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| Number of the course plan(2024-2025) | Computer Science | Academic Department | Faculty of Scienceand InformationTechnology | Faculty |
| 25/09/2024 | Date of plan approval | 34+ Faculty Requirements | Number of Major requirement courses |

**Faculty Requirements:**

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| **Prerequisite-co-requisite** | **Title of the course** | **Credit hours** | **Course number**  |
| Remedial Computer Skills (Synchronous) | Fundamentals of Information Technology | 3 | 0130100 |
| Brief descriptionThis Course Provides student with a comprehensive understanding of key concepts in the field of IT. The course covers major topics such as hardware and software components, computer architecture, networks and communications, information security, data management, basic programming, and problem solving. It equips students with essential skills to use technology effectively, write simple code, solve technical problems, and manage information efficiently. |
| **Prerequisite-co-requisite** | **Title of the course** | **Credit hours** | **Course number**  |
| ------------------ | Technical English for IT Students | 3 | 0135101 |
| Brief descriptionThis course aims to enhance students' English language skills in the field of information technology, with a focus on the technical terminology used in the field. Students will learn how to read and understand technical texts, write scientific reports, and communicate effectively in technical environments. Topics include terminology related to programming, networking, artificial intelligence, information security, and operating systems. By the end of the course, students will be able to use English effectively in their studies and practical applications. |
| **Prerequisite-co-requisite** | **Title of the course** | **Credit hours** | **Course number**  |
| Fundamentals of Information Technology | Emerging Topics in Information Technology | 3 | 0133102 |
| Brief descriptionThis course explores the latest trends and developments in the field of information technology. It covers emerging technologies, innovative practices, and the impact of IT on various industries. Students will engage in discussions on topics such as artificial intelligence, big data, cloud computing, cybersecurity, and the Internet of Things (IoT). The course aims to provide students with an understanding of how these technologies influence business strategies and operations, as well as the ethical and social implications of technological advancements. Additionally, students will have the opportunity to research and present on current IT topics, fostering critical thinking and analysis skills. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| ---------- | Discrete Mathematics | 3 | 0130110 |
| Brief descriptionThis course is a branch of mathematics dealing with discrete elements that uses algebra and arithmetic. It is essential for understanding the foundational concepts of computer science. Key topics include logic, set theory, combinatorics, graph theory, and algorithms. The course helps students develop problem-solving skills, especially for applications in computer algorithms, data structures, and programming. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number |
| Fundamentals of Information Technology+Technical English for IT Students | Computer Programming | 3 | 0130130 |
| Brief descriptionThis course focus on designing and writing instructions for a computer to perform specific tasks. Also on teaching students how to use programming languages to write, test, and debug programs. Key topics include data types, control structures, loops, functions, and arrays. The course aims to equip students with the ability to develop effective programming solutions to practical problems. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computer Programming | Applied Programming | 3 | 0130231 |
| Brief descriptionThis course Focuses on the design and development of software applications for practical purposes. This course aims to teach students how to build fully integrated applications using various programming languages. Key topics include user interface design, database management, user interaction, and software testing. The course seeks to equip students with the skills needed to develop efficient software solutions that meet user needs and operate effectively in real-world environments. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Technical English for IT Students | Entrepreneurship and Project Planning | 3 | 0131390 |
| Brief descriptionThis course Aims to equip students with the knowledge and skills required to successfully establish and manage projects. The course covers topics such as business idea development, business plan creation, market analysis, and resource management. Students learn how to identify business opportunities, assess risks, and develop effective strategies for project execution. Additionally, the course helps them understand principles of leadership, innovation, and the financial aspects needed for project growth. |

**Computer Science Major Requirements:**

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| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Discrete Mathematics | Digital Logic Design | 3 | 0130111 |
| Brief descriptionThis module introduces the fundamental principles of digital electronics and logic circuits, forming the foundation of computer hardware design. Topics include number systems, Boolean algebra, combinational and sequential logic, and circuit simplification techniques. Students will learn to design and analyze digital circuits, including multiplexers, decoders, flip-flops, and counters, using simulation tools and practical applications. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Digital Logic Design | Computer Organization and Architecture | 3 | 0130212 |
