Structure for
MCA
(Master of Compute Application)

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Saurashtra University
Department of Computer Science
CBCS structure for MCA

MCA

Master of Computer Application **:** Three years (six semester) full time course

Total credits for the course **:** **144**

Semester	Credits
Semester – 1	24
Semester – 2	24
Semester – 3	24
Semester – 4	24
Semester – 5	24
Semester – 6	24
Total credits	**144**

Semester – 1

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal exam	Weightage for semester end examination	Total marks	Duration of semester end examination in hrs.
1	CCA1001	Introduction to programming using C	4	4	30	70	100	3
2	CCA1002	Computer Organization	4	4	30	70	100	3
3	CCA1003	Internet concepts and tools	4	4	30	70	100	3
4	PCA1004	Practical – 1 Based on (CCA1001, CCA1003, MCA1005)	4	10	-	100	100	3
Inter/Multi Disciplinary Course								
5	MCA1005	PC software	4	4	30	70	100	3
Skill oriented course								
6	SCA1006	Technical writing	4	4	30	70	100	3
		Total	**24**	**30**	**150**	**450**	**600**	

Semester – II

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal exam	Weightage for semester end exam.	Total marks	Duration of semester end exam. in hrs.
1	CCA2001	Object oriented programming using C++	4	4	30	70	100	3
2	CCA2002	Data structure and algorithm	4	4	30	70	100	3
3	CCA2003	Building client server appli. using VB	4	4	30	70	100	3
4	CCA2004	Compute network	4	4	30	70	100	3
5	PCA2005	Practical – 2 Based on (CCA2001, CCA2002, CCA2003, MCA2006)	4	10	-	100	100	3
Inter/Multi Disciplinary Course								
6	MCA2006	Computer oriented Numerical and statistical method	4	4	30	70	100	3
		Total	**24**	**30**	**150**	**450**	**600**	

Semester – III

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal exam	Weightage for semester end exam.	Total marks	Duration of semester end exam. in hrs.
1	CCA3001	System analysis and design	4	4	30	70	100	3
2	CCA3002	Core java	4	4	30	70	100	3
3	CCA3003	Operating system and Linux/Unix programming	4	4	30	70	100	3
4	CCA3004	Database concepts and tools	4	4	30	70	100	3
5	PCA3005	Practical – 3	4	10	-	100	100	3
Inter/Multi Disciplinary Course								
6	MCA3006	Operation research	4	4	30	70	100	3
		Total	**24**	**30**	**150**	**450**	**600**	

Semester – IV

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal exam	Weightage for semester end examination	Total marks	Duration of semester end exam. in hrs.
1	CCA4001	Software Engineering	4	4	30	70	100	3
2	CCA4002	Advanced Java	4	4	30	70	100	3
3	CCA4003	.Net frame work and C#	4	4	30	70	100	3
4	CCA4004	Web programming -1	4	4	30	70	100	3
5	**Elective – 1**		4	4	30	70	100	3
	ECA4015	Advanced networking						
	ECA4025	Data Warehousing & Data Mining						
	ECA4035	Mobile Computing						
	ECA4045	Digital signal processing						
	ECA4055	E-commerce						
	ECA4065	E-Governance						
6	PCA4006	Practical – 4	4	10	-	100	100	3
		Total	**24**	**30**	**150**	**450**	**600**	

Semester – V

Sr. No	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal exam	Weightage for semester end exam.	Total marks	Duration of semester end exam. in hrs.
1	CCA5001	Building application using ADO.NET & ASP.NET	4	4	30	70	100	3
2	CCA5002	Web programming – 2	4	4	30	70	100	3
3	Elective – 2		4	4	30	70	100	3
	ECA5013	Geomatics (GIS, GPS & Remote Sensing)						
	ECA5023	Biometrics Technologies						
	ECA5033	Embedded Systems						
	ECA5043	Image Processing						
	ECA5053	Nano Tech. (Smart Materials, MEMS & NEMS)						
	ECA5063	Natural Language Processing						
4	PCA5004	Practical – 5	6	9	-	100	100	3
5	JCA5005	Project – 1	6	9	-	100	100	3
		Total	**24**	**30**	**90**	**410**	**500**	

Semester – VI

Sr. No.	Subject Code	Title of the course	Course Credits	No. of Hrs. per week	Weightage for internal exam	Weightage for semester end exam.	Total marks	Duration of semester end exam. in hrs.
1	JCA6001	Industrial project	24	-	-	300	300	3
		Total	**24**	**-**	**-**	**300**	**300**	

Coding for MCA subjects

CCA	Core MCA subject
PCA	Practical of MCA
ECA	Elective MCA subject
JCA	Project for MCA
MCA	Inter/Multi disciplinary MCA subject
SCA	Skill oriented MCA subject

Semester – I
CCA1001 : Introduction to programming using C

(1) Introduction

Introduction to computer and programming language, Evolution of C, Advantages of C, Compiling, Linking & Debugging C programs.

(2) Problem solving

Algorithms, Flowchart.

(3) Programming elements

Character set, constants, variables and data types, expressions, evaluation of expressions, standard I/O operations, decision making, branching and looping structures.

(4) Arrays and string handling

Defining one, two and multidimensional arrays, manipulating arrays, declaring and initializing strings, string manipulations, use of string handling functions. Operations of Strings (String handling through built-in & UDF: Length, Compare Concatenate, Reverse, Copy, Character Search using array)

(5) Structures

Defining & Processing, Passing to a function, (Array within structure, Array of structure, Nesting of structure, Passing structure and its pointer to UDF, Introduction to Unions and it's Utilities)

(6) User define functions

Defining and using functions, value parameters, recursions, nesting of function, storage class, and scope and life time of the variables.

(7) Pointers

Passing pointers as parameters, call by reference, pointer to pointers, Pointer variable, pointers to arrays and string, pointer arithmetic, pointer to functions.

(8) File handling

Defining, opening & closing a file, file operations, high level I/O and low level I/O. Open, Close, Create, Process Unformatted Data Files. (Formatted Console I/O functions, Unformatted Console I/O functions, Modes Of Files, Use Of fopen(), fclose(), fgetc(), fputc(), fgets(), fprintf(), fscanf(), fread(),fwrite(), Command Line Arguments

Reference Books :

(1) Programming & Data Structure using C - By: Dr. Atul Gonsai, Saurashtra University Publications
(2) Programming in C - by E. Balaguruswami (TMH)
(3) Computer programming in C - by V. Rajaraman (PHI)
(4) The C programming language - by Richi & Karninghan (PHI)
(5) C/C++ programmer's guide - by Pappas & Murray (BPB)
(6) The spirit of C - by Mulish kooper (Jaico)
(7) Understanding pointers in C - by Y. Kanetkar (BPB)

Semester – I
CCA1002 : Computer Organization

(1) Number System

Number system (Binary, Octal and Hexadecimal), Conversion from one number system to another including decimal, Operations on binary number system (Addition, subtraction, multiplication, complementation etc.), Integer and floating point representation.

(2) Gates and Boolean algebra

Gates, Fundamentals of Boolean algebra, Truth Tables, Preparing truth table for given circuit, Preparing circuit for given truth table (SOP & POS), De Morgan's Theorems, Gate Minimization (using Boolean mathematics, using Karnaugh map technique)

(3) Processors, Memory and Input / Output

Instruction Execution, CPU organization (Stack Organization (Intro.), Instruction Formats, Addressing modes), ALU design, Overview of Microprocessor chips, memory chips & Buses, Example of a typical Microprocessor chip and a memory chip, ISA bus, PCI bus, Universal Serial Bus (USB), Architecture of PC with multiple type of buses, I/O chips. Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware, Structure of 2D Memory.

(4) Basic Digital Logic Circuits.

Integrated circuits, Combinational Circuits - Encoder, Decoder, Multiplexer, De-Multiplexer, comparator, Arithmetic Circuits - Half adder, full adder, binary adder, binary adder/ subtractor.

(5) Memory elements and counters

Flip flops (SR Flip Flop, D-Flip Flop, JK Flip Flop), Registers (Storage Registers with Parallel Input & Serial Input, Shift Registers, Universal Register),Counters (Synchronous & Asynchronous Counters, Ripple Counter, Counters with Increment & Decrement Facility)

Reference Books:

(1) Tanenbaum A. S. : Structured Computer Organization, Prentice-Hall of India Pvt. Ltd.

