

Programme: M.Sc. (Computer Science)

Objectives

The discipline of computer science is concerned with the design of computers, computational processes and information transfer and transformation. Computer science engineers design and analyze software for many different applications, including networks, graphics, and artificial intelligence, Machine learning and database systems. Also focus on improving software reliability, network security or information retrieval systems.

Broad outcome of the Programme

1. Develop programs in various computer science technologies.
2. Acquire the knowledge of working principles of computers.
3. Improve analytical and critical thinking.
4. Analyze a problem and identify the requirements for solution.
5. To develop problem solving abilities using a computer.
6. To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems.
7. To train students in professional skills related to Software Industry.
8. To prepare necessary knowledge base for research and development in Computer Science.
9. To help student build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products.
10. To develop the ability to analyze a problem and devise an algorithm to solve it.
11. To formulate algorithms, pseudo codes and flowcharts for arithmetic and logical problems.
12. To understand structured programming approach.
13. To develop the basic concepts and terminology of programming in general.
14. To implement algorithms in the 'C' language.

Program specific outcomes

1. The Master of Science in Computer Science Program provides the students with knowledge, general competence, and analytical skills on an advanced level, needed in academics, industry, research.
2. Have demonstrated the ability to tackle challenging computing problems using a comprehensive knowledge of computer science, while reflecting a commitment to quality, innovation, critical thinking, and continuous improvement.
3. Have demonstrated the ability of analyzing and solving complex technical problems from a broad perspective of computer science.
4. Identify the software and hardware aspects of computer systems.
5. Solve mathematical and statistical problems.
6. Define the various stages of software system.
7. Acquire in depth knowledge of computer technologies.
8. Analyze the various applications of computer science.
9. Enrich the knowledge in the areas like Artificial Intelligence, Web Services, Cloud Computing, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies Advanced Operating System, Mobile Technologies, Software Project Management and core computing subjects.
10. Students understand all dimensions of the concepts of software application and projects.
11. Students understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT.
12. Developed in-house applications in terms of projects.
13. Provides technology-oriented students with the knowledge and ability to develop creative solutions. Develop skills to learn new technology.
14. Apply computer science theory and software development concepts to construct computing-based solutions.
15. Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Machine Learning.

Course outcome

M.Sc. (Computer Science) Sem – I

Course Title: - MCS 1.1: COMPUTER ARCHITECTURE

Course Outcomes: - Able to comprehend operations and arithmetic of computer systems. Able to identify data-path and control-path operations involved in the execution of a processor instruction. Able to understand and analyze the CPU, memory and IO architecture of a processor at the system level. Able to analyze the trade-offs involved in the CPU and memory organization of a processor system. The basic architecture of processing, memory and I/O organization in a computer system.

Course Title: - MCS 1.2: DATA STRUCTURE

Course Outcomes: - The students will be able to appreciate the data structures types, analysis of algorithms, linear and non linear lists. To use well-organized data structures in solving various problems. To differentiate the usage of various structures in problem solution. Implementing algorithms to solve problems using appropriate data structure.

Course Title: - MCS 1.3: JAVA PROGRAMMING

Course Outcomes: - Student will gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. Student will understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. Student will understand the principles of inheritance, packages and interfaces.

Student will able to use the Java SDK environment to create, debug and run simple Java programs. Student will able to implement object oriented concept like inheritance, polymorphism, encapsulation and data abstraction practically. Student will learn how to implement concurrent applications using threads; describe problems related to concurrent programming and how to solve these problems.

Student will implement applications with simple graphical user interfaces. Student will create web applications by using servlet, JSP etc. Student will implement database handling by using jdbc tool.

Course Title: - MCS 1.4: DATA COMMUNICATION

Course Outcomes: - Student will be able to understand network communication using the layered concept, Open System Interconnect (OSI) and the Internet Model. Student will be able to understand various types of transmission media, network devices; and parameters of evaluation of performance for each media and device. Student will be able to understand the concept of flow control, error control and LAN protocols; to explain the design of, and algorithms used in, the physical, data link layers.

Student will understand the working principles of LAN and the concepts behind physical and logical addressing, subnetting and supernetting. Student shall understand the functions performed by a Network Management System and to analyze connection establishment and congestion control with respect to TCP Protocol. Student shall understand the principles and operations behind various application layer protocols like HTTP, SMTP, and FTP.

