CANARA COLLEGE

Managed by Canara High School Association, Mangaluru

Reaccredited by NAAC and Affiliated to Mangalore University

Mahatma Gandhi Road, Kodialbail, Mangaluru – 575 003, D. K. District, Karnataka

MASTERS OF COMPUTER APPLICATIONS (M.C.A.)

[PEOs, POs, PSOs, COs & GAs]

CHOICE BASED CREDIT SYSTEM (CBCS)

(2025-26 Batch)

MASTER OF COMPUTER APPLICATIONS (M.C.A.)

Motto :

"Transforming Knowledge into Technology"

Vision :

- To empower the graduates to be technologically skilled, innovative and self-motivated.
- To build competent professionals to become part of the IT industry and research organizations.

Mission :

- To provide a strong theoretical and practical knowledge across the computer science discipline.
- To prepare students to be continuous learners in a connected world and absorb professional skills and ethical responsibilities.
- To strengthen the Industry-Academia interface.

Programme Educational Objectives (PEOs) :

PEO 1	To provide core theoretical and practical knowledge in the domain of Computer Applications for leading successful career in academia, industries, pursuing higher studies or entrepreneurial endeavors.
PEO 2	To develop the ability to critically think, analyze and make decisions for offering techno commercially feasible and socially acceptable solutions to real life problems in the areas of computing
PEO 3	To imbibe life-long learning, professional and ethical attitude for embracing global challenges and make positive impact on environment and society.

Programme Specific Outcomes (PSOs) :

Students of M.C.A. degree Programme at the time of graduation will be able to :

PSO 1	Identify, critically analyze, formulate and develop computer applications by applying knowledge of mathematics, computer science and management in practice.
PSO 2	An ability to devise and conduct experiments, interpret data and provide well informed conclusions and hence to understand the impact of system solutions in a contemporary, global, economic, environmental, and societal context for sustainable development.
PSO 3	An ability to communicate effectively and an ability to appreciate the importance of goal setting and to recognize the need for life-long learning.
PSO 4	An ability to function professionally with ethical responsibility as an individual as well as in multidisciplinary teams with a positive attitude.

Graduate Attributes (GAs) :

GA 1	Academic Excellence
GA 2	Professional Efficiency
GA 3	Technical Proficiency
GA 3	Effective Communication Skills
GA 4	Leadership and Team work
GA 5	Life-Long Learning
GA 6	Creativity and Innovation
GA 7	Social Engagement

COURSE OUTCOMES (COs)

FIRST SEMESTER

Course	Details
Code	25MCAH101
Title	**Mathematical Foundations of Computer Science**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ First
Type	Hardcore : Course 1
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, Group Discussions Assignments, Problem solving, Seminars and Presentations
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem solving skill

Learning Objectives :

- The primary objective of this course is to provide mathematical background and sufficient experience on various topics of discrete mathematics like logic and proofs, combinatory, graphs, algebraic structures, formal languages and finite state automata.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1 : Understand basic probability axioms and rules and the moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables.

CO2 : Modeling and design of computer based systems in a way that demonstrates.

CO3 : Recognize Model problems in Computer Science using graphs and trees.

CO4 : Understand the design and development principles in the construction of software systemsof varying complexity. and querying in various ways.

Course	Details
Code	25MCAH102
Title	**Operating Systems**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ First
Type	Hardcore : Course 2
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, Group Discussions Assignments, Problem solving, Seminars and Presentations
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem solving skill

Learning Objectives : To

- Explore the structure of OS and basic architectural components involved in OS design.
- Study the various device and resource management techniques for timesharing and distributed systems.
- Understand the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.
- Interpret the mechanisms adopted for file sharing in distributed Applications.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO 1 : Understand the structure of OS and basic architectural components involved in OS design.

CO 2 : Analyze and design the applications to run in parallel either using process or thread models of different OS.

CO 3 : Study the various device and resource management techniques for time sharing and distributed systems.

CO 4 : Recognize the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.

CO 5 : Interpret the mechanisms adopted for file sharing in distributed Applications.

CO 6 : Evaluate the requirement for process synchronization and coordination handled by OS.

CO 7 : Collecting and understanding the various security aspects of operating system.

Course	Details
Code	25MCAH103
Title	**Object Oriented Programming**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ First
Type	Hardcore : Course 3
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, Group Discussions Assignments, Problem solving, Seminars and Presentations
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem solving skill

Learning Objectives : To learn

- The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism.
- Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections.
- How to test, document and prepare a professional looking package for each business project using javadoc.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO 1 : Understand object oriented software development concepts.