(2) Malvino A. P.: Digital Computer Electronics, Tata McGraw, Hill Pub. Co. Ltd.

(3) Thomas Bartee : Computer Architecture & Logic Design Tata McGraw, Hill Pub. Co. Ltd.

(4) Pal Chaudhuri : Computer Organization and Design, Prentice-Hall of India Pvt. Ltd.rogramming In C (Hutchison R-MGH)

Semester – I
CCA1003 : Internet concepts and tools

(1) Web Fundamentals

Internet, Intranet, Extranet, WWW, IP Addressing and Domain Name System, Working of Web Browser and Web Server, Web Hosting, Virtual Host, Multi Homing, Distributed Web Server Overview, Document Root, Internet Service Provider and their Services, HTTP, Mail Services, Cookies, Static Web Sites and Dynamic Web sites, Apache, IIS, POP3, IMAP and Mail clients, NewsGroups.

(2) Developing Web Pages Using HTML

Introduction of HTML, Horizontal Rules and Graphical Elements, Hyperlinks, Tables, Web Forms, Image Techniques, Frames.

(3) Web Application Architecture

Client/Server, 2-tier, 3-tier, n-tier, CGI, Perl, Writing Client Side Scripts, Tools – Cascading Style Sheet.

(4) Cascading Style Sheet

Introduction to CSS, Font Attribute, Color And Background Attribute, Text attribute, Border Attribute, Margin Attribute, List Attribute, Class, Using SPAN and DIV tag, Layers.

Reference books:

(1) Ivan Bayross: HTML, Java Script, DHTML and PHP, BPB Publication, New Delhi
(2) Douglas E Comer: The Internet, PHI, New Delhi

Semester – I
PCA1004 : Practical – 1

(1) CCA1001 : Introduction to programming using C – 50 marks
(2) CCA1003 : Internet concepts and tools – 25 marks
(3) MCA1005 : PC software – 25 marks

Semester – I
MCA1005 : PC software

(1) Basic component of Computer

Block Diagram of a Personal Computer, characteristics of computers, generation of computers, classification of computers, types of computer, Computer performance (i.e. Parameters that affect computer's performance - CPU execution speed, Clock speed, RAM size, Cache ,Disc capacity etc.), Character codes (i.e. ASCII, EBCDIC, UNICODE, Excess-3, Grey code, Error checking codes etc. with their needs and utilities.)

(2) Elements of a computer processing system:

Processor: Understanding some of the functions of the CPU in terms of calculations, logical control and immediate access memory.

Storage devices and media: Compare the main types of memory storage devices in terms of speed, cost and capacity such as: diskette, zip disk, data cartridge, CD Rom, internal – external hard disk, Magnetic Tape, Magnetic Disk.

Input- devices: Various input devices: Mouse, Keyboard, Trackball, Scanner, touch pad, light pen, Joy stick, Digital Camera and Micro phone, Scanner etc.

Output – devices: Printers, Plotter and speaker, VDU etc.

Input – Output devices: Touch screens.

Memory: Understand different type of memory (RAM, ROM, EPROM, EEPROM, Flash RAM etc.], Measuring computer memory (Bit, Byte, KB etc.).

(3) Software

Types of software: System software, Application software.

Operating system software: Functions of OS and brief introduction of some OS. Batch, multi-programming, time sharing, multiprocessing, PC operating system, network operating system, on-line and real time operating system.

Application software: Common Application software such as: Word processing, spreadsheet, database, Web browsing, desktop publishing, accounting, Computer aided designing and drafting (CADD), MATLAB, LAB VIEW & simulation software

Programming paradigms and languages: classification, machine code, assembly language, Programming paradigms and higher level languages.

(4) Utility of Application software

Understanding of word processing, spreadsheet and presentation package using (MS – Office or Open Office) for data analysis.

Reference Books:

(1) Rajaraman V – Fundamental of Computers 2nd Edition, PHI
(2) Foundation of Information Technology – D. S. Yadav, New Age
(3) Foundation of Computing – P. K. Sinha, BPB
(4) Sanders, D.H. – Computer Today – McGraw Hill

Semester – I
SCA1006 : Technical writing

(1) Technical writing – an Introduction:
Structure & Sample Contents of technical writing

(2) Correspondence
Types (Memos, letters, and e-mail), Standards, Objectives, Components & Structures, Building Effective Resumes, Development of sample resumes, Job search: Techniques & Related Correspondence.

(3) Visual Objects
Document design strategies, Embedment of graphics, animation in e-document

(4) Electronic communication
Effective E-mail content generation and management of incoming & outgoing emails.

(5) Research, Report and Project strategy
Research Objectives, structure, criteria & sample content for development of research proposals.
Reports Objectives, structure, criteria & sample content for development of reports like annual reports, progress reports, data analysis, planning & monitoring reports
Objectives, criteria & sample content for development of project proposals

(6) Oral presentations
objectives , types of oral presentations , criteria for effective oral presentations and process , post – speech activities etc.

Semester – II
CCA2001: Object oriented programming using C++

(1) Introduction to OOP Language C++

C++ character set, tokens, structure of C++ programming, data types and it size, variables, constant, characters and character string, operators (arithmatic, relational, logical, bit-wise, compound assignment, increment-decrement, conditional, special operators), expressions, qualifiers, manipulator, type conversions, preprocessor directives, macro functions, operator precedence and associativity.

(2) Loops and decisions

For loop, while, do … while, and nesting of each others, if, if … else, else … if, nesting of if, switch, break, continue, go to.

(3) Arrays and structure

Single & multi dimensional arrays, strings, string manipulation, arrays of string, structure declaration, structure definition, nesting of structure, array of structure, structure & encapsulations.

(4) Function

Function components, passing data to function, function return data type, library functions, parameter passing, return by reference, default arguments, inline function, function overloading, arrays & functions, C++ stack, scope and extent of variables, storage classes, functions with variable number of arguments, recursive function.

(5) Object Oriented programming

Procedural languages Vs Object Oriented approach, characteristics of OOL, classes and objects (i.e.), object initialization and cleanup (i.e.), friend function, static function, assignment and copy initialization, the this pointer, dynamic objects, inheritance & polymorphism.

(6) Operating overloading & data conversion

Over-loadable operators, unary operator overloading, binary operator overloading, overloading of new and delete operators, subscript operator overloading, assignment operator overloading, conversion between basic data type, conversion between object and basic data types, conversion between objects of different classes.

(7) Inheritance

Introduction to the inheritance, types of inheritance, constructor and destructor in inheritance. Application of inheritance.

(8) Virtual function and templates

Introduction, need of virtual function, pointer to derived class objects, array of pointers to base class objects, pure virtual function, concept of abstract class and dynamic binding. Function templates overloaded function templates, multiple arguments function template, class templates and its applications.

(9) Stream handling

Definition of stream, predefined console stream, hierarchy of console stream classes, unformatted I/O operations, formatted console I/O operations, custom/user defined manipulators, stream operators with use defined class, hierarchy of file stream classes, file modes, file pointers and their manipulations, sequential and random access to file, ASCII & binary file, saving & retriving of objects, in-memory buffers & data formatting.

Books

(1) Object Oriented Analysis and Design – By Booch G.
(2) Designing Object Oriented software – By Rebecca Wirfs – Brock (PHI)
(3) Object Oriented Modeling and Design – James Rumbaugh (PHI)
(4) Mastering C++ programming – By Venugopal, Rajkumar, Ravishankar (TMH)
(5) Mastering C+ - By Robert Lafore
(6) Borland C++ & OOPS – TED Fasion
(7) C++ Programming language – By Stroustrup
(8) Programming with ANSI C++ by Bhusan Trivedi; Oxford Press

Semester – II
CCA2002: Data structure and algorithm

(1) Introduction to Data Structures

Primitive Data Structures, String Manipulation & Pattern Matching, Storage, Representation of Strings, Text Handling.

(2) Linear Data Structures:

Arrays, Storage Structure for Arrays, Structures & Arrays of Structures, Stack, Applications of Stacks, Queues, Simulation, Priority Queues, Pointers & Linked Allocation, Linked Linear Lists, Circularly Linked Linear Lists, Doubly Linked Linear Lists, Applications of Linked Linear Lists.

