MASTERS IN COMPUTER APPLICATIONS

Total Contact Hours = 28 Total Marks = 800 Total Credits = 23

SEMESTER 1st		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MCAP1-101	Introduction to Information Technology	3	1	-	40	60	100	4
MCAP1-102	Problem Solving and Programming using C	3	1	-	40	60	100	4
MCAP1-103	Digital Electronics	3	1	-	40	60	100	4
MCAP1-104	Mathematical Foundations of Computer Science	3	1	-	40	60	100	4
MHUM0-104	Business Communication - I	2	-	2	40	60	100	3
MCAP1-105	Software Lab-I (Introduction to Information Technology based on MCAP1-101)	-	-	2	60	40	100	1
MCAP1-106	Software Lab-II (Problem Solving and Programming using C based on MCAP1-102)	-	-	4	60	40	100	2
MHUM0-102	Business Communication Lab – I	-	-	2	60	40	100	1
Total	**Theory = 5 Labs = 4**	**14**	**4**	**10**	**380**	**420**	**800**	**23**

Total Contact Hours = 26 Total Marks = 700 Total Credits = 21

SEMESTER 2nd		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MCAP1-207	Computer Architecture & Organization	3	1	-	40	60	100	4
MCAP1-208	Relational Database Management System	3	1	-	40	60	100	4
MCAP1-209	Data and File Structures	3	1	-	40	60	100	4
MCAP1-210	Software Lab-III(Relational Database Management System based on MCAP1-208)	-	-	4	60	40	100	2
MCAP1-211	Software Lab-IV(Data and File Structures based on MCAP1-209)	-	-	4	60	40	100	2
MHUM0 - 103	Soft Skills - I	-	-	2	60	40	100	1
Departmental Elective – I								
MCAP1-256	Software Engineering and Project Management	3	1	-	40	60	100	4
MCAP1-257	System Analysis and Design							
MCAP1-258	Software Design Methodologies							
Total	**Theory = 4 Labs = 3**	**12**	**4**	**10**	**340**	**360**	**700**	**21**

Total Contact Hours = 26 **Total Marks = 800** **Total Credits = 22**

SEMESTER 3rd		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MCAP1-312	Computer Networks	3	1	-	40	60	100	4
MCAP1-313	Operating Systems	3	1	-	40	60	100	4
MCAP1-314	Object Oriented Programming using C++	3	-	-	40	60	100	3
MCAP1-315	Software Lab-V (Based on LINUX)	-	-	2	60	40	100	1
MCAP1-316	Software Lab-VI (Object Oriented Programming using C++ based on MCAP1-314)	-	-	4	60	40	100	2
MHUM0 - 105	Soft Skills - II	-	-	2	60	40	100	1
Departmental Elective – II (Select any one)								
MCAP1-359	Embedded Systems	3	1	-	40	60	100	4
MCAP1-360	Multimedia Technologies							
MCAP1-361	Parallel and Distributed Computing							
Open Elective - I (Select any one)		3	-	-	40	60	100	3
Total	**Theory = 5 Labs = 3**	**15**	**3**	**8**	**380**	**420**	**800**	**22**

Total Contact Hours = 30 **Total Marks = 800** **Total Credits = 24**

SEMESTER 4th		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MCAP1-417	Computer Graphics	3	1	-	40	60	100	4
MCAP1-418	Programming in Java	3	1	-	40	60	100	4
MCAP1-419	Internet Concepts & Web Technologies	3	1	-	40	60	100	4
MCAP1-420	Software Lab-VII (Computer Graphics based on MCAP1-417)	-	-	4	60	40	100	2
MCAP1-421	Software Lab-VIII (Programming in Java based on MCAP1- 418)	-	-	4	60	40	100	2
MCAP1-422	Software Lab-IX (Internet Concepts & Web Technologies based on MCAP1-419)	-	-	4	60	40	100	2
Departmental Elective – III (Select any one)								
MCAP1-462	Data Warehousing and Data Mining	3	-	-	40	60	100	3
MCAP1-463	Business Intelligence & Digital Marketing							
MCAP1-464	Software Testing and Quality Assurance							
Open Elective - II (Select any one)		3	-	-	40	60	100	3
Total	**Theory = 5 Labs = 3**	**15**	**3**	**12**	**380**	**420**	**800**	**24**

Total Contact Hours = 31 **Total Marks = 800** **Total Credits = 26**

SEMESTER 5th		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MCAP1-523	System Programming	3	-	-	40	60	100	3
MCAP1-524	Artificial Intelligence	3	1	-	40	60	100	4
MCAP1-525	Project(Planning & Design)	-	-	6	60	40	100	3
MCAP1-526	Theory of Computation	3	1	-	40	60	100	4
MCAP1-527	Information and Network Security	3	-	-	40	60	100	3
Departmental Elective – IV (Select any one)								
MCAP1-565	LAMP Technologies	3	1	-	40	60	100	4
MCAP1-566	Database Administration							
MCAP1-567	Network Administration							
MCAP1-568	Software Lab-X(LAMP Technologies based on MCAP1-565)	-	-	4	60	40	100	2
MCAP1-569	Software Lab-XI(Database Administration based on MCAP1-566)							
MCAP1-570	Software Lab-XII (Network Administration based on MCAP1-567)							
Open Elective - III (Select any one)		3	-	-	40	60	100	3
Total	**Theory = 4 Labs = 2**	**18**	**3**	**10**	**360**	**440**	**800**	**26**

**Note: Students have to select a combination of subjects in Departmental Elective –I as below:*

i) MCAP1-565 and MCAP1-568
ii) MCAP1-566 and MCAP1-569
iii) MCAP1-567 and MCAP1-570

Total Contact Hours = 26 **Total Marks = 500** **Total Credits = 19**

SEMESTER 6th		Contact Hrs			Marks			Credits
Subject Code	**Subject Name**	**L**	**T**	**P**	**Int.**	**Ext.**	**Total**	
MCAP1-628	Current Trends and Technologies	3	1	-	40	60	100	4
MCAP1-629	Project (Implementation & Execution)	-	-	10	60	40	100	5
Departmental Elective – V (Select any one)								
MCAP1-671	Big Data	3	1	-	40	60	100	4
MCAP1-672	Cloud Computing							
MCAP1-673	Dot Net Framework							
MCAP1-674	Mobile Computing & Android							
MCAP1-675	Soft Computing							
MCAP1-676	Software Lab-XIII (Big Data based on MCAP1-671)	-	-	4	60	40	100	2
MCAP1-677	Software Lab-XIV (Cloud Computing based on MCAP1-672)							
MCAP1-678	Software Lab-XV (Dot Net Framework based on MCAP1-673)							
MCAP1-679	Software Lab-XVI(Mobile Computing & Android based on MCAP1-674)							
MCAP1-680	Software Lab-XVII(Soft Computing based on MCAP1-675)							
Open Elective - IV (Select any one)		3	1	-	40	60	100	4
Total	**Theory = 3 Labs = 2**	**9**	**3**	**14**	**240**	**260**	**500**	**19**

Note: Students have to select a combination of subjects in Departmental Elective -II as below:

i) MCAP1-671 and MCAP1-676
ii) MCAP1-672 and MCAP1-677
iii) MCAP1-673 and MCAP1-678
iv) MCAP1-674 and MCAP1-679
v) MCAP1-675 and MCAP1-680

Overall

Semester	Marks	Credits
1st	800	23
2nd	700	21
3rd	800	22
4th	800	24
5th	800	26
6th	500	19
Total	**4400**	**135**

INTRODUCTION TO INFORMATION TECHNOLOGY

Subject Code: MCAP1-101 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objectives

1. This course will enable the student to gain and understanding of the core concepts and technologies which constitute Information Technology.
2. The intention is for the student to be able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology and Office Tools.

UNIT-I (10 Hrs)

Computer Fundamentals - Block structure of a computer, Characteristics of computers, Problem solving with computers, Generations of computers, Classification of computers on the basis of capacity, Purpose and Generation, Input devices, Output devices, Memories.

Number System - Bit, Byte, Binary, Decimal, Hexadecimal and Octal systems, Conversion from one system to the other.

Representation of Information - Integer and Floating point representation, Complement schemes, and Binary codes.

UNIT-II (11 Hrs.)

Operating system - Batch, Multi-programming, Time sharing, Network operating system, On-line and Real time operating system, Distributed operating system, Multi-processor, Multi-tasking

Windows - Installing windows with set-up, Starting and Quitting windows, Basic elements of windows, working with menus dialogue boxes, Window applications, Program manager, File manager, Print manager, Control panel, Write, Paint brush, Accessories including Calculator, Calendar, Clock, Card file, Note pad, Recorder etc.

UNIT- III (12 Hrs.)

Word Processing - Editing features, formatting features, Saving, Printing, Table handling, Page settings, Spell-checking, Macros, Mail-merge, and Equation editors.

Spreadsheet - Workbook, Worksheets, Data types, Operators, Cell formats, Freeze panes, Editing Features, formatting features, creating formulas, Using formulas, Cell References.

Presentation Graphics Software - Templates, Views, formatting slide, Slides with graphs, Animation, using special features, presenting slide shows.

UNIT- IV (12 Hrs.)

Computer Network and Communication - Network types, Network topologies, Network Communication devices, Physical communication media.

Internet and its Applications - E-mail, TELNET, FTP, World Wide Web, Internet chatting, Intranet, Extranet, Gopher, Mosaic, WAIS.

Security management tools - PC tools, Norton Utilities, Virus, Worms, Threats, Virus detection, Prevention and Cure utilities, Firewalls, Proxy servers.

Recommended Books

1. V. Rajaraman, 'Fundamentals of Computers', 3rd Edn., PHI.
2. Satish Jain, 'Information Technology Concepts', 4th Edn., BPB Publications.
3. P.K Sinha, 'Computer Fundamentals', 5th Edn., BPB Publications.
4. Turban, Mclean and Wetherbe, 'Information Technology for Management', 3rd Edn., John Wiley & Sons.
5. G. Courter, 'Mastering MS Office 2000 Professional', 4th Edn., BPB Publication.
6. Steve Sagman, 'MS- Office 2000 for Windows', 5th Edn., Addison Wesley.

Learning Outcomes

After completion of this course, the students would be able to:

1. Identify and understand the working of key components of a computer system and representation of numbers, alphabets and other characters.
2. Identify and understand the working of different operating systems and to install windows.
3. Become proficient in using the features of word processing in Word processing.
4. Students will be able to create technical and complex spreadsheets for data analysis using spreadsheet tools.
5. Students will become proficient to develop effective and professional business presentations using Power Point tools.
6. The students will learn about types of Communication networks, use of internet applications and security within the context of Information Technology.