| Brief descriptionThis course focuses on the fundamental principles of programming for data science and artificial intelligence applications. Students will learn how to use popular programming languages such as Python for data analysis and applying intelligent algorithms. Key topics include data processing, data exploration and cleaning, creating predictive models using machine learning techniques, and AI applications in areas like classification and clustering. By the end of the course, students will be able to develop efficient programs utilizing data science and AI to solve real-world problems. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Applied Programming | Data Structures | 3 | 0130221 |
| Brief descriptionThis course aims to teach students the fundamental concepts of data structures and how to use them efficiently in programming and problem-solving. The course covers basic data structures such as arrays, linked lists, stacks, queues, trees, graphs, and hash tables. Emphasis is placed on the design, implementation, and analysis of these structures in terms of time efficiency and memory usage. Topics include search, sort, and insertion algorithms, as well as performance optimization strategies. Students will learn how to select the appropriate data structures for various problems and apply them extensively in programming. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Applied Programming | Visual Programming | 3 | 0130232 |
| Brief descriptionThis module focuses on the principles and techniques of visual programming, emphasizing graphical user interface (GUI) design and development. Students will learn to create interactive, user-friendly applications using visual programming environments and tools, such as Visual Studio or other drag-and-drop platforms. The course covers event-driven programming, GUI components, data binding, and application logic integration. By the end, students will develop visually appealing, functional applications tailored to user needs. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computer Programming | Internet Applications Programming 1 | 3 | 0130233 |
| Brief descriptionThis module provides an introduction to web development and internet-based programming. Students will learn the fundamentals of creating dynamic and interactive web applications using core technologies such as HTML, CSS, and JavaScript. The course covers topics like responsive design, client-side scripting, and web standards. By the end of the module, students will have the skills to design and implement functional, aesthetically pleasing websites and foundational web applications. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Internet Applications Programming 1 | Internet Applications Programming 2 | 3 |  |
| Brief descriptionThis module builds on the concepts introduced in Internet Applications Programming 1, focusing on server-side programming and advanced web development techniques. Students will learn to develop dynamic, data-driven web applications using technologies such as PHP, Node.js, or Python with frameworks like Django or Flask. Topics include database integration, RESTful APIs, authentication, and web security practices. By the end of the module, students will be able to create full-stack web applications and deploy them to production environments. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Data Structures | Algorithms | 3 | 0130322 |
| Brief descriptionThe Algorithms course aims to introduce students to efficient problem-solving methods through the design and analysis of algorithms. The course covers topics such as sorting, searching, dynamic programming algorithms, and performance optimization techniques. It also focuses on evaluating algorithm efficiency in terms of time and space complexity. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computation Theory | Compiler Design and Programming Languages | 3 | 0130323 |
| Brief descriptionThis module explores the principles and techniques involved in designing and implementing compilers, alongside an in-depth study of programming language concepts. Students will learn about lexical analysis, syntax analysis, semantic analysis, code generation, and optimization. The course also examines the structure, features, and paradigms of various programming languages. Practical assignments may include developing components of a simple compiler or interpreter. By the end of the module, students will have a strong understanding of how high-level code is translated into executable machine instructions. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computer Organization and Architecture | Operating Systems | 3 | 0130313 |
| Brief descriptionThis module provides an in-depth understanding of the fundamental principles and concepts of operating systems. Topics include process management, memory management, file systems, scheduling algorithms, and input/output systems. Students will explore concepts like multitasking, synchronization, deadlock handling, and virtualization. The course also introduces system security and user privilege management. Through hands-on projects, students will analyze and interact with operating systems, gaining practical experience in system-level programming and understanding how operating systems function as a bridge between hardware and software. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Fundamentals of Information Technology | Software Engineering | 3 | 0130103 |
| Brief descriptionThis module introduces the methodologies, principles, and best practices used in the development of high-quality software systems. Topics include software development life cycles, requirement analysis, system design, implementation, testing, and maintenance. Students will learn about Agile and Waterfall methodologies, project management, and version control systems. The course emphasizes teamwork and collaboration through group projects simulating real-world software development scenarios. By the end of the module, students will understand how to deliver efficient, reliable, and maintainable software solutions that meet user and organizational needs. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computer Programming | Databases 1 | 3 | 0130204 |
