Computer Science & Engineering (Data Science)

COURSE DETAILS		
Class: II B. Tech	**Semester:** I	**Academic Year:** 2024-25
Course Title: Discrete Mathematics & Graph Theory	**Course Code:** 23A54301	
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Apply mathematical logic to solve problems.(BL1, BL3)
CO 2	Understand the concepts and perform the operations related to sets, relations and functions. Gain the conceptual background needed and identify structures of algebraic nature. (BL3, BL5)
CO 3	Apply basic counting techniques to solve combinatorial problems. (BL3)
CO 4	Formulate problems and solve recurrence relations. (BL2, BL3)
CO 5	Apply Graph Theory in solving computer science problems. (BL3, BL5)

COURSE DETAILS		
Class: II B. Tech	**Semester:** I	**Academic Year:** 2024-25
Course Title: Universal Human Values Understanding Harmony and Ethical human conduct		**Course Code:** 23A52301
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Define the terms like Natural Acceptance, Happiness and Prosperity. **(BL1, BL2)**
CO 2	Identify one's self, and one's surroundings (family, society nature). **(BL1, BL2)**
CO 3	Apply what they have learnt to their own self in different day-to-day settings in real life. **(BL3)**
CO 4	Relate human values with human relationship and human society. **(BL4)**
CO 5	Justify the need for universal human values and harmonious existence. **(BL5)**

COURSE DETAILS

Class: II B. Tech	**Semester:** I	**Academic Year:** 2024-25
Course Title: Introduction to Data Science	**Course Code:** 23A30401T	
Regulation: NECR BTECH 23	**Program Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of this course, the students should be able to:	
CO 1	Understand significance of Data Science. **(BL2)**
CO 2	Analyze large data. **(BL4)**
CO 3	Apply machine learning in Data Science. **(BL3)**
CO 4	Perform Data reduction and apply visualization techniques. **(BL3)**

COURSE DETAILS

Class: II B. Tech	**Semester:** I	**Academic Year:** 2024-25
Course Title: Advanced Data Structures & Algorithm Analysis		**Course Code:** 23A05302T
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Illustrate the working of the advanced tree data structures and their applications. **(BL2)**
CO 2	Understand the Graph data structure, traversals and apply them in various contexts**. (BL2)**
CO 3	Use various data structures in the design of algorithms. **(BL3)**
CO 4	Recommend appropriate data structures based on the problem being solved. **(BL5)**
CO 5	Analyze algorithms with respect to space and time complexities. **(BL4)** Design new algorithms. **(BL6)**

COURSE DETAILS		
Class: II B. Tech	**Semester:** I	**Academic Year:** 2024-25
Course Title: Object – Oriented Programming Through JAVA		**Course Code:** 23A05303T
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Analyze problems, design solutions using OOP principles, and implement them efficiently in Java. (BL4)
CO 2	Design and implement classes to model real-world entities, with a focus on attributes, behaviors, and relationships between objects (BL4)
CO 3	Demonstrate an understanding of inheritance hierarchies and polymorphic behaviour, including method overriding and dynamic method dispatch. (BL3)
CO 4	Apply Competence in handling exceptions and errors to write robust and fault-tolerant code. (BL3)
CO 5	Perform file input/output operations, including reading from and writing to files using Java I/O classes, graphical user interface (GUI) programming using Java FX. (BL3)
CO 6	Choose appropriate data structure of Java to solve a problem(BL6)

COURSE DETAILS		
Class: II B. Tech	**Semester:** I	**Academic Year:** 2024-25
Course Title: Advanced Data Structures and Algorithms Analysis Lab		**Course Code:** 23A05302P
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**1.5

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Design and develop programs to solve real world problems with the popular algorithm design methods. **(BL5)**
CO 2	Demonstrate an understanding of Non-Linear data structures by developing implementing the operations on AVL Trees, B-Trees, Heaps and Graphs**. (BL2)**
CO 3	Critically assess the design choices and implementation strategies of algorithms and data structures in complex applications. (BL5)
CO 4	Utilize appropriate data structures and algorithms to optimize solutions for specific computational problems. **(BL3)**
CO 5	Compare the performance of different of algorithm design strategies. **(BL4)** Design algorithms to new real world problems. **(BL6)**

