



NCRD's Sterling Institute of Management Studies

Nerul, Navi Mumbai

Internal Quality Assurance Cell (IQAC)

MCA PROGRAM

Graduate Attributes & Program Outcomes (POs)

Program Outcome (PO) No.	Graduate Attributes	Program Outcomes (POs)
PO1	Computational Knowledge	Apply knowledge of computing fundamentals and mathematics for solving complex problems and to formulate IT solutions.
PO2	Problem Analysis	Identify, analyze and formulate the real world requirements in computing domain for solving problems.
PO3	Design /Development of Solutions	Design and develop applications and appropriate software tools to meet certain specification.
PO4	Conduct Investigations of Complex Computing Problems	Analyze and review literatures to invoke the research skills to design and interpret in order to reach valid conclusions.
PO5	Modern Tool Usage	Create, select and apply appropriate techniques, resources, and latest computing tools for hard computing practices.
PO6	Professional Ethics	Apply ethical principles and adhere to professional ethics, cyber regulations and norms of application development.
PO7	Life-long Learning	Involve in lifelong learning for a continued career development and progress as a computer professional
PO8	Project Management and finance	Understand and apply IT and project management principles to manage Software projects.
PO9	Communication Efficacy	Communicate effectively using recent technology with the Software professionals and society through report

Program Outcome (PO) No.	Graduate Attributes	Program Outcomes (POs)
		writing as well as technical presentations.
PO10	Societal and Environmental Concern	Understand and assess societal, environmental, health, safety, legal, cultural issues and impact of software solutions.
PO11	Individual and Team Work	Function effectively both as a team leader and team member on multi disciplinary projects.
PO12	Innovation and Entrepreneurship	Discover openings and use novel thoughts for creating opportunity and to produce successful Entrepreneur.

Program Specific Outcome (PSOs)

PSO1	Solve real world problems by creating well designed Software solutions.
PSO2	Ability to work as skilled technocrats and vibrant entrepreneurs for the positive impact on business and society.

NCRD's Sterling Institute of Management Studies

Master of Computer Applications: MCA

Course Outcomes

SEMESTER I

Subject Code : MCA101

Subject Name : Object Oriented Programming

CO1	Justify various OOPs concepts
CO2	Apply object oriented programming concepts
CO3	Develop applications using C++
CO4	Solve real life complex problems

Subject Code : MCA102

Subject Name : Software Engineering & Project Management

CO1	Apply use of knowledge of Software Life Cycle to successfully implement the projects in the corporate world
CO2	Identify the Inputs, tools and techniques to get the required Project deliverable and Product deliverable using 10 Knowledge areas of Project Management
CO3	Implement Project Management Processes to successfully complete project in IT industry
CO4	Illustrate various Software cost estimation techniques

Subject Code : MCA103

Subject Name : Computer Organization and Architecture

CO1	Understand the fundamentals of digital logic for designing basic computer architecture.
CO2	Identify performance issues in processor and memory design of a digital computer.
CO3	Compare characteristics and features of different computer architectures and hardware
CO4	Discuss design factors of multiprocessor organization & architecture

Subject Code : MCA104

Subject Name : IT in Management

CO1	Understand the global business environment
CO2	Apply knowledge of business concepts and functions in an integrated manner
CO3	Compare IT –based solutions with the business environment
CO4	Determine use of current techniques, skills and tools necessary for computing practice

Subject Code : MCA105

Subject Name : Statistics And Probability

CO1	Classify quantitative and categorical data
CO2	Apply different statistical measures on data
CO3	Interpret the working knowledge of probability, statistics and mathematical modeling.
CO4	Compare different types of Probability and their fundamental applications

Subject Code : MCA L101

Subject Name : Lab 1-SEPM and OOP Lab

CO1	Construct the solution to a problem using Object Oriented Programming
CO2	Demonstrate use of C++ Concepts
CO3	Develop real time applications
CO4	Make use of Project management processes to successfully complete project in IT industries

Subject Code : MCA L102

Subject Name : Lab-II: Web Technologies and Mini Project Lab

CO1	Explain web application terminologies, Internet Tools, E – Commerce and other web services
CO2	Develop dynamic webpages using various web technologies
CO3	Combine multiple web technologies to create advanced web components
CO4	Design websites using appropriate security principles, focusing specifically on the vulnerabilities inherent in common web implementations

SEMESTER II

Subject Code : MCA201

Subject Name : Data Structures

CO1	Analyze and compute efficiency of various algorithms using data structure model
CO2	Explain linear and non-linear data structures
CO3	Implement static and dynamic representation of abstract data type and their usage in real life application
CO4	Use efficient storage mechanisms of data for an easy access
CO5	To introduce various techniques for representation of the data in the real world
CO6	Describe representation of linear data structures in memory and used by algorithms and their applications