PROBLEM SOLVING AND PROGRAMMING USING C

Subject Code: MCAP1-102 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objective

This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code. The nature of C language is emphasized in the wide variety of examples and applications.

UNIT-I (11 Hrs.)

Programming Process - Problem definition, Algorithms, Flow Charts, C Character set, Identifiers and Keywords, Constant and Variables, Data types, Declarations, Statements and Symbolic Constants.

Operators and Expressions - Arithmetic, Relational, Logical, Unary operators.

Bitwise Operators - AND, OR, Complement precedence and Associating bitwise shift operators

Input-Output - Standard, Console and String functions.

Coding Standards -Inline documentation, Indentation of code

Naming conventions -Variables, Global variables, Functions, Structures

Debugging - Tracking defects, Debugging by code inspection, Debugging by logs, Debugging using step-by-step execution, using break points.

UNIT-II (13 Hrs.)

Control Statements - Branching, Looping using for, While and Do-while Statements, Nested control structures, Switch, Break, Continue statements.

Arrays - Definition, Access of Elements, Initialization, Multidimensional arrays, Character arrays.

Pointers - Address and Dereferencing Operators, Declaration, Assignment, Initialization, Arithmetic, Precedence of address and Dereferencing operators, Pointer comparison, Conversion, Pointer Arrays and Pointers to Pointers. Pointers and Strings, Void Pointers, Dynamic Memory Management

UNIT-III (10 Hrs.)

Functions - Definition, Call, Prototypes, Formal and Actual Parameters, Passing Arguments to Functions, call by Value and Call by Address, Passing Array Elements as Arguments and Passing arrays as arguments, Recursion, Recursion v/s Iteration.

Program Structure - Storage Classes, Automatic, External and Static variables.

Pre-processor Directives - #include, #define, #undef, #if, #ifdef, #ifndef, #else, #elif, #endif, #error, #pragma, Predefine macros.

UNIT- IV (11 Hrs.)

Structure - Variable, Initialization, accessing members, Assignment, Size of structure, Scope of a structure, Nested structures, Pointer to structures, Scope of a structure, Type definition, Structure as function arguments, Arrays of structures, Structures containing arrays, Self-referential structures, Bit fields, Union, Enumerated data type.

File Processing - Opening and Closing, Data files, Creation, Processing & Unformatted data files, Random file access, Command line arguments.

Recommended Books

1. Shubhnandan Jamwal, 'Programming in C', 3rd Edn., Pearsons.
2. E. Balagurusamy, 'Programming in ANSI C', 3rd Edn., Tata McGraw Hill.
3. Brian Kernighan and Dennis Ritchie, 'C Programming Language', 2nd Edn., PHI.
4. Byron Gottfried, 'Programming with C', 2nd Edn., Tata McGraw Hill.
5. ISRD Group, 'Programming and Problem Solving Using C', 3rd Edn., Tata McGraw Hill.
6. Yashvant P. Kanetkar, 'Let us C', 4th Edn', BPB Publications, New Delhi.
7. R.S. Salaria, 'Application Programming in C', 2nd Edn., Khanna Book Publishing.

Learning Outcomes

After completion of this course, the students would be able to:

1. Understand the basic terminology used in computer programming. Students will be able to write, compile and debug programs in C language and use different data types in a computer program.
2. Design programs involving decision structures, loops, breaking control statements.
3. Design programs using arrays and understand the dynamics of memory by the use of pointers.
4. Design programs involving functions and learn to understand and analyse the use of storage classes and pre-processor directives.
5. Provide students with the means of writing efficient code using structures and learn file handling.

DIGITAL ELECTRONICS

Subject Code: MCAP1-103 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Learning Objective

Digital circuits which are the basic building blocks of a computer are introduced in this module to let the students know what activities it does behind the computing environment. This course portrays excellent ideas of the logic gates available and data processing to make students understand the concept better with the analogue and digital signals while computing.

UNIT-I (11 Hrs.)

Number System - Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System, Signed and Unsigned number, Conversion from One Number System to another. Arithmetic Operation without Changing the Base, Floating Point Representation

Binary Codes - Weighted Binary Codes, Non Weighted Codes, Reflective Codes, Sequential Codes, Alphanumeric Codes, BCD Code, Code Conversions, BCD Arithmetic

Logic Gates - Introduction to Logic gates, Universal Gates, Logic Gates Applications.

UNIT-II (13 Hrs.)

Boolean Algebra - Introduction, Boolean Laws-Commutative Law, Associative Law, Distributive Law, AND Laws, OR Laws, Inversion Laws, Principle of Duality, Duality Theorem, De-Morgan's Theorem. Simplification of Boolean Expression using Boolean

algebra, Sum of Products (SOP) & Product of Sums (POS) Forms, Realization of Boolean Expression using Gates, K-Maps, Simplification of Boolean Expression using K-Maps

Combinational Logic Circuits - Half Adder & Half Subtractor, Full Adder & Full Subtractor, Parallel Binary Adder, Binary Adder/Subtractor, BCD Adder, BCD Subtractor. Multiplexers & Demultiplexers, Implementation of Boolean equations using Multiplexer and Demultiplexer, Encoders & Decoder

UNIT-III (11 Hrs.)

Sequential Logic Circuits - Latch, Flip Flops- R-S Flip-Flop, J-K Flip-Flop, Master-Slave J-K Flip-Flop, Race Condition, Removing Race Condition, D Flip-Flop, T Flip-Flop, Applications of Flip-Flops, Registers.

Counters - Design of Asynchronous Counters, Design of Synchronous Counters

Logic Families - RTL, DCTL, DTL, TTL, ECL and its various Types, Comparison of Logic Families.

UNIT-IV (10 Hrs.)

Memory Devices - Classification of memories, RAM organization, Write operation, Read operation, Memory cycle. Static RAM Cell-Bipolar, RAM cell, MOSFET RAM cell, Dynamic RAM cell. ROM Organization, PROM, EPROM, EEPROM, Field Programmable Gate Arrays (FPGA).

Signal Conversions - Analog & Digital signals, A/D and D/A conversion.

VLSI Design - Introduction, Process & Applications.

Recommended Books

1. T.C. Bartee, 'Digital and Electronic Circuits', 3rd Edn., McGraw Hill.
2. R.P. Jain, 'Modern Digital Electronics', 4th Edn., Tata McGraw Hill.
3. M. Morris Mano, 'Digital Logic and Computer Design', 4th Edn., Pearson.
4. William H. Gothmann, 'Digital Electronics: An Introduction to Theory and Practice', 2nd Edn, Prentice Hall.
5. Albert Malvino, 'Digital Computer Electronics', 2nd Edn., Tata McGraw-Hill.

Learning Outcomes

After completion of this course, the students would be able to:

1. Acquired knowledge about basics of digital electronics and solving problems related to number systems.
2. Acquired knowledge about Boolean algebra.
3. Ability to identify, analyse and design combinational circuits.
4. Ability to design various synchronous and asynchronous sequential circuits.
5. Ability to understand Logic families.
6. Acquired knowledge about memory devices and signal Conversions.

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Subject Code: MCAP1-104 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

UNIT-I (10 Hrs.)

Mathematical Logic - Statements, logical operations, tautologies, contradictions, logical implications and equivalence, normal forms, theory and Inference for statement calculus, predicate calculus, Inference theory for predicate calculus.

UNIT- II (12 Hrs.)

Relations and Functions - Binary relations, computer representation of relations and diagraph, Equivalence relations, applications of congruence, Composition of relations, Transitive Closure, partially ordered sets, Hasse diagrams, lexicographic ordering,

topological sorting, Lattices and special types of lattices, Types of functions, functions for computer sciences, growth of function and binary operations.

UNIT-3 (11 Hrs)

Permutations and Combinations - Basic concepts; Rules of counting; combinatorial distribution of distinct and non-distinct objects; generating functions for permutation and combinatorial enumeration.

Recursion and Recurrence Relation - Primitive recursive function, Polynomials and their recursion, Iteration, Sequence and discrete functions, Recurrence relations, Generating function.

UNIT-4 (12 Hrs)

Lattice and Algebraic System, Basic Properties of Algebraic Systems, Special Types of Lattices, Distributed, Complemented Lattices, Boolean Algebra, Boolean Expressions, Normal Form of Boolean Expressions, Boolean Function, Basic Circuits and Theorems, Logical Gates and Relations of Boolean Function, Introduction to Graphs, Graph Terminology, Graph Isomorphism, Directed and Undirected Graphs and Their Representations; Paths, Reach Ability and Connectedness; Basic Concepts of Trees And Spanning Tree.

Recommended Books

1. J.P. Tremblay and R. Manohar, 'Discrete Mathematical Structures with Applications to Computer Science', 2nd Edn., Tata McGraw Hill.
2. Kenneth H. Rosen, 'Discrete Mathematics and its Applications with Combinatorics and Graph Theory', 6th Edn., Tata McGraw – Hill Education Private Ltd.
3. R.P. Grimaldi and B.V. Ramana, 'Discrete and Combinatorial Mathematics – An Applied Introduction', 2nd Edn., Pearson Education.
4. Doerr Alan., 'Applied Discrete Structures for Computer Science', 2nd Edn., Galgotia Publications.
5. C.L. Liu, 'Elements of Discrete Mathematics', 2nd Edn., Tata McGraw Hill.

BUSINESS COMMUNICATION

Subject Code: MHUM0-104 **L T P C** **Duration: 28 Hrs.**

2 0 0 2

Learning Objective: This course is designed to give students a comprehensive view of communication, its scope and importance in business, the role of communication in establishing a favorable image of the organization. The aim is to develop students' ability to communicate correctly and effectively on matters having relevance to day-to-day business operations. This course will make student conversant with fundamentals of communication, help them honing oral, written and non-verbal communication skills and to transform their communication abilities.

UNIT- I (7 Hrs.)

Introduction to Communication: Meaning, Process, Importance of Communication in Business, Types of Information, Formal and Informal Communication, Internal and External Communication. Approaches to Effective Communication, Essentials of Effective Business Communication (7Cs model)

Written Communication: Advantages and Disadvantages, Covering letter, Need, Functions and Kinds, Layout of Letter Writing, Types of Letter Writing: Persuasive Letters, Request Letters, Sales Letters, Complaints and Adjustments

UNIT –II (7 Hrs.)