(3) Nonlinear Data Structures:

Trees , Operations on Binary Trees , Storage Representation & Manipulation of Binary Trees, Conversion of General Tree to Binary Trees , Sequential & Other Representation of Trees , Application of Trees - Manipulation of Arithmetic Expression , Multi-linked Structures - Sparse Matrices.

(4) Sorting & Searching:

Introduction, Selection Sort, Bubble Sort, Merge Sort, Heap Sort, Quick Sort, Radix Sort , Sequential Searching , Binary Searching , Search Trees – Height Balanced , 2-3 Trees , Weight Balanced , m-ary Trees , Trie Structures , Hash table, Search Methods , Introduction , Hashing Functions , Collision Resolution Techniques.

Reference Books:

(1) Programming & Data Structure using C - By: Dr. Atul Gonsai, Saurashtra University Publications
(2) An introduction to data structure with applications - By Jean-Paul Sorenson (Mc graw - Hill)
(3) Data structure and program design in C - By Robert Knise, Bruce, P Leung, Clovis l Tonds (PHI)
(4) Introduction to data structure - By Bhagat Singh, Thomas L Naps (Galgotia)
(5) Data structure using C - By Aaron M Tenenbaum, Yedidyah Lansan, Moshe J Augenstein (PHI)
(6) Algorithms + Data structure = Program - By Wirth Niclaus (PH Int)

Semester – II
CCA2003: Building client server application using VB

(1) Introduction

Oop Concept, Getting Acquainted To Vb Environment, Form (Design And Code Window), Controls, Properties, Events And Methods, Project explorer, Object Browser, Data View Window.

(2) Controls

Label, Text Box, Command Button, Option Button, Check Box, Picture Box, Image Box, Combo Box, List Box, Drive, Dir, File List Box, Timer, Shape, Line, Rich Tex Box, Common Dialog Control, VS Flex Grid, DTPicker, SSTab, Tool Bar & Image List, Status Bar, Progress Bar, Tree View, List View, Slider, Winsock, OLE

(3) Declarations, Procedures, Functions And Arrays

Different Types Of Declarations, Dim, Public, Private, Scope Of Variables With Different Declarations, Standard Module, Module Declaration, Option Explicit, Constants, Subroutine And Functions, Static And Dynamic Array, Collection, Creation of function, procedure, events. Study and implementations of the different functions.

(4) Data Types And Control Structures

Different Data Types, Decision, If, If-Else, Nested If-Elses, If-Elseif, Logical Operators, Loops, For –Next, While – Wend, Do-While –Loop, Nesting Of Loops, Select Case, Goto

(5) Database Controls & Database Connectivity

Data Control (DAO & ADO), Dbcombo, Dblistbox, Data Bound Grid, Hierarchical Flex Grid

(6) Multiple Forms

Working With MDI Form & Child Forms, Menu Editor

(7) File Handling

Opening And Closing of File, Reading And Writing Records Into File

(8) Error Handling

Types of Errors, Design Time Error, Compile Time Error, Run Time Error, Err Object, Error Trapping Options in VB

(9) Report Generation

Data Report, Crystal Report

Reference Book

(1) Visual Basic Black Book
(2) Mastering Visual Basic – BPB

Semester – II
CCA2004: Computer network

(1) Introduction of Computer Network

Introduction To Networking, Components Of Networking, Different Computing Models Of Network, Centralized, Distributed, Collaborative, Networking Configuration Client/Server Based, Peer To Peer Networking, Local and Wide Area Network. Intranets and Internets Network Services, File Services, File Transfer Services, Printing Services, Application Services, Wide area and local networks, fundamentals of communication theory, channel speed and bit rate, voice communication and analog waveforms , bandwidth and the frequency spectrum.

(2) Networking Standards

Introduction to Standards, Standard Organization and the OSI rules and the Communication Process. The OSI reference Model, How Peer OSI Layer Communicates, Protocol Stacks, Conceptualizing the layers of the OSI Model, OSI physical layer, OSI Data Link Layer, Concepts Of OSI Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer, IEEE 802 family standard

(3) Transmission Media

Introduction to Transmission Media, Characteristics, Cost, Installation, Requirements, Bandwidth Band Usage, Attenuation and Electromagnetic Interference, Cable Media Coaxial Cable, Twisted-Pair Cable, Fiber Optic Cable, Summary Of Cable. Wireless Media, Reason for wireless Network, Wireless Communication with LANs, Comparison Of Different Wireless Media, Time Division Multiplexing (TDM), Time Division Multiple Access(TDMA).

(4) Connectivity Devices

Introduction to Modems, Asynchronous Transmission, Synchronous Transmission, Network Adapter card, Repeaters Hubs Passive, Active, Intelligent, Bridges, Routers, Brouters, Gateways, Routing Routing Algorithms Distance Vector Routing, Link State Routing.

(5) Network Topologies and architectures

Introduction to Access Methods, Contention Polling, Token Passing, Comparing Contention and Token Passing, Demand Priority, Network Topologies, Bus Topologies, Ring Topologies and Star Topologies Mesh Topology, Network Architectures Ethernet.

(6) Switching & Routing In Networks

Message Switching, Packet Switching when and when not to use packet switching, packet routing, and packet switching support to circuit switching networks.

(7) TCP/IP

TCP/IP and internetworking, related protocols, ports and sockets, The IP address structure, IP datagram,

Reference Books :

(1) Networking essentials -By Joe casad, Dan newland (Tech media)
(2) Data and computer communication -By Stallings (Macamillan)
(3) Design & analysis of computer communication network -By V Ahuja (PHI)
(4) Black U "Computer network – protocol standards and interfaces", PHI
(5) Stallings, W "Computer communication network" 4th edition PHI
(6) Tannebaum A S " Computer networks", PHI
(7) B A forozon "Data communication and networking", TMH

Semester – II
PCA2001: Practical - 2

(1) CCA2001 : Object oriented programming using C++. - 30 marks
(2) CCA2002 : Data structure and algorithm - 20 marks
(3) CCA2003 : Building client server application using VB - 30 marks
(4) MCA2006 : Comp oriented numerical and stat method - 20 marks

Semester – II
MCA2006: Computer oriented numerical and statistical method

(1) Solution of non-linear & transcendental equations

Bisection method, method of false position, newton-rapson method, secant method, method of successive approximation, concept oriented theoretical consideration of above methods.

(2) Solution of linear equations

Meaning, conditions for solutions, solution of equation by direct methods - (Gaussian elimination, Gaussian jordan), iterative methods - (Jacobi method, gaussian seidel), ill-conditional equations and solution.

(3) Interpolation and approximation

Introduction, finite differences, Newton's formulae, Central difference formulae, interpolation with unevenly spaced points, divided difference and their properties, inverse interpolation and double interpolation.

(4) Numerical integration & solution of ordinary differential equations

Concept of numerical integration with geometrical representation, trapezoidal method, simpson - 1/3 rule, simpson - 3/8 rule, veddle's rule, understanding and solution of Ordinary Differential Equation and theoretical consideration, euler method, modified euler's method, R-K 2nd order & 4th order method, predictor corrector methods.

(5) Statistics

Graphical representation, Frequency distributions, Measures of central tendency, Measures of dispersions, Correlation, Regression.

Reference books:

(1) Computer Oriented Numerical Method – by CK Kumbharana & Dr NN Jani
(2) Essential Computer Mathematics - by Seymour Lipschutz (Schaum series)
(3) Statistics (Schaum series)
(4) Fundamentals of mathematical statistics - by SC Gupta & VK Kapoor (S. Chand & sons)
(5) Statistics – by V.K.Kapoor.
(6) Mathematics – by V.K.Kapoor.

Semester – III
CCA3001: System analysis and design

(1) Overview of the System Analysis & Design System

System, Subsystem, Characteristics of system, Information System, Categories of Information system, System Analysis and Design, Types of User, Functions of System Analysts, System Development Strategies – Classical Method(SDLC), Structured Analysis Development Method, System Prototype Method, Project Proposals -Reasons for Project Proposal, Source of Project Request

(2) **Preliminary investigation and feasibility study, Activities in Requirement**

Fact Finding Techniques, Tools for Analysis – Decision Trees, Decision Tables, Structured English, data flow diagram and data dictionary.

