

MCA 2020-21

I Semester

Course no.	Course Name	Expected Learning Outcomes
CSA-CC-1201	Programming Using C	students will be able to: • Construct flowchart and write algorithms for solving basic problems. • Write 'C' programs that incorporate the use of variables, operators, and expressions along with data types. • Write simple programs using basic elements like control statements, functions, arrays, and strings. • Write advanced programs using the concepts of pointers, structures, unions, and enumerated data types. • Apply pre-processor directives and basic file handling and graphics operations in advanced programming.
CSA-CC-1202	Computer Organization and Architecture	students will be able to: • understand the roles, functions, and duties of components of the internal architecture of the central processing unit. • Describe the memory organization
CSA-CC-1203	Data Structure	At the end of the course students will be able to: • Explain the concept of data structure, abstract data types, algorithms, and basic data organization schemes such as arrays and linked lists. • Describe the applications of stacks and queues and implement various operations on them using arrays and linked lists. • Describe the properties of graphs and trees and implement various operations such as searching and traversal on them. • Compare incremental and divide-and-conquer approaches of designing algorithms for problems such as sorting and searching.
CSA-CC-1204	Discrete Mathematics	At the end of the course students will be able to: • use mathematical and logical notation to define and formally reason about basic discrete structures such as Sets, Relations, and Functions • Apply mathematical arguments using logical connectives and quantifiers to check the validity of an argument through truth tables and propositional and predicate logic • Formulate and solve recurrences and recursive functions • Apply the concept of combinatorics to solve basic problems in discrete mathematics Explain the concept of data structure, abstract data types, algorithms, and basic data organization

		• Formulate & use tree and graph algorithms to solve problems • Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
CSA-CC-1205	Operating System	students will be able to: 1. handle challenges of the resource handling of a computer using an operating system. 2. To apply the basic command of UNIX
CSA-CC-1206	C Programming Lab	After completing this course students will be capable enough to implement programming concepts in the C language.
CSA-CC-1207	Data Structure Lab	After completing this course students will be capable enough to implement various concepts of data structure.

II Semester

Course no.	Course Name	Expected Learning Outcomes
CSA-CC-2201	Java Programming	students will be able to: • Solve real-world problem java programming • Design practical GUI-based applications associated with the database.
CSA-CC-2202	Database Management Systems	students will be able to: • familiar with the database theory use basics of SQL and construct queries using SQL. • analyze the difference between the traditional file system and DBMS • work with different database languages • write relational algebra expressions for queries.
CSA-CC-2203	Design and Analysis of Algorithm	Course students will be able to: • Study different types of asymptotic notations that are used to analyze the running time of different algorithms and solve recurrences. • Analyze and derive the running time for different searching and sorting algorithms, study AVL trees and their construction, Red-Black trees, Overview of Divide and Conquer paradigm with examples. • Solve a variety of problems using different algorithm design paradigms like Dynamic Programming, Greedy Method, construction of Minimum Spanning Tree, a study of Shortest Path problem, and Maximum Network Flow problem. • Study of different String Matching algorithms, Backtracking method, example problems, and their backtracking solution using State Space Search Tree method. • Study of Branch and Bound technique, example problems and their solution using State Space Search Tree method, a study of P, NP and NP-Complete problems, Approximation algorithms and example problems.

CSA-CC-2204	Theory of Computation	After completion Students can: 1. demonstrates models, Turing machine, regular expression, push down automaton. 2. model, compare, and analyze different computational models. 3. apply and prove properties of languages, grammar and automata. 4. apply knowledge of computing and mathematics to solve problems
CSA-CC-2205	Data Communication & Computer Networks	Course students will be able to: • Understand the modulation used in the data communication system • Know the classification of computer networks. • Aware of new technologies and protocols used for data communication
CSA-CC-2206	Java Programming Lab	After completing this course students will be capable enough to relate and implement the real situation with various concepts of OOPs and Java.
CSA-CC-2207	DBMS Lab	After completing this course students will be capable enough to manage the database.
CSA-OE-2201	Computer Education-I	After completing this course, students will be aware of the structure, functioning, and working procedure of a computer system.