CO 2 : Study the principles of inheritance and polymorphism; and demonstrates how they relate to the design of abstract classes.

CO 3 : Understand the implementation of packages and interfaces.

CO 4 : Realize an exception handling, event handling and multithreading.

CO 5 : Design Graphical User Interface using applets and swing.

Course	Details
Code	25MCAH104
Title	**Advanced Data Structures and Algorithms**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ First
Type	Hardcore : Course 4
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, Group Discussions Assignments, Problem solving, Seminars and Presentations
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem solving skill

Learning Objectives : To

- Understand and remember algorithms and its analysis procedure.
- Design and implement various data structures algorithms.
- To introduce various techniques for representation of the data in the real world.
- Compute the complexity of various algorithms.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Expose the student to the algorithm analysis techniques, to the theory of reductions, and to the classification of problems into complexity classes like NP.

CO2: Design and analyze programming problem statements, choose appropriate data structures and algorithms for a specific problem.

CO3: Understand the necessary mathematical abstraction to solve problems, Come up with analysis of efficiency and proofs of correctness.

CO4: Comprehend and select algorithm design approaches in a problem specific manner.

CO5: Come across the importance of graphs and their features for the applications uses.

CO6: Gathering the real strategies searching and sorting techniques.

Course	Details
Code	25MCAS101
Title	**.NET Technology**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ First
Type	Softcore : Course 5
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, Group Discussions, Assignments, Problem solving, Presentations and practical classes.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem solving skill

Learning Objectives : To learn

- The concept of .NET framework, building blocks of .NET framework and application
- development using IDE.
- C# programming language, use of windows forms and GUI based programs.
- OOP concepts, concept of assemblies and string manipulation.
- Designing of web applications and validating forms using validation controls, interacting with database using server side programming.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO 1: Develop well-defined programs using the C# programming language; learn to use Windows forms and to create GUI-based programs.

CO 2: Apply the principles of object-oriented programming and develop assemblies and deployment in .NET.

CO 3: Apply and build web applications and validation form data using validation controls.

CO 4: Create dynamic web applications that interact with a database using server-side programming.

CO 5: Understand Constructing classes, methods and instantiate objects.

CO 6: Understand and implement string manipulation, events and exception handling within.NET application environment

Course	Details
Code	25MCAP102
Title	**Advanced Data Structures and Algorithms Lab**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ First
Type	Practicals : Course 6
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Hands-on laboratory sessions, Demonstration-based learning, Problem-based learning, Interactive lectures, Guided coding and debugging sessions, Mini-project–based learning, Peer learning and group discussions.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, Problem solving skill

Learning Objectives : To

- Understand and remember algorithms and its analysis procedure.
- Design and implement various data structures algorithms.
- To introduce various techniques for representation of the data in the real world.
- Compute the complexity of various algorithms.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Understand and explain fundamental data structures such as arrays, linked lists, stacks, and queues.

CO2: Implement linear and non-linear data structures using appropriate programming techniques.

CO3: Apply searching and sorting algorithms to solve computational problems efficiently.

CO4: Analyze the time and space complexity of algorithms using asymptotic notations.

CO5: Design and implement tree and graph-based algorithms for real-world applications.

CO6: Choose appropriate data structures and algorithms to develop optimized and efficient solutions for given problems**.**

Course	Details
Code	25MCAP103
Title	**.NET Technology Lab**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ First
Type	Practicals : Course 7
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Hands-on laboratory sessions, Demonstration-based learning, Problem-based learning, Interactive lectures, Guided coding and debugging sessions, Mini-project–based learning, Peer learning and group discussions.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, Problem solving skill

Learning Objectives : To

- Understand the architecture and components of the .NET framework and the role of IDEs in application development.
- Gain hands-on experience in programming using C# and the .NET environment.
- Apply object-oriented programming concepts to develop modular and reusable applications.
- Design and develop GUI-based applications using Windows Forms and controls.
- Implement database connectivity and server-side programming using ADO.NET.
- Handle exceptions, events, and string manipulation effectively in .NET applications.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Develop and execute programs using C# within the .NET framework.

CO2: Apply object-oriented programming concepts to build modular and reusable .NET applications.

CO 3: Design and implement GUI-based applications using Windows Forms and standard controls.

CO4: Implement database connectivity using ADO.NET to create dynamic, data-driven applications.