Developing Reading Skills: Identify the Purpose of Reading, Factors Effecting Reading, Learning How to Think and Read, Developing Effective Reading Habits, Reading Tactics and Strategies: Training Eye and Training Mind (SQ3R)

Developing Listening Skills: Importance, Purpose of Listening, Art of Listening, Factors Affecting Listening, Components of Effective Listening, Process of Listening, Principles and Barriers to Listening, Activities to Improve Listening

UNIT- III (7 Hrs.)

Oral Communication: Advantages and Disadvantages, Conversation as Communication, Art of Public Speaking, Group Communication Through Committees, Preparing and Holding Meetings, Overcoming Stage Fright, Ambiguity Avoidance.

Departmental Communication: Meaning, Need and Types: Interview Letters, Promotion Letters, Resignation Letters, Newsletters, Circulars, Agenda, Notice, Office Memorandums, Office Orders, Press Release

Report Writing: Structure, Types, Formats, Drafting of Various Types of Report. Nonverbal – Features, Understanding of Body Language, Posture, Gestures. Influences on Communication: Social Influences, Culture and Communication, Few Guidelines for Better Multicultural Communication, Business Etiquettes and Communication.

UNIT- IV (7 Hrs)

Group Discussion: Nature, Uses and Importance, Guidelines for GD Presentations: How To Make Effective Presentations, Four P" S of Presentation, Structuring, Rehearsing and Delivery Methods.

Resume Writing: Planning, Organizing Contents, Layout, Guidelines for Good Resume. Interviews: Preparation Techniques, Frequently Asked Questions about How to Face an Interview Board, Proper Body Posture, Projecting a Positive Image, Steps To Succeed In Interviews, Practice Mock Interview in Classrooms.

The Case Method of Learning: Dimensions of a Case, Case Discussion, Usefulness of The Case Method, Training of Managers, Use The Case Method. Report Writing: Structure, Types, Formats, Preparations and Presentation.

Course Outcome: After studying this course the students will enable to:

- Know the dynamics of communication in the business world
- Practice the different tools of communication
- Enable them to speak effectively suited to the situation
- Improve their competence in English

Recommended Books

1. Lesikar, Petit & Flately, 'Lesikar's Basic Business Communication', Tata McGraw Hill.
2. Raman Meenakshi, 'Prakash Singh, Business Communication', Oxford University Press.
3. Rizvi Ashraf,' Effective Technical Communication', Tata McGraw Hill.
4. Krizan, Buddy, 'Merrier, Effective Business Communication', Cengage Learning.
5. Diwan & Aggarwal, 'Business Communication', Excel.
6. Baugh, Frayer & Thomas, 'How to write first class Business Correspondence, Viva Book.
7. Taylor, English Conversion Practice', Tata McGraw Hill.
8. Devaraj, 'Executive Communication', Tata McGraw Hill.
9. Ober, 'Effective Bossiness Communication', Cengage Learning.

SOFTWARE LAB – I
(INFORMATION TECH. & OFFICE AUTOMATION BASED ON MCAP1-101)

Subject Code: MCAP1-105 **L T P C**
0 0 2 1

Learning Objectives

1. This course will enable the student to gain and understanding of the core concepts and technologies which constitute Information Technology.
2. The intention is for the student to be able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology and Office Tools.

Windows Operating System - Installing WINDOWS with set-up, Staring and Quitting WINDOWS, Basic Elements of WINDOWS, working with menus dialogue boxes, Window Applications, Windows Explorer, My Computer, Recycle bin, Programs, Favorites, My Documents.

Settings - Control Panel, Printers, Taskbar and Start menu, Folder Options, Active Desktop, Find, Help, Run.

Accessories – Entertainment, Games, System tools, Internet Tools, Calculator, Calendar, Clock, Card file, Note pad, Write pad, Recorder etc.

Word Processing & Presentation Tool - Salient Features of Word, Installation of Word, Starting and Quitting of Word, File, Edit, View, Insert, Format, Tools, Tables, Window, Help options and all of their features, Options and Sub Options etc. Transfer of files between Word Processors and Software Packages. Salient Features of Power Point, Installation, Starting and Quitting, File, Edit, View, Insert, Format, Tools, Slide Show, Window, Help options and all of their features, Options and Sub Options etc. Transfer of files between Presentation Tool and Software Packages.

Spreadsheet Tool - Spread Sheet, Getting started with Excel worksheet, entering data into Work Sheet, editing cell addressing, Ranges and range names, Commands, Menus, Copying and Moving cell contents, Inserting and Deleting rows and columns, Column width control, Cell protection, Printing reports, Creating and Displaying Graphs, Statistical functions.

Internet and its Applications - E-mail, TELNET, FTP, World Wide Web, Internet chatting, Intranet, Extranet, Gopher, Mosaic, WAIS.

Learning Outcomes:

After completion of this course, the students would be able to:

1. Familiarize with PC and WINDOWS commands, File creation, Editing, Directory creation.
2. Become proficient in using the features of word processing in Word.
3. Become proficient in using spreadsheet software and be able to create technical and complex spreadsheets for data analysis using spreadsheet tools.
4. Understand the use of Internet and its applications

SOFTWARE LAB – II
(PROBLEM SOLVING AND PROGRAMMING USING C BASED ON MCAP1-102)

Subject Code: MCAP1-106 **L T P C**
0 0 4 2

This laboratory course will mainly comprise of exercises on what is learnt under paper: MCAP1-102 (Computer Programming Using C).

Note: Program should be fully documented with simple I/O data. Flow charts should be developed wherever necessary.

Implement the following Concepts in C Programming:

Input-output statements: Formatted and Non-Formatted statements

Operators: Arithmetic, Logical, Conditional, Assignment, Bitwise, Increment/Decrement operators

Decision Making: Switch, if-else, nested if, else-if ladder, Break, Continue, Go to

Loops: While, Do-while, For

Functions: Definition, Declaration, Variable Scope, Parameterized Functions, return statement, call by value, Call by reference, Recursive functions

Pre-processor Directives: Pre-processor directives like INCLUDE, IFDEF, DEFINE, etc

Header Files: STDIO.H, MATH.H, STRING.H, PROCESS.H etc

Arrays: Array declarations, Single and Multi-dimensional, Memory limits, Strings and String functions

Pointers: Pointer declarations, Pointer to Function, Pointer to Array/String

Files: Creation and Editing of various types of files, closing a file (using functions and without functions).

Learning Outcomes

After completion of this course, the students would be able to:

1. Apply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, linking and executing a program using the development environment.
3. Analysing the complexity of problems, modularize the problems into small modules and then convert them into programs
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
6. Document and present the algorithms, flowcharts and programs in form of user-manuals

BUSINESS COMMUNICATION LAB - I

Subject Code – MHUM0-102 **L T P C**
0 0 2 1

The students will have to perform the practicals in lab related to the syllabus of the subject 'Business Communication'.

COMPUTER ARCHITECTURE & ORGANIZATION

Subject Code: MCAP1-206 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objective:

The objective of the course is to provide students with a solid foundation in computer design. Examine the operation of the major building blocks of a computer system and to introduce students to the design and organization of modern digital computers & basic assembly language.

UNIT-I (12 Hrs.)

Basic Computer Organization and Design - Common Bus System, Registers, Instruction codes, computer Instructions, Timing and Control, Instruction Cycle, Arithmetic, Logic &

Shift micro operations instructions, Memory Reference Instructions, Design of Basic Computer and it's working.

Programming & Controlling Basic Computer - Machine & Assembly Language, Programming Arithmetic and Logic Operations, Hardwired & Micro programmed control, Address Sequencing, Design of a control unit.

UNIT-II (10 Hrs.)

CPU Architecture - General register & stack organization, Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, ALU & Control Unit Architecture

I/O Organization - Peripheral Devices, input-output interface, Asynchronous Data Transfer, Modes of data transfer-programmed & interrupt initiated I/O, Priority Interrupt, DMA, I/O Processors.

UNIT-III (12 Hrs.)

Memory Organization - Main Memory-Memory Address Map, Memory connection to CPU, Associative Memory-Hardware organization, Cache Memory-Levels of Cache, Associative Mapping, Direct Mapping, Set-Associative Mapping.

Parallel & Multiprocessing Environment - Introduction to parallel processing, Pipelining, RISC Architecture, Vector & array processing, multiprocessing concepts, memory & resource Sharing, Inter processor communication & Synchronization.

UNIT- IV (11 Hrs.)

Overview of Assembly Language Programming - Architecture of a typical 8-bit processor (8085 microprocessor) - Registers, Instruction Set-Data Transfer Instructions, Arithmetic Instructions, Logical Instructions, Program Control Instructions, Machine Control Instructions.

Use of an Assembly Language for Specific Programs - Simple numeric manipulations, sorting of a list and use of I/O instructions

Recommended Books

1. M. Morris Mano, 'Computer System Architecture', PHI.
2. William Stallings, 'Computer Organization and Architecture', 8th Edn., Pearson.
3. P.V.S. Rao, 'Computer System Architecture', 2nd Edn., PHI.
4. J.P. Hayes, 'Computer Architecture & Organization, 3rd Edn., McGraw Hill.
5. Stone, 'Introduction to Computer Architecture', 2nd Edn., Galgotia.
6. Tanenbaum, 'Structured Computer Organization', 3rd Edn., PHI.

Learning Outcomes

After Completion of the course students will be able to:

1. Understand the fundamentals of different instruction set architectures and their relationship to the CPU design.
2. Understand the principles and the implementation of computer arithmetic.
3. Understand the Basic architecture of CPU and I/O Organization.
4. Understand the operation of modern CPUs including pipelining, memory systems and buses and multiprocessor systems and parallel programming.
5. To Understand the Overview of Assembly Language Programming and to create an assembly language program to program a microprocessor system.

RELATIONAL DATABASE MANAGEMENT SYSTEM

Subject Code: MCAP1-207 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objective

The course aims at providing the students through insight on few DBMS principles and practices. Students will learn and implement the operations for making and using databases with help of SQL and PL/SQL.

UNIT- I (12 Hrs.)

Introduction to DBMS - Overview of DBMS, Basic DBMS terminology, Data independence. Architecture of a DBMS, Introduction to data models: Entity relationship model, Hierarchical model, Network model, Relational model.

Relational Design - Relation scheme, Codd's Rule for RDBMS, Anomalies in a database, Functional Dependency: Dependencies and Logical implications, Closure set, testing if FD is in closure, Covers, Non redundant and Minimum cover, Canonical cover, Functional dependencies and Keys.

Normal Forms - INF, 2NF, 3NF, BCNF, Multi valued dependencies and Joined dependencies, 4NF, 5NF.