Subject Code : MCA202

Subject Name : Operating System

CO1	Classify and compare different styles of operating system designs
CO2	Analyze process management, I/O management, memory management functions of Operating System
CO3	Analyze and design the applications to run in parallel either using process or thread models of Linux and other OS
CO4	Utilize process scheduling and disk scheduling algorithms
CO5	Explore file management and protection and security concepts
CO6	Construct various shell scripts and awk programming
CO7	Make use of various file processing commands used in Linux

Subject Code : MCA 203

Subject Name : Computer Networks

CO1	Describe basic computer network protocols and their use in network design technology
CO2	Explain Data Communications System and its components
CO3	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer
CO4	Identify the different types of network devices and their functions within a Network
CO5	Explain the practical issues and various networking devices with their interconnections and configurations
CO6	Design various networking applications using packet tracer tool

Subject Code : MCA 204

Subject Name : Financial Accounting and Management

CO1	Apply accounting functions as an information development and communication system that supports economic decision making and provides value to entities and society
CO2	Create financial statements and related information and apply analytical tools in making both business and financial decisions
CO3	Analyze the impact of accounting system on several business functions and manager's decision making
CO4	Analyze and use financial statements; prepare budgets and investment options; assess risks and the rewards involved in firm's financial decisions

Subject Code : MCA205

Subject Name : Decision Making and Mathematical Modeling

CO1	Develop mathematical and logical thinking
CO2	Model situations from variety of settings in generalized mathematical form
CO3	Solve the real world business problem
CO4	Apply advanced modeling techniques to decision Making problems with the objective of enhancing the decision-making capabilities

Subject Code : MCA L201

Subject Name : Operating System and Computer Networks Lab (OS and CN Lab)

CO1	Apply various operating system commands
CO2	Develop shell scripts and awk programming
CO3	Explain the practical issues and various networking devices with their interconnections and configurations
CO4	Design various networking applications using packet tracer tool
CO5	Design network for any business requirement

Subject Code : MCA L202

Subject Name : Lab-II: Data Structure(D S) & Web Application Development using Open Source Tools Lab

CO1	Describe linear and non-linear data structures
CO2	Use the data structure model
CO3	Implement static and dynamic representation of abstract data type and their usage in real life application
CO4	Use efficient storage mechanisms of data for an easy access
CO5	Introduce various techniques for representation of the data in the real world
CO6	Explain representation of linear data structures in memory and used by algorithms and their applications

SEMESTER III

Subject Code : MCA301

Subject Name : Database Management Systems

CO1	Classify database schema for a given problem-domain, Normalize a database
CO2	Buildquery for database using SQL commands
CO3	Make use ofthe integrity constraints on database
CO4	Select the mechanism in which data can be stored, organized and manipulated in a database system
CO5	Apply various indexing and optimization techniques to process queries
CO6	Analyze and design database applications using suitable database techniques

Subject Code : MCA302

Subject Name : Java Programming

CO1	Solve computational problems using basic construct
CO2	Find a solution for real world problems using Java
CO3	Make Use of GUIs and event driven programming
CO4	Make Use of Web Applications using Server Side Programming
CO5	Construct Frame work using JAVA

Subject Code : MCA 303

Subject Name : Information Security

CO1	Summarize the requirement of information security and a clear understanding of its importance
CO2	Identify information security threats and countermeasures with information security designs using available secure solutions
CO3	Make use of database security mechanisms, intrusion detection systems, formal models of security, cryptography, network, web security

Subject Code : MCA 304

Subject Name : Operation Research

CO1	Explain Operations research methodology to a broad range of problems in business and industry
CO2	Make use of mathematics and mathematical modeling using computers to forecast the implications of various choices
CO3	Apply concepts of PERT and CPM in business problems
CO4	Analyze various methods for solving optimization problems

Subject Code : MCA 305

Subject Name : Software Testing and Quality Assurance

CO1	Explain Software Testing in Software Development
CO2	Identify Software Testing Techniques, tools and for finding bugs in Software
CO3	Make use of quality assurance methods to ensure quality of software
CO4	Solve the problems using Software Testing techniques and Approaches
CO5	Explain open source software Testing Tools

Subject Code : MCA L301

Subject Name : Database Management systems and Software Testing Lab

CO1	Design database systems using available tools
CO2	Develop applications using basic and modern database techniques as per organization requirements
CO3	Demonstrate software testing tools
CO4	Construct test design documents and test reports

Subject Code : MCAL302

Subject Name : Java Programming and Unified Modeling Language Lab

CO1	Develop a simple software application using the object oriented approach
CO2	Design and develop a Java Web Applications
CO3	Apply UML tools for object oriented software modeling

