar College of Engineering & Research Pune

Dr. Sunil B. Thakar

APCOER, Pune

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