MCA

Programme Outcomes (PO) for Master of Computer Applications

On completion of MCA programme, the students are expected to

PO1: Apply knowledge of computing fundamentals, basic mathematics, Industry standard techniques, and domain knowledge appropriate to the industry requirement to design software solutions to complex problems of interest to society.

PO2: Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions based on fundamental principles of mathematics, Logical design principles, and relevant domain knowledge.

PO3: Design and evaluate solutions for complex computing problems, and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental betterment.

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

PO5: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.

PO6: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.

PO7: Recognize the need and develop the ability to continue as a self learner for the sustained development as a computing professional.

PO8: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader of a team, to manage projects and in multidisciplinary environments.

PO9: Communicate effectively with the computing community, and with society at large, about complex computing activities through comprehension, preparation of effective reports, documentation, presentations, and issue and understand unambiguous instructions.

PO10: Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.

PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.

PO12: Identify a timely opportunity to create value and wealth for the betterment of the individual and society at large.

Programme Specific Outcome (PSO) for MCA [Master of Computer Applications]

PSO 1: Acquire knowledge of different data mining algorithms and applications

PSO2: Acquire skills to design and develop algorithms and implement those using high-level programming languages.

PSO3: Acquire knowledge to design a solution to a given problem through software engineering lifecycle and quality assurance techniques; get knowledge of software effort estimation,activity planning and risk management

PSO4: Acquire knowledge of protocols used for communication and networking

PSO5: Design, develop and implement application software projects to meet the demands of industry requirements using modern tools and technologies.

2017-18 and 2018-2019 Academic year

Course Outcome of MCA (2017 admission onwards)

Semester 1
MCA 101 Discrete Mathematics and Statistics
CO 1 Understand the basic concepts of mathematical logic and apply it for inference theory
CO 2 Calculate numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations.
CO 3 Apply the solving techniques for recursive models.
CO 4 Calculate probabilities and conditional probabilities.
CO 5 Understand and apply the testing of hypothesis to practical cases.

MCA 102 Data Structures
CO1: Describe algorithm and complexities.
CO2: Describe data structure and its various operations.
CO3:Describe sparse matrices,stack,queue and their various applications.
CO4:Describe linked list and its various forms like doubly list,circular list etc.
CO5:Describe trees and its various forms like binary tree,binary search tree,threaded binary tree,AVL trees,B Trees.
CO6:Perform various sorting and searching techniques.
CO7:Describe graph and its traversals.
CO8:Describe the various file organizations.

MCA 103 Paradigms of Programming Languages
CO 1: Examine syntax analysis and grammar of programming language
 SubCO1.1:Identify language paradigm and evaluation criteria
 SubCO1.2:Examine regular expression,finite automata and grammar of programming language
 SubCO1.3:Construct scannar and parser using lex and yacc tools.
CO 2:Analyze Semantics and Inspect Imperative Programming Language
 SubCO2.1:Define Lambda calculus and Semantic tools
 SubCO2.2:Examine Impereative language variables ,referencing enviornment etc
 SubCO2.3:Evaluate Stck and SubPrograms
CO3:Investigate about Object Oriented Programming and functional languages
 SubCO3.1:Compare C++,C#,Ruby,Java and Python OOPS Concept
 SubCO3.2:Contrast different functional language like LISP,Haskell and ML
CO4:Assess logical,concurrent and distributed programming
 SubCO4.1:Examine various features of Prolog
 SubCO4.2:Demonstrate Fork in Unix,Threads in Java and network programming
CO5:Inspect about scripting language
 SubCO5.1:Compare and contrast about python as scripting language

MCA 104 Digital Systems & Computer Architecture
CO1: Compare and contrast number system representations and conversions. Relate various binary codes.
CO2: Describe the designing layouts of logic gates, combinational logic networks and its optimization.Narrate Combinational and sequential circuits.
CO3: Describe the structure and functioning of a digital computer, including its overall system architecture,   operating system, and digital components. Understand the organization of the Control unit,   Arithmetic and

Logical unit, Memory unit and the I/O unit. Describe instruction sequencing. Analyze the effect of addressing modes on the execution time of a program.

CO4: Understand characteristics of memory and their classification. Relate various I/O accessing mechanisma.