UNIT-II (12 Hrs.)

Structured Query Language - Introduction to SQL, Oracle server and Oracle database, Oracle data types, Starting SQL*Plus, querying database tables, Conditional retrieval of rows, working with null values, matching a pattern from a table, Ordering the result of a query, Aggregate Functions, Grouping the result of a query.

Querying multiple Tables - Equi Joins, Cartesian Joins, Outer Joins, Self Joins; SET Operators: Union, Intersect, Minus.

Functions - Arithmetic functions, Character functions, Date functions, and Group functions.

UNIT-3 (10 Hrs.)

Data Manipulation and Control - Data Definition Language (DDL), Creating Tables, creating a Table with data from another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, dropping a Column; VIEW: Manipulating the Base table, Rules of DML Statements on Join Views, Dropping a VIEW, Inline Views.

Database security and privileges - GRANT command, REVOKE command, COMMIT and ROLLBACK.

UNIT- IV (11 Hrs.)

PL/SQL - Introduction to PL/SQL, The Advantage of PL/SQL, PL/SQL Architecture, Fundamentals of PL/SQL, PL/SQL Data types, variables and constants, Assignments and expressions, Operator precedence, referencing Non-PL/SQL variables, built in functions, conditional and iterative control, SQL within PL/SQL, writing PL/SQL code. Cursor management in PL/SQL, Cursor manipulation, Triggers, Stored procedures, Exception handling in PL/SQL, Predefined exceptions, User defined exceptions, Triggers, Stored procedures.

Recommended Books

1. B.C. Desai, 'An Introduction to Database Systems', 3rd Edn., Galgotia Publ. Private Ltd.
2. Ivan Bayross, 'PL/SQL The Programming Language of ORACLE', 2nd Edn., BPB Publication.
3. Henry F. Korth, Abraham, 'Database System Concepts', 3rd Edn., McGraw Hill Inc.

4. Ramez Elmasri, Shamkant Navathe, 'Fundamentals of Database Systems', 3rd Edn., Pearson.
5. Johannes Gehrke , Raghu Ramakrishnan, 'Database Management Systems', 4th Edn., McGraw Hill Education.
6. C.J. Date, 'Data Base Systems', Vols. I & II, 3rd Edn., Narosa Publications.
7. Mark L. Gillenson, 'Fundamentals of Database Management Systems', 2nd Edn., John Wiley and Sons.

Learning Outcomes

Students who complete this course would be able to perform the following tasks:

1. Master the basic concepts and appreciate the applications of database systems.
2. Be familiar with the relational database design.
3. Mater sound design principles for logical design of databases, including the E-R method and normalization approach.
4. Formulate data retrieval queries in SQL and the Relational Algebra and functions.
5. Understand analyse and apply Data Manipulation and Control and Database security and privileges.
6. Understand, analyse, and apply PL/SQL blocks using Cursors and Triggers.

DATA AND FILE STRUCTURES

Subject Code: MCAP1-208 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Learning Objective:

A study of advanced programming topics focused on logical structures of data, their physical representation, design and analysis of algorithms operating on the structures, and techniques for program development and debugging. Emphasis is placed on the appropriate use and choice of standard data structures.

UNIT-I (12 Hrs.)

Introduction to Data Structure - Concept of data, Problem analysis, Data structures and Data structure operations, Notations, Mathematical notation and Functions, Algorithmic Complexity, Big-O Notation and time space trade off.

Arrays - Overview of Arrays, Recursion, Pointers, Pointer Arithmetic, Array of pointers, Arrays in terms of pointers, Static and Dynamic Memory Management, Garbage Collection. Understanding and Implementation of Various Data Structures with Applications.

Stack - Operations like Push, Pop and Various Applications like Conversion from Infix to postfix and prefix expressions, Evaluation of postfix expression using stacks.

Queues - Operations like Enqueue, Dequeue on Simple, Circular and Priority Queues.

Linked Lists - Operations like Creations, Insertion, Deletion, Retrieval and Traversal on Single, Circular and doubly linked list.

UNIT-II (11 Hrs.)

Trees - Definitions and Concepts: Root Node, Leaf Node, Level, Degree, Height and Tree representation using linked List and array.

Tree Operations - Creation, Insertion, Deletion and Traversals (Preorder, In-order, Post ordered) and searching on various types of trees. Types of Trees: Binary trees, Binary search tree, Height balanced (AVL) tree, B trees, B+ Tree.

Heap - Definition, Structure, Algorithms and applications.

UNIT-III (10 Hrs.)

Graphs - Graph definitions and Concepts: Edge, Vertices, and Graph representation using Adjacency matrix, Adjacency lists. Types of graphs: Weighted, Unweighted, Directed,

Undirected Graphs. Graph Operations: Creation, Insertion, Deletion, Traversals and Searching (Depth first, Breadth-first) of various types of graphs and Dijkstra's algorithm for shortest distance calculation.

UNIT- IV (12 Hrs.)

Sorting - Concepts, Order, Stability and Efficiency of various algorithms (Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort and Radix Sort).

Searching - Concept and Efficiency of linear and binary search algorithms.

Hashing - Definition, Implementation and Applications.

Recommended Books

1. Lipschutz, Seymour, 'Theory & Problems of Data Structures', 2nd Edn., Schaum Series.
2. E. Horwitz, and S. Sahni, 'Fundamentals of Data Structures, Computer Science', 2nd Edn., Press.
3. Tremblay, 'An introduction to Data Structures with Applications', 3rd Edn., Tata McGraw.
4. A.V. Aho, Hopcroft, J.E. Ullman, 'Data Structures and Algorithms', 3rd Edn., Addison Wesley.
5. A.M. Tanenbaum and M.J. Augenstein, 'Data Structures using C', 2nd Edn., Prentice Hall International.
6. A. Berman, Michael, 'Data Structure via C++', 2nd Edin., Oxford University Press.

Learning Outcomes

After completion of this course, the students would be able to:

1. Design and apply appropriate data structure using simple algorithms for modelling and solving given computing problems
2. Understand, analyse and Develop algorithms to implement different data structures such as: arrays, linked lists, stacks, queues and Linked Lists
3. Understand, analyse and Develop algorithms to implement linear data structures such as trees.
4. Understand, analyse and Develop algorithms to implement graphs.
5. Identify, understand and determine the usage of sorting, searching and Hashing operations and their associated algorithms.

SOFTWARE LAB – III
(RELATIONAL DATABASE MANAGEMENT SYSTEM BASED ON MCAP1-207)

Subject Code: MCAP1-209 **L T P C** **Duration: 60 Hrs.**

0 0 4 2

Learning Objectives

Students will learn and implement the operations for making and using databases with help of SQL and PL/SQL

Implement the Following Concepts

1. Comparative study of various Database Management Systems
2. Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL)
3. How to apply Constraints at various levels?
4. View data in the required form using Operators, Functions and Joins.
5. Creating different types of Views for tailored presentation of data.
6. How to apply Conditional Controls in PL/SQL.
7. Error Handling using Internal Exceptions and External Exceptions.
8. Using various types of Cursors.
9. How to run Stored Procedures and Functions.

10. Creating Packages and applying Triggers.
11. Creating Arrays and Nested Tables.

Learning Outcomes

Students who complete this course would be able to perform the following tasks:

1. Understand, Appreciate and Effectively Explain the Underlying Concepts of Database Technologies.
2. Design & Implement a Database Schema for Given Problem Domain.
3. Populate & Query a Database Using SQL DML/DDL Commands.
4. Normalize a Database.
5. Programming PL/SQL Including Stored Procedures, Stored Functions, Cursors, Packages.

SOFTWARE LAB – IV
(DATA AND FILE STRUCTURES BASED ON MCAP1-208)

Subject Code: MCAP1-209 **L T P C**
0 0 4 2

List of practical exercises, to be implemented using object-oriented approach in C++ Language:

Array: Insert an element at end as well as at a given position, delete an element from a given position, find the location of a given element using linear search and display the elements of the linear array.

Linked List: Insert an element, delete an existing element, and Display all the elements

Stack: To implement PUSH& POP operation on stack.

Queue: Insert and Delete operation on circular queue represented using a linear array.

Bubble Sort: To sort an array of integers in ascending order using Bubble sort.

Selection Sort: To sort an array of integers in ascending order using Selection sort.

Insertion Sort: To sort an array of integers in ascending order using bubble sort.

Merge Sort: To sort an array of integers in ascending order using merge sort.

Quick Sort: To sort an array of integers in ascending order using Quick sort.

Binary Search Tree: To demonstrate the use of binary search algorithm to search a given element in a Sorted array in ascending order. To insert, delete and display operations on a binary search tree.

Breadth-First Search: To illustrate the traversal of graph using breadth-first search.

Depth-first Search: To illustrate the traversal of graph using depth-first search.

Learning Outcomes

Students who complete this course will be able to:

1. Designing and applying appropriate data structure using simple algorithms for modelling and solving given computing problems.
2. Understand and implement the both array based and linked-list based data structures, including singly, doubly, and circular linked-lists.
3. Understand and implement the Stack data structure and stack operations.
4. Understand and implement the both array based circular queue and linked-list based queue implementations.
5. Understand and implement general tree data structures, including binary tree, both array based and reference based implementations;
6. Understand and implement binary search trees.
7. Understand and implement heaps using an array based tree data structure.
8. Understand and implement graph data structures.

SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

Subject Code: MCAP1-256 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objectives

To help students to develop skills that will enable them to construct software of high quality software that is reliable, and that is reasonably easy to understand, modify and maintain**.**

UNIT-I (12 Hrs.)

Software Engineering - Evolution of Software Engineering, Goals of software engineering, Software Development vs. Software Engineering.

Software Process - Software Process, Waterfall, Spiral, Prototyping, Selection of appropriate process model Fourth Generation Techniques.

Software Requirements Analysis - Analysis Principles, SRS, Components of SRS, Requirement Elicitation Techniques- FAST and QFD

UNIT-II (11 Hrs.)

Software Design - Design Objectives, Principles, Design Concepts, Design Process, Design Strategies and Methods, Architectural Design-Architectural Styles, Modular Design, Object oriented design, User-interface design. Principles of structured Analysis and Design Tools i.e. DFD, DD, Decision Tables and Decision Trees

Software Project Management - Software Project Planning and its characteristics, Types of metrics, Effort Estimation- FP, LOC, FP vs. LOC, Schedule & Cost Estimation Models- Activity Networks- PERT/CPM, COCOMO-I, COCOMO-II Model.

UNIT- III (11 Hrs.)

