

IT DEPARTMENT

UIET

Vision

The department of Information Technology envisions creating groomed, technically competent and skilled intellectual IT professionals to meet the current challenges of the modern computing industry.

Mission

- a. To uplift students through advanced quality education in Information Technology.
- b. To provide technical solutions in the field of Information Technology to the local society.
- c. To provide need based quality training in the field of Information Technology.
- d. To maintain state-of-the-art facilities and laboratories where students and faculty can enhance their understanding of technology.
- e. To provide students with the tools to become productive, participating global citizens and life-long learners.
- f. To provide an atmosphere for students and faculty for continuous learning to investigate, apply and transfer knowledge.

Program Outcome

The Department of Information Technology (IT) is dedicated to promote learning the various subjects and technologies in the field of information technology. At present, the Department offers two courses i.e., B.Tech.- I.T. and Post Graduate Diploma in Data Science and Machine Learning.

Bachelor of Technology, (B.Tech.-IT) is a Bachelor's degree awarded for an undergraduate course or program in the Information technology field of duration four years (8 semesters). The aim of B.Tech. (IT) degree is to provide basic inputs in various aspects of IT and broad understanding of other interdisciplinary interfaces for providing the needs of effective business management by bridging the gaps between managerial practices and Information Technology.

The Post Graduate Diploma in Data Science and Machine Learning prepares data science professionals to distill vast stores of complex and unstructured data into actionable insights, improved decision making, and competitive advantage.

Program Outcomes (POs):

PO-1 Engineering Knowledge: Acquire strong fundamental knowledge of computer science and engineering along with mathematics.

PO-2 Programming languages and tools: Possess programming skills in different contemporary

programming languages and use different development tools.

PO-3 Problem analysis: Ability to identify, formulate & analyse requirements of a problem

PO-4 Handle complex problems: Develop skills to synthesize research-based knowledge in the design and analysis of data for providing solutions to complex problems.

PO-5 Teamwork: Flexibility to adapt to a team environment. To be able to work as a team leader

PO-6 Ethics: To understand contemporary legal, social & ethical issues in computing. PO-7

Presentation and Communication: To be able to present and communicate precisely and effectively.

PO-8 Life-long learning: To have passion for acquiring technical advancements in the field of computer science and engineering.

PO-9 Social responsibilities: To apply skills for social causes and work towards sustainable solutions.

Program Specific Outcomes (PSOs)

PSO-1: To be able to understand a problem, think of the best suitable approach to solve the problem, develop and evaluate effective solutions.

PSO-2: To be able excel in contemporary technologies being adopted by the industry and academia.

PSO-3: To be able to excel in various programming/project competitions and technological challenges laid by professional bodies.

COURSE OUTCOME

SEMESTER III	
Course Name and code: Object oriented programming(DIT-S201)	
Course Objective: I. The concepts of Object Oriented programming. II. The programs to implement event handling, user interfaces and graphical interfaces with the help of Java. III. The web applications to connect with the databases	
Course Outcome	
CO1	Explain fundamental features of object oriented language
CO2	Explain Java Runtime Environment, Java Language building Blocks and illustrate to run simple Java programs
CO3	Construct Java programs by making use of 3 principles of OOPS with run time

	error handling mechanisms
CO4	Make Use of multithreading concepts, and event handling mechanism to build Java programs
CO5	Develop event driven Graphical User Interface (GUI) programming using applets and swings

Course Name and code: Data Structures(DIT-S205)

Course objective:

- I. To provide students with skills needed to understand and analyze performance trade-offs of different algorithms / implementations and asymptotic analysis of their running time and memory usage.
- II. To provide knowledge of basic abstract data types (ADT) and associated algorithms: stacks, queues, lists, tree, graphs, hashing and sorting, selection and searching.
- III. The fundamentals of how to store, retrieve, and process data efficiently.
- IV. To provide practice by specifying and implementing these data structures and algorithms in Python.
- V. Understand essential for future programming and software engineering courses.

Course Outcome

CO1	Summarize the basic data structures concepts such as arrays, structures, unions, pointers, strings and dynamic memory allocation functions.
CO2	Make use of stacks to evaluate mathematical expressions and queues for mazing problem.
CO3	Choose linked lists to implement of lists, stacks, queues, polynomials and sparse matrix.
CO4	Construct various types of trees using linked lists and apply tree traversal methods for expressions evaluation
CO5	Utilize BFS, DFS, searching, sorting, hashing and files concepts to develop various applications.

