FIRST SEMESTER

Fundamentals of Programming (23B61CS111)

Algorithmic Thinking: Introduction to Algorithmic Thinking and Problem Solving, Step by step solution to simple problems, developing logic/flow- chart/pseudo code to solve problems like simple/logical games, puzzles. C Programming: Introduction to C Programming syntax and semantics, data types and variables, expressions and assignments, array, simple I/O, conditional and iterative control structures, functions and parameter passing, e.g., factorial, Fibonacci, Programs for pattern generation. Programs for Elementary numerical problems: unit conversion, average, sum, min, max of a list of numbers, common operations with matrix, polynomial, and polygons, approximating the square root of a number, finding the greatest common divisor. Advanced C programming: Structure, Union, pointers, Pointer arithmetic, handling 1 D and 2 D array using its pointer notation, sending these in function. Searching and Sorting Techniques: Linear and binary search, insertion, selection, and bubble sort.

Fundamentals of Programming Lab (23B65CS114)

Algorithmic Thinking: Introduces principles of problem-solving through step-by-step approaches, including logic development, flowcharts, and pseudocode. Students engage with different tools and perform exercises to draw flowcharts and pseudocode. C Programming: Covers syntax and semantics of C programming, including data types, variables, expressions, arrays, and control structures. Students implement basic I/O operations, functions, and classic algorithms like factorial and Fibonacci sequences. Elementary Numerical Problems: Focuses on solving basic numerical problems using C programming. Students learn unit conversion, calculating averages, sums, and working with matrices, polynomials, and polygons. Techniques for approximating square roots and finding greatest common divisors are explored. Advanced C Programming: Delves into advanced C programming concepts like structures, unions, pointers, and 1D/2D arrays. Students learn pointer arithmetic and passing arrays as function parameters. Searching and Sorting Techniques: Introduces fundamental searching and sorting algorithms such as linear and binary search, insertion, selection, and bubble sort. Practical implementation through hands-on exercises enhances problem-solving proficiency.

English 23B31HS111

English for Communication : Communication Process and Channels, Technical Communication Skills, Non-Verbal Communication Skills and Body Language, Gambits and Small Talk; Pronunciation : Features of English Phonology, Introduction to International Phonetic Alphabet; Business Communication : Dynamics of Professional Presentation, Business Letters and Resume, Email Messages, Memorandum, Technical Reports formats, Other Business Writings: Circulars, Notice, Agenda and Minutes; Vocabulary Enrichment & Grammar: Essentials of Grammar, Applied Grammar and Usage: Tense, Aspect, Mood and Voice, Building Advanced Vocabulary; Rhetorics & Literature : Literary Devices; Isaac Asimov's short story Too Bad; John Galsworthy's short story Ultima Thule

Fundamentals of Mathematics (23B31MA111)

Sets and their representation, Mapping or function, Relation and their representation, Limit and continuity, Tangent to a curve, Taylor's series, maxima and minima, Fundamental theorem of calculus, Definite integral as a limit of sum, Properties of definite Integrals, Algebra of matrices, Row echelon form, Rank of a matrix, Gauss elimination method, Eigenvalues and eigenvectors.

Environmental Science 23B12BT111

The Multidisciplinary nature of environment, principles of Biodiversity & conservation, overview of various Natural resources including Energy, their consumption & conservation strategies, different forms of Pollution, hazardous waste management, Urban planning, Disaster management, Environmental Policies, Laws,

Regulations, ethics and a Field Work component that appraises students with issues in environment in current context.

Multimedia Technology-I (23B61CS113)

Multimedia: definition, elements, classification, importance and applications in various fields; linear and nonlinear multimedia, multimedia systems; raster and vector graphics, picture element, resolution, aspect ratio, color depth, 1-bit, 8-bit, 24-bit images; Adobe Photoshop & Illustrator: basics, tools overview and default shortcuts keys; sound and its characteristics, digitization of sound, MIDI, audio system; video and animation: basics; file formats (JPEG, PNG, TIFF, HEIC, PSD, AI, AVI, etc).