Software Testing - Testing Fundamentals- Error/Fault/Failure, Testing Principles, Test Cases, Testing Techniques-White Box, Black-Box Testing & its Technique: Equivalence Class Partitioning, Boundary Value Analysis, White-Box Testing & its Techniques: Basis Path Testing, Structural Testing, Logic Based Testing, Fault Based Testing.

Software Testing Strategies - Unit Testing, Integration Testing, System Testing, Verification and Validation Testing, Acceptance Testing, Alpha and Beta Testing, Regression Testing.

UNIT-IV (11 Hrs.)

Quality Assurance - Overview of Software Quality, Software Quality Attributes, Factors Affecting Software Quality, Building, Software Quality Assurance Plan, Quality management Principles, Capability Maturity Model, Risk Assessment.

Software Maintenance - Types of software maintenance, Reverse Engineering, and Software maintenance process models.

System Configuration Management (SCM) - SCM principle, Change Management, Version and Release Management.

Recommended Books

1. R.S. Pressman, 'Software Engineering: A Practitioner's Approach', 6th Edn., McGraw-Hill.
2. P. Jalote, 'An Integrated Approach to Software Engineering', 3rd Edn., Narosa Publishing House.
3. Mall, Rajiv, 'Fundamentals of Software Engineering', 4th Edn., McGraw Hill.
4. K.K. Aggarwal and Y. Singh, 'Software Engineering', 2nd Edn., New Age International Publishers.
5. Deutsch, Willis, 'Software Quality Engineering: A Total Technical and Management Approach', 3rd Edn., Prentice Hall.
6. T.G. Lewis, 'Software Engineering', 3rd Edn., McGraw Hill.

7. P.G. Hibbard, 'Constructing Quality Software', 4th Edn., North Holland Publication.

Learning Outcomes

1. Ability to understand Goals of software Engineering, Software Process models and Software Requirement analysis.
2. Ability to understand Software Design in detail.
3. Ability to understand software project Management
4. Ability to identify, Analyse and understand software testing.
5. Students will be proficient to understand software Quality Assurance.
6. Ability to understand Software maintenance.

SYSTEM ANALYSIS AND DESIGN

Subject Code: MCAP1-257 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objectives

To teach the analysis and practicality of various systems on which software
System can be developed. After completing this course student will be able to design and develop systems.

UNIT-I (11 Hrs.)

System Development Life Cycle - System Definition, Characteristics, Elements & Types of system, Phases of SDLC, Information gathering tools, Structured Analysis tools, Role of System Analyst.

Software Requirements Analysis - Analysis Principles, SRS, Components of SRS, Requirement Elicitation Techniques- FAST and QFD

UNIT-II (12 Hrs.)

System Design - Process and Stages of systems design, Input/output and File design, Documentation (User Manual, Design Documentation, Training Manual),Design objectives, Principles, Design Concepts, Design Process, Design Strategies and Methods, Architectural Design-Architectural Styles, Modular Design, Object oriented design, User-interface design. Principles of structured Analysis and Design Tools i.e. DFD, DD, decision tables and decision trees, Case Studies techniques in System Design.

UNIT-III (12 Hrs.)

Software Testing - Testing Fundamentals- Error/Fault/Failure, Testing Principles, Test Cases, Testing Techniques-White Box, Black-Box Testing & its Technique: Equivalence Class Partitioning, Boundary Value Analysis, White-Box Testing & its Techniques: Basis Path Testing, Structural Testing, Logic Based Testing, Fault Based Testing.

Software Testing Strategies - Unit Testing, Integration Testing, System Testing, Verification and Validation Testing, Acceptance Testing, Alpha and Beta Testing, Regression Testing.

UNIT- IV (10 Hrs.)

System Implementation - System Implementation Process, Implementation Methods

Software Maintenance - Types of Software Maintenance, Reverse Engineering, and Software Maintenance Process Models.

Recommended Books

1. Elias N. Awad, 'System Analysis and Design', 2nd Edn,, Galgotia Publications.
2. James A. Sen, 'Analysis and Design of Information System', 2nd Edn., Tata McGraw Hill.
3. Harry J. Rosenblatt, Shelly, 'Systems Analysis and Design', 3rd Edn., Cashman Series.
4. Scott Tilley, Harry J. Rosenblatt, 'System Analysis and Design', 3rd Edn., Willey.

Learning Outcomes

1. Ability to understand characteristics of system, Software Process models and Software Requirement analysis.
2. Ability to understand Software Design.
3. Ability to identify, Analyse and understand software testing strategies.
4. Students will be proficient to understand implementation of software.
5. Ability to understand Software maintenance.

SOFTWARE DESIGN METHODOLOGIES

Subject Code: MCAP1-257 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objectives

This course provides attendees with in-depth coverage of the concepts needed to effectively design and analyze software architecture. After attending this course, participants will have a better understanding of the essential considerations in any architectural design process, methods for eliciting critical quality attributes, the role of architecture evaluation, using the methods within a software development life cycle.

UNIT-I (12 Hrs.)

Basic concepts of Design - Introduction, Characteristics of design activities, Essential Elements of Designs.

Design Principles - Basic Rules of Software Design: Causes of difficulties, Vehicles to overcome difficulties, Basic Rules of Software Design.

Design processes - The Context of design in software Development process, Generic Design Process: Descriptive Models, Structure of Software Design Methods.

Design Quality - Software quality models: Hierarchical models, Relational models, The effect of design on software quality: efficiency, Correctness and reliability, Portability, Maintainability, Reusability, Interoperability.

UNIT- II (9 Hrs.)

Software Architecture - The Notion of Architecture: Architecture in The Discipline of Buildings, Architecture in The Discipline of Computer Hardware, The General Notion of Architecture: The Notion of Software Architecture: Prescriptive Models, Descriptive Models, Multiple View Models, The Roles of Architecture in Software Design, Software Architectural Style: Introductory Examples, The Notion of Software Architectural Style. Typical Architectural Styles**:** Data Flow: The General Data Flow Styles, Pipe and Filter Sub-Style, Batch Sequential Processing Sub-Style.

UNIT – III (12 Hrs.)

Using Styles in Design - Choices of Styles, Combinations of Styles, Hierarchical Heterogeneous Styles, Simultaneously Heterogeneous Styles, Locationally Heterogeneous Styles, Case Study: Keyword Frequency Vector: Specification of The Problem, Designs in Various Styles, Analysis and Comparison.

Architectural Design Space - Theory of Design Spaces: Structure of Design Spaces, Solving Design Synthesis and Analysis Problems, Design Space of Architectural Elements: Behavior Features, Static Features.

UNIT-IV (11 Hrs)

Analysis and Evaluation - The Concept of Scenario, Scenarios for Evaluating Modifiability: Scenarios for Evaluating Reusability, Specification of Operational Profiles, Evaluation and Analysis of Performance, Scenarios for Evaluating Reusability: Analysis and Evaluation of

Modifiability: The SAAM Method: The Input and Output, The Process (Activities in SAAM Analysis).

Model-Based Analysis - The HASARD Method: Representation of Quality Models, Construction of Quality Models, Hazard Identification, Cause- Consequence Analysis, Assembling Graphic Model, Identification of Quality Concerns.

Quality Trade- Off Analysis - The ATAM Method: ATAM analysis process, ATAM analysis activities

Recommended Books

1. Hong zhu, 'Software Design Methodology: From Principles to Architectural Styles', 2nd Edn., Elsevier.
2. J. Bosch, ACM Press, 'Design and Use of Software Architectures-Adopting and Evolving a Product – Line Approach', 3rd Edn., Addison Wesley.
3. Nick Rozanski, Eoin Woods, 'Software Systems Architecture: Working With Stakeholders Using Viewpoints and Perspectives', 2nd Edn., Pearson.

Learning Outcomes

1. Ability to understand basic concepts, principles, processes and quality attributes of design.
2. Ability to identify, Analyse and understand architecture of software.
3. Students will be proficient in using Styles in design.
4. Ability to identify, Analyse and understand architectural Design space.
5. Students will be proficient in analysis and evaluation of software.

COMPUTER NETWORKS

Subject Code: MCAP1-312 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objectives

After completion of this course, the students would be able to:

1. Independently understand basic computer network technology, data communication system and its components.
2. Identify the different types of network topologies, protocols, layers of the OSI model and TCP/IP.
3. Identify the different types of network devices and their functions within a network.
4. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

UNIT-I (12 Hrs.)

Introduction to Computer Networks - Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model.

Physical Layer - Concept of Analog & Digital Signal, Bandwidth, Transmission Impairments: Attenuation, Distortion, Noise, Data rate limits: Nyquist formula, Shannon Formula, Multiplexing: Frequency Division, Time Division, Wavelength Division, Introduction to Transmission Media : Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching: Circuit Switching, Message Switching, Packet Switching & their comparisons.

UNIT-II (12 Hrs.)

Data Link Layer - Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data link protocols for noisy and noiseless channels, Sliding Window

Protocols: Stop & Wait ARQ, Go-Back-N ARQ, Selective repeat ARQ, Data link protocols: HDLC and PPP.

Medium Access Sub-Layer - Static and dynamic channel allocation, Random Access: ALOHA, CSMA protocols, Controlled Access: Polling, Token Passing, IEEE 802.3 frame format, Ethernet cabling, Manchester encoding, collision detection in 802.3, Binary exponential back off algorithm.

UNIT-III (10 Hrs.)

Network Layer - Design issues, IPv4 classful and classless addressing, subnetting, Routing algorithms: distance vector and link state routing, Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms

UNIT-IV (11 Hrs.)

Transport Layer - Elements of transport protocols: addressing, connection establishment and release, flow control and buffering, multiplexing and de-multiplexing, crash recovery, introduction to TCP/UDP protocols and their comparison.

Application Layer - World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), Introduction to Network security.

Recommended Books

1. Andrew S. Tanenbaum, 'Computer Networks', 5th Edn., Pearson Education, **2010.**
2. Behrouz A. Forouzan, 'Data Communications & Networking', 5th Edn., Tata McGraw Hill, **2012.**
3. James F. Kurose and Keith W. Ross, 'Computer Networking', 6th Edn., Pearson Education, **2013.**
4. Douglas E. Comer, 'Internetworking with TCP/IP, Volume-I', 6th Edn., Prentice Hall India, **2013.**

OPERATING SYSTEMS

Subject Code: MCAP1-313 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objectives

After completion of this course, the students would be able to:

1. Understand functions, Role, different structures and views of Operating system.
2. Understand Process management in operating system.
3. Understand Memory Management in operating system.
4. Understand Device Management in operating system.

UNIT-I (11 Hrs.)

