

Post Graduate (PG)

Department of MCA

PROGRAM OUTCOMES (PO)

Upon completion of the Post Graduate programme, the students will be able to achieve the following outcomes:

PO1: Profound Professional Knowledge: Obtain proficiency to maneuver in diverse context of the advance subject knowledge.

PO2: Critical Thinking and Analysis: Attain the analytical expertise to create, analyse, formulate, and solve challenging problems.

PO3: Environment and sustainability: Understand the impact of the scientific solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO4: Research and Innovation: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Effective Communication: Demonstrate skills such as effective communication, decision making, problem and adapt ability to create technical writing.

PO6: Problem Solving: Understand, interpret, explain, analyse and assess the tools, techniques, models and methodologies to solve problems.

PO7: Employability: Demonstrate skills for doctoral, post-doctoral education, professional development and employability.

PO8: Advance tools and techniques: Attain ability to work with advanced IT tools and techniques in their domain.

PO9: Social Consciousness: Acquire awareness towards gender, environment, sustainability, human values and professional ethics and understand the difference between acting, responding and reacting to various social issues

PO10: Nation Building: Introspect and evolve into dynamic and creative individuals capable of socially productive, constructive actions that positively impact our Nation and the World at large

MCA PROGRAM OBJECTIVES (PO)

Upon completion of the programme, the student will attain the ability to:

- PSO1:** Create systems through software development to solve problems in Industry domain areas.
- PSO2:** Contribute to societal growth through research in their chosen field.
- PSO3:** Perform both as an individual and in a team through good analytical, design and implementation skills.
- PSO4:** Possess professional development through continuous learning.
- PSO5:** Comprehend, explore and build up computer programs in the areas allied to Algorithms, System Software, Multimedia, Web Design and Big Data Analytics for efficient design of computer-based systems of varying complexity.
- PSO6:** Pursue careers in IT industry/ consultancy/ research and development, teaching and allied areas related to computer science.

Semester I

MCA CS1T01: Software Engineering

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Explain a process model for a software project Development.
- CO2:** Prepare the SRS, Design document, Project plan of a given software system
- CO3:** Apply Project Management and Requirement analysis, Principles to S/W project development.
- CO4:** Analyze the cost estimate and problem complexity using various estimation techniques
- CO5:** Generate test cases using the techniques involved in selecting: Analyze (a) White Box testing (b) Block Box testing
- CO6:** Explain the advantages of configuration management and risk management activities.

Semester I

MCA CS1T02: Advanced Database Management System

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Describe the fundamental elements of relational database management systems.
- CO2:** Explain the basic concept of data modelling using the entity-relationship and developing database designs.
- CO3:** Convert E-R models to relational tables, populate relational database and formulate SQL queries on data.
- CO4:** Use database techniques such as SQL & PL/SQL
- CO5:** Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
- CO6:** Apply advanced database Programming concepts of varying complexities

Semester – I

Course Code: MCA CS1T03

Course Name Design and Analysis of Algorithm

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Analyze worst-case running times of algorithms using asymptotic analysis.
- CO2:** Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm.

Synthesize Divide-and- conquer algorithms. Derive and solve recurrences describing the performance of divide - and-conquer algorithms.

- CO3:** Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them.
- CO4:** Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
- CO5:** Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.
- CO6:** Explain the different ways to analyze randomized algorithms (expected running time, probability of error). Recite algorithms that employ randomization. Explain the difference between a randomized algorithm and an algorithm with probabilistic inputs

Semester – I

Course Code: MCA CS1T04

Course Name Computer Networks and Security

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Remember the techniques used in Data communication and types of transmission
- CO2:** Understand the need for data link control, error control mechanism
- CO3:** Apply various network layer techniques for designing subnets mask and routing addresses to fulfil networking requirements

- CO4:** Analyse OSI, TCP/IP and their protocols.
- CO5:** Evaluate issues of routing and congestion mechanism for independent and internetworking networks for wired and wireless link
- CO6:** Create or design application layer protocol with routing in switched networks

