

SEMESTER - V

PCC DS3101: Artificial Intelligence

Course Outcomes:

- CO1: Evaluate Artificial Intelligence (AI) methods and describe their foundations.
- CO2: Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation and learning.
- CO3: Demonstrate knowledge of reasoning and knowledge representation for solving real world problems.
- CO4: Analyze and illustrate how search algorithms play vital role in problem solving.
- CO5: Illustrate the construction of learning and expert system.
- CO6: Discuss current scope and limitations of AI and societal implications.

PCC DS3102: Database Engineering

Course Outcomes:

- CO1: Understand and identify issues arising from parallel and distributed processing of data.
- CO2: Select appropriate database and construct solution to real world problems of storing large data.
- CO3: Compare and Contrast NoSQL databases with each other and Relational Database Systems.
- CO4: Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex SQL scripts.
- CO5: Learn database administration tasks and security measures.

PCC DS3103: Information Security

Course Outcomes:

- CO1: Understand principles of Crypto-systems.
- CO2: Compare and analyze various security services and mechanisms.
- CO3: Apply and use the features of PGP, S/MIME, DSA, IPsec, SSL in their profession.
- CO4: Take precautions of their personal computing system from possible threats and attacks.
- CO5: Explore newer vulnerabilities and provide the solutions to them.

PEC DS3104: Elective-I: Machine Learning

Course Outcomes:

- CO1: Explain Machine Learning concepts.
- CO2: Analyze the Machine Learning model.
- CO3: Design solution using Machine Learning techniques.
- CO4: To tackle real world problems in domain of data mining, information retrieval, computer vision, linguistics and bioinformatics, etc.

PEC DS3104: Elective-I: Advanced Computer Networks

Course Outcomes:

- CO1: Explain the structure and functioning of the Internet, networking models, protocols, and networking devices, and analyze performance issues such as delay, loss, and throughput.
- CO2: Analyze and compare link-layer and network-layer mechanisms including error detection, multiple access protocols, routing algorithms, congestion control, and LAN technologies.
- CO3: Design and implement network-based applications using transport and application-layer protocols such as TCP, UDP, HTTP, FTP, DNS, and socket programming.
- CO4: Evaluate advanced networking technologies such as wireless and mobile networks, optical networks, VPNs, MPLS, multimedia networking, ad-hoc networks, and wireless sensor networks for real-world applications.

PEC DS3104: Elective-I: Internet of Things

Course Outcomes:

- CO1: Explain key concepts and terminologies related to Internet of Things (IoT).
- CO2: Compare different wireless technologies related to IoT.
- CO3: Propose IoT solution for real life problems.

PEC DS3104: Elective-I: Automata Theory

Course Outcomes:

- CO1: Understand basic concepts of Regular Language and Regular Expressions.
- CO2: Select appropriate abstract machine to recognize a given formal language.
- CO3: Generate complex languages by applying Union, Intersection, Complement, Concatenation and Kleene * operations on simple languages.
- CO4: Apply parsing concepts for syntax analysis.
- CO5: Be familiar with thinking analytically and intuitively for problem solving situations in related areas of theory in computer science.

MDM DS3105: Multi-disciplinary Minor-03: Programming using JAVA

Course Outcomes:

- CO1: Students will be able to articulate the principle of object-oriented problem solving & programming.
- CO2: Students will be able to illustrate code reusability, security and abstraction using inheritance, package and interface.
- CO3: Students will be able to develop reliable and user-friendly applications using exception handling and file handling.
- CO4: Students will be able to create desktop apps using SWING and event handling and also illustrate multithreading concepts.
- CO5: Students will be able to use JDBC & collection framework.
- CO6: Students will be able to apply network programming concept & develop web applications using servlet and jsp.

OE DS3106: Open Elective-03: Optimization Techniques for AI

Course Outcomes:

- CO1: Formulate optimization problems from practical AI/engineering scenarios.
- CO2: Classify optimization methods and choose correct approaches.

- CO3: Solve constrained/unconstrained optimization problems.
- CO4: Implement and compare heuristic/meta-heuristic optimization such as GA/PSO.
- CO5: Evaluate optimization performance and convergence criteria.

OE DS3106: Open Elective-03: Business Modeling and Design Thinking

Course Outcomes:

- CO1: Identify user needs and establish problem statements.
- CO2: Apply design thinking phases for real challenges.
- CO3: Construct robust business models (e.g., Business Model Canvas).
- CO4: Prototype and evaluate solutions with users.
- CO5: Reflect on design decisions and iterate improvements.

PCC DS3107: Database Engineering Lab

Course Outcomes:

- CO1: Understand and identify issues arising from parallel and distributed processing of data.
- CO2: Select appropriate database and construct solution to real world problems of storing large data.
- CO3: Compare and Contrast NoSQL databases with each other and Relational Database Systems.
- CO4: Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex SQL scripts.
- CO5: Learn database administration tasks and security measures.

