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| **MSC IT** |
|  | M. Sc. I Sem | **Fundamentals of Information Technology** | CO 1 | Recall and list the different generations of computers, as well as the various types of computers (Micro, Mini, Mainframe, Supercomputers), and describe their basic characteristics.. |
|  |  |  | CO2 | Explain the architecture of a computer system, including the block diagram, instruction sets, registers, processor speeds, and memory types (RAM, ROM, Cache, etc.). |
|  |  |  | CO3 | Demonstrate the use of various I/O devices (e.g., Keyboard, Mouse, Scanner, Printers) in practical scenarios, identifying the appropriate device for specific tasks. |
|  |  |  | CO4 | Compare and contrast different types of computer software, including system software, application software, and utility programs, and explain their need in the functioning of a computer system. |
|  |  |  | CO5 | Analyze the role of programming languages in software development, including the use of Assemblers, Compilers, and Interpreters, and apply this knowledge to understand how a computer executes code. |
|  | M. Sc. I Sem | **Programming with C** | CO 1 | Understand and Apply Basic Programming Concepts. |
|  |  |  | CO2 | Design and Develop Algorithms, for solving computational problems |
|  |  |  | CO3 | Implement Control Structures and Functions, and functions to develop efficient and functional C programs.. |
|  |  |  | CO4 | Work with Arrays, Pointers, Structures, and Unions in C, and understand their memory representations and practical applications. |
|  |  |  | CO5 | Handle Files and Debug Programs, to perform file operations and debug C programs to identify and resolve issues related to program logic and execution. |
|  | M. Sc. I Sem | **Data Communication and Computer Networks** | CO 1 | Define key concepts related to data communication, including the OSI reference model, TCP/IP model, and various network components. This outcome focuses on recalling fundamental terminologies and definitions. |
|  |  |  | CO2 | Explain the functions of each layer in the OSI and TCP/IP models, demonstrating an understanding of how these layers interact and their roles in data communication. |
|  |  |  | CO3 | Apply knowledge of routing algorithms to analyze different routing techniques such as shortest path routing and distance vector routing, illustrating their use in real-world networking scenarios. |
|  |  |  | CO4 | Compare and contrast various network technologies, including Ethernet, Frame Relay, and Wireless LAN, evaluating their benefits and limitations in different organizational contexts. |
|  |  |  | CO5 | Demonstrate the ability to design a simple data link layer protocol, incorporating flow control and error control techniques, and analyze its performance in a simulated environment. |
|  | M. Sc. I Sem | **Operating Systems** | CO 1 | Identify and define key concepts related to operating systems, including application programs, system programs, and the functions of an operating system. |
|  |  |  | CO2 | Describe the architecture of operating systems, including subsystems (top layer, middle layer, bottom layer) and the bootstrap process. |
|  |  |  | CO3 | Explain the differences between processes and threads, including their contexts, states, and management techniques. |
|  |  |  | CO4 | Apply CPU scheduling algorithms to manage processes effectively in various scenarios. |
|  |  |  | CO5 | Utilize inter-process communication mechanisms to facilitate communication between processes. |
|  | M. Sc. I Sem | **Database Management System** | CO 1 | Ability to design and implement database schema for an application using RDBMS concepts. |
|  |  |  | CO2 | Ability to write SQL queries for tasks of various complexities. |
|  |  |  | CO3 | Ability to write an application program that uses a database system as the backend. |
|  |  |  | CO4 | Understanding of internal working of a DBMS including data storage, indexing, query processing, transaction processing, concurrency control and recovery mechanisms. |
|  |  |  | CO5 | Awareness of non-relational and parallel/distributed data management systems with a focus on scalability. |