CO5: Apply exception handling, event handling, and string manipulation in .NET application development.

SECOND SEMESTER

Course	Details
Code	24MCAH201
Title	**Principles of Data Science**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ Second
Type	Hardcore : Course 1
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	• Interactive lectures to build strong foundations in data analytics concepts, statistical methods and analytical techniques. • Group discussions to promote analytical thinking, practical skills, and the ability to interpret and communicate data-driven insights.
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars

Learning Objectives : To learn

- The probability distributions and density estimations to perform analysis of various kinds of data .
- The statistical analysis techniques using Python and R programming languages.
- Expand the knowledge in R and Python to use it for further research.
- The students will be able to carry out data analysis/statistical analysis effectively visualize the data.

Expected Learning Outcomes:

Upon the completion of this course, the students will be able to :

CO1: Realize the importance of filtering functions, charts and tables.

CO2: Identify the importance and usage of R package and its features

CO3: Learn the fundamentals of python programming.

CO4: Understand the various search methods and visualization techniques.

CO5: Learn to use various techniques for mining data stream and applications using Map Reduce Concepts.

Course	Details
Code	24MCAH201
Title	**Software Engineering**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ Second
Type	Hardcore : Course 2
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Interactive lectures combined with demonstration-based and problem-based learning to strengthen conceptual understanding. Hands-on practical sessions through JUNIT test debugging activities help students apply software development life cycle concepts in practice.
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars

Learning Objectives : To

- Be agile software developers with a comprehensive set of skills appropriate to the needs of the dynamic global computing-based society.
- Capable of team and organizational leadership in computing project settings, and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.
- Acquire skills and knowledge to advance their career, including continually upgrading professional, communication, analytic, and technical skills.
- To understand project scheduling concept and risk management associated to various type of projects.

Expected Learning Outcomes:

Upon the completion of this course, the students will be able to :

CO1: Recognize the software engineering and software process.

CO2: Realize the concepts of agile methods and software testing.

CO3: Define various software application domains and remember different process model used in software development.

CO4: An ability to apply engineering design to produce solutions that meet specified needs.

CO5: Consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

Course	Details
Code	24MCAH203
Title	**Data Communications and Computer Networks**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ Second
Type	Hardcore : Course 3
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, practical networking concepts and real-world applications, Lab-Integrated Teaching, Assignments, Seminars and Presentations
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem-Based Learning skills

Learning Objectives :

- Acquire the computer networking knowledge as well as the existing connectivity technologies and the required infrastructure which comprises the key steps involved in the communication process.
- Identify the key issues for the realization of the LAN/WAN/MAN network architectures and the hybridized existing form in the business environment and enterprise.
- Establish a solid knowledge of the layered approach that makes design, implementation and operation of extensive networks possible. To learn the 7-layer OSI network model (each layer and its responsibilities) and understand the TCP/IP suite of protocols.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1 : Understanding the basic communication concepts in real time applications

CO2 : Identify the different networking and internetworking devices and their functions within a network

CO3 : Familiar with the protocols in DC and CN and their future uses in various applications

CO4 : Know the Importance of ISO - OSI and TCP / IP reference model and functions of each layer.

CO5 : Clearly understand the importance of services of all layers

CO6 : Familiar with the architecture of a number of different networks and classifications.

CO7 : Gather the importance of all applications protocols and port specifications.

Course	Details
Code	24MCAS201
Title	**Android Programming**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ Second
Type	Softcore : Course 1
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	The course adopts a blended learning approach combining interactive lectures with live demonstrations to explain Android OS concepts and application components. Hands-on laboratory sessions enable students to design, develop, and test Android applications using real-time tools and emulators. Mini-projects and problem-based learning are used to strengthen practical skills and industry readiness.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem-Based Learning skills

Learning Objectives :

- Fundamentals of Android Operating systems, android application components and android development framework.
- Designing of Android User Interfaces using various components like buttons, text views, toggle buttons, check boxes, spinners etc.
- How to develop software's with reasonable complexity and deploying software to mobile devices.
- The concept of intents and broadcasts, persistent storage and database connectivity concepts.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1 : Demonstrate their understanding of the fundamentals of Android operating systems.

CO2 : Show their skills of using Android software development tools.

CO3 : Deploy software to mobile devices and debug the programs.

CO4 : Understands the working of Android OS Practically and able to develop, deploy and maintain the Android Applications.