Multimedia Technology- I Lab (23B65CS116)

Graphics editing and manipulation: introduction to raster and vector graphics, image editing techniques using softwares; Adobe Photoshop: workspace overview, selection tools overview, default shortcuts keys, transforming and adjusting tools (move, rotate, scale, crop, resize), working with layers, image editing techniques, magazine cover design, poster design; Adobe Illustrator: workspace overview, selection-drawing-editing tools, working with paths and shapes, patterns and complex design, logo design, default shortcut keys.

Web Technology   23B61CS112

Introduction to the Internet and Web Technology: Static and dynamic web pages, client-side and server-side scripting. Creating HTML Pages:HTML documents, HTML tags and elements, Form handling. Styling the Web Pages with CSS: Cascading Style Sheets (CSS), CSS selectors and properties .Dynamic and Interactive Web Pages with JavaScript: JavaScript and its role in web development, Event handling and form validation .Control structures: loops and conditional statements, DOM manipulation for interactivity.PHP and MySQL for Web Applications:server-side scripting with PHP, connecting to MySQL,Introduction to Web Development Frameworks.

Web Technology Lab (23B65CS115)

Basic structure of HTML, Tags such as Headings, Paragraphs, Formatting, images, Tables, Lists with different attributes. CSS Introduction, style rules, colors, backgrounds, borders, fonts, links, list, tables, text. JS Introduction, Inclusion, Output, Variables, Data Types, Operators, Strings and Functions. HTML forms, client-side scripting using JavaScript. Database Connectivity with PHP. Overview of MYSQL, creating database, selecting a database, listing database and table names, creating a table, inserting data, altering tables and data, deleting database, deleting data and tables. Overview of PHP, Basic command with PHP examples. Develop Dynamic web applications to solve real world problems.

Introduction to Digital Technologies (23B66CS114)

Fundamentals, ML Algorithms, Training and Evaluation, Applications, Introduction, Data Collection, Storage and Management, Tools and Technologies, Data Analysis Techniques, Big Data Technologies and Ecosystem, Applications and Future Trends, Introduction, Use Cases and Applications, Real-World Implementations and Case Studies, Introduction, Features, Advantages and Disadvantages, IoT Devices, IoT Framework, IoT Applications, IoT Development Kit, Introduction to Blockchain Technology, Blockchain Security and Vulnerabilities, Cryptographic Foundations for Blockchain Security, Integrating Blockchain with Cybersecurity, Future Trends and Challenges, Introduction to Augmented Reality and Virtual Reality, UI and UX Design for AR and VR, Designing Interactions and Gestures in AR and VR, AR and VR Accessibility and Inclusivity, Design Challenges and Future Trends in AR and VR, Introduction, Robotic Automation in Smart Cities, Challenges and Opportunities in Smart Cities, Introduction, BCI Technologies and Modalities, Signal Processing and Machine Learning for BCI, BCI Applications in Assistive Technology, BCI in Gaming and Virtual Reality

Data Structures (23B61CS121)

Fundamentals of Linear and Non-Linear Data Structures, need of data structures, Memory Allocation – Static and dynamic, Introduction to Abstract Data Types.Review of Arrays: One dimension, two-dimension, memory representation, address calculation, and related operations.Linked List: Singly, Doubly, Circular, and related operations like Creation, Insertion, Deletion, Modification, Searching, Sorting, Reversing, and Merging. Stack: Static and dynamic implementation, operations, applications like conversion between polish and reverse polish notations.Queue: Static and dynamic implementation, operations, types: linear, circular, doubly ended. Searching – Review of Linear Search and Binary Search.Hashing – Hash Table, Chaining, Probing. Sorting – Merge, Quick, Radix, Bucket, and Count. Review of insertion, selection, bubble sort. Trees: Notations & Terminologies, Memory Representation, Binary Trees Types- Complete, Full, Strict. Tree Traversals (Recursive and non-recursive), Binary Search Tree and Basic Operations, Balanced BST: AVL Tree. Priority Queue using Binary Heaps. Graphs: Notations and Terminologies, Memory Representation: Adjacency Matrix and List; Graph Traversal using DFS and BFS.