PCC DS3108: Java Programming Lab

Course Outcomes:

- CO1: Students will be able to articulate the principle of object-oriented problem solving & Programming.
- CO2: Students will be able to illustrate code reusability, security and abstraction using inheritance, package and interface.
- CO3: Students will be able to develop reliable and user-friendly applications using exception handling and file handling.
- CO4: Students will be able to create desktop apps using SWING and event handling and also illustrate Multithreading concepts.
- CO5: Students will be able to use JDBC & collection framework.
- CO6: Students will be able to apply network programming concept & develop web applications using servlet and jsp.

PEC DS3109: Elective Lab 1: Machine Learning Lab

Course Outcomes:

- CO1: Demonstrate, visualize, analyze and preprocess the dataset from a real-time source.
- CO2: Apply appropriate Machine learning algorithms to the data.
- CO3: Analyze the results of algorithm and convert to appropriate information required for the real-time application.

PEC DS3109: Elective Lab 1: Advance Computer Network Lab

Course Outcomes:

- CO1: Explain the structure and functioning of the Internet, networking models, protocols, and networking devices, and analyze performance issues such as delay, loss, and throughput.
- CO2: Analyze and compare link-layer and network-layer mechanisms including error detection, multiple access protocols, routing algorithms, congestion control, and LAN technologies.
- CO3: Design and implement network-based applications using transport and application-layer protocols such as TCP, UDP, HTTP, FTP, DNS, and socket programming.

PEC DS3109: Elective Lab 1: Internet of Things Lab

Course Outcomes:

- CO1: Students will understand basic concepts of IoT.
- CO2: Students will be able to learn and implement RFID technology in various applications.
- CO3: Students will be able to write programs for basic applications.
- CO4: Student will understand and implement different communication technologies in IoT systems.

PEC DS3109: Elective Lab 1: Automata Theory Lab

Course Outcomes:

- CO1: Understand basic concepts of Regular Language and Regular Expressions.
- CO2: Select appropriate abstract machine to recognize a given formal language.
- CO3: Generate complex languages by applying Union, Intersection, Complement, Concatenation and Kleene * operations on simple languages.
- CO4: Apply parsing concepts for syntax analysis.
- CO5: Be familiar with thinking analytically and intuitively for problem solving situations in related areas of theory in computer science.

MDM DS3110: Multi-Disciplinary Minor 03 Lab: Programming using Java

Course Outcomes:

- CO1: Students will be able to articulate the principle of object-oriented problem solving & Programming.
- CO2: Students will be able to illustrate code reusability, security and abstraction using inheritance, package and interface.
- CO3: Students will be able to develop reliable and user-friendly applications using exception handling and file handling.
- CO4: Students will be able to create desktop apps using SWING and event handling and also illustrate Multithreading concepts.
- CO5: Students will be able to use JDBC & collection framework.
- CO6: Students will be able to apply network programming concept & develop web applications using servlet and jsp.

EL DS3111: Business English

Course Outcomes:

- CO1: Learn to communicate with others in practical, business oriented situations.
- CO2: Learn to express themselves in English with greater fluency, accuracy and confidence.
- CO3: Learn to handle themselves in English in a variety of business contexts, from negotiating, to using the telephone, to making presentations, to socializing.

- CO4: Enhance the skills of listening, speaking, pronunciation skills, as well as business vocabulary.
- CO5: Acquire the communicative competencies crucial for appropriate workplace behavior.

SEMESTER - VI

PCC DS3201: Advanced Database Systems

Course Outcomes:

- CO1: Understand and identify issues arising from parallel and distributed processing of data.
- CO2: Select appropriate database and construct solution to real world problems of storing large data.
- CO3: Compare and Contrast NoSQL databases with each other and Relational Database Systems.
- CO4: Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex SQL scripts.
- CO5: Learn database administration tasks and security measures.

PCC DS3202: Data Mining & Data Warehousing

Course Outcomes:

- CO1: Demonstrate storing voluminous data for online processing, Preprocess the data for mining applications.
- CO2: Apply the association rules for mining the data.
- CO3: Design and deploy appropriate classification techniques.
- CO4: Cluster the high dimensional data for better organization of the data.
- CO5: Discover the knowledge imbibed in the high dimensional system.

PCC DS3203: Feature Engineering

Course Outcomes:

- CO1: Explain basics of feature engineering used for representing and generating process.
- CO2: Describe features of different types of data with feature selection process.
- CO3: Describe feature transformations process for converting high dimensional features to low dimensional features.
- CO4: Explain feature learning process from the given input.