|  | M. Sc. I Sem | **Web Site Development** | CO 1 | Demonstrate the ability to create a basic web page using HTML, including the correct use of elements, tags, and attributes to structure content effectively. |
|  |  |  | CO2 | Apply CSS techniques to style web pages by utilizing various CSS properties and selectors, ensuring a visually appealing and user-friendly design. |
|  |  |  | CO3 | Utilize JavaScript to enhance web forms by implementing validation techniques, managing user input, and creating dynamic interactions within the web page. |
|  |  |  | CO4 | Implement client-server technology concepts by setting up a simple web server and configuring it to host a website. |
|  |  |  | CO5 | Analyze and apply different internet protocols in practical scenarios to facilitate data transfer and communication over the internet. |
|  | M. Sc. II Sem | **Computer Graphics and Multimedia Technology** | CO 1 | Define key concepts related to raster scan displays, storage tube displays, and color monitors. |
|  |  |  | CO2 | Explain the process of refreshing and flickering in displays and how these affect visual output. |
|  |  |  | CO3 | Demonstrate the use of the Cohen-Sutherland line clipping algorithm in practical scenarios involving 2D graphics. |
|  |  |  | CO4 | Summarize the fundamental problems in geometry as they relate to interactive graphics programming. |
|  |  |  | CO5 | Apply transformations such as translation, rotation, and scaling to 2D and 3D objects in a graphics programming environment.  |
|  | M. Sc. II Sem | **Data Structures and Algorithms** | CO 1 | Demonstrate Understanding of Data Structures((arrays, stacks, queues, linked lists, trees, graphs)) and Their Implementations |
|  |  |  | CO2 | Analyze the time and space complexity of algorithms using Big O notation, and compare the efficiency of different algorithms for solving the same problem. |
|  |  |  | CO3 | Implement Advanced Data Structures and Operations ((arrays, stacks, queues, linked lists, trees, graphs)) and Their Implementations |
|  |  |  | CO4 | Solve Problems Using Appropriate Data Structures and Algorithms for a given problem based on its requirements (e.g., time complexity, space efficiency). |
|  |  |  | CO5 | Apply Sorting and Searching Algorithms to Real-World Problems . |
|  | M. Sc. II Sem | **System Analysis and Design** | CO 1 |  Define key concepts in system analysis and design |
|  |  |  | CO2 | Explain the importance of stakeholder analysis in the system design process. |
|  |  |  | CO3 | Summarize the various methodologies used in system development |
|  |  |  | CO4 | Demonstrate how to create a basic requirements specification document for a given system scenario. |
|  |  |  | CO5 | Apply modeling techniques such as UML diagrams to represent system components and interactions. |
|  | M. Sc. II Sem | **Object-Oriented Technology Using C++** | CO 1 | Demonstrate Knowledge of Object-Oriented Programming Principles explain and identify the core concepts of Object-Oriented Programming, including classes, objects, inheritance, polymorphism, encapsulation, and abstraction, and their significance in software development. |
|  |  |  | CO2 | Implement Basic C++ Programs with Proper Syntax and Structure. |
|  |  |  | CO3 | Utilize Functions and Arrays to Solve Problems in C++ to design and implement functions, pass parameters, return values, and use arrays (single and multidimensional) for effective data handling and problem-solving in C++. |
|  |  |  | CO4 | Create and Manipulate Classes and Objects in C++ to define classes and objects in C++, implement constructors and destructors, overload functions and operators, and demonstrate how objects interact within a program as both data types and physical entities. |
|  |  |  | CO5 | Apply Inheritance and Polymorphism to Create Reusable and Flexible C++ Programs |
|  | M. Sc. II Sem | **Software Engineering** | CO 1 | Define and explain the fundamental concepts of software life-cycle models. |
|  |  |  | CO2 | Demonstrate comprehension of how requirements are gathered, documented, and validated. |
|  |  |  | CO3 | Implement testing strategies and reviews to ensure that software products meet specified requirements. |
|  |  |  | CO4 | Evaluate potential risks during the software development process and develop plans to manage these risks effectively. |