CO5: Discuss parallel processing architecture and classification. Explain instruction level parallelism

MCA 105 Problem Solving and Programming in C
CO1:Identify and abstract the programming task involved.

CO2:Approach the programming tasks using techniques learned and write pseudo-code.

CO3:Choose the right data representation formats like array, structure, pointer,unions, file etc based on the requirements of the problem.

CO4:Applying the various programming constructs like control statements,decision making statements,functions etc to solve the particular tasks.

CO5:Write the program on a computer, edit, compile, debug, correct, recompile and run it.

MCA 106T-C PRACTICALS
CO1: Illustrate flowchart and algorithm to the given problem.

CO2:Understanding the basic structure of c programming,declarations and usage of variables.

CO3:Write C Programs using operators

CO4:Exercise conditional and iterative statements to write C Prorgram.

CO5:Write C Programs using pointers, arrays ,strings and functions

CO6:Write C Program using pointers and allocate memory using dynamic memory management functions

CO7:Exercise user defined data types.

CO8:Implementation of Files

MCA 107 Data Structures through C - Practicals
CO1: Be able to design and analyze the time and space efficiency of the data structure

CO2: Be capable to identity the appropriate data structure for given problem ·

CO3: Have practical knowledge on the applications of data structures

MCA 108 English for Professional Communication
CO 1 Describe the process, barriers, types and principles of communication.

CO 2 Narrated the media of communication. Merits and demerits of written and oral communication.

CO 3 English with emphasis on LSRW skills. The concepts of process and requisites of good Listening and Reading skills and utility aids for communication.

CO4 The concepts of soft skills such as team work, professional etiquettes, leadership strategies,interpersonal and networking skills. Preparation for oral presentation.

CO 5 Manage different situation and negotiate good English communication. Think and analyze the situations and make good presentations of their work and decisions. How to prepare seminar, bio-data, official letters. Important tips for facing interviews.

Semester2

MCA 201 Optimization Techniques & Numerical Methods
CO 1   Understand various operations research models and its applications

CO 2   Solve the linear programming problems using various methods

CO 3   Describe the duality concepts and its relevance.
CO 4   Solve transportation and assignment problems
CO 5   Describe the functions and costs of an inventory system and familiarize
        various inventory models
CO 6   Apply numerical methods to obtain approximate solutions to mathematical
        problems.

MCA 202 Operating Systems
CO1 Describe and explain the fundamental components of a computer operating
     system.
CO2 Define, restate, discuss, and explain the policies for scheduling,
     deadlocks, memory management, synchronization, system calls, and
     file   systems.
CO3 Describe and extrapolate the interactions among the various components of
     computing systems.

MCA 203 Database Management Systems

CO1 - Describe the advantages of DBMS over traditional file system and the
       fundamental elements of DBMS and understand DBMS architecture.
CO2 – Translate ER model to Relational model and basics of relational algebra.
CO3 – Improve the database design by Normalization.
CO4 – Formulate SQL queries on data,manage transactions and handle concurrent
       transactions and database recovery.
CO5 – Understand enhanced database models.

MCA204 Data Communication and Networks
CO 1: Explain different data communication techniques,aspects of network hard ware
       and software.
CO 2: Discuss various transmission media, datalink layer services ;compare and
       contrast protocol standards.
CO 3: Explain network layer design issues, routing and congestion control algorithms
CO 4: Discuss transport layer and application layer protocols and multimedia
CO 5: Explain the aspects related to cryptography.

MCA 205 Web Technologies
CO1: Introduce the basic terms of   internet, protocols and web application
      architecture
CO2: Implement interactive web page(s) using HTML, CSS and XML.
CO3: Design a responsive web site using Javascript and the concept of AJAX
CO4: Build Dynamic web site using JSP with Database connectivity and introduce
      COM/DCOM model
CO5: Introduce Ruby language and Rails Application with Databases

MCA 206 DBMS Practicals
CO1 -   Install MySQL and perform table design with constraints.
CO2 – Formulate SQL queries with SQL Data Definition Language(DDL) commands
       and Data Manipulation (DML) commands.
CO3 – Use triggers, functions and procedures using PL/SQL.
CO4 – Develop sample applications using MySQL as Back End .