CO5 : Understands the concept of persistent storage and develop User Interface.

CO6 : Recognizes basics of SQLlite database and perform various possible operation on database.

Course	Details
Code	24MCAE205
Title	**Cloud Computing**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ Second
Type	Elective course - 5
Total Credits	03
Total Contact Hours	36
Contact Hours per Week	03
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	The course is delivered through interactive lectures to introduce core cloud computing concepts, architectures, and service models. Demonstration-based learning is used to explain virtualization technologies, cloud platforms (IaaS, PaaS, SaaS), storage models, and security services.
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars and case study .

Learning Objectives : To

- Characteristics and design principles of grid and cloud computing.
- Security mechanisms in grid and cloud computing applications.
- Designing methodologies of distributed computing and Importance of cloud computing environments.
- The concepts of virtualization and use of cloud service models.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Demonstrate an in-depth understand of the design principles of grid and cloud computing.

CO2: Design and demonstrate distributed computing applications.

CO3: Understand cloud based data storage, cloud based database solutions and research trends in cloud computing.

CO4: An ability to apply engineering design to produce solutions that meet specified needs.

CO5: Analyze cloud security issues and applications of Fog computing.

Course	Details
Code	24MCAP201
Title	**Principles of Data Science Lab**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ Second
Type	Practicals: course -1
Total Credits	03
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	The course adopts a hands-on, practice-oriented pedagogy where core data analytics concepts are reinforced through guided laboratory sessions using Python. Students work with real-world datasets to perform data preprocessing, statistical analysis, visualization, and modeling. Demonstration-based learning, guided coding and debugging, and problem-based exercises are used to apply statistical tests, regression, classification, clustering, and association rule mining techniques. Mini-projects, case studies, and group discussions will be conducted.
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars

Learning Objectives : To

- The probability distributions and density estimations to perform analysis of various kinds of data
- The statistical analysis techniques using Python and R programming languages.
- Expand the knowledge in R and Python to use it for further research.
- The students will be able to carry out data analysis/statistical analysis effectively visualize the data.

Expected Learning Outcomes:

Upon the completion of this course, the students will be able to :

CO1: Realize the importance of filtering functions, charts and tables.

CO2: Identify the importance and usage of R package and its features

CO3: Learn the fundamentals of python programming.

CO4: Understand the various search methods and visualization techniques.

CO5: Learn to use various techniques for mining data stream and applications using Map Reduce Concepts.

Course	Details
Code	24MCAP203
Title	**Android Programming Lab**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	First/ Second
Type	Practicles : Course 3
Total Credits	03
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	The course adopts a blended learning approach combining interactive lectures with live demonstrations to explain Android OS concepts and application components. Hands-on laboratory sessions enable students to design, develop, and test Android applications using real-time tools and emulators. Mini-projects, case studies, and problem-based learning are used to strengthen practical skills and industry readiness.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem-Based Learning skills

Learning Objectives :

- Fundamentals of Android Operating systems, android application components and android development framework.
- Designing of Android User Interfaces using various components like buttons, text views, toggle buttons, check boxes, spinners etc.
- How to develop software's with reasonable complexity and deploying software to mobile devices.
- The concept of intents and broadcasts, persistent storage and database connectivity concepts.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1 : Demonstrate their understanding of the fundamentals of Android operating systems

CO2 : Show their skills of using Android software development tools

CO3 : Deploy software to mobile devices and debug the programs

CO4 : Understands the working of Android OS Practically and able to develop, deploy and maintain the Android Applications..

CO5 : Understands the concept of persistent storage and develop User Interface.

CO6 : Recognizes basics of SQLlite database and perform various possible operation on database.

COURSE OUTCOMES (COs)

THIRD SEMESTER

Course	Details
Code	24MCAH301
Title	**Machine Intelligence**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second /Third
Type	Hardcore: Course-1
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	The course is delivered using an application-driven and hands-on pedagogy that combines interactive lectures with guided laboratory sessions to build strong foundations in machine learning and deep learning concepts. Demonstration-based learning and guided coding exercises are used to implement learning paradigms, neural network models, optimization techniques, and regularization methods..
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars

Learning Objectives : To

- The basic exposition to the goals and methods of Artificial Intelligence.
- Apply these techniques in applications which involve perception, reasoning and learning.
- To have an understanding of the basic issues of knowledge representation and blind and heuristic search.
- The basic understanding of some of the more advanced topics of AI such as learning, natural language processing, agents and robotics, expert systems, and planning.