Data Structures Lab (23B65CS124)

Programs based on Memory Allocation – Static and dynamic, pointer arithmetic,Review of Arrays: One dimension, two-dimension, memory representation, address calculation, and related operations. Linked List: Singly, Doubly, Circular, and related operations like Creation, Insertion, Deletion, Modification, Searching, Sorting, Reversing, and Merging. Stack: Static and dynamic implementation, operations, applications like conversion between polish and reverse polish notations. Queue: Static and dynamic implementation, operations, types: linear, circular, doubly ended. Searching – Review of Linear Search and Binary Search. Hashing – Hash Table, Chaining, Probing. Sorting – Merge, Quick, Radix, Bucket, and Count. Review of insertion, selection, bubble sort. Trees: Notations & Terminologies, Memory Representation, Binary Trees Types- Complete, Full, Strict. Tree Traversals (Recursive and non-recursive), Binary Search Tree and Basic Operations, Threaded Binary Tree. Balanced BST: AVL Tree, B Tree. Priority Queue using Binary Heaps. Graphs: Notations and Terminologies, Memory Representation: Adjacency Matrix and List; Graph Traversal using DFS and BFS.

Database Management System (23B61CS122)

Introduction to Databases: DBMS Architecture, Data Independence, Two and Three Schema architecture, Data models, Schema, Instances, Role of database administrator; Relational database and ER Model: Entity and its types, Entity set, Notations for ER Diagram; Relational Model: Relational Data Models, Relational algebra, Relational calculus; Database Design: Functional Dependencies, Armstrong's inference rule, Normalization, First Normal form, Second Normal form, Third Normal Form, BCNF; Structured Query Language: DDL. DML, DRL, TCL; Procedural Language: PL/SQL: Data types, Stored Procedures, Functions, Exceptions, Cursors and triggers; Transaction and Concurrency Control: Definition of Transactions, ACID properties, Schedules, Serializability, Concurrency Control, Lock-based protocols, Time-stamp based protocols; Database Recovery: System Failure, Backup and recovery Technique, checkpoints, rollback, Deadlock.

Database Management Systems Lab 23B65CS125

MySQL commands: Create command, Data Types, Constraints,SQL-DML :Select, Insert, Update, Delete,Conditions and Logical Operators, SQL Aggregate Functions ,SQLJoins: Cross Join, Natural Join, Inner Join, Outer Join, SQL Clauses, Sorting Results (ORDER BY Clause), Grouping Results (GROUP BY Clause), ANY and ALL, Combining Result Tables (UNION, INTERSECT, EXCEPT),Subqueries multiple column , subqueries with Having and group by clause,Procedural Language :storing data using procedures, using stored functions and using cursors and triggers.

Python I (23B61CS123)

Introduction to Python: Data types, Variables and Assignment Statements; Control and Looping Statements: if, else, while, for, Iterables, list and Iterators, Built in range function, Augmented Assignments, Boolean Operators and, or and not; Functions: Defining functions, Random Number, Python Standard Library, math Module Functions, Default Parameter Values; Sequences: Arrays, Lists and Tuples; Dictionaries and Sets: Introduction to Dictionaries. Creating a Dictionary, Iterating through a Dictionary, Basic Dictionary Operations, Dictionary Methods keys and values; Array-Oriented Programming with NumPy; Strings: A Deeper Look; Files and Exceptions; Data Visualization.