Course Title: - MCS 1.5: APPLIED MATHEMATICS

Course Outcomes:- A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning. A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences.

A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

Course outcome

M.Sc. (Computer Science) Sem – II

Course Title: - MCS 2.1: COMPUTER NETWORKS

Course Outcomes: - The students will be able to appreciate the concepts of different types of networks and different layers along with the network devices and protocols at each layer

Course Title: - MCS 2.2: ANALYSIS AND DESIGN OF ALGORITHMS

Course Outcomes:-Students will learn fundamental concepts of asymptotic notations of an algorithm, Space & Time Complexity, Searching & Sorting Algorithms, Divide and Conquer techniques. Students will know various design and analysis techniques such as greedy algorithms, dynamic programming. Student will understand the techniques used for designing of different graph algorithms. Students will learn how to apply backtracking, branch and bound techniques for real time problems. Students will know the concepts of P, NP and NP-Complete problems.

Course Title: - MCS 2.3: COMPUTER GRAPHIC

Course Outcomes:-To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping. To describe the importance of viewing and projections. To define the fundamentals of animation, virtual reality and its related technologies. To understand a typical graphics pipeline.

To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations. To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations. The computer graphics course prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation.

Course Title: - MCS 2.4: THEORY OF COMPUTATION

Course Outcomes:-Model, compare and analyze different computational models using combinatorial methods. Apply rigorously formal mathematical methods to prove properties of languages, grammars and automata. Construct algorithms for different problems and argue formally about correctness on

different restricted machine models of computation. Identify limitations of some computational models and possible methods of proving them. Have an overview of how the theoretical study in this course is applicable to an engineering application like designing the compilers.

Course Title: - MCS 2.5: DIGITAL IMAGE PROCESSING

Course Outcomes:-Interpret image storage, sampling, and frequency domain processing operations. Evaluate current technologies and issues that are specific to image processing systems. Analyze different image enhancement techniques. Integrate concepts of various image processing algorithms.

M.Sc. (Computer Science) Sem – III

Course Title: - MCS 3.1: WIRELESS COMMUNICATIONS

Course Outcomes: - How to model wireless channels? How to design and analyze diversity techniques? Understand cellular system design. Understand MIMO and OFDM techniques.

Course Title: - MCS 3.2: MACHINE LEARNING

Course Outcomes: Recognize the characteristics of machine learning that make it useful to real-world problems. Process available data using python libraries and predict outcomes using Machine Learning algorithms to solve given problem. Able to estimate Machine Learning models efficiency using suitable metrics. Design application using machine learning techniques.

Course Title: - MCS 3.3: LINUX OPERATING SYSTEMS

Course Outcomes: To gain strong knowledge of OS programming by taking Linux as a case .Build proficiency on the Linux API's and system calls. To get the knowledge of high performance and secure coding by using OS capabilities create multitasking applications using various IPC Mechanisms

Course Title: - MCS 3.4: SOFTWARE ENGINEERING

Course Outcomes: The students will be able to understand the theoretical concepts of software development models, system, system engineering, design engineering, testing strategies and estimation strategies.

Course Title: - MCS 3.5: CLOUD COMPUTING

Course Outcomes: To understand the principles and paradigm of Cloud Computing. To appreciate the role of Virtualization Technologies. Ability to design and deploy Cloud Infrastructure. Understand cloud security issues and solutions.

Course outcome

M.Sc. (Computer Science) Sem – IV

Course Title: - MCS 4.1: ARTIFICIAL INTELLIGENCE

Course Outcomes: To learn various types of algorithms useful in Artificial Intelligence (AI). To convey the ideas in AI research and programming language related to emerging technology. To understand the numerous applications and huge possibilities in the field of AI that goes beyond the normal human imagination.

Course Title: - MCS 4.2: DATA SCIENCE

Course Outcomes: Build statistical models and understand their power and limitations. Use machine learning and optimization to make decisions. Acquire, clean, and manage data. Visualize data for exploration, analysis, and communication. Collaborate within teams. Deliver reproducible data analysis. Manage and analyze massive data sets.