III Semester

Course no.	Course Name	Expected Learning Outcomes
CSA-CC-3201	Software Engineering	students will be able to: • demonstrate an understanding of software engineering layered technology and software process models that provide a basis for the software development lifecycle. • apply agile development methods for developing software. • describe software/system requirements and understand the processes involved in the discovery and documentation of these requirements. • practice system modeling techniques and object-oriented design for software development. • test software using verification and validation, static analysis, reviews, inspections, and audits. • appreciate software project management that includes project planning, project estimation techniques, risk management, quality management, and configuration management. • work as an individual and/or in a team to develop and deliver quality software.
CSA-CC-3202	Programming with Python	students will be able to: • Construct and execute basic programs in Python. • Select the appropriate data structure of Python for solving a problem. • Use external libraries and packages with Python • Apply the features of Python language in various real applications. • Design object-oriented programs using Python for solving real-world problems.

CSA-CC-3203	AI & Machine Learning	students will be able to • Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents • Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game-based techniques to solve them. • Attain the capability to represent various real-life problem domains using logic-based techniques and use this to perform inference or planning. • understand basics of Machine learning including Supervised Learning, Unsupervised Learning, Ensemble Learning, Reinforcement Learning concepts, and use them in real-life problems.
CSA-CC-3204	WEB Application Design using PHP	students will be able to: • develop web applications using PHP
CSA-EC-3201	Cryptography and Network Security	students will be able to: • Explain Basic Principles, different security threats, countermeasures, foundation course of cryptography mathematics, and Symmetric Encryption. • Classify the basic principles of Asymmetric key algorithms and operations of asymmetric key cryptography. • Design Cryptographic Hash Functions as SHA-3 and Digital Signatures as Elgamal • Explain the concept of Key Management and Distribution and User Authentication • Determine the knowledge of Network and Internet Security Protocols such as S/MIME

CSA-EC-3202	Scientific Computing	students will be able to: • understand numerical problems, • can solve real-world problems using scientific computing.
CSA-EC-3203	Computer Graphics	students will be able to: • Demonstrate graphics drawings concerning graphics primitives. • Explain the mathematical concepts of different graphics algorithms. • Apply 2D & 3D transformation concepts to represent images with different dimensions and shapes. • Analyze and evaluate the concepts of projections and shading methods to obtain realistic images. • Develop scenes with different clipping methods and transform them into the graphics display device.
CSA-EC-3204	Ad-Hoc and Sensor Networks	students will be able to: • Evaluate the principles and characteristics of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure-based networks • Determine the principles and characteristics of wireless sensor networks • Discuss the challenges in designing MAC, routing, and transport protocols for wireless ad-hoc sensor networks • Illustrate the various sensor network Platforms, tools, and applications • Demonstrate the issues and challenges in security provisioning and also familiar with the mechanisms for implementing security and trust mechanisms in MANETs and WSNs
CSA-EC-3205	Simulation and Modeling	students will be able to: • Understand the technique of simulation and different types of system models. • Understand the probability concepts in simulation and study different random number generator techniques along with standard

		tests for random numbers. • Study discrete system simulation like the simulation of a telephone system. • Study computer models of queueing, inventory and scheduling systems, Variance Reduction techniques, and analysis of simulation output. Study GPSS language and various GPSS programs. sedimentation
CSA-CC-3205	Python Programming Lab	After completing this course students will be capable enough to write programs in Python language.
CSA-CC-3206	Web Application Lab	After completing this course students will be capable enough to develop web-based applications.
CSA-SE-3201	Industrial Tour, Seminar Participation, Minor Project, training	After completion of this course, the student will improve the skill of communication and presentation through discussion, training.
CSA-OE-3201	Computer Education – II	After completion of this course, students will be able to know the basic part of computer networking, operating system, Database management, and cybercrime.