Introduction - Introduction to Operating system, Role of Operating System as resource manager, function of kernel and shell, operating system structures, views of an operating system.

UNIT-II (11 Hrs.)

Process management - CPU scheduling, Scheduling Algorithms, PCB, Prices synchronization, Deadlocks, Prevention, Detection and Recovery

UNIT-III (11 Hrs.)

Memory Management - Overlays, Memory management policies, Fragmentation and its types, Portioned memory managements, Paging, Segmentation, Ned of Virtual memories, Page replacement Algorithms, Concept of Thrashing

UNIT-IV (12 Hrs.)

Device Management - I/O system and secondary storage structure, Device management policies, Role of I/O traffic controller, scheduler, File Management: File System Architecture, Layered Architecture, Physical and Logical File Systems, Protection and Security, Brief study to multiprocessor and distributed operating systems. Case Studies: LINUX / UNIX Operating System and Windows based operating systems. Recent trends in operating system.

Recommended Books

1. A. Silberschatz and Peter B. Galvin, 'Operating System Concepts', 2nd Edn., Wiley, **2013**.
2. Dhananjay M. Dhamdhere, 'Operating Systems', 1st Edn., McGraw-Hill, **2008**.
3. Gary Nutt, 'Operating Systems Concepts', 2nd Edn., McGraw-Hill, **2001**.
4. Stuart E. Madnick and John J. Donovan, 'Operating Systems', 1st Edn., McGraw-Hill, **1974**.
5. William Stallings, 'Operating Systems: Internals and Design Principles', 6th Edn., Prentice Hall, **2008**.

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code: MCAP1-314 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Objectives

After completion of this course, the students would be:

1. Able to learn basics and programming skills of high level language C++.
2. Able to learn how to manage the memory by using dynamic memory management.
3. Able to learn how to use reusability concept by using inheritance and templates.
4. Able to learn the skills of handing modular approach and exceptions.

UNIT-I (11 Hrs.)

Object-Oriented Programming Concepts - Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, basic concepts of object-oriented programming — concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging.

Standard Input/output - Concept of streams, hierarchy of console stream classes, input/output using overloaded operators >> and << and member functions of i/o stream classes, formatting output, formatting using ios class functions and flags, formatting using manipulators.

UNIT-II (12 Hrs.)

Classes and Objects - Specifying a class, creating class objects, accessing class members, access specifiers, static members, use of const keyword, friends of a class, empty classes, nested classes, local classes, abstract classes, container classes, bit fields and classes.

Pointers and Dynamic Memory Management - Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using new and delete operators, pointer to an object, this pointer, pointer related problems - dangling/wild pointers, null n pointer assignment, memory leak and allocation failures.

UNIT-III (11 Hrs.)

Constructors and Destructors - Need for constructors and destructors, copy constructor, dynamic constructors, explicit constructors, destructors, constructors and destructors with static members, initialize lists.

Operator Overloading and Type Conversion - Overloading operators, rules for overloading operators, overloading of various operators, type conversion - basic type to class type, class type to basic type, class type to another class type.

UNIT-IV (11 Hrs.)

Inheritance - Introduction, defining derived classes, forms of inheritance, ambiguity in multiple and multipath inheritance, virtual base class, object slicing, overriding member functions, object composition and delegation, order of execution of constructors and destructors.

Virtual functions & Polymorphism - Concept of binding - early binding and late binding, virtual functions, pure virtual functions, abstract classes, virtual destructors.

Exception Handling - Review of traditional error handling, basics of exception handling, exception handling mechanism, throwing mechanism, catching mechanism, re-throwing an exception, specifying exceptions.

Templates and Generic Programming - Template concepts, Function templates, class templates, illustrative examples.

Files - File streams, hierarchy of file stream classes, error handling during file operations, reading/writing of files, accessing records randomly, updating files.

Recommended Books

1. Robert Lafore, 'Object Oriented Programming in C++', 4th Edn., Waite Group, **2001**.
2. E. Balagurusamy, 'Object Oriented Programming with C++', 6th Edn., Tata McGraw Hill, **2013**.
3. R.S. Salaria, 'Object-Oriented Programming using C++', 4th Edn., Khanna Book Publishing, **2009**.
4. BjarneStroustrup, 'The C++ Programming Language', 3rd Edn., Addison Wesley, **1997**.
5. Herbert Schildt, 'C++: The Complete Reference', 4th Edn., McGraw Hill, **2009**.

SOFTWARE LAB – V
(OPERATING SYSTEMS BASED ON LINUX)

Subject Code: MCAP1-315 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-313. Students are required to do at least 8 assignments based on the paper.

SOFTWARE LAB – VI
(OBJECT ORIENTED PROGRAMMING USING C++)

Subject Code: MCAP1-316 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-314. Students are required to do at least 8 assignments based on the paper.

EMBEDDED SYSTEMS

Subject Code: MCAP1-359 **L T P C** **Duration: 35 Hrs.**
3 1 0 4

Learning Objectives

1. Describe the recent trends and design issues in embedded systems.
2. Design real time embedded system using the PIC microcontroller 16F877A.

3. Analyse assembly language programming in PIC Microcontroller 16F877A.
4. Understand the different applications of embedded systems.

UNIT-I (9 Hrs.)

Introduction to Embedded Systems - Overview of embedded systems, Features, Requirements and applications of embedded systems, Recent trends in the embedded system design, Common architectures for the ES design, Embedded software design issues, Introduction to development and testing tools.

UNIT-II (9 Hrs.)

Embedded System Architecture - Basics of PIC16F877A microcontroller, Pin Diagram, Architecture, Memory organization, Special Function Registers, GPIO, Timer Comparator, A/D Convertor, Bus Architecture, Data operations, Addressing modes, Timers and Counters.

UNIT-III (9 Hrs.)

Assembly language programming - Memory-Mapped I/O, Interrupt handling, PIC16F877A Instruction Set, Assembler Directives, Programming of PIC Microcontrollers.

UNIT-IV (8 Hrs.)

Applications of Embedded Systems - Industrial and control applications, Networking and telecom applications, Digital Signal Processing and multimedia applications, Applications in the area of consumer appliances.

Recommended Books

1. Steve Heath, 'Embedded Systems Design', 2nd Edn., Newnes, **2002**.
2. Jane W.S. Liu, 'Real-Time Systems', 1st Edn, Prentice Hall, **2000**.
3. John B. Peatman, 'Design with PIC Microcontrollers', 1st Edn., Pearson, **1997**.
4. PIC 16F877A Manual.

MULTIMEDIA TECHNOLOGIES

Subject Code: MCAP1-360 **L T P C** **Duration: 35 Hrs.**
3 1 0 4

Learning Objectives

1. To acquire fundamental principles of multimedia, including digitization and data compression for non-textual information.
2. To understand core multimedia technologies and standards.
3. To gain hands-on experience in image, sound and video editing.
4. To design, capture, store and integrate sound, images and video to deliver multi-modal information.

UNIT-I (9 Hrs.)

Introduction - Overview of multimedia computing, Definitions, terms, terminologies, characteristics and requirements of different media, Components of multimedia systems.

Human's visual and audio system - Characteristics of human visual system, Light and visible light, Human retina structure and functions, Non-perceptual uniform color models and perceptual uniform color models, Characteristics of human's audio system, Frequency response and Magnitude range.

UNIT-II (9 Hrs.)

Multimedia data representation and analysis - Representation of sound/audio, image and video, Speech Generation, Analysis and software, Image analysis, Display and Printing.

UNIT-III (9 Hrs.)

Multimedia coding and compression - Coding requirements, Compression principles, Entropy and hybrid coding, Compression standards: JPEG and MPEG.

UNIT-IV (8 Hrs.)

Multimedia technology development - Multimedia history, Technology development, Challenging problem, Research difficulty, Multimedia industry.

Recommended Books

1. John F. Koegel Buford, 'Multimedia Systems', 1st Edn., Pearson, **2002**.
2. Ralf Steinmetz and Klara Nahrstedt, 'Multimedia: Computing, Communications and Applications', 1st Edn., Pearson, **2002**.
3. Judith Jeffcoate, 'Multimedia in Practice: Technology and Applications', 1st Edn., Prentice Hall, **1995**.

PARALLEL AND DISTRIBUTED COMPUTING

Subject Code: MCAP1-361 **L T P C** **Duration: 35 Hrs.**
3 1 0 4

Learning Objectives

1. Recall the fundamental concepts, scope, design and model the parallelism.
2. To study performance matrices used for performance analysis and understand various parallel computing architectures.
3. To understand the scheduling process of the parallel computing.
4. To outline the fundamentals of parallel programming models.

UNIT-I (9 Hrs.)

Introduction - Parallel computing, Scope of parallel computing, Paradigms of parallel computing: Synchronous- Vector/Array, SIMD, Systolic, Asynchronous- MIMD, reduction paradigm.

Hardware taxonomy - Flynn's classifications, Handler's classifications.

Software taxonomy - Kung's taxonomy, SPMD.

UNIT II (9 Hrs.)

Abstract parallel computational models - Combinational circuits, Sorting network, PRAM models, Interconnection RAMs.

Parallelism approaches - Data parallelism, Control parallelism.

Parallel programming models - Shared memory programming, Distributed memory programming, Object oriented programming, Data parallel programming, Functional and dataflow programming.

UNIT III (9 Hrs.)

System Architectures - Taxonomy and topology – shared memory multiprocessors: UMA-Uniform Memory Architecture, NUMA-Non Uniform Memory Architecture, SMP distributed memory networks, Cache coherence protocols, CC-NUMA architectures, Consistency protocols, Data pre-fetching, CC-NUMA memory management, Message processing multiprocessors, Processor organization - Static and dynamic interconnections.

UNIT IV (8 Hrs.)

Scheduling and Parallelization - Scheduling, Types of scheduling algorithms, Load scheduling, Loop scheduling, Parallelization of sequential programs, Parallel programming support environments.

Recommended Books

1. Gregory R Andrews, 'Foundations of Multithreaded, Parallel, and Distributed Programming', Addison-Wesley Professional, **1999**.
2. Michael J. Quinn, 'Parallel Computing: Theory and Practice', 2nd Edn., McGraw Hill, **2002**.

3. Vipin Kumar, Ananth Grama, Anshul Gupta and George Karypis, 'Introduction to Parallel Computing', 2nd Edn., Pearson, **2003**.

COMPUTER GRAPHICS

Subject Code: MCAP1-417 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: At the end of the course, the students should be able to:
1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
3. Use of geometric transformations on graphics objects and their application in composite form.

