

M. C.A. Second Year (w.e.f. 2015-16)

Semester III				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA -301	Operating system	1	3	4
MCA -302	Foundations of OOPs	1	3	4
MCA -303	Management Information System Security	1	3	4
MCA-304	Data Communication	1	3	4
MCA-305	Probability and Statistics	1	3	4
MCA-306	Lab-5 Operating system Windows and Linux	0	2	2
MCA-307	Lab-6 (OOPs)	0	2	2
MCA-308	Seminar -2 on Current Topic and Trends	1	0	1
	Total Credits	6	19	25

Semester IV				
Code No.	Title of the Paper	Internal Credits	External Credits	Total Credits
MCA-401	Software Engineering	1	3	4
MCA-402	Project Management	1	3	4
MCA-403	Advance Programming Techniques	1	3	4
MCA-404	Computer Network	1	3	4
MCA-405	Machine Learning	1	3	4
MCA-406	Lab-7 Advance Programming Techniques	0	2	2
MCA-407	Lab-8 Machine Learning	0	2	2
MCA-408	Industrial Talk / Visit /Seminar	1	0	1
	Total Credits	6	19	25

MCA II Year (w.e.f. 2015-16)
MCA-301-Operating System (4 Credits)

Unit-1 Introduction

Introduction: System structure, user perspective, operating system services, system commands, assumption about Hardware, Shell Programming: Bourne shell and C shell programming, variables, constants, environments, control structures, shell scripts examples

Unit-2 Introduction to Kernel

Architecture of Unix Operating system, System concepts, kernel data structures, system administration,

Unit-3 Internal Representation of files

Inodes, Structure of a regular file, Directories, super block, Inode assignment to new file, allocation of disk blocks

Unit-4 System Calls for the file System

Open, Read, Write, file and recording locking, close, file creation, creation of special files, change directory and change root.

Unit-5 Structure of process

Process states & Transition, layout of system memory, layout of the kernel, Context of process, saving the context of the process, SLEEP

Unit-6 Process Control

Process creation, signals, process Termination, awaiting process termination, invoking other programs, UID of a process, changing the size of a process, The shell, system boot and the init process.

Suggested Readings:

1. The Design of the Unix operating System *by Maurice J. Bach*
2. Unix System Administration A Beginner's Guide *by Steve Maxwell publishing by McGraw-Hill/Osborne*
3. Learning the Unix Operating By Jerry Peek, Grace Todino & John Strang; ISBN 1-56592-390-1, 4th Ed. O'REILLY
4. William Stallings, Operating Systems, Prentice Hall.
5. Harvey M. Deitel, An introduction to operating systems. Addison-Wesley.

MCA-302 Foundations of OOPs (4 Credits)

Unit-1 Principle of OOP's

Procedural Vs Object Oriented Programming ,Classes, Object, Data Abstraction, Encapsulation, Inheritance, Polymorphism , Tokens, Keywords, Identifiers & Constants, Basic Data Types, User-Defined Data Types, Symbolic Constant, Type Compatibility, Reference Variables, Operator in C++, Scope Resolution Operator,

Unit-2 Basics of C++

A Brief History of C & C++ ,C Vs C++ ,A Simple C++ Program ,Application of C++ , Structure & Class ,Compiling & Linking , Defining Member Functions ,Making an Outside Function Inline ,Nesting of Member Functions, Private Member Functions, input and output statement.