Course Title: - MCS 4.3: INTERNET OF THINGS (IOT)

Course Outcomes: able to design circuit diagrams for Wi-Fi, Bluetooth, SIM808 GPS/GSM/GPRS, Zigbee. Able to program communication devices using PC and “AT” Commands. Able to implement IoT applications using PC, Mobile, Web services, API, etc.

Course Title: - MCS 4.4: PROJECT WORK

Course Outcomes: Undertake problem identification, formulation and solution. Design solutions to complex problems utilizing a systems approach. Conduct a project. Acquire skills to develop the software project. Understand the software development life cycle. Project-based learning connects students to the real world. Prepares students to accept and meet challenges in the real world.

Programme: Master of Computer Applications (MCA)

Programme Outcome

1. Apply the knowledge of mathematics and computing fundamentals to various real life applications for any given requirement
2. Design and develop applications to analyze and solve all computer science related problems
3. Design applications for any desired needs with appropriate considerations for any specific need on societal and environmental aspects
4. Analyze and review literatures to invoke the research skills to design, interpret and make inferences from the resulting data
5. Integrate and apply efficiently the contemporary IT tools to all computer applications
6. Solve and work with a professional context pertaining to ethics, social, cultural and cyber regulations
7. Involve in perennial learning for a continued career development and progress as a computer professional
8. Function effectively both as a team leader and team member on multi disciplinary projects to demonstrate computing and management skills
9. Communicate effectively and present technical information in oral and written reports
10. Utilize the computing knowledge efficiently in projects with concern for societal, environmental, and cultural aspects

Programme Specific Outcome

1. Design, develop and implement interdisciplinary application software projects to meet the demands of industry requirements using modern tools and technologies.
2. Analyze the societal needs to provide novel solutions through technological based research.

Course outcome

Master of Computer Applications (MCA)

Sem – I

Course Title: - MCA 1.1: COMPUTER ORGANIZATION ARCHITECTURE

Course Outcomes: The students will be able to understand digital logic design, including logic elements, and their use in combinational and sequential logic

circuit design, the basic architecture of processing, memory and I/O organization in a computer system.

Course Title: - MCA 1.2: OPERATING SYSTEM

Course Outcomes: Master functions, structures and history of operating systems. Master understanding of design issues associated with operating systems. Master various process management concepts including scheduling, synchronization, and deadlocks. Be familiar with multithreading. Master concepts of memory management including virtual memory. Master system resources sharing among the users. Master issues related to file system interface and implementation, disk management. Be familiar with protection and security mechanism.

Course Title: - MCA 1.3: APPLIED MATHEMATICS

Course Outcomes: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology and recognize basic geometrical figures and graphical displays, state important facts resulting from their studies. A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning. A student should get adequate exposure to global and local concerns that explore them many aspects of Mathematical Sciences. A student is able to apply their skills and knowledge, that is, translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.

Course Title: - MCA 1.4: C PROGRAMMING

Course Outcomes: Develop modular programs using control structures, pointers, arrays, strings, structures, Linked list, Trees and Graph .Design and develop solutions to real world problems using C.

Course Title: - MCA 1.5: DATABASE MANAGEMENT SYSTEM

Course Outcomes: Solve real world problems using appropriate set, function, and relational models. Design E-R Model for given requirements and convert the same into database tables. Use SQL.

Course outcome

Master of Computer Applications (MCA)

Sem – II

Course Title: - MCA 2.1: COMPUTER NETWORKS

Course Outcomes:- The students will be able to appreciate the concepts of different types of networks and different layers along with the network devices and protocols at each layer

Course Title: - MCA 2.2: THEORY OF COMPUTATION

Course Outcomes:- Model, compare and analyze different computational models using combinatorial methods. Apply rigorously formal mathematical methods to prove properties of languages, grammars and automata. Construct algorithms for different problems and argue formally about correctness on different restricted machine models of computation. Identify limitations of some computational models and possible methods of proving them. Have an overview of how the theoretical study in this course is applicable to an engineering application like designing the compilers.

Course Title: - MCA 2.3: DATA STRUCTURES

Course Outcomes:- The students will be able to appreciate the data structures types, analysis of algorithms, linear and non linear lists. To use well-organized data structures in solving various problems. To differentiate the usage of various structures in problem solution. Implementing algorithms to solve problems using appropriate data structure.

Course Title: - MCA 2.4: JAVA PROGRAMMING

Course Outcomes:- Student will gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. Student will understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. Student will understand the principles of inheritance, packages and interfaces.