UNIT–I (11 Hrs.)

Computer Graphics- Introduction, Applications of computer graphics, Components of Computer Graphics System.

Input & Output Devices- Keyboard, Touch panel, Light pens, Graphic tablets, Joysticks, Trackball, Data glove, Digitizer, Image scanner, Mouse, Voice Systems, Impact and non-impact printers.

Video Display Devices- CRT systems, Random and Raster scan Systems, Direct view storage tube. Flat panel displays – Emissive vs Non-Emissive displays, LCD displays, Plasma Panel displays, 3-D viewing devices, Virtual Reality.

UNIT–II (12 Hrs.)

Scan conversion- DDA and Bresenham line algorithms, Midpoint circle algorithm, Midpoint ellipse algorithm, Area filling techniques (Boundary fill, Flood fill, scan line area fill algorithm), character generation, limitations of scan conversion.

2-dimensional Graphics- 2D Cartesian and Homogeneous co-ordinate system, Geometric transformations (translation, Scaling, Rotation, Reflection, Shearing), Composite transformations, two dimensional viewing transformation and clipping (Cohen –Sutherland, Sutherland-Hodge man algorithms).

UNIT–III (11 Hrs.)

3-dimensional Graphics- 3D Cartesian and Homogeneous co-ordinate system, Geometric transformations (translation, Scaling, Rotation, Reflection), Composite transformations. Mathematics of Projections – Perspective Projections, Anomalies of perspective projections, Parallel Projections, Introduction to 3D viewing pipeline and clipping.

UNIT–IV (11 Hrs.)

Hidden line and surface elimination algorithms- Z-buffer, scan-line, Painter's algorithm.

Illumination Models- Diffuse reflection, Specular reflection, refracted light, texture surface patterns, Half toning, Dithering.

Recommended Books:

1. D. Hearn and M.P. Baker, 'Computer Graphics', 2nd Edn., Pearson, **2002**.
2. Andries van Dam, F. Hughes John, James D. Foley; Steven K. Feiner, 'Computer Graphics Principles and Practice in C', 2nd Edn., Pearson, **2002**.
3. Roy A. Plastock, 'Computer Graphics', 2nd Edn., McGraw Hill, **2000.**
4. F.S. Hill, 'Computer Graphics using OpenGL', 3rd Edn., PHI, **2009.**
5. Jeffrey McConnell, 'Computer Graphics: Theory into Practice', 1st Edn., Jones and Bartlett Publishers, **2005.**

6. William M. Newman, 'Principles of Interactive Computer Graphics', 2nd Edn., McGraw Hill, **2001.**

PROGRAMMING IN JAVA

Subject Code: MCAP1-418 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: At the end of the course, the students should be able to:
1. Use the Java programming language in the development of small application programs that demonstrate professionally acceptable coding and performance standards.
2. Understanding of the basic principles of the object oriented development process and apply this understanding to the analysis and design of solutions for small scale problems.
3. Work with the JDBC technology and learn Java Generics and the development of Projects.

UNIT–I (11 Hrs.)

Introduction- Object Oriented Concept, Features and Applications of Java, Differences between Java and C++, Structure of Java Program, Literals, Tokens, Keywords, Constants, Variables & Data types, Scope of variables, Operators, Expressions, Flow control statements. Arrays, Vectors, Type Conversion, Command Line Arguments, Access specifiers, Constructors, Inheritance, Static Classes, Abstract Classes, Final Classes, Wrapper Classes, Garbage Collection & Finalize method, Handling String and String Buffer classes, Method Overloading and Overriding.

UNIT–II (11 Hrs.)

Interfaces & Packages- Introduction, implementing multiple inheritance through Interfaces, Packages, Multithreaded Programming.

Exception Handling- Introduction, Handling System defined Exceptions, Creating and handling user defined exceptions.

Managing I/O- Introduction to streams, Handling and using various Stream Classes.

UNIT–III (11 Hrs.)

Applets- Introduction to Applets, Types of Applets, Using Applet Applications, Passing Parameters to Applets.

Introduction to Graphic Programming- Applying 2-D transformations on Objects, Event Handling, Layouts, Frames, Panels, JDBC.

UNIT–IV (12 Hrs.)

Advanced Programming- Servlet Programming (Servlet Life Cycle, Generic Servlet, HttpServlet, HttpServletRequest, HttpServletResponse, Service method, doGET method, doPOST method, Servlet Exception).

Recommended Books:

1. Y. Daniel Liang, 'Introduction to Java Programming', 9th Edn., Pearson, **2011.**
2. Herbet Schildt, 'Java 2: The Complete Reference', 5th Edn., McGraw Hill, **2002.**
3. Gary Cornell and Cay S. Horstmann, 'Core Java, Volume 2- Advanced Features', 8th Edn., Pearson, **2008.**
4. Ed Roman , Rima Patel and Gerald Brose, 'Mastering Enterprise Java Beans', 3rd Edn., John Wiley & Sons Inc., **2004.**

SYSTEM PROGRAMMING

Subject Code: MCAP1-419 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes:

1. The objective of this course is to understand the execution process of HLL programs and understand the working of scanners and parsers.
2. This will help the students to understand the basic design of various system software

UNIT-I (11 Hrs.)

Introduction to System Software - Definition, Features of system programming, system programming vs. application programming.

Scanning and Parsing - Programming Language Grammars, Classification of Grammar, Ambiguity in Grammatical Specification, Scanning, Parsing, Top Down Parsing, Bottom up Parsing.

UNIT-II (13 Hrs.)

Assembler - Single pass assembler, Two-pass assembler, Algorithm of Two Pass Assembler and General Design Procedure of an Assembler.

UNIT-III (10 Hrs.)

Compilers - Overview of compilation process, Lexical analysis, Syntax analysis, Semantic analysis, Intermediate code generation and Code optimisation techniques, Compiler vs. Interpreter.

Loaders - Loading, Schemes, Design of absolute loader, Design of direct linking loader and MS-DOS Linker, Text Editors, Line Editor, Steam Editors, Screen Editor, Word processors, Structure Editors.

UNIT-IV (11 Hrs.)

Operating System - Basic concepts, Operating System as Resource Manager, Concepts of Processor, Memory, I/O and File Managements. Introduction to Device Drivers, USB and Plug and Play systems.

Recommended Books

1. John. J. Donovan, 'Systems Programming', 1st Edn., McGraw-Hill, **2001.**
2. A.V. Aho, Ullman Sethi R., I.D. 'Compilers: Principles, Techniques and Tools', 2nd Edn., Addison-Wesley, **1999**.
3. D.M. Dhamdhere, 'Systems Programming and Operating System', Tata McGraw Hill, 3rd Edn., **2002**.

SOFTWARE LAB – VII (COMPUTER GRAPHICS)

Subject Code: MCAP1-420 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-417. Students are required to do at least 8 assignments based on the paper.

SOFTWARE LAB – VIII
(PROGRAMMING IN JAVA)

Subject Code: MCAP1-421 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-418. Students are required to do at least 8 assignments based on the paper.

DATA WAREHOUSING AND DATA MINING

Subject Code: MCAP1-462 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to:
1. Understand operational database, data ware housing, need of database to meet industrial needs.
2. Identify the components in typical data warehouse Architecture and understand the multidimensional schemas for data warehouse.
3. Understand the knowledge about data mining, decision tree, generic algorithms and Fuzzy set approach.

UNIT – I (10 Hrs.)

Review of Data Warehouse- Need for strategic information, Decision support system, Knowledge discovery & decision making, need for data warehouse, Data warehousing and data mining, common characteristics of Data warehouse, Data Marts, Metadata, Operational versus analytical databases, trends and planning of Data warehousing.

UNIT - II (11 Hrs.)

Schemas and Architecture of Data warehouse- Multidimensional data model, Data cubes, Schemas for Multidimensional Database: stars, snowflakes and fact constellations. Data warehouse process & architecture, OLTP vs. OLAP, ROLAP vs. MOLAP, types of OLAP servers, 3-Tier data warehouse architecture, distributed and virtual data warehouses, data warehouse manager.

UNIT – III (12 Hrs.)

Introduction to Data Mining- Data mining definition & task, KDD versus Data mining, Techniques, Tools and Applications of Data mining. Data mining query languages, data specification, specifying knowledge, hierarchy specification, pattern presentation & visualization specification.

Data mining techniques- Association rules, Clustering techniques, Decision tree knowledge discovery through neural.

UNIT – IV (12 Hrs.)

Data mining Classification- Networks & Genetic Algorithms, Rough Sets, Support Vector Machines and Fuzzy techniques. Mining Complex data objects, Spatial databases, Multimedia databases, Time series and Sequence data, mining Text Data bases and mining Word Wide Web.

Recommended Books:

1. Jiawei Han, Micheline Kamber, Jian Pei, 'Data Mining: Concepts and Techniques', 3rd Edn., Morgan Kaufmann, **2011**.
2. George M. Marakas, 'Modern Data Warehousing, Mining, and Visualization', 1st Edn., Prentice Hall, **2001**.

3. Elzbieta Malinowski and Esteban Zimanyi, 'Advanced Data Warehouse Design: from Conventional to Spatial and Temporal Applications (Data-Centric Systems and Applications)', 1st Edn., Springer, **2008.**
4. Matteo Golfarelli and Stefano Rizzi, 'Data Warehouse Design: Modern Principles and Methodologies', 1st Edn., McGraw-Hill Education, **2009.**
5. Alex Berson and Stephen J. Smith, 'Data Warehousing, Data Mining, & OLAP', 1st Edn,, Tata McGraw Hill, **1997.**

BUSINESS INTELLIGENCE AND DIGITAL MARKETING

Subject Code: MCAP1-463 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to:
1. Understand the role of business intelligence and digital marketing within an organization.
2. Use decision-making tools/Operations Research techniques and manage business processes using analytical and management tools.
3. Analyse and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.

UNIT – I (12 Hrs.)

Introducing the Technical Architecture- The value of architecture, Technical Architecture overview, Back room Architecture, Presentation Server Architecture, Front room Architecture, Infrastructure, Metadata, and Security.

Introducing Dimensional Modeling- Making the Case for Dimensional Modeling, Dimensional Modeling primer, Enterprise Data Warehouse Bus Architecture, More on Dimensions & Facts.

UNIT – II (10 Hrs.)

Designing the Dimensional Modeling- Modeling Process overview, Getting Organized, Four Step Modeling Process, Design the Dimensional Model.

UNIT – III (11 Hrs.)

Introducing Extract, Transformation & Load- Round up the requirements, the 34 subsystems of ETL, Extracting Data, Cleaning & Conforming data.