Unit-3 Decision making, control structure and Functions

IF Structure, For, while, do-while, switch structure, The Main Function, Function Prototyping, Call by Reference, Call by Address, Call by Value, Return by Reference ,Inline Function,

Unit-4 Constructor & Destructor

Constructor ,Parameterized Constructor ,Multiple Constructor in a Class ,Constructors with Default Arguments ,Dynamic Initialization of Objects, Copy Constructor ,Dynamic Constructor ,Const Object ,Destructor

Unit-5 Operator Overloading & Type Conversion

Defining operator Overloading, Overloading Unary Operator ,Overloading Binary Operator, Overloading Binary Operator Using Friends ,Manipulating of String Using Operators, Type Conversion, Rules for Overloading Operators

Unit-6 Inheritance

Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Hierarchical Inheritance, Multiple Inheritance, Hybrid Inheritance ,Virtual Base Classes, Abstract Classes ,Constructor in Derived Classes, Nesting of Classes

Suggested readings:

- 1.C++: The Complete Reference Herbert Schildt
- 2.Let us C++ Kanetkar
- 3.Object Oriented Programming with C++ E. Balagurusamy
- 4.C++ Primer Stanley Lippman & Lajoi
- 5.C++ Programming Language Bjarne Stroustrup
- 6.C++ Programming Bible Al Stevens & Clayton Walnut

MCA-303 Management Information System (4Credits)

Unit-1 Management Information system

Need, Purpose and objectives- contemporary approaches to MIS – Information as a strategic resource- use of information for competitive advantage- capital MIS as an instrument for the organizational change.

Unit-2 Information Management and Decision Making

Model of Decision Making – Classical, administrative and Herbert Simon's Models, Attributes of Information & its relevant to decision making – Types of Information.

Unit-3 Information Technology

Definition, IT Capabilities and their organizational impact – Telecommunication and Networks – Types and Topologies of Networks – IT in enabled Services such as call Centers, Geographical Information System etc.

Unit-4 DBMS & Systems Analysis and Design

Data warehousing and Data mining, System Development Life Cycle – Alternative Systems Building Approaches – Proto Typing Development Strategies-Structured Analysis - Prototyping- Rapid Developing Tools – CASE Tools –Object oriented systems (only introduction to these tools and techniques).

Unit-5 Decision Support System

Group Support System – Executive Information Systems - Executive Support Systems – Experts Systems and Knowledge based Experts Systems – Artificial Intelligence.

Unit-6 Management Issues in MIS

Information Security and controls- Quality assurance – Ethical and Social Dimension – Intellectual Property Rights as related to IT services/ IT products – Managing Global Information Systems.

Suggested Readings:

1. Management Information Systems-Laudon 7th Edition, Pearson Education , Asia.
2. Management Information Systems, Jawadekar Tata McGraw Hill.
3. Management Information Systems, Davis and Olson, Tata McGraw Hill.
4. Management Information Systems, Jayant Oke.

MCA-304 Data Communication (4 Credits)

Unit-1 Communication Fundamentals

Definition, Characteristics, components of Data communication system, Analog signal, noise, digital signal, conversion of analog to digital signal : Sampling, Quantizing, encoding.

Unit-2 Modulation

Modulation process: Analog modulation (Amplitude modulation, frequency modulation, phase modulation) , digital Modulation (Amplitude shift keying, Frequency shift keying, Phase shift keying, Quadrature phase shift keying,) Hybrid modulation

Unit-3 Multiplexing

Frequency division multiplexing, Time division multiplexing, Primary Mux, Higher order mux

Unit-4 Transmission media

Characteristics: Noise, attenuation, group delay, interference, guided transmission media (Copper cables, Fiber Optics cables) Unguided media(domestic radio, satellite communication, mobile radio.

Unit-5 Communication Model

Line connections, Transmission modes: Asynchronous transmission, synchronous transmission, Transmission techniques: Simplex, Half duplex, Full duplex.

Unit-6 Switching

Circuit, message, packet, Internet connection through PSTN, IEEE 802.3 Ethernet Frame Structure

Suggested Readings:

1. Data communication fundamentals- tilak De Silva
2. Data Communication and Networking, fourth edition- Behrouz A Forouzan, McGraw-Hill Forouzan Networking Series
3. Data communication and Computer Network- Er.Sourav Kumara Giri.
4. Data Communication and Computer Networks- Dr. P. Premchand

MCA-305 Probability and Statistics (4 Credits)

Unit-1 Basic Statistics

Measures of central tendency; Measures of dispersion; Moments, Skewness and Kurtosis, Linear correlation, Karl Pearson's coefficient of Correlation, Rank correlation. Simple linear regression model, coefficient of determination. Multiple linear regression models: least square procedures for model fitting, a matrix approach to least squares.