MCA 207 Web Technologies Practicals
CO1: Generate and develop static as well as dynamic website using HTML,CSS, Javascript,JSP and Ruby.
CO2: Also implement data base connectivity in JSP and Rails

Semester 3

MCA 301 Principles of Management and Accounting
CO1 : Intoduction to managerial concept,Define different approaches of management thought,Classify planning, Discuss about organizing, Explain the delegation of authority
CO2 : Define staffing, Discuss about directing,Significance of motivation,Classify motivational theories
CO3 : Illustrate the key elements of an organizational behavior, Compare the concepts of individual and group behaviour in organization
CO4 : Explain the concepts of marketing management,Discuss about Marketing research,Define product life cycle,Identify pricing strategies,Differentiate between various sales promotion tools
CO5 : Explain the concepts of management accounting,Comparison between financial accounting, Management accounting & Cost accounting,Define the concepts of journal, ledger & Trial balance,Analyze various Final accounts

MCA 302 Analysis & Design of Algorithms
CO 1: Analyze the complexity of Algorithms
CO 2: Examine the divide and conquer design strategy for solving problems
CO 3: Apply Greedy method and Dynamic programming method for solving problems
CO 4: Solve problems using Backtracking and branch and bound techniques . Explain different string matching algorithms.
CO 5: Describe NP -hard and NP-complete problems

MCA 303 Object Oriented Programming through Java
CO1: Introduce OOPS concepts, History and features of java, introduce control structures like arrays and string
CO2: Identify classes, objects, members of a class and the relationships among them .Also demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
CO3: Understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application   development and implement file handling
CO4: Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events
CO5: Identify, Design & develop complex Graphical user interfaces using AWT Controls.

MCA 304 Software Engineering & Project Management

CO1: Knowledge of basic SW engineering methods and practices, and their appropriate application.   Describe the basic concepts and principles of components of software engineering, e.g., of requirements engineering, system design, software implementation, testing and maintenance, and how these components contribute to the software process.

CO2: Describe software engineering layered concepts and Process frame work. A general   understanding of software process models. Determine an appropriate process model.

CO3: Define UML based Object oriented designing and relate different data models, object models,context models and behavioural models.

CO4: Understanding of the role of project management and identifying key phases like planning,   scheduling, risk management, etc. Estimate, plan, calculate, and adjust project variables

CO5:   Develop strategies to calculate and mitigate risk factors. Describe cost estimation and quality management.

MCA 305 Object Oriented Analysis & Design

CO1: Analyse, design, document the requirements through use case driven approach.
CO2:Identify, analyse, and model structural and behavioural concepts of the system.
CO3:Develop,explore the conceptual model into various scenarios and applications.
CO4:Apply the concepts of architectural design for deploying the code for software.

MCA 306 PHP Programming Practicals

CO1:Demonstrate the installation of PHP
CO2 : Analyze the data types, creating & working with variables, different operators and conditional statements.
CO3 : Describe about functions, working of arrays, file handling in PHP
CO4 : Compare cookies & sessions, Illustrate the working with databases
CO5 : Designing webpages to communicate with PHP, Explain the uploading of a file

MCA 307 OOPS through Java Practicals

CO1: Implementing OOPS concepts, applet programs , Event driven Programs for Graphical Drawing Application, and JDBC in GUI and Console Application

Semester 4

MCA 401 System Software

CO1: Describe various finite state automations like NFA and DFA,Vaious turing machine models and its construction.
CO2: Understand SIC architecture, features of utility software's such as assemblers, loaders, linkers, editors and macro processor.
CO3: Design simple assembler for Simple instruction computer.
CO4:Design linker and loaders for simple instruction computer.
CO5: Design elementary macro processor for simple assembly level language

MCA 402Data Mining

CO1: Introducing data mining concepts and explore data warehouse and OLAP and understanding the type of data to be mined.
CO2: Apply preprocessing methods for any given raw data and mining frequent

patterns.
CO3:Get familiarize with various classification and prediction algorithms and its
   application.
CO4:Understand the clustering technique and its various methods applying on real
   world problems.
CO5 :Explore the various applications and trends of data mining.