(3) Input & output design

Objective of Output, Types of Output, Types of Presenting Information, Designing Printed Output (Printed Reports, printed output Method, special forms, multiple copies), Objective of input design, Data capturing guidelines, Designing of source document, layout, captions, Coding Techniques (Classification Code. Functions code, Sequence code, significant digit subset code, mnemonic code etc.) Input Validations and tests

(4) Database- File Design

System development in a database environment, Design of Database – Normalization (INF, 2NF, 3NF& BCNF), Top-Down structure of modules, Coupling & Cohesion, Span of control, Module size, Shared modules, Software Design tools - Structured flowcharts, HIPO, Warnier diagrams.

(5) Testing Methods

Unit test, system test, peak load test, storage test, performance time test, recovery test, verification, validations and certifications

(6) Implementation

System Implementation methods (Parallel, direct cut-over, Pilot approach, phase in) Training & Training Methods

Reference books:

(1) Analysis and design of information system – By Jams A Seen (TMH)
(2) Structured Analysis and Design, Yourdon E. and Constantine L. L: Yourdon Press, New York.

Semester – III
CCA3002: Core java

(1) Introduction

Java Environment, Java Features and support

(2) Overview of Java Environment

Sample program & Compilation, Using block of code, Lexical Issues (White space, identifiers, Literals, Comments, Separators, Keyword), Java Class Library, Data type, Operators, Control structures, Arrays and String Class

(3) Classes, objects and methods

class, object & method, Defining class, adding variables, adding methods, creating objects, Constructor, this key word, garbage collection, finalize() method, Accessing class members, methods overloading, static members, nesting of methods, Vectors & wrapper classes, Implementation of O.O.P concept in java, Inheritance, Subclasses, subclass constructor, multiple inheritance, hierarchical inheritance, overriding methods, Abstract Class, Final variables and methods, final classes, Method Using final to Prevent Overriding & overloading, finalize methods ,The Object Class, Visibility control – public access, friendly access, protected access, private protected access, rules of thumb, Method Overloading, Object as parameters, Argument Passing, Returning Objects, recursion, Access control, static, final, Nested & Inner Classes, String class, Command-Line arguments

(4) Packages and Interfaces

Defining package, understanding CLASSPATH, Access protection, Importing Packages, Defining Interfaces

(5) Exception Handling

Exception Types, Uncaught Exceptions, Multiple catch Clauses, Nested try Statements, Throw, Throws, Finally, Java's Built-in Exceptions, Creating Your Own Exception Subclasses

(6) Multithreaded programming

Creating threads, run() method, new thread, thread class, stopping & blocking threads, Life cycle of thread – newborn, runnable, running, blocked, dead, waiting, sleeping, suspended, blocked, Using thread methods, thread exceptions, thread priority, synchronization, Implementing the 'Runnable' interface

(7) Applet

What is an Applet, Applet Lifecycle, Applet class, AppletContext class, passing parameters to applet, Use of java.awt.Graphics class and its various methods in an applet

(8) Event Handling

Event Delegation Model or Event Class Hierarchy, All classes and interfaces of Event Delegation Model, Programmes related to event handling covering all types of events

(9) Graphics

Layout managers (FlowLayout, BorderLayout, CardLayout, GridBagLayout, GridLayout), AWT controls (Labels, buttons, canvases, checkboxes, checkboxgroup, choices, textfields, textareas, lists, scrollbars, panels, windows, frames, menus, menubars)

(10) I/O files in java

Concept of streams, Difference between CharacterStreams and ByteStreams, CharacterStreams (Reader, Writer, BufferedReader, InputStreamReader, FileReader, BufferedWriter, OutputStreamReader, FileWriter, PrintWriter), ByteStreams (InputStream, FileInputStream, FilterInputStream, BufferedInputStream, DataInputStream, OutputStream, FileOutputStream, FilterOutputStream, BufferedOutputStream, DataOutputStream, PrintStream), Other Classes (RandomAccessFile, StreamTokenizer, File)

Reference books:

(1) The Complete Reference Java, Herbert Schildt: TMH, New Delhi
(2) Black Book: Java Programming, DreamTech Publication, New Delhi

Semester – III
CCA3003: Operating system and Linux/Unix programming

(1) Introduction

Operating system concepts and terminology, Types of operating system - an overview, Batch operating system, Time sharing systems, Real time system, Distributed operating system, Functions of operating system as a resource manager, Operating system organization: Hierarchical organization, extended machine organization.

(2) Linux/Unix Introduction:

Log in, log out, basic shell commands, Files and directories, users and groups, Permissions, types of kernels.

(3) First step to Linux/Unix User interface:

Moving around, Looking at the contents of directories, Creating new directories, Copying files, Moving files, Deleting files and directories, Looking at files, Getting online help.

(4) General purpose utilities

clear: Clear the Screen, script: Record your session, chmod: Changing file permission, chown and chgrp: changing file ownership, find: Search for files, head: Displaying Beginning of a File, tail: Displaying Ending of a File, wc: Word Count, touch: Updating a File's Time and Date, who: Login Details

(5) Process management

Introduction to process, Process concepts - States of process, Scheduling, ps: Process Status, Background and Foreground Processes, nice: Job Execution with Low Priority, kill: Premature Termination of Process, at: Execute on Specified Time, batch: Execute Later, cron: Running Jobs Periodically, crontab: Manipulate the crontab for a User, wait: Waiting for Process to Complete, sleep: Process to Sleep

(6) Input/output and memory management

Standard input and standard output, Redirecting input and output, Input File, Redirection, Concept of Piping, Tee, Logical and physical address, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, Virtual memory – Demand Paging, Page replacement algorithms

(7) File management

File system, File Concept – Access Methods, Directory Structure - I-nodes, structure of a regular file, directories, Finding Patterns, Regular Expressions, grep: Searching for Pattern, egrep: Extended grep, fgrep: Multiple String Searching, Working with Columns and Fields, cut: Splitting File Vertically, pest: pasting File, join: Joining Data, Tools for Sorting, sort: Ordering Data, uniq: Locating Repeated Lines, Comparing files, cmp: Comparing Two Files, comm: Finding What is Common, diff: Converting One File to Other, Changing information in Files, tr: Translating Characters, sed: stream editor,

Examining File contents, od: Displaying Data in Octal, mount: Mounting File System, umount: Unmounting File System

(8) Inter-process communication

write: Two Way Communication, talk: An Alternative Way to write, mail: The Universal Mailer, news: The Bulletin Board, finger: Details of Users, telnet: Remote Login

(9) Shell programming

VI editor command and Shell scripts, making shell scripts interactive, command line arguments, shells & sub-shells, shell functions, String handling, array .

Reference books :

(1) UNIX-LINUX Concept Shell Scripts and Administration By: Dr. Atul M Gonsai, Saurashtra University Publications
(2) UnixOperating system By Ritchie BPB publications
(3) UNIX concepts & application By Sumitabha Das TMH publication
(4) Adcanced UNIX – A programmer's guide (Stephen piata SAMs)
(5) Silberschetz A and Galvin : Operating Systems Concepts. Addision - Wesley.
(6) Tanenbaum : Operating Systems Prantice Hall of India Pvt. Ltd.
(7) Madnick S. & Donovan J. J. : Operating Systems.McGraw Hill Book Co.

Semester – III
CCA3004: Database concepts and tools

(1) Introduction to database system

Introduction to database system, Characteristics of the Database, Database systems. Data Models, Data modeling using the Entity- Relationship Approach.

(2) Introduction to ORACLE Server

ORACLE Server & Instances, Database Structure & Space Management, Memory & Process Structure, Schemas & Schema Objects, Client Server Architecture – Distributed Database Processing, Database Backup & Recovery, ORACLE Utility – Import , Export

(3) Introduction to SQL

Basic Data Types of ORACLE, Data Definition Language (DDL), Data Manipulation Language (DML), Transaction Processing Language (TPL), Data Constraints, Inbuilt Functions, Subqueries , Join , Indexes , Views , Sequences , Synonyms

(4) Introduction to PL/SQL

Advantages of PL/SQL and Generic PL/SQL Block, Cursor – Implicit & Explicit Cursor , Cursor For Loop , Parameterized Cursor, Locking Strategy – Implicit & Explicit Locking , Lock Table, Exception Handling

(5) ORACLE Database Object

Stored Procedures & Functions, Packages, Triggers

(6) Users , Privileges & Roles

Users – Create & Delete User , Grant & Revoke Command, Privileges – System & Object Privileges , Assigning , Viewing , Revoking System & Object Privileges Roles – Create , Grant , View & Delete the Roles

Reference books:

(1) Ivan Bayross : SQL/PLSQL , The Programming Language of ORACLE , BPB Publication
(2) J.A.Ramalho : Learn ORACLE 8i , BPB Publication
(3) Nilesh shah : Database Systems using ORACLE , PHI Publication

Semester – III
PCA3005: Practical – 3

(1) CCA3002 : Core Java - 30
(2) CCA3003 : OS and Linux/Unix prog. - 20
(3) CCA3004 : Database concepts and tools - 30
(4) MCA3006 : Operation research - 20

Semester – III
MCA3006: Operation research

(1) Linear programming

Mathematical model, assumptions of linear programming, graphical solution, principles of simplex method, revised simplex method, duality, dual simplex method.