Unit-2 Probability Theory

Sample space, Events, Axioms of Probability, Addition and multiplication theorems on probability, Independent events, Conditional probability, Bayes Theorem

Unit-3 Random variables and Distribution

Random variables, Probability density functions and distribution functions, Marginal density functions, Joint density functions, mathematical expectations, moments and moment generating functions. Discrete probability distributions- Binomial, Poisson distribution, Continuous probability distributions- Uniform distribution and Normal distribution.

Unit-4 Testing of hypothesis I: Null and alternative hypothesis, types of errors, level of significance, critical region, Large sample tests: Testing of hypothesis concerning mean of a population and equality of means of two populations.

Unit-5 Testing of hypothesis II: Small sample tests: t Test-for single mean, difference of means. Paired t-test, Chi-square test, F test - test for equality of two population variances. Estimation: Point estimation, interval estimation and central limit theorem (Statement only).

Unit-5 Analysis of Variance: One-way classification fixed effects model, comparing variances, pair wise comparisons, randomized complete block design.

Suggested Readings:

1. Probability & Statistics for Engineers and Scientists, Walpole, Myers, Myers, Ye. Pearson Education.
2. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill
3. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Trivedi, Prentice Hall of India.
4. Probability and statistics for engineers: Erwin Miller And John E.Freund. Prentice-Hall of India / Pearson, Sixth edition.
5. Text book of Probability and Statistics by Dr.Shahnaz Bathul, V.G.S.Publishers 2003.
6. Susan Milton and Jesse C. Arnold Introduction to Probability and Statistics Fourth edition, TMH.
7. William Mendenhall, Robert J Beaver, Barbara M Beaver Introduction to Probability and Statistics 12th edition, Thomson.
8. Introduction to Mathematical Statistics -Robert V. Hogg &Allen T. Craig.
9. Fundamentals of Statistics: S.C.Gupta, 6th 2004, Himalaya Publications.
10. Introduction to Probability and Statistics, Medenhall, Thomson Learning,

MCA-306 Lab-5 Operating System windows and Linux (4Credits)
MCA-307 Lab-6 (OOPs) (4 Credits)
MCA-308 Seminar -2 on Current Topic and Trends (1 Credits)

MCA IV Semester CGPA

MCA-401 Software Engineering (4 Credits)

Unit-1 Product and Process

Evolving role of Software, Software Characteristics, Software Applications, Crisis on the Horizon, Software Myths, A layered Technology, software process model, Evolutionary software process models, Component based development, fourth generation techniques, process and product.

Unit-2 Managing Software Project

Introduction, Project Management Concepts, Software Process and Project Metrics.

Unit-3 Conventional Methods for Software Engineering

Introduction, System Engineering, Analysis Concepts and Principles, Analysis Modeling.

Unit-4 Software Design concept

Design Concepts and Principles, Architectural Design, User Interface Design, Component-level Design.

Unit-5 Software Testing Techniques

Software testing Strategies, Testing tactics.

Unit-6 Object- Oriented Software Engineering

Introduction, Object-Oriented Concepts and principles, Objected-Oriented Analysis, Object-Oriented Design, Object-Oriented Testing, Technical Metrics for Object-Oriented Systems.

Suggested Readings:

1. Pressman, *Software Engineering a Practitioners Approach*, 5th Edition, TMH.
2. Jalota Pankaj, *An integrated approach to software Engineering*, Narosa Pub.
3. Jawadkar, *Software Engineering*, TMH Pub.
4. Sommerville, *Software Engineering* , Pearson Education.

MCA -402 Project Management (4 Credits)

Unit-1 Fundamentals of Project Management

Definition, Characteristics of Project, Types of Project, Project Phases, Project management Process, Project life cycle

Unit-2 Project formulation

Significance of project formulation, Project formulation, Feasibility analysis, technical analysis and financial analysis, cost of project, financing and estimates of sales of project.