Expected Learning Outcomes:

Upon the completion of this course, the students will be able to :

CO1: Realize the state space and its searching strategies.

CO2: Understand machine learning concepts and range of problems that can be handled by machine learning.

CO3: Discuss the core concepts and algorithms of advanced AI, including informed searching Algorithm, Different Types of Machine Learning Approaches

CO4: An ability to apply engineering design to produce solutions that meet specified needs.

CO5: Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems.

Course	Details
Code	24MCAH302
Title	**Internet Of Things**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second/ Third
Type	Hardcore
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	The course follows a hands-on and experiential approach with interactive lectures and demonstrations to explain core IoT concepts and architectures. Practical lab sessions and mini-projects enable students to design and implement basic IoT systems using devices, sensors, and cloud integration.
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars

Learning Objectives : To

- Understand the concepts of Internet of Things.
- Analyze basic protocols in wireless sensor network.
- Design IoT applications in different domain and be able to analyze their performance.
- Implement basic IoT applications on embedded platform.

Expected Learning Outcomes:

Upon the completion of this course, the students will be able to :

CO1: Understand IoT applications and Architectures in real world and realize the various IoT Protocols

CO2: Differentiate between the levels of the IoT stack and be familiar with the key technologies

CO3: To provide an overview on the ICT ecosystem and enabling environment

CO4: To provide an understanding of the technologies and the standards relating to the IoT.

CO5: To develop skills on IoT technical planning and Identify how IoT differs from traditional data.

Course	Details
Code	24MCAH303
Title	**Advanced Database Management Systems**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second /Third
Type	Hardcore : Course-3
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, practical networking concepts and real-world applications, Lab-Integrated Teaching, Assignments, Seminars and Presentations
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars

Learning Objectives : To

- Basics of NoSQL databases, Relational Databases, Information Retrieval and XML databases.
- The concepts of column databases, distributed database and data warehousing schemes
- Various concepts of MongoDB and types of consistency.
- Advance Databases, Convergent databases and Disruptive Databases.

Expected Learning Outcomes:

Upon the completion of this course, the students will be able to :

CO1: Explore the concepts of NoSQL Databases.

CO2: Understand and use columnar and distributed database patterns.

CO3: Learn to use various Data models for a variety of databases.

CO4: Explore the relationship between Big Data and NoSQL databases

CO5: Understands the concept of MongoDB and types of consistency.

Course	Details
Code	24MCAS302
Title	**Image Processing**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second / Third
Type	Hardcore : Course 2
Total Credits	04
Total Contact Hours	48
Contact Hours per Week	04
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, Assignments, Seminars and Presentations, visual understanding, analytical thinking, and hands-on skill development.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem-Based Learning skills

Learning Objectives :

- Fundamental concepts of a digital image processing system.
- Analyze the basic algorithms used for image processing & image compression with morphological image processing.
- To study the image fundamentals and mathematical transforms necessary for image processing.
- Design algorithms to solve image processing problems and meet design specifications.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Understand the need for image transforms different types of image transforms and their properties.

CO2: Develop any image processing application and understand the rapid advances in Machine vision.

CO3: Learn different techniques employed for the enhancement of images.

CO4: Identify different causes for image degradation and overview of image restoration Techniques.

CO5: Explain different Image enhancement techniques

CO6: Design & Synthesize Color image processing and its real world applications.

CO7: Come across the image representation with their model approaches.

Course	Details
Code	24MCAE304
Title	**Natural Language Processing**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second /Third
Type	Elective
Total Credits	03
Total Contact Hours	48
Contact Hours per Week	03
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	The course adopts a practical and application-oriented approach combining interactive lectures with guided laboratory and coding sessions. Students gain hands-on experience in text preprocessing, representation techniques, classical NLP models, and modern neural architectures including transformers and large language models. Case studies, mini-projects, and real-world datasets are used to strengthen conceptual understanding and develop practical skills in NLP applications such as sentiment analysis, translation, and question answering.
Evaluation Method	Two Internal Assessment Exams, University Semester Exam, & seminars

Learning Objectives : To

- To introduce students the challenges of empirical methods for natural language processing (NLP) applications
- To introduce basic mathematical models and methods used in NLP applications to formulate computational solutions.
- To introduce students research and development work in information retrieval, information extraction, and knowledge discovery using different natural language resources.
- Understand the principles of language resource annotation and its use in machine learning applications and apply the above principles in analysis of data and acquire intended information through the use of available tools.