Python-1 Lab (23B65CS126)

Python Data Types, Operators: Arithmetic, Assignment, Relational, Logical, Conditional and Control Statements, Functions, Sequences: Lists, Tuples, Dictionaries, Sets, Strings, Array-Oriented Programming with NumPy, File Handling, Exceptions Handling: try and catch statement, finally clause, Data Visualization: Matplotlib

Discrete Mathematics (23B31MA112)

Relations, Equivalence Relations, Partial Ordered Set, Hasse Diagram, Lattice, Boolean Algebra, Warshall's Algorithm, Functions, Recursively Defined Functions, Generating Functions, Z-Transforms, Propositions, Basic Logical Operators, Truth Tables,Tautogies and Contradictions, Valid Arguments and Fallacy, Propositional Functions and Quantifiers, Graphs, Subgraphs, Eulerian Graph and Koingsberg Problem, Hamiltonian Graph, Labelled and Weighted Graphs, Tree Graphs-Minimum Spanning, Tree(Prim's Algorithm), Graph Colorings, Four Color Problem, Trees, Digraphs, Rooted Trees, Binary Trees, Sequential Representation, Adjacency matrix, Path Matrix, Shortest Path.

Soft Skills-1 (23B31HS112)

Holistic understanding of self-awareness, interpersonal skills, decision-making, leadership, and capacity enhancement for personal and professional success. Personal and professional development, significance of Personality Development, self-awareness and positive thinking. Emotional Intelligence. Components and skills required for development, SWOT analysis for personal growth. Stress and Time management: coping mechanisms. Goal Setting and Prioritization: Long term and short-term. Goals: implementation strategies. Decision Making: steps and techniques Negotiation: fundamentals and styles. Leadership: Traits, culture, and emerging trends. Team Building: dynamics of effective teams, nuances of different team types. Capacity Building elements, zones of learning, and strategies for continuous development.

EVERYDAY PSYCHOLOGY (23B36HS111)

Introduction to Everyday Psychology: Use and Purpose of psychology in everyday life, Understanding behavior; Understanding Self- Basic Human Emotions, Self-esteem, Identity, Personality, Morality; social context of development - Family, Peers and Schooling, Media and Socio-cultural theory, Family Relationships and Relationship Struggles; Mental health, taboos around mental issues, mental health concerns like Body Image, Loneliness, Anxiety, Sadness vs Depression, Abuse, Coping Strategies, Role of counselling, and Self-Regulation

THIRD SEMESTER

Algorithm and Problem Solving (23B61CS211) (3 CREDITS)

Introduction to Algorithms: Definition and importance of algorithms, Characteristics of good algorithms, Basic algorithmic techniques; Algorithm Analysis, Brute Force Algorithms, Divide and Conquer, Dynamic Programming, Greedy Algorithms, Graph Algorithms, String Algorithms, Advanced Topics: Computational geometry algorithms, Network flow algorithms, NP-completeness and approximation algorithms; Problem-solving Strategies: Problem analysis and understanding, Problem-solving frameworks, Techniques for handling complex problems.

Object Oriented Programming (23B61CS212) (4 CREDITS)

Introduction to Object-Oriented Programming, Classes and Objects, Inheritance and Polymorphism, Abstraction and Encapsulation, Packages and Modules, Exception Handling, Object-Oriented Analysis and Design (OOAD), Advanced OOP Concepts: Generics and parameterized classes/methods, Nested classes and inner classes, Reflection and introspection; Design Patterns, Event-Driven Programming: Introduction to event-driven programming, Handling events using OOP principles.

Multimedia Technology-II (23B61CS213) (2 CREDITS)

Interactive Multimedia Systems, Virtual Reality (VR) Fundamentals, Augmented Reality (AR) Concepts, Multimedia Content Creation, Multimedia Databases, Multimedia Networking, 3D Modeling and Animation, Multimedia Compression and Streaming, Advanced Multimedia Applications: Multimedia in e-learning and education, Multimedia in entertainment and gaming, Emerging trends and future directions in multimedia technology.