Semester IV

Course no.	Course Name	Expected Learning Outcomes
CSA-EC-4201	Data Mining and Knowledge Discovery	students will be able to: • Apply data mining techniques in real life. Implement various data mining techniques
CSA-EC-4202	Cloud Computing	students will be able to: • Compare the strengths and limitations of cloud computing. • Examine the economics, financial, and technological implications for selecting cloud computing for own organization • Identify the architecture, infrastructure, and delivery models of cloud computing. • Understand the role of SOA Technologies and the Workflow framework. • Apply a suitable virtualization concept. • Choose the appropriate Cloud application, Programming Model, and approach based on security and threats.
CSA-EC-4203	Multimedia and Animation	students will be able to: • Explain the technical aspects of multimedia systems and animation. • Apply various file formats of audio, video, and text media in different applications. • Analyze the QoS parameters of multimedia applications through internet. • Evaluate different types of multimedia compression methods. • Design interactive multimedia software applications using animations. • Develop real-time multimedia and animation applications using different multimedia components.
CSA-EC-4204	Cyber Security	students will be able to: • understand cyber-attacks, types of cybercrimes, cyber laws, and also how to protect themselves and

		ultimately the entire Internet community from such attacks.
CSA-EC-4205	R Programming	students will be able to: • construct and execute basic programs in R using elementary programming techniques • write programs in R-language and can use different packages available in R. • perform the different non-parametric tests on different types of data. To impart the concepts of programming. use external R-packages in statistics and graphics
CSA-EC-4206	Big Data and Analytics	students will be able to: • Identify the need-based tools, viz., Pig and Hive and to handle and formulate an effective strategy to implement a successful Data analytics project • Organize the existing technologies and the need for distributed files systems to analyze the big data • Analyze the concepts of stream memory and spark models. • Explain the use of the NoSQL database in data analytics.
CSA-EC-4207	Mobile Applications Design and Development	students will be able to: • Install and configure Android application development tools • Design and develop user interfaces for the Android platform • Save state information across important operating system events • Apply Java programming concepts to Android application development
CSA-EC-4208	Parallel and Distributed Systems	students will be able to: • Study software components of distributed and parallel computing systems. • Know about the communication and interconnection architecture of multiple computer systems. • Recognize the inherent difficulties that arise due to the distributedness of computing resources. • understand basic problems in

		distributed computing, especially concerning concurrency, parallelism, synchronization, deadlocks, safety, and liveness properties
CSA-EC-4209	Blockchain Technology	students will be able to: • Demonstrate the foundation of Blockchain technology and understand the processes in payment and funding. • Identify the risks involved in building Blockchain applications. • Review of legal implications using smart contracts. • Choose the present landscape of Blockchain implementations and Understand Cryptocurrency markets. • Examine how to profit from trading cryptocurrencies.
CSA-EC-4210	Microsoft .Net Technologies	students will be able to: • Design Web applications / Websites using ASP.NET. • Use ASP.NET controls in web applications • Debug and deploy ASP.NET web applications. • Create database-driven ASP.NET web applications and web services.
CSA-EC-4211	Internet of Things	students will be able to: • Explain the architecture of the Internet of Things • Demonstrate the different enabling technologies for IoTs • Apply Python Programming skills to develop IoT application • Analyze the architecture of Arduino and Raspberry Pi. • Create Small IoT Applications using Sensors
CSA-EC-4212	Natural Language Processing	students will be able to: • Relate to the existing NLP systems and determine the advantages and disadvantages of these systems. • Demonstrate the skills of solving specific NLP tasks, as well as running experiments on textual data.

		• Apply Natural Language Processing (NLP) knowledge to some of its applications. Assess and apply the available tools of NLP on various case studies
CSA-EC-4213	Information Retrieval & Web Mining	students will be able to: • To Understand Document as Vector • Performance evolution metric for IR • To understand Search Engine functionality
CSA-EC-4214	Digital Image Processing & Computer Vision	Course students will be able to: To understand how digital images are represented, manipulated, encoded, and processed, with emphasis on algorithm design, implementation, and performance evaluation
CSA-EC-4215	Embedded System Design	students will be able to: • Understand the concepts of Embedded Systems • Understand interfacing of IO devices and other peripherals. • Device driver programming & interrupt service mechanisms • Understand Inter-process Communication and Synchronization of processes, Threads and Tasks. • Learn OS functions and Real-Time Operating System
CSA-CC-4201	Dissertation	Students will learn how to write research paper and make web application.