|  |  |  | CO5 | Assess the effectiveness of various estimation methods in predicting project timelines and resource allocation, providing critical insights into their advantages and limitations. |
|  | M. Sc. II Sem | **Application Development Using ASP.NET** | CO 1 | Define key concepts related to ASP.NET |
|  |  |  | CO2 | Identify the different types of web applications that can be developed using ASP.NET. |
|  |  |  | CO3 | Explain the role of the Model-View-Controller (MVC) pattern in ASP.NET applications  |
|  |  |  | CO4 | Summarize the steps involved in setting up an ASP.NET development environment |
|  |  |  | CO5 | Demonstrate the ability to create a simple web application using ASP.NET |
|  | M. Sc. III Sem | **Principles of Management** | CO 1 | Define key management concepts  |
|  |  |  | CO2 | Explain the importance of organizational structure and its impact on management effectiveness. |
|  |  |  | CO3 | Demonstrate the application of motivational theories by creating a plan to enhance employee engagement in a hypothetical organization. |
|  |  |  | CO4 |  Identify major historical figures in management theory and summarize their contributions. |
|  |  |  | CO5 | Apply decision-making models to real-world scenarios by analyzing case studies |
|  | M. Sc. III Sem | **Programming in Java** | CO 1 | Apply the fundamental principles of Object-Oriented Programming to design and implement Java classes and objects that model real-world scenarios. |
|  |  |  | CO2 | Demonstrate the ability to declare and use various Java data types, variables, and operators, along with control to create dynamic and functional Java applications. |
|  |  |  | CO3 | Design classes with appropriate methods and constructors in Java. |
|  |  |  | CO4 | Implement exception handling mechanisms to manage errors gracefully in Java applications, ensuring robust program execution. |
|  |  |  | CO5 | Create multithreaded programs in Java effectively. |
|  | M. Sc. III Sem | **Data Warehousing & Data Mining** | CO 1 | Define key terms related to data mining, including its functionalities and core concepts. |
|  |  |  | CO2 | Identify various forms of data preprocessing, such as data cleaning, integration, and transformation. |
|  |  |  | CO3 | Explain the Importance of Data Cleaning and significance of data cleaning processes. |
|  |  |  | CO4 | Summarize the concepts of classification and prediction in data mining. |
|  |  |  | CO5 | Apply different clustering methods to a given dataset to demonstrate their understanding of cluster analysis. |
|  | M. Sc. III Sem | **E-Commerce Technologies** | CO 1 | Define and articulate essential terms and concepts related to e-commerce and enable themself to engage effectively in discussions about e-commerce. |
|  |  |  | CO2 | Explain the benefits of e-commerce for both businesses and consumers. |
|  |  |  | CO3 | Discuss how the Internet and web technologies support various e-commerce activities and explore the role of technologies. |
|  |  |  | CO4 | Analyze different e-business models and evaluate their applications in real-world scenarios.  |
|  |  |  | CO5 | Apply their knowledge by designing and developing a basic e-commerce website, demonstrating proficiency in essential skills. |
|  | M. Sc. III Sem | **Wireless Technology** | CO 1 | Identify and list the key components of wireless communication systems |
|  |  |  | CO2 |  Define essential terminology related to wireless technology, |
|  |  |  | CO3 |  Explain the basic principles of wireless communication |
|  |  |  | CO4 | Summarize the major standards and protocols used in wireless technology |
|  |  |  | CO5 | Demonstrate the setup of a basic wireless network |
|  | M. Sc. III Sem | **Information Security & Cryptography** | CO 1 | Explain and apply the fundamental concepts of cryptography and differentiate between symmetric and asymmetric encryption methods. |
|  |  |  | CO2 | Analyze classical encryption techniques and their cryptanalysis methods, including differential and linear cryptanalysis. |
|  |  |  | CO3 | Implement Key Management and Authentication Protocols. |
|  |  |  | CO4 | Evaluate various security protocols used in network security. |
|  |  |  | CO5 | Apply concepts from number theory to analyze public key cryptosystems. |