Expected Learning Outcomes:

Upon the completion of this course, the students will be able to :

CO1: Understand basic approaches to syntax and semantics in NLP.

CO2: Realize approaches to discourse, generation and dialogue in NLP

CO3: Familiarize the current methods for statistical approaches to machine translation.

CO4: Understand machine learning techniques used in NLP, including hidden Markov models and probabilistic context-free grammar.

CO5: Familiar with clustering and unsupervised methods, log-linear and discriminative models, and the EM algorithm as applied within NLP

Course	Details
Code	24MCAP305
Title	**Image Processing Lab**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second / Third
Type	Practicles : Course 5
Total Credits	03
Total Contact Hours	48
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Lectures with interactive sessions, Assignments, Seminars and Presentations, visual understanding, analytical thinking, and hands-on skill development.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, University Semester Exam, seminars, Problem-Based Learning skills

Learning Objectives :

- Fundamental concepts of a digital image processing system.
- Analyze the basic algorithms used for image processing & image compression with morphological image processing.
- To study the image fundamentals and mathematical transforms necessary for image processing.
- Design algorithms to solve image processing problems and meet design specifications

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Understand the need for image transforms different types of image transforms and their properties.

CO2: Develop any image processing application and understand the rapid advances in Machine vision.

CO3: Learn different techniques employed for the enhancement of images.

CO4: Identify different causes for image degradation and overview of image restoration Techniques.

CO5: Explain different Image enhancement techniques

CO6: Design & Synthesize Color image processing and its real world applications.

CO7: Come across the image representation with their model approaches

Course	Details
Code	24MCAM301
Title	**Mini Project and Domain Knowledge Seminar**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second / Third
Type	MINI project
Total Credits	03
Total Contact Hours	12
Contact Hours per Week	06
Examination Duration	03 Hours
Max. Marks	CIA :30 End Semester Exam : 70 Total : 100
Total Modules	04
Pedagogy	Seminars on selected domains, Presentations of synopsis and implementation, and hands-on skill development.
Evaluation Method	Viva-Voce, two Internal Assessment Exams, seminars , CIA and University Semester Exam.

Learning Objectives :

- Apply theoretical knowledge of image processing to solve real-world problems.
- Analyze, design, and implement image processing algorithms using appropriate tools and techniques.
- Develop problem-solving, teamwork, and project management skills through hands-on implementation.
- Gain experience in integrating image processing concepts with practical applications.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Identify a real-time problem and formulate it using image processing concepts.
CO2: Design and implement image processing algorithms to meet defined project objectives.
CO3: Analyze experimental results and evaluate system performance.
CO4: Demonstrate the ability to use software tools and programming environments for image processing.
CO5: Work effectively as a team and communicate technical ideas through documentation and presentation.

COURSE OUTCOMES (COs)

FOURTH SEMESTER

Course	Details
Code	**24MCAP401**
Title	**Dissertation and Viva-Voce**
Programme	Master of Computer Applications (M.C.A.)
Year / Semester	Second / Fourth
Type	Hardcore : Course 3
Total Credits	16
Total Contact Hours	32
Contact Hours per Week	5
Examination Duration	--
Max. Marks	CIA :100 End Semester Exam : 300 Total : 400 [Dissertation Valuation – 200 marks; Viva - Voce - 100 marks]
Total Modules	--
Pedagogy	A research-oriented, mentor-guided pedagogy that emphasizes independent learning, problem identification, solution design, and professional communication.
Evaluation Method	Viva-Voce, Project phase seminars, Dissertation Valuation, University Semester Exam

Learning Objectives :

- To offer students a glimpse into real world problems and challenges that is needed in IT industries
- To enable students to create very precise specifications of the IT solution to be designed.
- To introduce students to the vast array of literature available of the various research/project challenges in the field of IT.
- To create awareness among the students of the characteristics of several domain areas where IT can be effectively used.

Expected Learning Outcomes :

Upon the completion of this course, the students will be able to :

CO1: Discover potential research areas in the field of IT.
CO2: Conduct a survey of several available literature in the preferred field of study.
CO3: Compare and contrast the several existing solutions for research/project challenge.
CO4: Demonstrate an ability to work in teams and manage the conduct of the research/project study.
CO5: Formulate and propose a plan for creating a solution for the research/project plan Identified.
CO6: Report and present the findings of the study conducted in the preferred domain.
CO7: Improve communication and management skills of the students.