SEMESTER III

Course Name and code: Probability and Statistics(MTH - S 504)	
Course Outcome	
CO1	Identify use of probability and characterize probability models using probability mass function and cumulative distribution function.
CO2	Utilize the techniques of developing discrete and continuous probability distributions and its applications.
CO3	Make use of random process in terms of its mean and correlation functions.
CO4	List the methods of hypothesis testing for goodness of fit.
CO5	Examine terminology and nomenclature appropriate queuing theory.

Semester :4	
Introduction to python Programming	
Objective:-	
I. Understanding Fundamentals of Python Programming	
II . Understand and implement Control Structures.	
III . Learn and implement Strings and Functions in Python.	
IV . Understand and implement advance functions like iteration and recursion.	
V . Implement Object Oriented Programming concepts in Python	
Course Outcome:	
CO1	Able to Understanding Fundamentals of Python Programming
CO2	Able to Understand and implement Control Structures.

CO3	Able to implement Strings and Functions in Python.
CO4	Able to implement advance functions like iteration and recursion.
CO5	Able to Implement Object Oriented Programming concepts in Python

SEMESTER V	
Course Name and code: Operating System (DIT-S309)	
Course Objective	
<ul style="list-style-type: none"> ● To study types of Operating System and Process Management. ● To learn Scheduling and Process Synchronization. ● To study Deadlock and Storage management. ● To study Virtual Memory and File Management. ● To learn Disc Management. 	
Course Outcome	
CO1	Explain the types of operating system and ability to create threads and perform interposes communication.
CO2	Understand CPU scheduling and able to solve process synchronization problems.
CO3	Understand issues surrounding deadlock handling and memory management.
CO4	Explain paging and segmentation methods suitable for virtual memory. Ability to manage files and directory.

CO5	Be able to recover and manage disk spaces. Knowledge of files systems and Android OS.
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SEMESTER V

Course Name and code: Theory of Computation (DIT-S303)

Course Objective
The aim of this course is, 1. Understand basic properties of formal languages and formal grammars. 2. Understand basic properties of deterministic and nondeterministic finite automata. 3. Understand the relation between types of languages and types of finite automata. 4. Understanding the Context free languages and grammars, and also Normalizing CFG. 5. Understanding the minimization of deterministic and nondeterministic finite automata. 6. Understand basic properties of Turing machines and computing with Turing machines. 7. Understand the concept of Pushdown automata and its application. 8. Know the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problems. 9. Understand the challenges for Theoretical Computer Science and its contribution to other sciences.

Course Outcome

CO1	Outline the concept of Finite Automata and Regular Expression
CO2	Illustrate the design of Context Free Grammar for any language set
CO3	Demonstrate the push down automaton model for the given language
CO4	Make use of Turing machine concept to solve the simple problems
CO5	Explain decidability or undecidability of various problems

SEMESTER V

Course Name and code: Database Management System (DIT-S 307)

COURSE OBJECTIVES:

- To learn the basic knowledge of Database Management System and various types of data models.
- To learn the concept and syntax of ER Diagram and the extended ER features.
- To learn various constraints and write SQL queries.
- To learn the basic structure of the Oracle system.
- To learn the concept of Normalization.
- To learn the concept of Lossless decomposition and dependency preservation.
- To learn the various issues in transaction processing.
- To learn the recovery system
- To learn the various techniques for concurrency control in Databases.

Course Outcome

CO1	Able to understand the basic concepts of DBMS and ER Model and How to draw ER Diagrams.
CO2	Ability to define constraints, writing queries using SQL syntax and Applying the Relational algebra and Calculus to define expressions for queries in Databases.
CO3	Able to understand the purpose of Normalization and defining various Normal forms.
CO4	Able to understand the basic issues while implementing the concept of Transaction and recovery.
CO5	Able to understand the various Concurrency Control techniques and concepts of Object Oriented databases.