| Brief descriptionThis module introduces the fundamental concepts of database systems and their role in managing and organizing data. Topics include relational database design, data modeling with Entity-Relationship (ER) diagrams, normalization, and Structured Query Language (SQL) for data manipulation and retrieval. Students will explore database management systems (DBMS) and their applications in real-world scenarios. By the end of the module, students will have the skills to design, implement, and query relational databases effectively using industry-standard tools. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Fundamentals of Information Technology | Computer Networks | 3 | 0130214 |
| Brief descriptionThis module provides an introduction to the principles, architecture, and protocols of computer networks. Topics include network models (OSI and TCP/IP), data transmission, routing, switching, and wireless communication. Students will explore concepts such as IP addressing, network security, and the functionality of key protocols like HTTP, FTP, and DNS. The course includes practical assignments in configuring and troubleshooting networks using tools and simulations. By the end of the module, students will understand how networks enable communication between devices and support the internet and other distributed systems. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Discrete Mathematics | Computation Theory | 3 | 0130220 |
| Brief descriptionThis module explores the fundamental concepts of theoretical computer science, focusing on the mathematical models of computation. Topics include finite automata, regular languages, context-free grammars, Turing machines, and the Church-Turing thesis. Students will also examine computational complexity, including P vs. NP problems, decidability, and reducibility. The course emphasizes the formal underpinnings of algorithms and their limitations, providing a foundation for understanding the scope and boundaries of what computers can compute. By the end of the module, students will have a solid grasp of computation theory and its applications in computer science. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Databases 1 | Systems Analysis and Design | 3 | 0130305 |
| Brief descriptionThis module focuses on the methodologies and techniques used in the analysis and design of information systems. Topics include requirements gathering, feasibility studies, system modeling with tools like Unified Modeling Language (UML), and designing effective solutions to meet organizational needs. Students will explore structured and object-oriented approaches, as well as agile methodologies. Practical assignments and case studies will allow students to apply theoretical concepts to real-world scenarios. By the end of the module, students will be equipped to analyze complex systems, identify user requirements, and design efficient, scalable, and maintainable solutions. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Applied Programming | Data Science and Artificial Intelligence Programming | 3 | 0130335 |
| Brief descriptionThis module introduces students to the foundational concepts and tools for programming in data science and artificial intelligence (AI). Topics include data manipulation, visualization, machine learning algorithms, and AI techniques such as neural networks and natural language processing. Students will work with programming languages like Python and libraries such as Pandas, NumPy, TensorFlow, or scikit-learn. Practical applications include predictive modeling, classification, and clustering. By the end of the module, students will have the skills to implement data-driven solutions and develop intelligent systems for real-world challenges. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computer Networks | Data and Information Security | 3 | 0130315 |
| Brief descriptionThis module focuses on the principles and practices of securing data and information in digital systems. Topics include encryption techniques, access control, authentication, network security, and threat analysis. Students will learn about common vulnerabilities, such as malware and phishing, and methods to safeguard against cyberattacks. The course also covers legal and ethical considerations in information security. Through hands-on exercises, students will gain practical experience in implementing security measures and using tools to detect and prevent security breaches. By the end of the module, students will understand how to protect sensitive data and maintain system integrity. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Databases 1 | Databases 2 | 3 | 0130306 |
| Brief descriptionThis module builds upon the foundational concepts introduced in Databases 1, focusing on advanced topics and applications of database systems. Topics include database optimization, indexing, transactions, concurrency control, and recovery mechanisms. The course also explores non-relational databases (NoSQL), distributed databases, and data warehousing. Students will gain hands-on experience in advanced SQL features, database security, and performance tuning. By the end of the module, students will be able to design and manage complex database systems and address real-world data management challenges. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Visual Programming | Mobile Application Programming | 3 | 0130436 |
| Brief descriptionThis module provides an introduction to the design and development of mobile applications. Students will learn to create apps for platforms such as Android or iOS using tools and frameworks like Android Studio, Swift, or Flutter. Topics include user interface design, event-driven programming, data persistence, API integration, and deployment to app stores. Emphasis is placed on creating responsive and user-friendly applications. By the end of the module, students will be equipped to design, develop, and deploy mobile applications that address real-world needs. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Operating Systems | Cloud Computing and Distributed Systems | 3 | 0130424 |