Semester – I

Course Code: MCA CS1L05

Course Name: Lab on Responsive Web Designing

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Explain why users need to know where they are, where they can go and what is on a web page.
- CO2:** Create wireframe mockups of web pages.
- CO3:** Identify the key functional elements of web pages
- CO4:** Use Bootstrap components to realise page designs
- CO5:** Use JavaScript data structures such as arrays and objects to define the data used in a web page
- CO6:** Use the Handlebars template library to convert data to HTML

Semester – I

Course Code: MCA GI1T1

Course Name: Statistical And Numerical Computing

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Understand the various approaches dealing with the data using theory of probability

CO2: Analyze the different samples of data at the different levels of significance using various hypothesis testing

CO3: Develop a framework for estimating and predicting the different samples of data for handling the uncertainties

CO4: Understand error, source of error and its effect on any numerical computation and also analyze the efficiency of any numerical algorithm

CO5: Learn how to obtain numerical solution of nonlinear equations using Bisection, Newton – Raphson and fixed-point iteration methods

CO6: Solve system of linear equations numerically using direct and iterative methods

Semester – I

Course Code: MCA SE1L01

Course Name: Lab based on Statistical Package

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Learn how to analyze the data, identify the problems and choose the relevant techniques to apply.

CO2: Learn various techniques of data visualization using statistical softwares.

CO3: Gets an idea how Ms-Excel, R, Minitab and other statistical softwares makes it simpler than ever to get deep insights from the data.

CO4: Perform different tests on means.

CO5: Perform Hypothesis testing.

CO6: Learn how to analyze the data in Ms-Excel, R and other statistical softwares.

Semester – I

Course Code: MCA SE1L02

Course Name: Training on Computer Networking

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Know the concept of IP Addressing and its implementation.

CO2: Study about the idea of Data Sharing.

CO3: Gain the knowledge of Data Security.

CO4: Learn how to block a website.

CO5: Know about RAID Configuration and its types.

CO6: Know the concept of Blocking of ICMP and its impact on network security.

Semester – II

Course Code: MCA CS2T06

Course Name: Object Oriented Analysis and Designing

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Demonstrate the importance of modelling in the software development life cycle.

CO2: Abstract object-based views for generic software systems.

CO3: Understand the object-oriented approach to analysing and designing systems and software solutions.

CO4: Employ the Unified modelling Language notations to create effective and efficient system designs.

CO5: Understand the difference between writing programs for the software and doing analysis and design.

CO6: Analyse and Design the given System

Semester – II

Course Code: MCA CS2T07

Course Name: Distributed Computing

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Understand the design, implementation and security issues of distributed systems.
- CO2:** Apply knowledge of distributed systems techniques and methodologies.
- CO3:** Explain the design and development of distributed systems and distributed systems applications.
- CO4:** Use the application of fundamental Computer Science methods and algorithms in the development of distributed systems and distributed systems applications.
- CO5:** Understand the difference between writing programs for the software and doing analysis and design.
- CO6:** Discuss the design and testing of a large software system, and to be able to communicate that design to others.

Semester – II

Course Code: MCA GI2T2

Course Name: Optimization Techniques

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Analyze any real life system with limited constraints and depict it in a model form.
- CO2:** Convert the problem into a mathematical model.

- CO3:** Understand a variety of problems such as assignment, transportation, travelling salesman etc.
- CO4:** Solve the problems using a linear programming approach.
- CO5:** Understand different queuing situations and find the optimal solutions using models for different situations.
- CO6:** Identify and develop Optimization Techniques models from the verbal description of the real system.

Semester – II

Course Code: MCA CS2L08

Course Name: Mini Project I (Lab)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Apply the process to be followed in the software development life-cycle models.
- CO2:** Implement communication, modeling, construction & deployment practices in software development.
- CO3:** Analyze & design the software models using unified modeling language (UML).
- CO4:** Explain the concepts of various software testing methods & be able to apply appropriate testing approaches for development of software.
- CO5:** Explain the quality management & different types of metrics used in software development.
- CO6:** Apply the concepts of project management & planning.