COURSE DETAILS

Class: II B. Tech **Semester:** I **Academic Year:** 2024-25
Course Title: Object – Oriented Programming Through JAVA Lab **Course Code:** 23A05303P
Regulation: NECR BTECH 23 **Program/Dept.:** B.Tech/CSD **Credits:**1.5

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Demonstrate a solid understanding of Java syntax, including data types, control structures, methods, classes, objects, inheritance, polymorphism, and exception handling. **(BL2)**
CO 2	Apply fundamental OOP principles such as encapsulation, inheritance, polymorphism, and abstraction to solve programming problems effectively**.(BL3)**
CO 3	Familiar with commonly used Java libraries and APIs, including the Collections Framework, Java I/O, JDBC, and other utility classes. **(BL2)**
CO 4	Develop problem-solving skills and algorithmic thinking, applying OOP concepts to design efficient solutions to various programming challenges. **(BL3)**
CO 5	Proficiently construct graphical user interface (GUI) applications using JavaFX **(BL4)**
CO 6	Develop new programs for solving typical computer science problems**(BL6)**

COURSE DETAILS

Class: II B. Tech **Semester:** I **Academic Year:** 2024-25
Course Title: Python programming **Course Code:** 23A05304
Regulation: NECR BTECH 23 **Program/Dept.:** B.Tech/CSD **Credits:**2

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Classify data structures of Python(BL4)
CO 2	Apply Python programming concepts to solve a variety of computational problems (BL3)
CO 3	Understand the principles of object-oriented programming (OOP) in Python, including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs (BL3)
CO 4	Become proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas (BL2)
CO 5	Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries (BL3)
CO 6	Propose new solutions to computational problems(BL6)

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: Optimization techniques		**Course Code:** 23A52402e
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Understanding Optimization and Formulation of Linear Programing Models**(BL1)**
CO 2	Formulate and Solve Transportation & Assignment Models**(BL3)**
CO 3	Sequencing of operations and optimizing**(BL2)**
CO 4	Discuss the game theory and strategies**(BL2)**
CO 5	Developing networks of activities and finding optimal mode of projects**(BL3)** evaluation.

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: Probability & Statistics		**Course Code:** 23A54401
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Acquire knowledge in finding the analysis of categorically and various statistical elementary tools.**(BL2,BL3)**
CO 2	Develop skills in designing mathematical models involving probability, random variables and the critical thinking in the theory of probability and its applications in real life problems. **(BL3,BL5)**
CO 3	Apply the theoretical probability distributions like binomial, Poisson, and Normal in the relevant application areas. **(BL3)**
CO 4	Analyze to test various hypotheses included in theory and types of errors for large samples. **(BL2,BL3)**
CO 5	Apply the different testing tools like t-test, F-test, chi-square test to analyze the relevant real life problems. **(BL3,BL5)**

COURSE DETAILS

Class: II B. Tech **Semester:** II **Academic Year:** 2024-25
Course Title: STATISTICAL METHODS FOR DATA SCIENCE **Course Code:** 23A31401T
Regulation: NECR BTECH 23 **Program/Dept.:** B.Tech/CSD **Credits:**3

Course Outcomes: After successful completion of this course, the students should be able to:	
CO 1	Understand the basic concepts of Statistics. **(BL2, BL3)**
CO 2	Analyze the data and draw conclusion about collection of data under study using Point estimation. **(BL3, BL5)**
CO 3	Analyze data and draw conclusion about collection of data under study using Interval estimation. **(BL3)**
CO 4	Analyze to test various hypotheses included in theory and types of errors for large samples. **(BL2, BL3)**
CO 5	Apply the different testing tools like t-test, F-test, chi-square test to analyze the relevant real life problems. **(BL3, BL5)**