Student will able to use the Java SDK environment to create, debug and run simple Java programs. Student will able to implement object oriented concept like inheritance, polymorphism, encapsulation and data abstraction practically. Student will learn how to implement concurrent applications using threads; describe problems related to concurrent programming and how to solve these problems.

Course Title: - MCA 2.5: SOFTWARE ENGINEERING

Course Outcomes:- The students will able to under the theoretical concepts of software development models, system, system engineering, design engineering, testing strategies and estimation strategies.

Course outcome

Master of Computer Applications (MCA)

Sem – III

Course Title: - MCA 3.1: ANALYSIS AND DESIGN OF ALGORITHMS

Course Outcomes:- Students will learn fundamental concepts of asymptotic notations of an algorithm, Space & Time Complexity, Searching & Sorting Algorithms, Divide and Conquer techniques. Students will know various design and analysis techniques such as greedy algorithms, dynamic programming. Student will understand the techniques used for designing of different graph algorithms. Students will learn how to apply backtracking, branch and bound techniques for real time problems. Students will know the concepts of P, NP and NP-Complete problems.

Course Title: - MCA 3.2: COMPUTER GRAPHICS

Course Outcomes:- To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping. To describe the importance of viewing and projections. To define the fundamentals of animation, virtual reality and its related technologies. To understand a typical graphics pipeline. To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations. To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations. The computer graphics course

prepares students for activities involving in design, development and testing of modeling, rendering, shading and animation.

Course Title: - MCA 3.3: DIGITAL IMAGE PROCESSING

Course Outcomes:- Interpret image storage, sampling, and frequency domain processing operations. Evaluate current technologies and issues that are specific to image processing systems. Analyze different motion compensation techniques. Integrate concepts of various image processing algorithms

Course Title: - MCA 3.4: WEB PROGRAMMING

Course Outcomes: - Design web pages. Use technologies of Web Programming .Apply object-oriented aspects to Scripting. Create databases with connectivity using JDBC. Build web-based application using sockets.

Course Title: - MCA 3.5: DATA SCIENCE

Course Outcomes: - Build statistical models and understand their power and limitations. Use machine learning and optimization to make decisions. Acquire, clean, and manage data. Visualize data for exploration, analysis, and communication. Collaborate within teams. Deliver reproducible data analysis. Manage and analyze massive data sets

Course outcome

Master of Computer Applications (MCA)

Sem – IV

Course Title: - MCA 4.1: ARTIFICIAL INTELLIGENCE

Course Outcomes:-To learn various types of algorithms useful in Artificial Intelligence (AI).To convey the ideas in AI research and programming language related to emerging technology. To understand the numerous applications and huge possibilities in the field of AI that goes beyond the normal human imagination.

Course Title: - MCA 4.2: PHP PROGRAMMING

Course Outcomes: - To implement PHP script using Decisions and Loops. To develop PHP applications using Strings, Arrays and Functions. To design

object-oriented programming (OOP) principles for PHP and use HTML form elements that work with any server-side language. To display and insert data using PHP and MySQL.

Course Title: - MCA 4.3: DOT NET PROGRAMMING

Course Outcomes: - Gain a go the principle od knowledge of object-oriented programming. Write clear and effective C# code. Access data using ADO.NET. Develop web applications using ASP.NET Web Forms. Develop and use ASP.NET Web Services.

Course Title: - MCA 4.4: PYTHON PROGRAMMING

Course Outcomes: - Install, debug and run a Python program, differentiate between brackets, braces, and parentheses, define variables, identify keywords, Operators and Operands, Expressions, perform type conversion, use if, if-else, for, while loop. access elements in lists, traverse a list, delete elements from list, perform concatenation, repetition, In operator, builtin list, tuple and dictionary functions, methods and operators, basic tuples operations, updating, deleting elements from dictionary, dictionary keys, operations, file, directories and exc eption handling.

Course Title: - MCA 4.5: PROJECT WORK

Course Outcomes: - Undertake problem identification, formulation and solution. Design solutions to complex problems utilizing a systems approach. Conduct a project. Acquire skills to develop the software project. Understand the software development life cycle. Project-based learning connects students to the real world. Prepares students to accept and meet challenges in the real world.