Semester – II

Course Code: MCA SE2L03

Course Name: Technical Presentation and Report Writing

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Learn the correct Grammatical use and Writing skills.

CO2: Acquire the knowledge of Technical Writing and differentiate between technical and literary styles.

CO3: Study about the different forms of Letter Writing: Formal, informal and semi-official letters; business letter as well as various elements of a Job Application: Cover letter, bio-data, CV and Resume.

CO4: Know about the basic structure of Report Writing

CO5: Learn about a range of Presentation Skills including Oral presentation and public speaking skills; business presentations.

CO6: Understand the importance of Technology-based Communication, Netiquettes, E-mail etc.

Semester – II

Course Code: MCA SE2L04

Course Name: Personality Development & Inter Religious Values

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Know about the Nature and Need of Inter-Religious study.

CO2: Gain knowledge about the Scope of Comparative Religion.

CO3: Learn about the Salient features of various religions.

CO4: Understand the similarities and differences among religions.

CO5: Know about the conflicting truth claims of different religions and inter-religious harmony.

CO6: Understand the meaning of religious tolerance and secularism.

Semester – II

Course Code: MCA DSE2T1

Course Name Elective 1 (Option 1: Compiler Design)

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Understand the concept of Compilers and translators, the phases of a compiler, and Compiler writing tools.

CO2: Construct a parse tree, or explain why no parse tree exists, given a BNF grammar and a string over the appropriate alphabet.

CO3: Implement a lexical analyzer from a specification of a language's lexical rules.

CO4: Compute the FIRST set and the FOLLOW set for a BNF grammar

CO5: Apply simple intermediate code optimizations.

CO6: Implement code generator.

Semester II

Course Name Elective 1

(Option 2: Digital Image processing and Multimedia)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Explore and evaluate the role of different components of a digital image processing.
- CO2:** Understand the wide range of present and future applications of digital image processing, both for the visible spectrum images such as those from other sensors (Radar, Ultrasonic, etc.).
- CO3:** Explain and Understand the multidimensional digital signal processing in the field of images (2D) and video (3D).
- CO4:** Differentiate and justify the two major approaches to image processing: processing in the spatial and frequency domains.
- CO5:** Analyze and implement different techniques of coding and image compression
- CO6:** Understand the image analysis and use methods of image segmentation and mathematical morphology.

Semester II

Course Code: MCA DSE2T1

Course Name: Elective 1 (Option 3: Computer Graphics)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** List the various concepts used in computer graphics.

- CO2:** Implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
- CO3:** Explain and Understand the multidimensional digital signal processing in the field of images (2D) and video (3D).
- CO4:** Describe the importance of viewing and projections.
- CO5:** Define the fundamentals of animation, virtual reality and its related technologies.
- CO6:** Design an application with the principles of virtual reality.

Semester – II

Course Name: Elective 2 (Option 1: Introduction to Machine Learning)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Recognize the characteristics of machine learning that make it useful to real-world problems.
- CO2:** Understand the basic underlying concepts for supervised discriminative and generative learning.
- CO3:** Characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
- CO4:** Understand the concept behind neural networks for learning non-linear functions.
- CO5:** Understand and apply unsupervised algorithms for clustering.
- CO6:** Understand the foundation of generative models.

Semester – II

Course Name: Elective 2 (Option 2: Artificial Intelligence)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
- CO2:** Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
- CO3:** Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
- CO4:** Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.
- CO5:** Demonstrate proficiency in applying scientific method to models of machine learning.
- CO6:** Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

Semester – II

Course Name Elective 2 (Option 3: Soft Computing)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.

- CO2:** Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
- CO3:** Understand the fundamental theory and concepts of neural networks
- CO4:** Identify different neural network architectures, algorithms, applications and their limitations
- CO5:** Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
- CO6:** Reveal different applications of these models to solve engineering and other problems.