(2) Special types of linear programming

Transportation and assignment problem.

(3) Replacement Theory

Replacement of items that deteriorate – Replacement of items that fail group replacement and individual replacement.

(4) Project scheduling by PERT/CPM

Introduction, basic difference between PERT/CPM, diagram representation, critical path calculation, construction of time chart and resources leveling, probability and cost consideration in project scheduling, project control.

Reference books:

(1) V.K.Kapoor : Operations Research – Problems & Solutions, Sultan Chand & Sons, New Delhi
(2) J.K.Sharma : Operations Research – Theory & Applications, MacMillan India Ltd,
(3) H.A.Taha : Operations Research - An Introduction, PHI

Semester – IV
CCA4001: Software Engineering

(1) Introduction

Software and role of software, types (nature) of software, Software Engineering-A Layered Technology, Process Framework, Capability Maturing Model Integration (CMMI), Process Model – Waterfall Model, Incremental Process Model, RAD Model, Evolutionary Process Models-Prototyping,` Spiral Model, Concurrent Development Model, Specialized Process Model – Component-Based Development , Formal Methods Model, Aspect-Oriented Software Development. Agile Process, Agile Process Model – Extreme Programming, Adaptive Software Development, Dynamic Systems Development Method, Scrum, Crystal, Feature Driven Development, Agile Modeling.

(2) Software Requirement

Requirement Engineering Tasks, Requirements Engineering Process, Eliciting Requirements, Elaborating Requirements, Negotiating Requirements, Validating Requirements.

(3) Analysis Model

Requirements Analysis, Elements of Analysis Model, Data Modeling Concepts, Object Oriented Analysis, Scenario Based Modeling, Flow-Oriented Modeling, Class Based Modeling, Behavioral Model.

(4) Software Designing

Design Concepts, Design Model, Pattern Based Software Design, Designing Class-Based Component,Conducting Component Level Design.

(5) Software Testing

Test Strategies for Conventional Software, Test Strategies for object Oriented Software, Validation Testing, System Testing, Debugging, Black Box Testing, White Box Testing, Control Structure Testing.

Reference books:

(1) Roger Pressman: Software Engineering, McGraw-Hill Publication
(2) Pankaj Jalote: An Integrated Approach to Software Engineering, Narosa Publication
(3) Joseph Schmuller: Teach Your Self UML in 24 Hours, Techmedia Publication

Semester – IV
CCA4002: Advanced Java

(1) Java Swings

Fundamental of Swing & Key features of Swing, Components & Containers, Swing Packages & Applications, Painting Fundamentals, Event Handling. Working with JFrame, JApplet, JPanel, JTextField, JPasswordField, JButton, JCheckBox, JRadioButton, JList, JScrollPane, JComboBox, JMenu, JMenuBar, JMenuItem, JPopupMenu, JTree, JTable.

(2) JDBC (Java Database Connectivity)

Introduction of JDBC, JDBC Architecture, Data types in JDBC, Processing Queries, Database Exception Handling, Discuss types of drivers.

(3) Java Network Programming

Networking Basis – TCP/IP models, Network Addressing, Domain Name Services(DNS), Ports, Sockets, Simple Client Server Program using TCP, Simple Client Server Program using UDP, Introduction to RMI Architecture, Object Serialization, Implementing Remote class & Interfaces, Client Server Program using RMI

(4) Servlets

Introduction of Servlet, HTTP Servlet Basics, Type of Servlet and Life cycle, Retrieving Information into Servlet , Making session and cookies into Servlet , Servlet with JDBC, Methods (getWriter(), getInitParametor(), getInitParametorNames(), getServletContext(), getServletName(), getServletInfo(), limit(), forward(), service, getAttribute(), getAttributeNames()

(5) JSP

Introduction JSP and JSP Basics, Directives (page, include, taglib), Scripting Elements (Declaration, scriptlots, expressing), Standard Action (JSP: useBean, JSP:getProperty, JSP:setProperty, JSP:param, JSP:include, JSP:Forward, JSP:plugin), Life cycle of JSP, JSP and Java Beans, JSP:session & cookies, Error Handling with JSP, JDBC with JSP

Reference Books

(1) The Complete Reference Java 2 - Herbert Schildt and Patrick Naughton
(2) Teach your self Java - E. Balaguruswamy
(3) JAVA Servlet Programming – Oreilly
(4) Developing Java Servlets – Techmedia
(5) Professional JSP – Wrox
(6) JSP Beginner's Guide – Tata McGrawHill by Gary Bolling, Bharathi Nataragan

Semester – IV
CCA4003: .Net framework and c#

(1) Components of the .NET Architecture:

MS .NET Runtime, Managed/Unmanaged Code, Intermediate Language, Common Type System, MS .NET Base Class Library (BCL), Assemblies, Metadata, ssemblies and Modules, Assembly Cache, Reflection, Just In Time Compilation, Garbage Collection

(2) MS .Net Programming with C#

Introduction to C# .Net language, C# Program Console Application Development, Compiling and Executing, Defining a Class, Declaring the main() Method, Organizing Libraries with Namespaces, Using the using Keyword, Adding Comments, C# Data Types, Value Types-Primitive Data Types, Reference Types

C# Control Structures -Using the if Statement, Using the if-else Statement, Using the switch case Statement, Using the for Statement, Using the while Statement, Using the do while Statement, Using the break Statement, Using the continue Statement, Using the return Statement, Using the goto Statement .

C# Properties and Indexers – Using Properties- Get Accessor, Set Accessor, Accessing Lists with Indexers, Delegates and Events in C# - Single Cast, Multicast. Events, Exception Handling in C# -Using the try Block, Using the catch Block, Using the finally Block, Using the throw Statement. Inheritance, Polymorphism, Interfaces in C#, Structures in C#, Operator Overloading in C#, Using Generics in C#

Multithreading -Getting started with threads, managing thread lifetimes, destroying threads, scheduling threads, communicating data to a thread

Windows form and Controls - General Controls (Label, text box, button, list box, combo box, check box, radio button picture box, date time picker progress bar, timer. Status strip, user defined controls), Containers (Group box, panel, split container, tab control, tab layout panel, flow layout panel), Menu and Tools Bars, Menu strip, context menu strip, status strip, tool strip, Dialogs (Color dialog, folder browser dialog, font dialog, open file dialog, save file dialog)

File I/O with streams - Stream classes (filestream, streamreader and streamwriter, string readers and writers, file system classes (directory and directoryinfo, file and fileinfo, parsing paths), nonconsole use of streams (openfile dialog, reading web pages), serialization (Binaryformatter, soapformatter, xmlserializer, implementing iserializable))

Reference books

(1) Beginning C#, Wrox Publication
(2) Professional C#, Wrox Publication

Semester – IV
CCA4004: Web programming – 1

(1) Writing Client Side Scripts

Introduction to JavaScript, Writing JavaScript into HTML, Data Types and Literal , Type Casting, Creating Variable, Incorporating Variables in a Javascript, Javascript Array, Operators and Expressions in Javascript, Special Operators, Constructor, Condition Checking, Endless Loop, Functions in Javascript, User Define Function, Dialog Boxes, The Javascript Document Object Model, Built in objects in javascript, Form used By a website, Cookies

(2) Writing server side script

Introduction to PHP, how PHP works, The PHP .ini File, Basic PHP syntax : PHP tags, PHP statements and whitespace comments, PHP functions, Variable types, variable names (identifiers, type strength, variable scope, super, globals, constants, variable – testing and manipulation functions), First PHP script, PHP operators, Creating Dynamic pages: Single Quotes Vs. Double Quotes, Passing variables on the URL, passing variables via the Query String, Flow Control, Arrays.