SEMESTER V

Course Name and code: Design and Analysis of Algorithm (DIT-S 305)

COURSE OBJECTIVES:

- To study the concepts of complexity of algorithms and understand the analysis of algorithms based on input size.
- To learn advanced data structure and their fundamentals.
- To learn use of greedy and dynamic programming techniques and their application in the field of computer science to solve problems.
- To learn algorithms for graph theory problems like spanning tree problem, single source shortest path and advance features of graph application in the field of computer science.
- To learn string matching algorithms and, P, NP problem in computer science domain.

Course Outcome

CO1	Understand the algorithms and notation, including order notation, and how to analyze the complexity of the algorithms.
CO2	Understand the concept of B-tree, and Red black tree.
CO3	Compare, contrast, and apply the key algorithmic design paradigms: divide and conquer, greedy method, dynamic programming techniques.
CO4	Understand the concepts of Graph algorithms to solve problems using Greedy methods as well as dynamic programming techniques.
CO5	To understand the concepts of Randomized, and exact vs. approximate. Implement, empirically compare, and apply fundamental algorithms and string matching, P, NP and NP complete real-world problems.

SEMESTER V

Course Name and code: **Introduction to Compiler (DIT-S 311)**

Course Objective:-

The objective of the course is to provide an introduction to the system software like assemblers, compilers, and macros. It provides the complete description about inner working of a compiler. This course focuses mainly on the design of compilers and optimization techniques. It also includes the design of Compiler writing tools. This course also aims to convey the language specifications, use of regular expressions and context free grammars behind the design of compiler. Provide an understanding of the fundamental principles in compiler design and the skills needed for building compilers for various situations that one may encounter in a career in Computer Science. Learn the process of translating a modern high-level language to executable code required for compiler construction.

Course Outcome

CO1	Understand fundamentals of compiler and identify the relationships among different phases of the compiler.
CO2	Understand the application of finite state machines, recursive descent, production rules, parsing, and language semantics.
CO3	Analyze & implement required module, which may include front-end, back-end, and a small set of middle-end optimizations
CO4	Use modern tools and technologies for designing new compilers.

SEMESTER VI

Course Name and code: **Internet Technology (DIT-S 308)**

COURSE OBJECTIVES:

- To learn basic concepts of web and web projects.
- To learn and implement interactive web pages using HTML, CSS.
- To learn basic concepts of JavaScript and design responsive web pages using HTML, CSS.
- To learn the basics concepts and syntax of PHP.

Course Outcome

CO1	Able to understand the basic terminology of web and concepts of web projects.
CO2	Hands on practice on HTML and learn to implement HTML in web development.
CO3	Hands on practice on CSS and learn to implement CSS in web development.
CO4	Understand the concepts and use of JavaScript in web applications.
CO5	Understand the use of PHP as server side language.

SEMESTER VI**Course Name and code: Information System (DIT-S 402)****COURSE OBJECTIVES:**

- To learn the basic concepts Information System, and different types of Information Systems.
- To learn the basic concepts of Business Information Systems, Telecommunication, Database Management.
- To be able to understand the basics of Information Technology used for Information System, Security & Ethical Challenges.
- To learn Modern Approach of System Analysis and Design, and Systems Development Life Cycle,
- To learn Process Modeling, Conceptual Data Modeling.

Course Outcome	
CO1	Able to understand basic concepts Information System, and different types of Information Systems
CO2	Able to understand the Information System for Business Operations, Managerial Decision Support and Strategic Advantage.
CO3	Able to design and develop various, Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management.
CO4	Able to approach Modern System Analysis and Design, Improving is Development Productivity, Identifying and Selecting System Development.
CO5	Able to understand Process Modeling, Logic Modeling, Structured English, Decision Tables, Decision Trees, Organizational.

SEMESTER VI	
Course Name and code: Telecommunication system (DIT-S 525)	
COURSE OBJECTIVES:	
<ul style="list-style-type: none"> ● Students can understand the concept of telecommunication system paradigm, its functions and its new boundaries. ● Understanding the typical infrastructure for mobile networks through a popular GSM architecture. ● Understanding of the data delivery models and database issues in mobile environments. ● To understand the Mobile Ad-hoc Networks (MANETs) and Routing protocols. 	
Course Outcome	
CO1	Understand and think about developing the new telecommunication system based application.