Semester – III

Course Code: MCA CS3T09

Course Name: Advanced Web Designing using J2EE

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Learn the Internet Programming, using Java Applets
- CO2:** Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists
- CO3:** Apply event handling on AWT and Swing components.
- CO4:** Access database through Java programs, using Java Data Base Connectivity (JDBC)
- CO5:** Create dynamic web pages, using Servlets and JSP.
- CO6:** Understand the multi-tier architecture of web-based enterprise applications using/Enterprise JavaBeans (EJB).

Semester – III

Course Code: MCA CS3T10

Course Name: Cloud Computing

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.
- CO2:** Apply the fundamental concepts in data centers to understand the trade-offs in power, efficiency and cost.
- CO3:** Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.
- CO4:** Analyze various cloud programming models and apply them to solve problems on the cloud.

Semester- III

Course Code: MCA CS3T11

Course Name Data and Web Mining

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Understand Data Warehouse fundamentals, Data Mining Principles.
- CO2:** Design data warehouse with dimensional modelling and apply OLAP operations.
- CO3:** Identify appropriate data mining algorithms to solve real world problems.

- CO4:** Apply the association rules for mining the data
- CO5:** Design and deploy appropriate classification techniques.
- CO6:** Cluster the high dimensional data for better organization of the data.

Semester – III

Course Code: MCA CS3L12

Course Name: Mini Project II (Lab)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Apply the process to be followed in the software development life-cycle models.
- CO2:** Implement communication, modeling, construction & deployment practices in software development.
- CO3:** Analyze & design the software models using unified modeling language (UML).
- CO4:** Explain the concepts of various software testing methods & be able to apply appropriate testing approaches for development of software.
- CO5:** Explain the quality management & different types of metrics used in software development.
- CO6:** Apply the concepts of project management & planning.

Semester – III

Course Code: MCA SE3L05

Course Name: MOOCs

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Give students more online learning experience

CO2: Implement a mode of blended learning environment so that students can learn at their own pace.

CO3: Able to connect across disciplines and corporate / institutional walls.

CO4: Contribute to lifelong learning and professional development

CO5: Aims at Learner centeredness and digital inclusion

CO6: Provides Flexible Learning Environment

Semester – III

Course Code: MCA SE3L06

Course Name: Seminar

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Receive the knowledge of leading research works in the field of Computer Science and develop the ability to evaluate research performed by others.
- CO2:** Show competence in identifying relevant information, defining and explaining topics under discussion.
- CO3:** Practice skills of academic writing that facilitate effective communication and train the skills of producing scholarly texts in English.
- CO4:** Learn to use appropriate vocabulary, and demonstrate command of voice modulation, voice projection, and pacing, use of visual, audio and audio-visual material to support their presentation.
- CO5:** Demonstrate problem-solving skills and apply theoretical knowledge.
- CO6:** Apply their knowledge to reach across diverse disciplines to apply theories, methods and knowledge bases from multiple fields to a single question or problem.

Semester - III

Course Code: MCA DSE3T3

Course Name: Elective 3 (Option 1: Management Information System and E-Commerce)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Remember the fundamental concepts of information systems.
- CO2:** Understand the knowledge about management of information systems
- CO3:** Apply a framework and process for aligning organization's IT objectives with business strategy.
- CO4:** Analyse the use information technology to solve business problems
- CO5:** Evaluate how information technology impacts a firm

CO6: Illustrate the impact of information systems in society

Semester - III

Course Code: MCA DSE3T3

Course Name: Elective 3 (Option: 2 Enterprise Resource Management)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Identify the important business functions provided by typical business software such as enterprise resource planning and customer relationship management.
- CO2:** Describe basic concepts of ERP systems for manufacturing or service companies.
- CO3:** Understand and be able to articulate the life cycle stages of any ERP implementation
- CO4:** Analyze a current architecture and perform an effective gap analysis before an ERP implementation.
- CO5:** Analyze the technical aspect of telecommunication systems, the internet and their roles in the business environment.
- CO6:** Develop skills necessary for building and managing relationships with customers, and stakeholders.