PHP and HTML Forms, HTML Forms, how HTML Forms work, processing form input

String Manipulation, Formatting Strings, /Concatenation, String Manipulation Functions, Examples of string functions, working with string manipulation functions, magic quotes

Reusing Code and Writing Functions, including files, require, require_once, auto_prepend_file and auto_append_file, user functions, defining and calling functions, default values, variable scope, by reference vs.. by value, form processing code organization, code organization, conclusion

Managing Data, querying a database, inserting, updating deleting, searching records mysql functions.

Regular expressions, Regular Expression Syntax, Start and End (^$), Number of occurrences (? +*{}), Common Characters (.\d\D\w\W\s\S), Grouping ([]), Negation (^), Subpatterns(()), Alternatives(|), Escape Character (\), Form validation functions with regular expressions

Session Control and /Cookies , Sessions, Configuring Sessions, Session Functions, Cookies, Authentication with Session Control.

Sending Email with PHP, mail(), shortcomings of mail(), PHPMailer,Sending a password by Email

File System Management, Opening a file, fopen(), Reading from a file, fgets(), writing to a file, fwrite(), writing to a file, file locking, flock(), uploading files via an HTML form, getting file information, more file functions, directory functions getting a directory listing, creating a resume management page.

Reference Books

(1) Beginning JavaScript 2nd Edition – Wrox
(2) Beginning PHP5, Apache, Mysql Web Development – Wrox
(3) PHP Bible, 2nd Edition :Tim Converse, Joyce Park
(4) PHP manual

Semester – IV
Elective - 1
ECA4015: Advanced networking

(1) Communication Protocols

Peer – To – Peer Processes, network addressing (Physical Address, Internet Address, Port Address), Network Address Classification - Recognizing Classes, NETID & HOSTID, Classes & Blocks, Network Addresses, Special Addresses, Sub-netting, Super-netting, Classless Addressing, Process To Process Communication, Port Addresses, Socket Addresses

(2) Socket Interface

Socket Definitions, Address Transformation, Byte Manipulation Functions, Socket System Calls, Socket Addresses, Connectionless – Connection, Oriented C/S Interface

(3) Winsock Windows Programming

Winsock Overview, Berkeley Sockets Versus WinSock, WinSock Extensions to Berkeley Sockets, Windows Message-Driven Architecture, Retrieving The Network Service Protocol, Use Of Winsock Control

(4) Programming Applications

Socket based chat program, Building an Internet Client Program, Building an Internet Server Program, Building Client Server Applications, Date and time Routines

Reference books

(1) Unix network programming W. R. Stevens PHI
(2) TCP/IP protocol Suite Forouzan TMH
(3) Expert Guide to Visual Basic 6 Wayne S. Freeze BPB
(4) Network Programming in C

Semester – IV
Elective - 1
ECA4025: Data warehousing & Data Mining

(1) Introduction of Data Warehouse

Operational and Informational systems, OLTP and DSS systems, Characteristics of Data Warehouse, Data Warehouse software and hardware architecture, Basic steps to develop data warehouse architecture, Architectural components of data warehouse, Data warehouse system architecture (Two-Tiered and Three-Tiered)

(2) Data Marts

Data Mart structure, Usage of Data Mart, Security in Data Mart, Data warehouse and Data Mart

(3) Online Analytical Transactional Process

OLTP and OLAP systems, Types of OLAP (MOLAP, ROLAP and HOLAP) with advantages and Disadvantages

(4) ETL

Extraction of Data, Transformation of Data, Loading of Data, Practical study of popular ETL tools

(5) Introduction of Data Mining

Foundation of Data Mining, Data Mining Process (Data Understanding, Data Preparation, Creating database for data mining, Exploring database, preparation for creating for data mining model, building a data mining model, evaluating a data mining model, deployment of data mining model)

(6) Data Mining Techniques

Statistics (Point Estimation, Model based summarization, Bayes theorem, Hypothesis testing, Correlation and regression), Machine Learning, Decision Trees, Neural Networks, Genetic Algorithms (Cross-over techniques, Mutation Function, Fitness Function), Association Rules (Apriori Algorithm, Sampling Algorithm, Partitioning algorithm, Pincer-Search algorithm, FP-Tree Growth algorithm), Clustering (Hierarchical algorithm, Agglomerative algorithm, Divisive clustering, K- Means, Nearest Neighbor, clustering large database)

(7) Practical study in WEKA Environment

Implementation of data set into WEKA, Rules generated using charts, Analysis of data using WEKA, Comparison of various algorithms

(8) **Practically development and implementation of Data mining models in** following areas

Insurance, Financial services, Healthcare and medicine, Telecommunications
Transportation and logistics, Government, Education

Reference books

(1) Data mining Explained, A manager's guide to customer centric business intelligence Rhonda Delmater Monte Hancock Digital Press
(2) Data mining, Pieter Adriaans Dolf Zantinge
(3) Data warehousing in the real world- A practical guide for business DSS Sam Anahory Dennis Murray

Semester – IV
Elective - 1
ECA4035: Mobile computing

(1) Introduction to wireless networks and mobile computing

(2) Wireless Transmission
Frequencies, signals, antennas, signal propagation, Multiplexing (SDM, FDM, TDM, COM), modulation(ASK, FSK, PSK), spread spectrum, cellular system

(3) Medium Access Control
Hidden/exposed terminals, near/far terminals, SDMA, FDMA, TDMA, CDMA

(4) Wireless LANs
Infra red vs. radio transmission, infrastructure vs. ad-hoc networks, IEEE 802.11 architecture, MAC layer, Synchronization, power management, roaming, IEEE 802.11 802.11b, 802.11a, new developments, Bluetooth overview

(5) Mobile IP
Overview, network elements, packet delivery, agent discovery, registration unneling and encapsulation, optimization, IPV6, IP micro-mobility support, DHCP and mobile IP

(6) Mobile Transport Layer
Traditional TCP and implications on mobility, indirect TCP, snooping TCPDiscussion of project ideas Mobile TCP, fast retransmit/fast recovery, selective retransmission, and transaction oriented TCP TCP over 2.5/3G networks, performance-enhancing proxies

(7) Mobile Computing
File systems and WWW architectures for mobile computing WAP - architecture, protocols (WDP, WTLS, WTP, WSP) WAP - Wireless Applications Environment, WML, Push architecture, push/pull services, push-pull based data acquisition, WAP1.X stacks, l-mode, WAP 2.0

(8) Wireless Telecomm Networks
Evolution of wireless telecomm networks : GSM, GPRS IS-95, CDMA-2000, W-CDMA, 3G

(9) Messaging Services
Short Message Services (SMS) Multimedia Message Services(MMS) Multimedia transmission over wireless

Reference books:

(1) Mobile computing, Asoke K Talukder, Roopa R Yavagal
(2) Mobile communications, Jochen Schiller, Addison wesley

Semester – IV
Elective - 1
ECA4045: Digital signal processing

(1) Basic principles of signal processing

Introduction, Principles of analog signal processing, Principles of optical signal processing, Introduction to digital signal processing, Building blocks of a digital signal processing, Comparison between optical signal processing and digital signal processing, Analog to digital conversion.

(2) Functions in signal processing

Delta function, Unit-step function, Unit-ramp function, Parabolic and exponential functions, Sinusoidal function, Even and odd functions, Periodic and non periodic functions.

(3) Transformations and Filters

Introduction, Fourier transformation, Laplace transformation, Z-transformation, Discrete fourier transformation, Fast-Fourier transformation, High-pass filters, Band-pass filters, Band-reject filters

Reference Book

(1) Digital Signal Processing - Theory, Analysis and Digital-filter Design, B.Somanathan Nair

Semester – IV
Elective - 1
ECA4055: E-commerce

(1) Introduction to electronic commerce
telecommunications infrastructure, and Internet technology, client-server architecture of Internet applications, standard Internet services, HTTP

(2) Markup languages
HTML, XML dynamic Web content

(3) Concerns for E-commerce growth
Internet bandwidth and Technology issues, Security issues

(4) Problems of Internet technology
network architecture, quality of service

(5) Internet access and services
measuring and pricing the Internet

(6) Concept of Digital economy

(7) E-business models

(8) Security of Internet
hosts and networks, public key infrastructure, safety of e-commerce applications

(9) Trust and reputation in e-commerce

(10) **Business-to-consumer e-commerce- online marketing and selling, information goods**

(11) Electronic Commerce Applications
E-Markets, E-Auctions on the Internet, Electronic payment systems

(12) Intelligent agents in electronic commerce
Business-to-business e-commerce - supply chain management

(13) Architectures for E-Commerce.