Subject Code : MCA PR301

Subject Name : Mini Project

CO1	Design and develop a mini-project
CO2	Adapt project management skills
CO3	Take part in small groups on medium scale computing projects
CO4	Demonstrate the ability to produce a technical document

SEMESTER IV

Subject Code : MCA 401

Subject Name : Data Mining and Business Intelligence

CO1	Explain BI techniques and applications
CO2	Demonstrate various data mining skills using software tools
CO3	Apply data warehouse concepts for data analysis and report generation
CO4	Make use of theories, concepts and techniques to solve real-world BI problems

Subject Code : MCA 402

Subject Name : Advanced Web Technologies

CO1	Explain UI applications using C#
CO2	Design and develop secure web applications using asp.net according to industry standards
CO3	Define custom web services

Subject Code : MCA 403

Subject Name : Computer Graphics

CO1	Explain different algorithms of Computer Graphics
CO2	Apply 2 D transformation techniques
CO3	Analyze 3 D transformation techniques
CO4	Apply image processing techniques

Elective-I : MCA404

Subject Code : MCA 4041

Subject Name : Entrepreneurship Management

CO1	Explain the concepts and fundamentals of Entrepreneurship
CO2	Analyze the process of Business Idea generation and converting the idea into a Business Model
CO3	Determine the Role of Small Scale Industries (SSI) & Institutions Supporting Small Scale Enterprise
CO4	Explain exit strategies and Social Responsibilities

Subject Code : MCA 4042

Subject Name : Business Infrastructure and Management

CO1	Adapt the transformations from traditional business to e-business
CO2	Identify the Infrastructure and Security issues related to e-business
CO3	Explain current scenarios of digital world and applications of it

Subject Code : MCA 4043

Subject Name : Enterprise Resource Planning

CO1	Explain the basic structure of ERP
CO2	Identify implementation strategy used for ERP
CO3	Apply design principles for various business module in ERP
CO4	Analyze different emerging technologies for implementation of ERP

Subject Code : MCA 4044

Subject Name : Ethics & CSR

CO1	Explain ethical theories and ethics in profession
CO2	Examine global issues in ethics
CO3	Apply Ethical Code, Audit and living in real world
CO4	Analyze Corporate Social Responsibility and its framework

Elective-II : MCA405

Subject Code : MCA 4051

Subject Name : Digital Forensics

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CO1	Classify computer forensic awareness
CO2	Make use of the knowledge for investigations in order to solve computer crime
CO3	Demonstrate best practices for incidence response
CO4	Apply computer forensic tools for investigation

Subject Code : MCA 4052

Subject Name : Simulation & Modeling

CO1	Explain concepts and steps in simulation study
CO2	Classify the types of simulation
CO3	Apply functional modeling to model the activities of a static system
CO4	Analyze the behavior of a dynamic system and create a model for a dynamic system
CO5	Create the simulation models of real systems

Subject Code : MCA 4053

Subject Name : Next Generation Networks

CO1	Evaluate the importance of packet switching for NGN
CO2	Analyze and differentiate various architectures of a next generation network (NGN)
CO3	Compare multiple services offered by NGN

Subject Code : MCA 4054

Subject Name : Artificial Intelligence and Soft Computing

CO1	Explain various AI concepts
CO2	Solve the problems using neural networks techniques.
CO3	Apply fuzzy logic techniques to find solution of uncertain problems
CO4	Analyze the genetic algorithms and their applications

Subject Code : MCA L401

Subject Name : Advanced Web Technology and Data Mining and Business Intelligence Lab

(AWT and DMBI Lab)

CO1	Develop Windows forms applications and Web Applications using Dot NET Technologies
CO2	Apply Data warehousing and mining techniques
CO3	Design and implement web enabled BI application for industry

Subject Code : MCA L402

Subject Name : Computer Graphics and Image Processing Lab

CO1	Develop programs based on algorithms of Computer Graphics.
CO2	Make use of 2D transformation concepts
CO3	Make use of 3D transformation concepts
CO4	Analyze various image processing techniques

Subject Code : MCAL403 Activity Lab

Subject Name : Soft Skills Development

CO1	Explain the significance and mechanism of communication and interpersonal skills, and the usage in professional space and technical domain.
CO2	Make use of proficiency in written business correspondence, research and analysis of documents for effective communication with society at large.
CO3	Combine good work ethics and etiquette awareness for effective corporate functioning.
CO4	Demonstrate the art of communication for developing their careers and also as a lifelong learning.
CO5	Develop a holistic personality ready for confident work and professional life.