Semester - III

Course CODE: MCA DSE3T3

Course Name Elective 3 (Option:3 Principles of Management & Organizational Behaviour)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Demonstrate the applicability of the concept of Organizational behaviour of people in the organization.
- CO2:** Demonstrate the applicability of analyzing the complexities associated with management of individual behaviour in the organization.
- CO3:** Analyze the complexities associated with management of the group behaviour in the organization.
- CO4:** Demonstrate how the organizational behaviour can interchange in understanding the motivation behind behaviour of people in the organization.
- CO5:** Explain organizational culture and describe its dimensions and to examine various organizational designs.
- CO6:** Identify the various leadership styles and the role of leaders in a decision making process.

Semester-III

Course Code: MCA DSE3T04

Course Name: Elective 4 (Option 1: Parallel Computing)

- CO1:** Understand the basic construction and use of parallel computer and use of the terminology for how one measures the performance of parallel algorithms and parallel computers.
- CO2:** Design computer programs for different types of parallel computers.
- CO3:** Apply optimized sequential code for fastest possible execution, analyze sequential programs and determine if they are worthwhile to parallelize.
- CO4:** Develop parallel algorithms design and different parallel programming models for MPI, POIX threads.

CO5: Develop algorithms for parallel computers. This applies both to computers with shared memory and with distributed memory.

CO6: Analyse parallel algorithms and performance measures for different programming models applicable to shared and distributed memory computers.

Semester – III

Course Name: Elective 4 (Option 2: Wireless Network)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Understand fundamental underlying principles of wireless computer networking.
- CO2:** Describe and analyze the hardware, software, components of a wireless network and their interrelations.
- CO3:** Analyze the requirements for a given organizational structure and select the most appropriate architecture and technologies;
- CO4:** Gain a basic knowledge of the use of cryptography and network security
- CO5:** Install and configure wireless applications.
- CO6:** Specify and identify deficiencies in existing protocols and modify for new industry requirements

Semester – III

Course Code: MCA DSE3T4

Course Name: Elective 4 (Option 3: Big Data Analytics)

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Describe the characteristics of Big Data

- CO2:** Describe the basics of Hadoop and HDFS architecture.
- CO3:** Deploy Job Execution in Hadoop Environment
- CO4:** Develop Big Data solutions using Hadoop EcoSystem
- CO5:** Analyze Infosphere BigInsights Big Data Recommendations
- CO6:** Deploy Machine Learning Techniques using R

Semester – IV

Course Code: MCA CS4P13

Course Name: Internship

Course Outcomes:

After completion of the course, the student will be able to:

- CO1:** Provide practical experience in a standard work environment.
- CO2:** Development of skills necessary for a lasting and rewarding career in the future.
- CO3:** Provide the student with an opportunity to gain knowledge and skills from a planned work experience in the student's chosen career field.
- CO4:** Provide learning experiences not available in the classroom setting.
- CO5:** Demonstrate ethical conduct and professional accountability while working in a team for the benefit of society.
- CO6:** Understand the resources requirement and planning to facilitate the project success

Semester – IV

Course Code: MCA CS4P14

Course Name: OJT Project

Course Outcomes:

After completion of the course, the student will be able to:

CO1: Create systems through software development to solve problems in Industry domain areas.

CO2: Analyze, design, verify, validate, implement, apply, and maintain software systems.

CO3: Provide work experience enabling students to apply what they learnt in the college and acquire new skills.

CO4: Get an opportunity to establish interest in industrial/ commercial activities.

CO5: Learn to work efficiently in their jobs after the training.

CO6: Provide hands-on knowledge about a particular topic so that it becomes easy for the trainee to understand it practically and it can be implemented effectively.