Unit-3 Risk and Uncertainty Decisions

Project risk, types of project risk, identifying the risk, risk category, methods using risk identification,, Project risk Analysis, qualitative analysis and quantitative analysis, sensitivity analysis, break even analysis, cost of capital and capital budgeting.

Unit-4 Project scheduling and Control

Definition of Project scheduling, Project controls and importance, Network techniques of Project Management: Gantt chart, CPM, PERT

Unit-5 Software Project Management

Nature of Software and Software Development, software between computers and people, software quality, Software quality assurance, relation between software quality and software productivity, risk reduction, Role of project manager in software development

Unit-6 Project Management Information System (PMIS)

Concept of PMIS, components of PMIs, choosing and implementing PMIS, benefit of PMIS. Common errors managing PMIS

Suggested readings:

1. Project Management, S. Chaudhary, Tata McGraw Hill
2. Project-Preparation, Appraisal, Budgeting and Implementation, Prassna Chandra, Tata McGraw Hill.
3. Software Project Management , Bob Hughes and Mike Cotterell, Tata McGraw Hill
4. Software Projct Management : Areal-world Guide to Success, Joel Henry, Pearson education.

MCA-403 Advanced Programming Techniques (4 Credits)

Unit-1 Introduction to Internet Programming

Client Server model, Browsers - Graphical and Hypertext Access to the Internet, HTTP – Hyper Text Transfer Protocol.

Unit-2 Creating Internet, World Wide Web pages

HTML – Hyper Text Markup Language, Headers, body, html tags, tables Text, graphics, sounds, video clips, multi-media, Client side image mapping, web page counters, HTML resources, HTML converters and tools.

Unit-3 HTML forms and scripting

Building a form, Text fields and value, size, maxlength, html buttons, radio, checkboxes, prechecked. Selection lists, Introduction to CGI scripting. Action and Method - GET and POST. HTML form interface with CGI scripts. Automating processing such as info forms and email. Programming CGI interfacing via forms.

Unit- 4 Introduction to Java

Introduction to Java, Javac, Java class libraries, JDK, jdbc, Java Byte Codes. Classes and Objects, Applets, Applet parameter passing Control Structures. Basic Windows, mouse and buttons Events, the Java event model. Basic I/O. JAR Files, Java archiver.

Unit- 5 Advanced Java Programming

Graphic User Interface with AWT. AWT calls, Windows, dialog boxes, pop-up menus. Graphics. Using a Layout manager. Manipulating Images. Image animation..

Unit-6 XML Technologies

XHTML(Extensible HTML) - A stricter and cleaner XML based version of HTML. XML DOM (XML document object model)- A standard document model for accessing and manipulating XML.

Suggested readings:

1. Deitel and Deitel. "Java - How to Program", Addison-Wesley Press,
2. “Web Technologies” by Kahate Godbole.
3. “Database and XML Technologies” by A.W. Ganczarski.
4. Scott Oaks and Henry Wong. "[Java Threads](#)", O'Reilly and Associates Publishing, Sebastopol, CA.
5. Gary Cornell, Cay Horstmann. "Core Java", SUN Soft Press Publishing, Mountain

MCA-404 Computer Networks (4 Credits)

Unit-1 Introduction

Uses of Computer Networks, Network hardware, Software, OSI Reference model, example of network.

Unit -2 Physical Layer

Guided and unguided transmission media, wireless communication, communication satellites, public switched telephone network, the mobile telephone system

Unit-3 Data link layer

Data link layer design issues, error detection and correction, elementary data link protocols, sliding window protocols, protocols verification, examples of data link protocols: HDLC

Unit -4 Medium access control sub layer

Channel allocation problem, multiple access protocols: AIOHA, CSMA, CSMA/CD Ethernet, wireless LAN, Broadband wireless, Bluetooth

Unit- 5 Network layer

Design issues, Routing algorithm, optimality principle, shortest path routing, Flooding

Unit -6 Distance vector routing, Link state routing, Hierarchical routing, multicast routing, congestion control algorithms

Suggested readings:

1. A. S. Tanenbaum, *Computer Network*, PHI Pub.
2. Forouzan, *Computer Network*, TMH.
3. Black, *Computer Network*, PHI Pub.
4. Douglas E, Comer, *Internetworking with TCP/IP*, PHI Pub.