SEMESTER V

Subject Code :MCA501

Subject Name : Wireless and Mobile Technology

CO1	Explain characteristics of mobile networks and wireless communication
CO2	Compare the various wireless technologies and its applications
CO3	Determine the concept on generation of cellular networks and its standards used
CO4	Plan a wireless communications system for a given environment
CO5	Apply the appropriate technology in the applications

Subject Code : MCA 502

Subject Name : Advance Distributed Computing

CO1	Explain design techniques and constraints of distributed computing
CO2	Analyze the concepts of failure detection and recovery, shared memory and group communication in distributed system
CO3	Examine various models for distributed systems and concepts in message passing
CO4	Identify different cloud technologies available
CO5	Designing security and storage in cloud technologies

Subject Code : MCA 503

Subject Name : User Experience Design

CO1	Explain the Characteristics of Graphics Interface and its Principles
CO2	Design the standards and structures
CO3	Apply the Prototype and kinds of tests
CO4	Analyze an interaction design problem and propose a user-centered process, justifying the process and identifying the trade-offs
CO5	Construct high quality, professional documentation and artifacts relating to the design process for preparation for a professional portfolio

Electives I: Department Level Electives(MCADLE504)

Subject Code : MCADLE5041

Subject Name : Big Data Analytics

CO1	Develop and maintain reliable, scalable systems using Apache HADOOP
CO2	Design Map Reduce based application
CO3	Compare conventional SQL and NoSQL
CO4	Analyze and develop Big Data solutions using HIVE and PIG

Subject Code : MCADLE5042

Subject Name : Machine Learning

CO1	Explain the concepts of machine learning
CO2	Analyze the Machine Learning techniques
CO3	Apply regression, classification with AdaBoost and clustering methods to real world applications
CO4	Illustrate support vector machine, Dimensionality reduction, Anomaly detection, Recommender Systems

Subject Code : MCADLE5043

Subject Name : Internet of Things

CO1	Explain the use of IoT from a global context
CO2	Discuss simple applications using IoT
CO3	Analyze the IoT enabling Technologies
CO4	Determine the real world problems and challenges in IoT

Subject Code : MCADLE5044

Subject Name : Multimedia System Design

CO1	Assess multimedia architecture and its latest applications
CO2	Implement compression, decompression techniques and different formats for image, audio and video
CO3	Plan and develop multimedia projects

Electives II: Institute Level Electives (MCAILE505)

Subject Code : MCAILE5051

Subject Name : Intellectual Property Rights and Patents

CO1	Explain Intellectual Property assets
CO2	Support individuals and organizations in capacity building
CO3	Distinguish information across organizations
CO4	Take part in development, promotion, protection, compliance, and enforcement of Intellectual Property and Patenting.

Subject Code : MCAILE5052

Subject Name : Research Methodology

CO1	Create a preliminary research design for projects in their subject matter areas
CO2	Analyze the collected data and make report
CO3	Interpret complex data or situations clearly
CO4	Discuss the research findings

Subject Code : MCAILE5053

Subject Name : Management Information System

CO1	Explain theoretical aspects of Management Information Systems
CO2	Apply the procedures and practices for performing information system planning and design.
CO3	Analyze various Decision Support Systems
CO4	Determine the implications of Management Information Systems on business

Subject Code : MCAILE5054

Subject Name : Green Computing

CO1	Develop awareness among stakeholders and promote green initiatives in their environments leading to a green movement
CO2	Adapt special skills such as knowledge about energy efficiency, ethical IT assets disposal, carbon footprint estimation.
CO3	Create eco-friendly environment in IT industry

Subject Code : MCAL501

Subject Name : Mobile Application and User Experience Design Lab

CO1	Demonstrate Android activities life cycle
CO2	Apply proficiency in coding on a mobile programming platform
CO3	Design and develop innovative android applications
CO4	Create real life application with end-to-end understanding of User experience practices.

Subject Code : MCAL502

Subject Name : Open Source System for ADC Lab

CO1	Design and Develop the solution to a problem using java concepts
CO2	Demonstrate use of java Concepts
CO3	Illustrate various advanced distributed concepts

Subject Code : MCAPR501

Subject Name : Mini Project

CO1	Design, implement and evaluate a project
CO2	Apply project management skills
CO3	Take part in a team effectively and ethically towards project development
CO4	Demonstrate the ability to produce a technical document

SEMESTER VI

Subject Code : MCA PR601

Subject Name : Internship- Project

CO1	Examine real life organizational and environmental situations
CO2	Develop technical skills as per the requirements of the domain
CO3	Adapt professional and interpersonal ethics
CO4	Apply SDLC phases in developing software project and in writing the project document

Subject Code : MCA602

Subject Name : Research Paper

CO1	Create research paper
CO2	Interpret data coherently and effectively to counter-hypothesis
CO3	Apply experience in preparation of research materials for publication or presentation