| Brief descriptionThis module explores the principles and technologies of cloud computing and distributed systems. Topics include distributed architectures, virtualization, cloud service models (IaaS, PaaS, SaaS), and scalability. Students will learn about distributed algorithms, data consistency, fault tolerance, and security in distributed environments. The course also covers cloud platforms such as AWS, Microsoft Azure, or Google Cloud, and their practical applications. Through hands-on projects, students will deploy and manage cloud-based solutions, gaining an understanding of how distributed systems support modern computing and big data processing. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Visual Programming | Game Programming | 3 | 0130437 |
| Brief descriptionThis module introduces students to the fundamentals of game development, focusing on the principles of game design and programming. Topics include game physics, graphics rendering, animation, artificial intelligence for games, and user interaction. Students will work with game engines like Unity or Unreal Engine, as well as programming languages such as C# or C++. The module emphasizes creativity, problem-solving, and optimization techniques for performance. By the end of the module, students will have the skills to design, develop, and test interactive 2D and 3D games. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Completion of 90 Hours | Field Training | 3 | 0130491 |
| Brief descriptionThe Field Training course in Computer Science aims to provide students with practical experience by working on real-world projects related to any System applications. The training involves applying the skills and knowledge gained during their studies, such as developing mobile applications, databases, and designing systems. Students are encouraged to interact with professionals in the field, helping them understand industry challenges and innovations. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Department Approval | Graduation Project 1 | 2 | 0135492 |
| Brief descriptionThis module is the first phase of a two-part capstone project where students apply their knowledge and skills to a real-world problem. Students will work individually or in teams to identify a project topic, define objectives, conduct research, and develop a detailed project proposal. Emphasis is placed on problem analysis, requirement gathering, and system design. Regular progress meetings with faculty supervisors ensure alignment with academic and professional standards. By the end of this module, students will have a comprehensive project plan and initial implementation strategies, setting the foundation for successful project development in Graduation Project 2. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Graduation Project 1 | Graduation Project 2 | 2 | 0135493 |
| Brief descriptionThis module is the second phase of the capstone project, where students focus on implementing, testing, and delivering their proposed solution from **Graduation Project 1**. Students will develop a functional system, application, or research prototype while adhering to industry standards and best practices. Emphasis is placed on rigorous testing, evaluation, and documentation of the project. Regular progress reviews with supervisors ensure quality and address challenges. By the end of this module, students will present and demonstrate their completed project, along with a comprehensive report detailing their work, findings, and outcomes. This serves as the culmination of their undergraduate studies. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Department Approval (90)+Entrepreneurship and Project Planning | Professional Practice Camp | 3 | 0135494 |
| Brief descriptionThe Professional Practices Camp in Artificial Intelligence course aims to provide students with an intensive practical experience in real work environments related to artificial intelligence. The camp involves applying the knowledge and skills acquired through participation in actual projects and interacting with professionals in the field. The camp focuses on developing technical and practical skills, such as developing machine learning algorithms, data analysis, and designing intelligent systems. Students are also encouraged to build a professional network that enhances their career opportunities in the future. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computerized Mathematical Applications | Operations Research | 3 | 0130316 |
| Brief descriptionThis module introduces the fundamental concepts and techniques of operations research for solving optimization problems in decision-making. Topics include linear programming, network flows, queuing theory, inventory models, and simulation. Students will learn to formulate real-world problems mathematically and solve them. Applications in logistics, resource allocation, and project management are explored. By the end of the module, students will have the skills to apply quantitative methods to optimize systems and processes in various industries. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Internet Applications 1 | Human-Computer Interaction | 3 | 0130307 |
| Brief descriptionThis module explores the principles and practices of designing effective and user-friendly interfaces between humans and computers. Topics include usability, user experience (UX), interaction design, cognitive psychology, and accessibility. Students will learn to apply user-centered design techniques, conduct usability testing, and analyze user behavior to improve system interfaces. Tools and methods for prototyping and evaluation, such as wireframing and A/B testing, are also introduced. By the end of the module, students will be able to design and evaluate interactive systems that meet the needs and expectations of diverse users. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Visual Programming | Image and Digital Media Processing | 3 | 0130338 |
| Brief descriptionThis module provides an introduction to the principles and techniques of processing and analyzing digital images and multimedia content. Topics include image representation, enhancement, filtering, compression, and feature extraction. Students will explore applications such as image recognition, video processing, and multimedia editing using tools and libraries like OpenCV or MATLAB. The course also covers the basics of audio and video processing, focusing on creating and manipulating digital media. By the end of the module, students will have practical skills in implementing algorithms for digital media processing and understanding their real-world applications. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Recent Topics in Information Technology | Intelligent Systems | 3 | 0130308 |