Algorithm and Problem Solving (APS) Lab (23B65CS214) (1 CREDITS)

Basic Algorithms, Recursion, Data Structures, Algorithm Analysis: Analyzing the time and space complexity of algorithms through practical examples and comparing the performance of different algorithms. Dynamic Programming, Greedy Algorithms, Graph Algorithms, String Algorithms, Problem-Solving Strategies: Applying various problem-solving strategies such as divide and conquer, backtracking, and dynamic programming to solve algorithmic problems efficiently.

Object Oriented Programming (C++) Lab (23B65CS215) (1 CREDITS)

Introduction to C++ Environment Setup, Concepts of Object-Oriented Programming, Class Design and Implementation, Inheritance and Polymorphism, Operator Overloading and Type Conversion, Templates and Generic Programming, Introduction to templates: Creating function templates and class templates, Generic programming techniques; Standard Template Library (STL), Exception Handling, File Handling, Project Work and Applications.

Multimedia Technology-II Lab (23B65CS216) (1 CREDITS)

Interactive Multimedia Systems: Designing and implementing interactive multimedia applications, User interface design principles for interactive systems; Multimedia Authoring Tools: Adobe Animate, Adobe After Effects, or Unity3D, creating multimedia content using authoring tools; Designing and managing multimedia databases, Understanding and Implementing multimedia streaming and communication protocols.

FOURTH SEMESTER

Software Engineering (23B61CS221) (3 CREDITS)

Introduction to Software Engineering: Definition, scope, and importance of software engineering, Software development lifecycle models, Software Processes: Waterfall model, Agile methodologies (Scrum, Kanban), DevOps practices. Requirements Engineering: elicitation and analysis, specification and documentation, validation and management. Software Design, Implementation and Coding Practices, Software Testing, Software Maintenance and Evolution, Software Project Management, Quality Assurance and Metrics.

Operating System (23B61CS222) (3 CREDITS)

Introduction to Operating Systems, fundamental concepts such as processes, memory management, file systems, and I/O handling. Operating system design principles, including scheduling algorithms, concurrency control, and resource allocation techniques. Concepts and principles underlying modern operating systems. Include

process management, memory management, file systems, and concurrency control, Distributed and Real-Time Operating Systems.

Java Full Stack Development-I (Core Java) (23B61CS223) (4 CREDITS)

Essential Java libraries and frameworks for building robust and scalable applications, programming fundamentals, web development frameworks: Spring Boot, and database integration with technologies like JDBC and Hibernate. Foundation in Java programming language: syntax, data types, control flow, object-oriented programming, and exception handling, File handling, Multithreading, Introduction to GUI Programming with Swing, Introduction to JavaFX: Overview of JavaFX, Creating JavaFX applications.

Software Engineering Lab (23B65CS224) (1 CREDITS)

Theoretical software engineering principles to practical scenarios through hands-on projects and exercises. Software requirements analysis, design methodologies, implementation techniques, testing strategies, and project management. Software Development Tools, Emerging trends and technologies in software engineering.

Java Full Stack Development-I (Core Java) Lab (23B65CS225) (1 CREDITS)

Practical exercises focused on mastering core Java programming concepts. Topics include object-oriented programming, data structures, exception handling, file handling, and multithreading, Arrays and Strings, Collections Framework.

FIFTH SEMESTER

Computer Organization and Architecture (23B61CS311) (4 CREDITS)

Introduction to Computer Organization and Architecture, Number Systems and Data Representation, Boolean Algebra and Logic Gates, Central Processing Unit (CPU), Memory Hierarchy, Input/Output (I/O) Organization, Instruction-Level Parallelism, Parallel Processing and Multiprocessing, Computer Performance Evaluation, Assembly Language: Assembly language syntax and programming constructs, Data movement and arithmetic instructions, Control flow instructions.

Computer Networks (23B61CS312) (3 CREDITS)

Introduction to Computer Networks: networking concepts, Network types and topologies, OSI and TCP/IP models; Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer, Network Security, Network Management, Emerging Technologies: Software-defined networking (SDN), Internet of Things (IoT), Cloud networking.