CO2	Capable of discussing some new methodological dispute associated with this new paradigm and can conclude with some good facts.
CO3	Understand the database issues in mobile environments and data delivery models in mobile computing.
CO4	Clever to improve mobile ad-hoc network (MANET) applications and/or procedures/protocols.
CO5	Able to develop and describe various existing or new mobile environment related protocols.

SEMESTER VI	
Introduction to python Programming	
Objective:-	
I. Understanding Fundamentals of Python Programming	
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III . Learn and implement Strings and Functions in Python.	
IV . Understand and implement advance functions like iteration and recursion.	
V . Implement Object Oriented Programming concepts in Python	
Course Outcome:	
CO1	Able to Understanding Fundamentals of Python Programming
CO2	Able to Understand and implement Control Structures.

CO3	Able to implement Strings and Functions in Python.
CO4	Able to implement advance functions like iteration and recursion.
CO5	Able to Implement Object Oriented Programming concepts in Python

SEMESTER VII	
Course Name and code: Software Project Management (DIT-S 501)	
Course Outcome	
CO1	Understand the selection, prioritization and initiation of individual projects and strategic role of project management
CO2	Understand the work breakdown structure by integrating it with organization and uncertainty in projects
CO3	Students will be able to understand risk management planning using project quality tools
CO4	Understand the activities like purchasing, acquisitions, contracting, partnering and collaborations related to performing projects
CO5	Draw the network diagram to calculate the duration of the project and reduce it using crashing.

SEMESTER VIII

Distributed Systems DIT-S511

Objective:-

- To understand distributed system architecture and also the limitations in designing the distributed operating systems along with its proposed solution.
- To study distributed operating system concepts for Mutual exclusion and Deadlock handling algorithms and agreement protocols.
- To study basics of agreement problem along with its solution and understand the concepts of distributed file system.
- To know and implement the algorithms for distributed shared memory management and understand the concepts of load scheduling in distributed operating system.
- To study communication in distributed system along with communication protocols in a broader sense.

Course Outcome:

CO1	Students will attain knowledge with distributed system architecture, design and its implementation.
CO2	Learn mutual exclusion and Deadlock management in distributed system.
CO3	Learn use of agreement protocols in distributed system and distributed file system management.
CO4	Learn different resource management techniques like distributed shared memory and scheduling for distributed systems.
CO5	Learn routing algorithms and their applicability in distributed system.

SEMESTER VIII

Graph Theory MTH-S503

Objective:-

- This course introduces fundamental concepts in Graph Theory, including properties and characterisation of graph/trees and graph theoretic algorithms, which are widely used in

Mathematical modeling and has got applications across Computer Science and other branches in Engineering.	
Course Outcome:	
CO1	Explain vertices and their properties, types of paths, classification of graphs and trees & their properties. (Cognitive Knowledge Level: Understand)
CO2	Demonstrate the fundamental theorems on Eulerian and Hamiltonian graphs. (Cognitive Knowledge Level: Understand)
CO3	Illustrate the working of Prim's and Kruskal's algorithms for finding minimum cost spanning tree and Dijkstra's and Floyd-Warshall algorithms for finding shortest paths. (Cognitive Knowledge Level: Apply)
CO4	Explain planar graphs, their properties and an application for planar graphs. (Cognitive Knowledge Level: Apply)
CO5	Explain the Vertex Color problem in graphs and illustrate an example application for vertex coloring. (Cognitive Knowledge Level: Apply)

SEMESTER VIII

Artificial Neural Networks DIT-S523

Objective:-

- Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network
- Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning and Boltzmann learning
- Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception.
- Analyze the limitation of Single layer Perceptron and Develop MLP with 2 hidden layers, Develop Delta learning rule of the output layer and Multilayer feed forward neural network with continuous perceptions

Course Outcome:

CO1	Model Neuron and Neural Network, and to analyze ANN learning, and its applications
CO2	Perform Pattern Recognition, Linear classification
CO3	Develop different single layer/multiple layer Perception learning algorithms
CO4	Design of another class of layered networks using deep learning principles
CO5	Learn the concepts of principle component and SOM.