(14) New Emerging Opportunities for E-Business
Digital Government: Government to Citizen (G2C), Government to, Government (G2G), Government to Business (G2B), Standards for E-Commerce, Web Services for Online E-Commerce, Digital Media and E-Commerce

Recommended Books:

(1) The Complete E-Commerce Book: Design, Build and Maintain a Successful Webbased Business,
(2) Developing E-Commerce Sites, Addition Wesley Publications
(3) Frontiers of E-Commerce, Addition Wesley Publications
(4) E-commerce : Kamlesh K Bajaj, Debjani nag

Semester – IV
Elective - 1
ECA4065: E-Governance

(1) E-Governance
(2) Introduction to E-governance
(3) Role of ICT's in e-governance
(4) Need, importance of E-governance
(5) Categories of E-governance
(6) Key Issues of E-Governance
- (6.1) Technology
- (6.2) Policies
- (6.3) Infrastructure
- (6.4) Training
- (6.5) Copyrights
- (6.6) Consulting
- (6.7) Funds

(7) E-governance Models
- (7.1) Model of Digital Governance
- (7.2) Broadcasting /Wider Dissemination Model
- (7.3) Critical Flow Model
- (7.4) Interactive-service model/Government –to-Citizen-to-Government Model (G2C2G)

(8) Major areas of E-governance Services
- (8.1) Public Grievances: Telephone, Ration card, transportation
- (8.2) Rural services: Land Records
- (8.3) Police: FIR registration, Lost and found
- (8.4) Social services: Death, domicile, school certificates
- (8.5) Public information: employment, hospitals, railway
- (8.6) Agricultural sector: Fertilizers, Seeds
- (8.7) Utility payments: Electricity, water, telephone
- (8.8) Commercial: income tax, custom duty, excise duty

(9) E-Governance Infrastructure, stages in evolution and strategies for success
- (9.1) E-readiness
  - (9.1.1) Data Systems Infrastructure
  - (9.1.2) Legal Infrastructural preparedness
  - (9.1.3) Human Infrastructural preparedness

(10) Challenges against E-governance
(11) Study of E-governance initiatives in Indian states
- (11.1) Gujarat
- (11.2) Andharapradesh
- (11.3) Maharashtra
- (11.4) Kerala
- (11.5) Karnataka etc

Reference books

(1) E-governance concepts & case studies – PHI publication
(2) Geo-information international publications
(3) E-governance projects, PHI publication

Semester – IV
PCA4006: Practical – 4

(1) CCA4002: Advanced Java - 35 marks
(2) CCA4003: .Net framework and c# - 35 marks
(3) CCA4004: Web programming – 1 - 30 marks

Semester – V
CCA5001: Building application using ADO.NET & ASP.NET

(1) Database Application Development with ADO.Net

Introduction to ADO.NET, ADO.NET Architecture, Understanding the ConnectionObject, Building the Connection String, Understanding the CommandObject, Understanding DataReaders, Understanding DataSets and DataAdapters, DataTable, DataColumn, DataRow, Differences between DataReader Model and DataSet Model, Understanding the DataViewObject, Working with System.Data.OleDb, Using DataReaders, Using DataSets

(2) Web based application development using ASP.NET

Introducing the ASP.NET - ASP.NET Controls, ASP.NET Pages, ASP.NET Framework, Web.config File, Global.asax Page

Standard Controls - Displaying Information, Accepting User Input, Submitting Form Data, Displaying Images, Using the Panel Control, Using the HyperLink Control

Validation Controls - Overview of the Validation Controls, RequiredFieldValidator Control, RangeValidator Control, CompareValidator Control, RegularExpressionValidator Control, CustomValidator Control, ValidationSummary Control, Custom Validation Controls

Rich Controls - Accepting File Uploads, Displaying a Calendar, Displaying Advertisements, Displaying Different Page Views, Displaying a Wizard

Designing ASP.NET Websites - Designing Websites with Master Pages (Creating Master Pages, Modifying Master Page Content, Loading Master Pages Dynamically), Designing Websites with Themes(Creating Themes, Adding Skins to Themes, Adding Cascading Style Sheets to Themes, Creating Global Themes, Applying Themes Dynamically)

(3) Performing Data Access in ASP.NET

Overview of Data Access, Using the SqlDataSource Control, Using different List Controls, Using the GridView Control, Using the DetailsView Control, Using the FormView Control, Using the Repeater Control, Using the DataList, DataGrid Control

(4) Security in ASP.NET

Using the Login Control, Using the CreateUserWizard Control, Using the LoginStatus Control, Using the LoginName Control, Using the ChangePassword Control, Using the PasswordRecovery Control, Using the LoginView Control

Reference Books

(1) ASP .Net Unleashed, Sams Publication
(2) Mastering ASP.NET with C#, by A. Russell Jones SYBEX Publication
(3) Professional ADO.NET
(4) Microsoft .NET XML Web Services Step by Step by Adam Freeman

Semester – V
CCA5002: Web programming – 2

(1) Advanced PHP

PHP XML Support, Simple XML Objects, executing X path Queries, DOM Interoperability, Using X path, Installing and Configuring LIBXSL, Applying server side XSL Transformations, Using XML in N-Tier Architecture, Mixing PHP Objects and XML

PHP Web Services, Web service Technology Stack, SOAP Soup, Web services with PHP, Installing NuSOAP, Building a SOAP SERVER, Consuming a Web service, Generating WSDL Dynamically, Understanding Generated WSDL, WSDL and SOAP Proxies

Ajax with PHP, Ajax overview, Ajax Technology Stack, Ajax Implementations, Installing and configuring HTML Ajax Pear Module, Ajax Server, Ajax Client
Smarty templates, Smarty overview, installing and configuring smarty Pear Module, Setting up a Template, passing data to the template, smarty for template, designers, smarty for programmers, smarty in N-Tier Architecture

(2) ASP

ASP Introduction, Global.asa file, Asp Server Side Scripting, ASP Functions

ASP Object: Application Object (Collection Reference, Methods Reference, Events Reference), ObjectContext Object (Collection Reference, Methods Reference,
Events Reference), Request Object (Properties Reference, Collection Reference, Method Reference), Response Object (Properties Reference, Collection Reference), Server Object (Properties Reference, Method Reference), Session Object (Properties Reference, Collection Reference, Method Reference, Events Reference),

The ADO Recordset Object (Properties Reference, Collection Reference, Method Reference, Events Reference)
ASP Components (ASP ADRotator, ASP BrowserCap, ASP ContentLinking, ASP ContentRotator)

ASP and AJAX, Ajax Introduction, Ajax ASP

Reference Books

(1) Beginning Ajax – Wrox
(2) PHP Bible, 2nd Edition :Tim Converse, Joyce Park
(3) Beginning PHP5, Apache, Mysql Web Development – Wrox
(4) XML Bible – Wiley
(5) O'Reilly-ASP In.A.Nutshell-2ndEdition - O'Reilly

Semester – V
Elective - 2
ECA5013: Geometric (GIS, GPS & Remote sensing)

(1) Geographic Information System (GIS)

Introduction, GIS – Perspective for insights and growth, Project domain of GIS, Real world representation through GIS, Mapping concepts, features and properties, Types of Information in a digital map, Map Analysis, Spatial concepts, Vector and Raster format in GIS, Functionality available within GIS Data display and querying, 3-D analysis, Network analysis, The benefits of using GIS, The applications of GIS - Environmental resources management, Emergency planning and routing, Provision of health, education or retail services, Facility management for the utilities, Highway maintenance and accident monitoring, Market analysis, Population analysis and prediction

(2) Global Positioning System (GPS)

Introduction, Need of GPS, How it works, Accuracy of GPS, The GPS satellite system, Components and basic facts of GPS, Components of a GPS (The control segment, The space segment, The user segment)

(3) Surveying with GPS

Methods of observations - Absolute positioning, Relative positioning, Differential GPS (The reference station, The mobile station, Data link), Kinematics GPS

GPS Receivers (Navigation Receivers, Surveying receivers, Geodetic Receivers), Computation of coordinates in GPS (Transformation from global to local datum, Geodetic coordinates to Map coordinates, GPs Heights and Mean Sea Level heights)

Factors that affect GPS, Reference station in GPS, Real use of GPS, Future of GPS technology, GPS in INDIA

(4) Remote sensing

Fundamentals of Remote Sensing, Introduction to remote sensing, Electromagnetic radiation, The electromagnetic spectrum, Interactions with the atmosphere, Radiation – rarget interactions, Passive vs. Active sensing, Characteristics of images, Satellites & sensors, Data reception, transmission, and processing, Remote sensing applications (Agriculture, Forestry, Geology, Hydrology, Sea ice, Land cover & land use, Mapping, Oceans & coastal monitoring

Reference books

(1) The GIS Book – George Korte
(2) A to Z GIS – Shelly Somer
(3) GIS for Everyone – Davis, David E.
(4) Principles of GIS – Burrough, P.A.