Full Stack Developer-I (Web development/Java/Mobile) (23xxxxxxx) (2 CREDITS)

Introduction Web Development, Core Java Programming, Database Management Systems: Relational database concepts, SQL fundamentals (queries, joins, subqueries), Introduction to JDBC (Java Database Connectivity), Database integration with Java applications. Web Development with Java Servlets, JavaServer Pages (JSP), Frontend Development Frameworks, Mobile Development Basics,

Full Stack Developer-I(Web development/Java/Mobile) Lab (23xxxxxxxx) (1 CREDITS)

Web Development: HTML, CSS, JavaScript, Front-end frameworks (e.g., React, Angular, Vue.js), Back-end frameworks (e.g., Node.js, Express.js), RESTful APIs, Database integration (e.g., MySQL, MongoDB). Java Programming: Core Java concepts (e.g., classes, objects, inheritance, polymorphism), Data structures and algorithms, Exception handling, Multithreading, Java Collections Framework. Mobile Development: Mobile app development platforms (e.g., Android, iOS), Mobile UI/UX design principles, Mobile app architectures (e.g., MVC, MVVM), Mobile development frameworks (e.g., Android SDK, Flutter, React Native), Mobile database integration.

Introduction to Blockchain (23B61CS321) (4 CREDITS)
Blockchain Technology, Cryptography Basics: Cryptographic hash functions, Public-key cryptography, Digital signatures. Decentralization and Distributed Ledger Technology (DLT), Blockchain Architecture, Cryptocurrency and Tokens, Blockchain Platforms and Frameworks, Blockchain Applications and Use Cases, Regulatory and Legal Considerations, Blockchain Security and Privacy.

Cloud Computing (23B61CS322) (4 CREDITS)
Introduction to Cloud Computing, Virtualization Basics, Cloud Infrastructure, Cloud Services and Platforms, Deploying Applications in the Cloud, Managing Cloud Resources, Security and Compliance, Emerging Trends in Cloud Computing: Serverless computing and Function as a Service (FaaS), Edge computing and IoT integration, Multi-cloud and hybrid cloud strategies.

Agile Software Development (23B61CS323) (3 CREDITS)
Introduction to Agile Software Development, Agile Methodologies: Scrum framework, Kanban method, Extreme Programming (XP), Lean software development. Agile Project Management, Collaboration and Communication: Cross-functional teams, Communication techniques, Stakeholder engagement and feedback. Agile Engineering Practices: Test-driven development (TDD), Pair programming, Continuous integration (CI) and continuous delivery (CD), Refactoring and code quality. Scaling Agile: Agile at scale frameworks (e.g., SAFe, LeSS), Distributed agile teams, Managing dependencies and risks.

IOT Analytics (23B61CS324) (3 CREDITS)
Introduction to IoT Analytics, IoT Data Collection, Storage and Management. Data Analytics Techniques for IoT, Real-time Data Processing: Stream processing frameworks (e.g., Apache Kafka, Apache Flink), Complex event processing (CEP), Edge computing for real-time analytics. Visualization of IoT Data, IoT Data Security and Privacy, IoT Analytics Platforms and Tools: IoT analytics platforms, Comparative analysis of tools (e.g., Azure IoT Analytics, AWS IoT Analytics, Google Cloud IoT Core). Ethics and Challenges in IoT Analytics.

Full Stack Developer-II (Web development/Java/Mobile) (23xxxxxxx) (1 CREDITS)
Advanced Web Development, Java Enterprise Development, Frameworks and Libraries: Spring Framework, Hibernate ORM, Apache Struts. Database Management, Mobile Application Development, Deployment and DevOps, Security in Full Stack Development.

Full Stack Developer-II (Web development/Java/Mobile) Lab (23xxxxxxx) (1 CREDITS)
Front-end Web Development, Back-end Web Development, Java Application Development, Mobile App Development, Integration and Full-stack Development: Integrating front-end and back-end components, RESTful API communication, Data exchange formats (e.g., JSON, XML), Session management, Testing and debugging full-stack applications**.** Deployment and DevOps.