MCA 403 TCP/IP Protocols
CO 1: Examine about different network models and seervices
   SubCO1.1:Contrast and compare about TCP/IP and OSI
   SubCO1.2:Analyze wired,wireless LANs and network layer services
CO 2:Evaluate different addressing mechanism in network
   SubCO2.1:Classify about classless and classful addressing
   SubCO2.2:Examine about network layer protocol like ARP and ICMP
CO3:Inspect different routing protocol and services of transport layer
   SubCO3.1:Identify multicasting and unicasting protocol
   SubCO3.2:Assess about Transport layer protocols like UDP and TCP
CO4:Compare about transport layer features ,different network paradigms and DNS
   SubCO4.1:Discuss about flow ,error,congestion control in transport layer
   SubCO4.2:Classify about peer to peer and client server paradigm
   SubCO4.3:Inspect about Domain Name System
CO5:Categorize about application layer protocols and IPV6
   SubCO5.1:Rate about TELNET,SSH,FTP TFTP etc used in application layer
   SubCO5.2:Compare and contrast about IPV6 protocol

MCA 404 Linux OS and Shell programming
CO1:Introduction to the history and various distributions of Linux, Explain the
   physical structure of filesystems, Discuss the basic commands, explain the types
   of files, ownership and permissions of a file.
CO2:Getting idea of the basic of shell programming like the conditions ,iterations and
   expression evaluation.
CO3:Discusss about the administrative files, lClassification of administrative and log
   file, Discuss the creation and manipulation of user accounts, Explain the
   mounting of file systems,
CO4:Getting permission of administrator using su and sudo, Discuss about the
   installation and removal of packages. Describe about the backup and restore
   mechanisms,Discuss about the various commands used for communication.
CO5:Discuss some services used for configuring servers., Demonstrate the
   configuration of various servers like samba, ftp, squid, nfs, telnet, apache, ssh
   etc.

MCA 405E Big Data Analytics (E42)
CO 1 Understanding Bigdata, its objectives and applications. Brief introduction of
   opensource technologies Hadoop.
CO 2   Introduction to NoSQL. Gain a perspective idea about different types of
   database, concurrency issues on storing semi and unstructed data.
CO 3 Explore more about Hadoop, pipes scaling. HDFS architecture and data flow to
   and from outside environment.
CO 4 Conceptualize the MapReduce job run, YARN and input output primitives of
   MR.
CO 5 To understand the application and   objectives of Hadoop related tools like

Hbase, Cassandra, Pig and Hive.

MCA 406 Linux OS & Shell programming Practicals
CO1:Shown the network based Installation of Linux.
CO2:Giving handson on Basic Overview of various commands-
Mathematical,filter,pipes etc
CO3:Giving handson on Shell Programming using various concepts like conditional
statements,looping statements,exporting variables
CO4:Giving handson on Process Management with Linux
CO5: Giving handson on File System management, User Administration, Linux Start
up andShutdown, Software package Management
CO6:Giving handson on LAN Card configuration, Server Configuration- DHCP, DNS,
FTP,Telnet,SSH, NFS, WebServer, SQUID Proxy server.

Semester 5

MCA 501 User Interface Design
CO1: Give an account of the historic development of user interfaces.
CO2 : know the important human characteristics in design
CO3: understand the principles of good screen design
CO4: develop an interface with proper screen based controls, menus, windows and
navigation schemes.
CO5: meaningful graphics, icons and images in proper colors, organization and layout

MCA 502 Knowledge Management & Business Intelligence
CO 1 Become familiar with basic principles of Knowledge and its understanding.
Different types of knowledge.
CO 2 Creating an awareness about conventional and new knowledge life cycle.
Importance of Rapid Prototyping in K development.
CO 3 Make students understand K creation and transformation. Discussing in detail
the different ways to capture knowledge and issues faced during it.
CO 4 Become familiar with Business Intelligence and how it is changing current
trends of governance.
CO 5 Describing how implement intelligence in business growth. Tools used for the
web revolution, New applications of BI etc.