COURSE DETAILS

Class: II B. Tech **Semester:** II **Academic Year:** 2024-25
Course Title: Database Management Systems **Course Code:** 23A05402T
Regulation: NECR BTECH 23 **Program/Dept.:** B.Tech/CSD **Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Understand the basic concepts of database management systems**(BL2)**
CO 2	Analyze a given database application scenario to use ER model for conceptual design of the database **(BL4)**
CO 3	Utilize SQL proficiently to address diverse query challenges **(BL3).**
CO 4	Employ normalization methods to enhance database structure**(BL3)**
CO 5	Assess and implement transaction processing, concurrency control and database recovery protocols in databases. **(BL4)**

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: Digital Logic and Computer Organization		**Course Code:** 23A30402
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**3

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Differentiate between combinational and sequential circuits based on their characteristics and functionalities. **(BL2)**
CO 2	Demonstrate an understanding of computer functional units.**(BL2)**
CO 3	Analyze the design and operation of processors, including instruction execution, pipelining, and control unit mechanisms, to comprehend their role in computer systems.**(BL3)**
CO 4	Describe memory hierarchy concepts, including cache memory, virtual memory, and secondary storage, and evaluate their impact on system performance and scalability. **(BL3)**
CO 5	Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices, including interrupts, DMA, and I/O mapping techniques. **(BL3)**
CO 6	Design Sequential and Combinational Circuits**(BL6)**

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: DATA ENGINEERING LAB		**Course Code:** 23A32402P
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**1.5

Course Outcomes: After successful completion of this course, the students should be able to:	
CO 1	Analyze and troubleshoot data engineering problems using systematic approaches. (BL5)
CO 2	Work effectively in teams to solve data engineering challenges and deliver projects on time. (BL6)
CO 3	

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: Database Management Systems Lab		**Course Code:** 23A05402P
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**1.5

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Utilizing Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL) commands effectively within a database environment **(BL3)**
CO 2	Constructing and execute queries to manipulate and retrieve data from databases **(BL3)**
CO 3	Develop application programs using PL/SQL **(BL3)**
CO 4	Analyze requirements and design custom Procedures, Functions, Cursors, and Triggers, leveraging their capabilities to automate tasks and optimize database functionality **(BL4)**
CO 5	Establish database connectivity through JDBC(Java Database Connectivity) **(BL3)**

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: Data Engineering		**Course Code:** 23A32402T
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**2

Course Objectives: The main objective of the course is to make student • Explain basic concepts of Data Engineering • Discuss bout Data Engineering Life Cycle • How to design Good Data Architecture	
Course Outcomes: After successful completion of this course, the students should be able to:	
CO 1	Understand Data Engineering Life cycle. (BL1)
CO 2	Apply appropriate data modeling techniques for different types of data. (BL3)
CO 3	Evaluate and select appropriate technologies and frameworks for specific data engineering tasks. (BL5)
CO 4	Implement data quality checks and governance processes to ensure data reliability andcompliance. (BL5)

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: Design Thinking & Innovation		**Course Code:** 23A99401
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**2

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Define the concepts related to design thinking.**(BL1, BL2)**
CO 2	Explain the fundamentals of Design Thinking and innovation **(BL1, BL2)**
CO 3	Apply the design thinking techniques for solving problems in various sectors. **(BL3)**
CO 4	Analyse to work in a multi disciplinary environment **(BL4)**
CO 5	Evaluate the value of creativity **(BL5)**
CO 6	Formulate specific problem statements of real time issues **(BL3, BL6)**

COURSE DETAILS		
Class: II B. Tech	**Semester:** II	**Academic Year:** 2024-25
Course Title: Data Science Lab		**Course Code:** 23A30401P
Regulation: NECR BTECH 23	**Program/Dept.:** B.Tech/CSD	**Credits:**2

Course Outcomes: After successful completion of the course, student will be able to:	
CO 1	Apply principles and techniques for optimizing the performance of Python applications (BL3)
CO 2	Implement parallel computing applications using Python (BL5)
CO 3	Develop GP Uaccelerated Python applications (L6)