Large Scale graph Analysis (23B61CS411) (4 CREDITS)
Introduction to Large-Scale Graph Analysis, Graph Representation and Storage, Graph Traversal Algorithms: Breadth-first search (BFS), Depth-first search (DFS), Shortest path algorithms (Dijkstra's algorithm, Bellman-Ford algorithm). Graph Partitioning, Distributed Graph Processing, Community Detection, Graph-based Machine Learning, Scalable Graph Analysis Tools and Frameworks: Introduction to graph processing libraries: NetworkX, GraphFrames.

Game Theory (23B61CS412) (5 CREDITS)
Definition and scope of game theory, Strategic interactions and rational decision-making, Basic Concepts in Game Theory, Static Games: Simultaneous games, Dominant strategies and dominated strategies, Nash equilibrium and its existence. Dynamic Games: Sequential games, Backward induction, Subgame perfect equilibrium. Cooperative Games: Coalition formation, Shapley value, Core and stable outcomes. Evolutionary

Game Theory, Applications of Game Theory, Mechanism Design: Introduction to mechanism design, Incentive compatibility, Vickrey-Clarke-Groves mechanism.

Metaheuristic Optimization (23B61CS413) (4 CREDITS)

Introduction to Optimization, Metaheuristic Optimization Techniques Overview, Genetic Algorithms (GA), Simulated Annealing (SA), Particle Swarm Optimization (PSO), Ant Colony Optimization (ACO), Differential Evolution (DE), Hybrid and Multi-objective Metaheuristics, Applications of Metaheuristic Optimization.

Information Retrieval (23B61CS414) (4 CREDITS)

Definition and significance of information retrieval, Information retrieval models: Boolean, Vector Space Model, Probabilistic Model. Indexing and Searching, Evaluation of Information Retrieval Systems, Text Processing and Natural Language Processing (NLP) in Information Retrieval, Web Search and Information Retrieval, Multimedia Information Retrieval, Emerging Trends in Information Retrieval: Semantic search, Personalized search, Social media retrieval.

Game Theory Lab (23B65CS415) (1 CREDITS)

Fundamental concepts in game theory, application to real-world scenarios. mixed strategies and evolutionary game theory, mechanism design, auction theory, and cooperative game theory.

Metaheuristic Optimization Lab (23B65CS416) (1 CREDITS)

Implementation and Fine-tuning of Metaheuristic Algorithms: Programming metaheuristic algorithms in a high-level language (e.g., Python, Java), Parameter tuning and algorithm customization, Experimental design and performance evaluation methodologies. metaheuristic algorithms for optimization problems: genetic algorithms, particle swarm optimization, ant colony optimization, and tabu search.

Introduction to DeVOPS (23B61CS421) (2 CREDITS)

Definition, origins , Principles and cultural aspects of DevOps. DevOps Practices and Processes: Agile development methodologies, Continuous integration (CI) and continuous delivery (CD), Infrastructure as code (IaC), Monitoring and feedback loops. Version Control Systems and Automation Tools, Continuous Integration and Delivery (CI/CD), Infrastructure as Code (IaC), Monitoring and Logging, DevOps Culture and Collaboration, Security in DevOps.

Social   NetworkAnalysis   (23B61CS422)   (4   CREDITS)

Network Data Collection and Representation, Centrality Measures: Degree centrality, Betweenness centrality, Closeness centrality, Eigenvector centrality. Community Detection: Modularity-based methods, Hierarchical clustering algorithms, Girvan-Newman algorithm. Diffusion Processes in Networks: Information diffusion models, Contagion models (e.g., SIR, SIS), Influence maximization. Social Network Analysis Applications: Online social networks, Collaboration networks, Influence marketing and viral marketing, Epidemiology and disease spread, Organizational networks. Ethical and Privacy Considerations.