PEC DS3204: Elective-II: Research Methodology

Course Outcomes:

- CO1: Define a good research problem, hypothesis and objectives.
- CO2: Identify alternative research methodologies and analytical techniques for a chosen research question.
- CO3: Analyze basic techniques of quantitative and qualitative data gathering.
- CO4: Summarize the purpose, process, methods and results in preparation of a research report and various forms of IPRs.

PEC DS3204: Elective-II: Soft Computing

Course Outcomes:

- CO1: Explain the necessity of Soft Computing techniques in addressing complex, uncertain and imprecise problems encountered in various domains.
- CO2: Analyze and apply Fuzzy Logic concepts such as fuzzy sets, membership functions, fuzzy inference systems.

- CO3: Evaluate different search methods for problem-solving, including state space search, heuristic search and evolutionary algorithms for finding optimal solutions.
- CO4: Design and implement Genetic Algorithms for solving single-objective optimization problems, utilizing various genetic operators such as encoding, crossover, selection, and mutation.
- CO5: Design different ANN models for solving real-life problems.

PEC DS3204: Elective-II: Cyber Security

Course Outcomes:

- CO1: Explain the cyber security concepts.
- CO2: Describe the cyber security vulnerabilities and prevention techniques.
- CO3: Explain the different rules and regulations under I.T. ACT.
- CO4: Explain the concepts of digital forensics & incident management.

PEC DS3204: Elective-II: Computer Algorithms

Course Outcomes:

- CO1: Understand and demonstrate algorithm design methods with analysis.
- CO2: Devise algorithm for given problem statement and analyze its space and time complexity by using recurrence relation.
- CO3: Categorize the problem to determine polynomial and non-polynomial based on its nature.
- CO4: Understand and demonstrate basic concepts of parallel algorithms.

PEC DS3205: Elective-III: Data Acquisition

Course Outcomes:

- CO1: Identify and classify data sources, data types, and formats suitable for data science applications.
- CO2: Acquire data from heterogeneous sources such as files, databases, web APIs, and real-time streams.
- CO3: Implement scalable data ingestion pipelines using modern tools and cloud platforms.
- CO4: Apply data quality checks, governance policies, and ethical practices during data acquisition.

PEC DS3205: Elective-III: Object Oriented Modeling and Design

Course Outcomes:

- CO1: Ability to analyze and model software systems.
- CO2: Ability to construct OO view of the system.
- CO3: Ability to design a Software System using OMT design techniques.
- CO4: Ability to design a Software System using UML design techniques.

PEC DS3205: Elective-III: Image Processing

Course Outcomes:

- CO1: Explain different concepts and processes in digital image processing.
- CO2: Apply different image processing operations on an image.
- CO3: Analyze various operations on image using different tools.
- CO4: Compare various filtering, enhancement, segmentation and classification techniques used in image processing.
- CO5: Design various applications in Image Processing.

PEC DS3205: Elective-III: Exploratory Data Analysis

Course Outcomes:

- CO1: Explain the fundamental concepts in exploratory data analytics.
- CO2: Interpret various data preprocessing techniques in exploratory data analytics.
- CO3: Apply different techniques in EDA on real life data.
- CO4: Analyze different application dataset using EDA techniques.

MDM DS3206: Multi-disciplinary Minor-04: Database Concepts and Design

Course Outcomes:

- CO1: Explain the fundamental database concepts.
- CO2: Apply the normalization techniques and SQL queries on database.
- CO3: Interpret various indexing and concurrency control techniques.
- CO4: Develop a database application using database design principles.

PCC DS3207: Advanced Database Systems Lab

Course Outcomes:

- CO1: Understand and identify issues arising from parallel and distributed processing of data.
- CO2: Select appropriate database and construct solution to real world problems of storing large data.
- CO3: Compare and Contrast NoSQL databases with each other and Relational Database Systems.
- CO4: Make use of SQL cursors, triggers, stored procedures, and procedural SQL to write complex SQL scripts.
- CO5: Learn database administration tasks and security measures.

PCC DS3208: R Programming Lab

Course Outcomes:

- CO1: Demonstration and implement of basic R programming framework and data structures.
- CO2: Explain critical R programming language concepts such as control structures and recursion.
- CO3: Applying mathematical and statistical operations data structures in R.
- CO4: Examine data-sets to create testable hypotheses and identify appropriate statistical tests.

EL DS3209: Software Testing Tools

Course Outcomes:

- CO1: Understand software testing concepts, STLC, and bug life cycle.
- CO2: Design and execute manual test cases for software applications.
- CO3: Automate functional test cases using Selenium tools.
- CO4: Apply advanced automation techniques such as data-driven testing and TestNG.
- CO5: Perform performance testing and defect tracking using testing tools.
- CO6: Develop and automate a complete web application testing project.