Semester – V
Elective - 2
ECA5023: Biometrics technologies

(1) Introduction to Biometrics

What is Biometrics? Why Biometrics? Authentication, Identification, Verification, Key Biometrics terms, System Model, Accuracy in Biometrics systems: FAR, FRR, FNMR, FMR, FTE, EER, ATV, Different Biometrics technologies, Comparison of Biometrics technologies

(2) Fingerprint Identification Technology & Facial scan Technology

History, Components, Working of Fingerprint technology, Deployment, Strengths, Weaknesses, Applications

Facial scan: Components, Face detection, Working of Facial scan technology, Competing facial scan technology, Deployments, Strengths, Weaknesses, Face recognition technologies: Eigenfaces, LDA, ICA, LFA, EBGM, NN & SVM, Tensorfaces, Manifolds, Kernel methods, Applications

(3) Iris scan Technology & Hand geometry Technology

Components, Working, Deployments, Strengths, Weaknesses, Systems and performances, Applications.

(4) Hand geometry

History, Development, Applications, Working, Performance, Standardization ,Implementation and privacy issues.

(5) Retina Identification and Voice Recognition

Retina/Choroids human descriptor, Technology, Eye signature, Instruments, Working, Performance, Limitations, Applications. Voice recognition Components, Working, Deployments, Strengths, Weaknesses, Performance issues, Applications

(6) Other behavioral technologies

Signature scan recognition, Key stroke recognition, Palm print recognition, Gait recognition.

(7) Multimodal Biometrics

Introduction, Taxonomy, Levels of fusion, Performance comparison, Applications.

(8) Smart card Technologies

What is smart-card? Smart-card chips, Temper resistance, Smart-card characteristics, Smartcard Reader, Current applications of Smart-card, Smart-card application development, Smart-card production steps, Smart-card platforms and operating systems, Smart-card security

Reference Books

(1) Biometric Systems – James Wayman & Others – Springer
(2) Biometrics: Identity verification in a networked world – Samir Nanavati & Others – Wiley Computer Publishing
(3) Biometrics: Personal Identifixation in Networked Society – Anil Jain & Others – Kluwer Acedemic Publishers
(4) Handbook of Biometrics – Anil Jain & Others – Springer
(5) Smart cards, Tokens, Security & Applications – Keith Mayes – Springer

Semester – V
Elective - 2
ECA5033: Embedded system

(1) Embedded Systems, Microprocessors
Introduction to Embedded System, Examples of Embedded System, Embedded System Design Process, Difference between Microprocessor & Microcontroller Introduction to Microprocessor- Pentium 8086

(2) Micro controllers
An Intro. To Micro controllers- 8051 & 80196, 8051 Processor, 8051 Micro controller Programming (using C & Assembly Lang.)

Control Systems, DAS, Microcomputer based Control Systems

Reference Books:

(1) Intro. To Embedded Systems & Microcontrollers Mohammad Ali

Semester – V
Elective - 2
ECA5043:Image processing

(1) Introduction to Digital Image Fundamentals

What is Digital Image Processing, The origins of Digital Image Processing, Examples of Fields that use Digital Image Processing, Fundamental steps in Digital Image processing, Components of Image Processing system, Elements of Visual Perception, Light and Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships between Pixels, Linear and Nonlinear Operations

(2) Image Enhancement

Spatial domain – Background, Some basic gray level transformation, Histogram processing, Enhancement using Arithmetic/Logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters, Combining Spatial Enhancement features

Frequency domain – Background, Introduction to the Fourier Transform and the Frequency Domain, Smoothing Frequency-Domain Filters, Sharpening Frequency Domain Filters, Homomorphic Filtering, Implementation

(3) Image Restoration

A model of the Image Degradation/Restoration process, Noise Models Restoration in the presence of noise only spatial filtering, Periodic noise reduction by Frequency domain filtering, Linear, Position-invariant degradation, Estimating the degradation functions, Inverse filtering, Minimum Mean Square Error (Wiener) filtering, Constrained least squares filtering, Geometric mean filter, Geometric Transformations

(4) Color Image Processing

Color Fundamentals, Color models, Pseudo Color image processing, Basics of full color image processing, Color transformations, Smoothing and sharpening, Color segmentation, Noise in color images, Color Image compression

(5) Image Compression

Fundamentals, Image Compression models, Elements of Information theory, Error free compression, Lossy compression

Reference Books

(1) Digital Image Processing (Second Edition) By Rafael C. Gozales, Richard E. Woods. (Pearson Education)
(2) Digital Image Processing with MATLAB By Rafael C. Gozales, Richard E. Woods. (Pearson Education)
(3) Digital Image Processing By Kenneth R. Castleman. (Prenctice Hall)
(4) Digital Image Processing By Bernd Jähne (Springer)

Semester – V
Elective - 2
ECA5053: Nano Tech. (smart materials, MEMS & NEMS)

Chapter – 1

Introduction, Emerging Trends in Nanotechnology, Nanotechnology : Science and Applications, Synthesis and assembly strategies of Nanotechnology, Applications of Novel Nanomaterials, Methods of Nanofabrication, Modern techniques of Nanofabrication, Molecular Manufacturing

Chapter – 2

Industrial application of Nanotechnology, Computer Science for Nanotechnology, Properties of Nano Structured material, Carbon Nanotube technologies, Electron Beam Lithography

Chapter – 3

Nano wires, Magnetic Nanostructure, Quantum dots, Nanoelectronics, Nanomaterials in magnetic and optical data storage systems.

Nanotechnology and Healthcare, Nanomedicine, DNA Nanotechnology, Synthetic nanobiotechnology, Nanotechnology in tissue Engineering, Nanotechnology in Agriculture

Chapter – 4

NanoScale environmental technology, Impacts of Nano materials on environment and human health, Nanotechnology in Air pollution monitoring, Nanotechnology in Security and Defence, Nanotechnology for Space Operations, , in Biomedical Area, in Energy Resource Development, Environmental Nanotechnology : Regulation and legal considerations

Chapter – 5

Nanotechnology and Economic Growth, Nanotechnology in Developing Countries, Convergence of Technologies and Tools

Future of Nanotechnology - Today and Tomorrow, Business Opportunities, Innovative Trends in Nanotech Markets, Opportunities and Challenges

Semester – V
Elective - 2
ECA5063: Natural language processing

(1) Introduction

Brief history of NLP, some basic applications of NLP, NLP architecture, Introduction to machine translation, problems in machine translation, different types of MT.

(2) Speech Reorganization

Introduction to automatic speech recognition, components of ASR, Applications, Nature of Speech, Speech understanding Applications, Recognizing continuous speech, Problems and related issues in speech reorganization, human speech recogntion, comparisons between human and machine speech recognizer.

(3) Speech Synthesis

Introduction, Approach, Human speech synthesis, Electronic Simulation of the speech, Synthesis in speech comparison and reorganization

(4) Speaker verification

Introduction, acoustic parameters, similarity measures, text dependent speaker verification, text independent speaker verification, text prompted speaker verification, identification, verification and the decision threshold

Reference books

(1) Speech and audio signal processing – Ben gold, Nelson Morgan, wiley
(2) Natural language rocessing, Akshar Bharti, Vineet Chaitanya, Rajeev Sangal, PHI

Semester – V
PCA5004: Practical – 5

(1) CCA5001: Building appl. using ADO.NET & ASP.NET - 50 marks
(2) CCA5002: Web programming – 2 - 50 marks

Semester – V
JCA5005: Project – 1

(1) In house development of the project – 100 marks.

Semester – VI
JCA6001: Industrial project

Project development in the industry – 300 marks