SEMESTER VI

DATA COMMUNICATION AND COMPUTER NETWORK

COURSE CODE: DIT-S-302

COURSE OBJECTIVES

To understand the concepts of communicating channel in order to deal with the different transmission media. To learn different about the different approaches of networking through switching modes and different multiplexing techniques. To learn the importance of IEEE standard to raise good results and modes to apply various protocols internally and externally in specified time domain. To deal with the problems arises due to channel allocation and ultimately to detect collisions so as to avoid them on priority basis To learn different models o transfer data through physical communicating medium with the help of routing algorithms. To analyze the features of different algorithms to find a short way to approach to the destination To understand significance of various layers in OSI as well as TCP/IP models to bring a data in segment form and to synchronize the interaction of source and destination using respective layers. To draw elementary knowledge regarding different known systems that provide various characteristics, when number of protocols are applied to secure the data

<u>Course Outcome</u>	
CO1	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
CO2	Analyze the services and features of various protocol layers in data networks. Student shall understand the principles and operations behind various application layer protocols like HTTP, SMTP, FTP
CO3	Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols
CO4	Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure
CO5	Have a working knowledge of datagram and internet socket programming. Identify the basic security threats of a network

SEMESTER IV

SOFTWARE ENGINEERING

COURSE CODE: DIT-S-206

COURSE-OBJECTIVE

To provide the concepts of software crisis, issues, characteristics, evolution and application with respect to software engineering. To give fundamental aspects of software development with respect to requirement engineering, requirement analysis, design, coding, testing and maintenance.

To elaborate the implementation of life cycle and models used in software development.

To give the practical knowledge of software designing along with object oriented design approach and its methodology.

To give knowledge of practical implementation of software coding style and software testing strategies for software development.

To provide the practical knowledge in software development in terms of maintenance of software after software implementation.

To give the knowledge of management of software project from initial stage to final stage for software development.

Course Outcome

CO1	Learn the concepts of software crisis, issues, characteristics, evolution and application with respect to software engineering
CO2	Know the fundamental aspects of software development with respect to requirement engineering, requirement analysis, design, coding, testing and maintenance.
CO3	Gain practical knowledge of software designing along with object oriented design approach and its methodology. Find the practical implementation of software coding style and software testing strategies for software development. Know the practical knowledge in software development in terms of maintenance of software after software implementation.
CO4	Enhance the knowledge of management of software project from initial stage to final stage for software development
CO5	Access the practical knowledge for ensuring the quality and reliability of software during software development using models.

SEMESTER III

DIGITAL ELECTRONICS

COURSE CODE: DIT-S-203

COURSE OBJECTIVE

The objective of this course is to provide the fundamental concepts associated with the digital logic and circuit design. To introduce the basic concepts and laws involved in the Boolean algebra and logic families and digital circuits. To familiarize with the different number systems, logic gates, and combinational and sequential circuits utilized in the different digital circuits and systems. The course will help in design and analysis of the digital circuit and system

Course Outcome

CO1	Understand the concepts of basic computer,number system
CO2	Analyze Combinational Logic circuits, Simplification of Algebraic Equations using Karnaugh Maps and Quine Mc Clusky Techniques
CO3	Construct Digital multiplexers, Adders and Subtractors, Binary Comparators, Latches and Master-Slave Flip-Flops
CO4	Analyze Synchronous and Asynchronous Sequential circuits

CO5	Understand registers and Counters, A/D and D/A converters.
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SEMESTER VII	
CRYPTOGRAPHY AND NETWORK SECURITY	
<u>COURSE CODE: DIT-S-512</u>	
COURSE OBJECTIVE	
<p>To provide introduction to the concept of Network Security Model and Cryptography systems. To give the knowledge of Digital Signature and other Security Measures available. To familiarize with the security of messages and measures to secure the messages. To showcase IP Security Architecture & Transport Layer Security to identify the vulnerability of the Internet systems and recognize the mechanisms of the attacks. Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks</p>	
<u>Course Outcome</u>	
CO1	Illustrate the concepts of Network Security and Compare Various Symmetric and Asymmetric Cryptographic methods used for Network Security
CO2	Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.

CO3	Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.
CO4	Summarize different Authentication Techniques & Describe programs like PGP & S/MIME
CO5	Determine appropriate mechanisms for protecting information systems ranging from operating systems to database management systems and to applications.