MCA 503 Enterprise Resource Planning
CO 1: Relate about traditional approch and ERP approch
SubCO1.1:Judge about the risk and benefits of ERP
SubCO1.2:State about fundamental ERP technology
CO 2:Analyze about ERP solution and Fundamental modules
SubCO2.1:Compare about small ,medium and large vendors
SubCO2.2:Explain about Business process Reengineering and business process
management
CO3:Critique about ERP implementation
SubCO3.1:Justify implementation methodology and life cycle of ERP
SubCO3.2:Interpret about ERP vendors and data migration
CO4:Demonstarte post implementation phase of ERP
SubCO4.1:Sketch maintenance   phase of ERP
SubCO4.2:Compare and contrast success and failure of   factors of ERP
CO5:Appraise about emerging trends of ERP

SubCO5.1:Support and discuss about addons of ERP
SubCO5.2:Examine about different ERP success and failure stories

MCA 504 Advanced Java Programming
CO 1: Illustrate the fundamental concepts-streams, Threads and swing
CO 2: Apply network Programming in Java
CO 3: Discuss applications in distributed environment
CO 4: Explain multi tier application development
CO 5: Discuss enterprise applications

MCA 505 Distributed Computing (E55)
CO1 : Discuss about the concepts of distributed system, Classify the architecture of distributed systems, Define process with threads concepts, Explain code migration
CO2 : Classify communication methods, Analyze various algorithms of synchronization
CO3 : Illustrate consistency and replication,: Explain fault tolerance mechanisms
CO4 : Examine cryptography in distributed systems
CO5 : Describe about distributed file systems in networks

MCA 506 Advanced Java Programming Practicals
CO 1: Implement the fundamental concepts-streams, Threads and swing using program
CO 2: Implement network Programming in Java
CO 3: Implement RMI
CO 4: Implement server side programming using servlet and JSP
CO 5: Implement bean

MCA 507 Python Programming – Practicals

CO1 : Understands the basic concepts of python programming and various data types like lists, tuples , dictionaries, sets etc.
CO2: Understand about files, control statements and exception handling
CO3: Develop real-world applications using oops
CO4: Introduce modules and implement recursion
CO5: Develop GUI design and database programming

Course Outcome of MCA (2011 admission onwards)

Semester 2

MCA 201 Probability and Statistics
CO 1:Providing students with a formal treatment of probability theoryand its applications.
CO 2 : Equipping students with essential tools for statistical analyses .
CO 3: Providing a good understanding of the basic concepts of statistical inference
CO 4: Understanding of exploratory data analysis
CO 5: Fostering understanding through real-world statistical applications.

MCA 202 Data Structures and Analysis of Computer Algorithms
CO1: Describe algorithm and analyze the performance of algorithms. data structure and its various operations.
CO2: Describe sparse matrices, stack, queue and their various applications.
CO3: Describe linked list and its various forms like doubly list, circular list etc, trees and its various forms like binary tree, binary searchtree, threaded binary tree, AVL trees, B Trees.
CO4: Perform various sorting and searching techniques, graph and its traversals.
CO5: Choose appropriate algorithm solving techniques like divide and conquer, greedy, dynamic programming, backtracking, branch and bound methods, Identify NP hard and NP complete problems

MCA 203 - Microprocessors and Embedded Systems
CO 1: Describe the architecture and internal organization of the processor- 8086
CO 2: Explain Instruction Set, Assembler Directives and Assembly Language Programming of 8086
CO 3: Describe Special Purpose Programmable Devices and their Interfacing
CO 4: Compare various processors
CO 5: Describe embedded system and the microcontroller-8051

MCA 204 Operating Systems:
CO1 :Describe and explain the fundamental components of a computer operating system.
CO2: Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems.
CO3:Describe and extrapolate the interactions among the various components of computing systems.

MCA 205 Object Oriented Programming with C ++
CO1: Discuss the properties of Object Oriented Programming Language., Comparison of procedure oriented and Object oriented Languages.,Discuss the the concept of Objects and Classes.
CO2: Explain the concept of constructors and the types of constructors.
CO3: Discuss the concept of function overloading and operater overloading.
CO4: Discuss about inheritance and the type of inheritance .
CO5: Discuss about the streams in C++ and the passing of commandline arguments.