| Brief descriptionThis module introduces the principles and techniques underlying intelligent systems, focusing on the design and implementation of systems that simulate human decision-making and problem-solving. Topics include knowledge representation, reasoning, search algorithms, expert systems, fuzzy logic, and neural networks. By the end of the module, students will understand the foundations of intelligent systems and their role in advancing modern technology. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Computer Networks | Data Communication and Security | 3 | 0130317 |
| Brief descriptionThis module focuses on the principles of data communication and the methods used to secure transmitted information. Topics include data transmission techniques, network protocols, encryption, authentication, and integrity mechanisms. Students will explore concepts like cryptography, secure socket layers (SSL/TLS), firewalls, and virtual private networks (VPNs). The module emphasizes protecting data from unauthorized access and ensuring its confidentiality and availability during transmission. By the end of the module, students will have a strong understanding of how to safeguard data in communication systems. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Operating Systems | Embedded Systems | 3 | 0130418 |
| Brief descriptionThis module provides an introduction to the design and implementation of embedded systems, which integrate hardware and software to perform dedicated functions. Topics include microcontrollers, real-time operating systems (RTOS), interfacing sensors and actuators, and energy-efficient design.  |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Databases 2 | Management of Administrative and Business Systems | 3 | 0130409 |
| Brief descriptionThis module explores the role of information systems in managing administrative and business operations. Topics include enterprise resource planning (ERP), customer relationship management (CRM), decision support systems (DSS), and business process automation. Students will examine how technology enhances efficiency, supports decision-making, and drives organizational success. The course also covers systems implementation, data integration, and change management in business contexts. Through case studies and practical exercises, students will gain insights into designing, deploying, and managing business systems that align with organizational goals. By the end of the module, students will understand how technology optimizes administrative and business functions. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Visual Programming | Special Programming Language | 3 | 0130439 |
| Brief descriptionThis module focuses on introducing and mastering a programming language not commonly covered in foundational courses, chosen for its relevance to emerging technologies or specialized domains. Students will explore the language's syntax, core features, and best practices, applying it to real-world problems. The module emphasizes practical programming skills, including debugging, optimization, and leveraging the language’s unique capabilities. By the end of the module, students will be proficient in the selected language and understand its applications in industry-specific contexts. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Department Approval | Advanced Topics in Computer Science | 3 | 0130495 |
| Brief descriptionThis module explores cutting-edge developments and specialized topics in computer science, offering students exposure to emerging trends and advanced concepts. The content may vary based on current industry and research advancements. Students will engage in critical analysis of new technologies, case studies, and practical applications. The module encourages independent research and project-based learning, allowing students to deepen their understanding of complex topics. By the end, students will be equipped with knowledge of the latest innovations in computer science and their potential impact on the field. |

**Supporting Requirements:**

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| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Remedial Computer Skills (Synchronous) | Foundations of Mathematics | 3 | 0101112 |
| Brief descriptionThis Course explores the basic concepts and principles underlying mathematics and plays a vital role in information technology disciplines. Key topics include logic, set theory, relations, functions, and mathematical proofs. These foundations contribute to the development of critical and analytical thinking skills, enhancing students' ability to design algorithms, organize and analyze data. They also help students understand how to connect different systems and apply encryption principles to protect information. Thus, foundations of mathematics are a cornerstone for understanding the concepts and techniques of information technology, aiding students in excelling in areas such as programming, data analysis, and cybersecurity. |
| Prerequisite-co-requisite | **Title of the course** | Credit hours | Course number  |
| Foundations of Mathematics  | Computerized Mathematical Applications | 3 | 0101274 |
| Brief descriptionThis course focuses on the use of computer technology to solve mathematical problems and model real-world situations. The course covers various software tools and programming languages used in mathematical computation, including spreadsheets, mathematical software (such as MATLAB or Mathematica), and programming languages like Python and R, Students learn to apply mathematical theories using computational tools, enhancing their problem-solving skills and preparing them for practical applications in fields such as engineering, finance, and data science. |

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