MCA -405 Machine Learning (4 Credits)

Unit – 1 Introduction to Fuzzy Sets & Crisp Sets

Fuzzy Sets: Basic Types, Fuzzy Sets: Basic Concepts, Fuzzy Sets Vs Crisp Sets, Additional Properties of alpha cuts, Presentation of fuzzy sets.

Unit – 2 Operations on Fuzzy Sets

Fuzzy complements, Fuzzy Union, Fuzzy Intersections, Crisp & Fuzzy Relation, Binary Fuzzy Relation, Binary Relation on single set, Fuzzy Equivalence Relations, Fuzzy Compatibility Relation

Unit – 3 Introduction to ANN

Biological Neuron and Artificial Neuron Model, McCulloch-Pits Neuron Model, Perceptron Classification, Linearly Separability, XOR Problem, Overview of Neural Network, Architecture, Learning Rules, Supervised Learning, Unsupervised Learning, Perceptron Learning, Reinforcement Learning, Delta Learning Rule.

Unit – 4 Multilayer Feed forward

Generalized Delta Learning, Back propagations training algorithm and derivation of weight, Variant in Back propagations.

Unit – 5 Fuzzy System and Neuro Fuzzy System

Fuzzy neurons, Fuzzy Neural Network, Fuzzy associative memory

Unit-6 Application of Fuzzy Sets and Neural Network

Feature Extraction, Application in Pattern Recognition, Introduction to Multibiometric Identification System.

Suggested readings:

1. Fuzzy Sets and Fuzzy Logic Theory and Application *By- George J. Klir, Bo Yuan*
2. Fuzzy Sets Uncertainty and Information *By- George J. Klir, Tina A. Floger*
3. Introduction to the Theory of Neural Competition *By- John hertz, Krogh and Richard Addision Wesely*
4. Artificial Neural Systems *By Jack M. Zurada West Publishing Company, 1992.*
5. Fuzzy Logic with Engineering Applications', *By Timothy J. Ross, 'McGraw Hill, 1997.*
6. Neural Networks A CLASS ROOM APPROACH *By Satish Kumar, Tata McGraw – Hill Publishing.*
7. Laurance Fauset, 'Fundamentals of Neural Networks', Pearson Education, 2004.
8. David Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Pearson Education, 2007.
9. J.S.R.Jang, C.T.Sun and E.Mizutani, ' Neuro- Fuzzy and Soft Computing' Pearson Education, New Delhi, 2004
10. Jacek M. Zurada, 'Introduction to Artificial Neural Systems', Jaico Publishing home, 2002.
11. John Yen and Reza Langari, 'Fuzzy Logic – Intelligence, Control and Information'

MCA-406 Lab-7 Advance Programming Techniques (4Credits)

MCA-407 Lab-8 Machine Learning (4 Credits)

MCA-408 Industrial visit/Seminar (1Credits)

Seminar is, generally, a form of academic instruction, at a department or university. Students may engage in original research, exploration, practice, and/or synthesis of ideas. Results are exchanged through reports, demonstrations, and/or discussions.

A seminar may include a presentation by the student. Students are expected to prepare for and participate actively in seminars by giving a paper, answering questions or discussing subject matter in front of Head and faculty.

The idea behind the seminar system is to familiarize students more extensively with the methodology of their chosen subject and also to allow them to interact with examples of the practical problems that always crop up during research work.

It is essentially a place where assigned readings are discussed, questions can be raised and debates conducted. It is relatively informal, at least compared to the lecture system of academic instruction.