MCA 206 C++ Lab
CO1: Give hands on about the concept of class structure.
CO2: Illustration of constructors and destructors,Demonstration of function overloading, operator overloading
CO3:Demonstration of friend function and friend classes.
CO4:Demonstration of virtual function,Demonstration of function overloading
CO5:Demonstration of streams,Demonstration of create a file to store some records and search for a particular record and display it.
CO6:Demonstration of how exception handling is performed,Demonstration of how templates can be created and how generic classes can be used

Semester 3

MCA 301 Java and Web Programming
CO1 :Apply the core principles of the Object oriented programming using Java Language
CO2: Implement multitasking using multi threading concept
CO3:Use visual tools to produce well designed, effective applications and Applets
CO4: Implement JDBC connectivity and introduce Networking concepts
CO5: Web Page desogoning using JSP,HTML,Servlets,Javascript etc.
MCA 302 Software Engineering
CO1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
CO2: An ability to communicate effectively with a range of audiences

MCA 303 System Software
CO1: Describe various finite state automations like NFA and DFA,Vaious turing machine models and its construction.
CO2: Understand SIC architecture, features of utility software's such as assemblers, loaders, linkers, editors and macro processor.
CO3:Design simple assembler for Simple instruction computer.
CO4:Design linker and loaders for simple instruction computer.
CO5:Design elementary macro processor for simple assembly level language.

MCA 304 Database Management System
CO1:Describe the advantages of DBMS over traditional file system and the fundamental elements of DBMS and understand ER model.
CO2:Translate ER model to Relational model and basics of relational algebra.
CO3:Formulate SQL queries on data.
CO4:Improve the database design by Normalization.
CO5:Manage transactions and also understand basics of distributed DBMS.

MCA 305 Data Communications
CO 1: Explain different data communication techniques,aspects of network hard ware and software.
CO 2: Discuss various transmission media, datalink layer services ;compare and contrast protocol standards.
CO 3: Explain network layer design issues, routing and congestion control algorithms

MCA 306 Java Programming Lab

Implementing OOPS concepts, applet programs , Event driven Programs for Graphical Drawing Application, ,JDBC in GUI and Console Application,web page designing using servlets, JSP,Javascript etc.

MCA 307 DBMS Lab

CO1 : Install and configure Oracle Database and perform table design with constraints.
CO2 : Formulate SQL queries with SQL Data Definition Language(DDL) commands and Data Manipulation (DML) commands.
CO3: Use triggers, functions and procedures using PL/SQL.
CO4: Develop sample applications using Oracle as Back End .

Semester 4

MCA 401 Operations Research

CO1 - Identify and develop operational research models from the verbal description of the real system.
CO2 – Understand the mathematical tools that are needed to solve optimisation problems.
CO3 – Understand variety of problems such as assignment, transportation, travelling salesman etc.
CO4 – Understand different queuing situations and find the optimal solutions using models for different situations.
CO5 –Simulate different real life probabilistic situations using Monte Carlo simulation technique.

MCA 402 Computer Networks

CO1: Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3.
CO2: Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
CO3: Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;

MCA 403 Linux and Shell Programming

CO1:Introduction to the history and various distributions of Linux, Explain the physical structure of filesystems, Discuss the basic commands, explain the types of files, ownership and permissions of a file.
CO2:Getting idea of the basic of shell programming like the conditions ,iterations and expression evaluation.
CO3:Discusss about the administrative files, lClassification of administrative and log file, Discuss the creation and manipulation of user accounts, Explain the mounting of file systems,
CO4:Getting permission of administrator using su and sudo, Discuss about the installation and removal of packages. Describe about the backup and restore mechanisms,Discuss about the various commands used for communication.
CO5:Discuss some services used for configuring servers., Demonstrate the configuration of various servers like samba, ftp, squid, nfs, telnet, apache, ssh etc.

MCA 404 Object Oriented Modeling and Design

CO1 : Become familiar with object oriented analysis and design of a system and

iterative approach of software development.

CO2 : Understand the initial step of iterative software development process with the basic UML diagrams.

CO3 : Get familiarize with the design patterns and acquire test driven development process.

CO4 : Understand the second step of iterative software development process with the GRASP and GoF patterns.

CO5 : Understand the last step of iterative software development process refining domain model and learning other UML diagrams.

MCA 405 Artificial Intelligence

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.

MCA 406 Linux Lab

CO1:Shown the network based Installation of Linux.

CO2:Giving handson on Basic Overview of various commands- Mathematical,filter,pipes etc

CO3:Giving handson on Shell Programming using various concepts like conditional statements,looping statements,exporting variables

CO4:Giving handson on Process Management with Linux

CO5: Giving handson on File System management, User Administration, Linux Start up andShutdown, Software package Management

CO6:Giving handson on LAN Card configuration, Server Configuration- DHCP, DNS, FTP,Telnet,SSH, NFS, WebServer, SQUID Proxy server.

MCA 407 Open Source Lab- Python

CO1: Introduce various data types and data structures

CO2: Understand control statements

CO3: Introduce classes, files and modules

CO4: Develop database and web programming

CO5: Develop web application projects

Semester 5

MCA 501 Computer Security

CO 1: Relate about traditional approch and mordern approch of cryptography and also about Fundamentals of Abstract algebra

SubCO1.1:Judge about the security services ,attack and model

SubCO1.2:State about fundamentals of finite group ,ring ,fieldsand modular arithematic

SubCO1.3:Discuss about Block Ciphers and Data Encryption Standard.

CO 2:Analyze about Block Cipher and Number Theory

SubCO2.1:Compare about Advanced Encryption Standard, Multiple Encryption and Triple DES,

SubCO2.2:Explain about Prime Numbers, Fermat's and Euler's Theorems, Testing for

Primality, The Chinese Remainder Theorem, Public-Key Cryptography and RSA

CO3:Critique about Key Management and Authentication and Hash Functions

SubCO3.1:Justify implementation of Digital Signatures and Authentication protocols

SubCO3.2:Interpret about Key exchange algorithms like Diffie-Hellman Key Exchange, Elliptic Curve

CO4:Demonstarte Network Security and System Security

SubCO4.1:Sketch about Authentication Applications, Electronic Mail Security, IP and Web Security,

SubCO4.2:Compare and contrast about Intruders, Malicious Software, Firewalls

CO5:Appraise about Hardware Solutions in cryptography

SubCO5.1:Support and discuss about Authentication Tokens, Smart Cards and Biometrics

SubCO5.2:Examine about Secret sharing schemes ,Zero-knowledge techniques and Folklore.

MCA 502 Internet Technology and Distributed Applications

CO 1 : Become familiar with basic principles of TCP/IP addressing (classful and classless). Explore the other network layer protocols.

CO 2 Narrated unicasting and multicasting. Explore the various protocols for both. Describes the virtual private networks.

CO 3 Make students understand UDP and TCP . Discussing in detail process, communication, connection establishment, flow control, error control and time managemnt of TCP.

CO 4 Aquire knowledge and understanding of DNS, FTP, TFTP HTTP WAP architectures and packet formats.

CO 5 Become familiar with Multimedia, digitizing Audio and Video and protocols. Familiarize Voice over IP.

MCA 503 Computer Graphics

CO1: Discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications. .Provide an understanding of mapping from a world coordinates to device coordinates, 2D clipping, and projections.

CO2: Identify and relate various 2 dimensional trasformation techniques. Understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.

CO3: Relate 3 Dimensional transformation techniques. Compare and contrast 3D clipping.

CO4: Classify various representations for curves and surfaces. Examine different 3D representations for solid objects.

CO5: Compare and contrast Visible surface detection algorithms. Assess various shading mechanisms.

MCA 504 Data Mining

CO1 : Introducing data mining concepts and explore data warehouse and OLAP and understanding the type of data to be mined.

CO2 : Apply preprocessing methods for any given raw data and mining frequent patterns.

CO3 : Get familiarize with various classification and prediction algorithms and its application.

CO4 : Understand the clustering technique and its various methods applying

on real world problems.

CO5 : Explore the various applications and trends of data mining.

MCA 505(E) Distributed Computing

CO1 : Discuss about the concepts of distributed system, Classify the architecture of distributed systems, Define process with threads concepts, Explain code migration

CO2 : Classify communication methods

CO3 : Analyze various algorithms of synchronization,Illustrate consistency and replication

CO4 : Explain fault tolerance mechanisms

CO5 : Examine cryptography in distributed systems,Describe about distributed file systems in networks

MCA 506 Computer Graphics Lab

CO 1: Design algorithms for different basic geometric primitives.

CO 2: Implement the concept of animation.

CO 3: Demonstrate 2D & 3D geometrical transformations, Curves and surfaces.

CO 4: Implement VSD techniques, 3D objects and shading.

CO 5: Design a simple OpenGL project.

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