Introducing Business Intelligence Applications- Importance of B.I., Applications, Analytical cycle for B.I., Types of B.I. Applications, Navigating Applications via the B.I. portal.

UNIT – IV (12 Hrs.)

Designing & Developing B.I. Applications- B.I. Application resource planning, B.I. Application Specification, B.I. Application Development, B.I. Application maintenance.

Recommended Books:

1. Sam Anahory and Dennis Murray, 'Data Warehousing in the Real World: A Practical Guide for Building Decision Support Systems', 1st Edn., Addison Wesley Longman Ltd., **1997**.
2. Ralph Kimball and Margy Ross, 'The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling', 3rd Edn, Wiley, **2013**.
3. Jiawei Han, Micheline Kamber, Jian Pei, 'Data Mining: Concepts and Techniques', 3rd Edn., Morgan Kaufmann, **2011**.
4. R.N. Prasad and Seema Acharya, 'Fundamentals of Business Analytics', 1st Edn., Wiley, **2011**.

SOFTWARE TESTING AND QUALITY ASSURANCE

Subject Code: MCAP1-464 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to:

1. Analyse different approaches to software testing and quality assurance, and select optimal solutions for different situations and projects;
2. Conduct independent research in software testing and quality assurance and apply that knowledge in their future research and practice;
3. Evaluate the work of peers constructively by following proven methods of peer-review, and by using the principles of research ethics.

UNIT-I (10 Hrs.)

Testing Principles- Need of testing, Basic concepts – errors, faults, defects, failures, test bed, unit testing, integration testing system, system testing, regression testing, alpha, beta and acceptance testing, functional testing, performance testing, white box testing, black box testing, verification and validation.

UNIT-II (12 Hrs.)

Test Management- Testing Life Cycle – Roles and activities, Test Planning, Develop test plan review, Test Cases design strategies. Black box approach: random testing, equivalence class partitioning and boundary value analysis. White box approach: test adequacy criteria, coverage and control flow graphs, paths, loop testing, mutation testing.

UNIT-III (12 Hrs.)

Software Metrics- Scope of software metrics, Classifying software measures, Measurement basics – representational theory, scales, meaningfulness, What to measure – GOM technique, Control flow structure, product quality metrics – MTTF, defect density, customer problems, customer satisfaction, function point.
Quality Assurance- Quality concepts – quality, quality control, quality assurance, cost of quality Software quality assurance – SQA activities, software reviews, inspections, audits, Software reviews, inspections, audits, Software reliability Quality Attributes: correctness, reliability, usability, integrity, portability, maintainability, interoperability. Ishikawa's Seven Basic Tools.

UNIT-IV (11 Hrs.)

Quality Standards- Basic concept of – ISO 9000 & 9001, CMM, six sigmas.
Development of CMM- CMM – Following KPAs: requirements management (RM), software project tracking and oversight (SPTO), software configuration management (SCM), organization process definition (OPD), software product engineering (SPE), peer reviews (PR), quantitative process management (QPM), process change management.

Recommended Books:

1. Kshirasagar Naik and Priyadarshi Tripathy, 'Software Testing and Quality Assurance: Theory and Practice', 1st Edn., Wiley, **2008**.
2. Jeff Tian, 'Software Quality Engineering: Testing, Quality Assurance, and Quantifiable, Improvement', 1st Edn., Wiley, **2005**.
3. William E. Perry, 'Effective Methods for Software Testing: Includes Complete Guidelines, and Checklists', 3rd Edn., Wiley, **2006**.
4. Glenford J. Myers, 'The Art of Software Testing', 3rd Edn., Wiley, **2015**.

ARTIFICIAL INTELLIGENCE

Subject Code: MCAP1-522 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course the student will be able to understand the:

1. different types of AI agents.
2. various AI search algorithms.
3. the fundamentals of knowledge representation.

UNIT–I (11 Hrs.)

Basics of AI - What is Artificial Intelligence, what is an AI technique, Criteria for success, Problems, Problem spaces and search, Production system, Problem characteristics, Hill-climbing, Best-First search, AO algorithm, Constraint satisfaction.

UNIT–II (12 Hrs.)

Natural Language Processing - Introduction, Overview of linguistics, Grammars and language, Basic Parsing techniques, Semantic analysis and representation, Structure, Natural Language generation, Natural Language systems.

UNIT–III (11 Hrs.)

Knowledge Representation - Issues, Approaches to knowledge Representation, Representing simple facts in logic, Computable functions and predicates, Procedural vs declarative knowledge, Forward vs Backward Reasoning matching, Control knowledge.

UNIT–IV (11 Hrs.)

Expert Systems - Rule-Based system architecture, Non-production system Architecture, Dealing with uncertainty, Knowledge acquisition and validation, Knowledge system Building tools.

Recommended Books

1. Elaine Rich and Kevin Knight, 'Artificial Intelligence', Tata McGraw Hill, 5th Edn., **2014**.
2. Dan. W. Patterson, 'Introduction to Artificial Intelligence and Expert Systems', Prentice Hall India, 1st Edn., **2015**.
3. Eugene Charniak and Drew McDermott, 'Introduction to Artificial Intelligence', Pearson Education, 1st Edn., **2002**.

PROJECT (PLANNING AND DESIGN)

Subject Code: MCAP1-523 **L T P C**
0 0 8 4

Students are encouraging for the Project Planning & Design which covers the schematic design phase of a project. They are also learning to building the layout design, review building codes and regulations, coordinate schematics etc.

THEORY OF COMPUTATION

Subject Code: MCAP1-524 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to:

1. Design a finite automaton to recognize a given regular language and transform a language into regular expression or finite automaton or transition graph.
2. Define deterministic and nondeterministic finite automata and prove properties of regular languages and their classification.

3. Build a context-free grammar for pushdown automata.
4. Design Turing machine and Post machine for a given language.

UNIT-I (10 Hrs.)

Finite Automata - Formal language, need for formal computational models, Non computational models, Deterministic finite Automata, Non deterministic finite Automata, Equivalence of NFA and DFA, 2-Way Finite Automata, Crossing sequences, Moore and Mealy Machine, Application of finite automata i.e. Lexical Analyzers, text editors.

UNIT-II (10 Hrs.)

Regular Expression and Languages - Regular expression, Equivalence of finite Automata and Regular expressions, Conversion between regular expressions and finite Automata, Application of Regular Expressions, Lexical analysis, Finding pattern in text.

UNIT-III (12 Hrs)

Regular Languages and Regular sets - Pumping lemma for regular sets, Applications of pumping lemma. Closure properties of regular language, The Myhill-Nerode Theorem, Minimization of finite Automata.

Pushdown Automata - Pushdown Automata, Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context free grammar.

UNIT-IV (13 Hrs.)

Context free Grammar and Languages - Context Free Grammars, Derivation Trees, Leftmost and rightmost derivations, Ambiguity, parsing techniques for parsing of general CFG's, Properties of Context Free Languages, Normal forms for context free grammars, The Pumping Lemna for context free Languages, Closure properties of context free languages.

Turing Machine (TM) - One Tape, multi-tape, The notions of time and space complexity in terms of T.M. Construction of simple problems, Computational complexity.

Recommended Books:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, 'Introduction to Automata Theory, Languages and Computation', 3rd Edn., Pearson, **2006**.
2. Daniel I.A. Cohen, 'Introduction to Computer Theory', 2nd Edn., Wiley, **2011**.
3. Adesh K. Pandey, 'Theory of Automata and Computation', S.K. Kataria & Sons, **2013**.
4. K.L.P. Mishra, 'Theory of Computer Science: Automata, Languages and Computation', Prentice Hall India Learning Private Limited, 3rd Edn., **2006**.

INFORMATION AND NETWORK SECURITY

Subject Code: MCAP1-525 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to:

1. Identify common network security vulnerabilities and attacks and explain the foundations of Cryptography and network security.
2. Impart knowledge on Encryption techniques, Design Principles and Modes of operation.
3. Be familiar with Firewall Design Principles and network security designs using available secure solutions.

UNIT-I (10 Hrs.)

Introduction - Security Attacks (Passive & Active Attacks), Security Services, Security Mechanisms, Model for Internetwork Security, Man in the middle attack, Conventional Encryption Principles, Monoalphabetic ciphers, Playfair Ciphers, Transposition Ciphers, Cipher block chaining mode, Approaches of message authentication.

UNIT-II (11 Hrs.)

Public Key Cryptography - Public Key Cryptography Principles, RSA algorithm, Digital Signatures, Digital Certificates, Certificate Authority and Key management Kerberos, X.509 Directory Authentication Service.

UNIT-III (12 Hrs.)

IP Security - Security Problems of IP, Security Objectives, IP Security Protocol Modes, Authentication Header, Security Payload. Firewall Characteristics, Types of Firewalls and their practical use, NAT.

UNIT-IV (12 Hrs.)

Email and Web Security - PGP, S/MIME, Security Socket Layer, Transport Layer Security, Secure Electronic Transaction.

Recommended Books:

1. Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone, 'Handbook of Applied Cryptography', Jaypee Medical, **1996**.
2. Bart Preneel, Christof Paar and Jan Pelzl , 'Understanding Cryptography', 1st Edn., Springer, **2010**.
3. Bernard Menezes, 'Network Security and Cryptography', 1st Edn., Cengage, **2010**.
4. William Stallings, 'Network Security Essentials Applications and Standards', 5th Edn., Pearson, **2013**.

LAMP TECHNOLOGIES

Subject Code: MCAP1-565 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to;

1. Understand brief introduction to the open source technologies.
2. Understand interactive sessions enabling students to enhance their skills in contributing and implementing their technical knowledge.

UNIT-I (10 Hrs.)

Introduction - Open Source definition, Free Software vs. Open Source Software, Public Domain Software, Open Source history, Initiatives, Principle and Methodologies, Open Standards.

Open Source Development Model Licenses and Patents - What Is a License, Important FOSS Licenses (Apache, BSD, GPL, LGPL), Copyrights and Copy lefts, Patents Economics of FOSS: Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization.

UNIT-II (12 Hrs.)

Programming on PHP and JavaScript - JavaScript: JavaScript variables, control structures, functions, arrays and objects. Cascading Style Sheets, Client Side Scripting - Java Script, PHP: Form processing and business logic, stream processing and regular expressions, viewing client/server environment variables, connecting to database and handling of cookies. SQL, Accessing databases with PHP.

UNIT-III (11 Hrs.)

Open Source Web Technologies - Two Tier and Three Tier Web based Application Architecture. Apache, Web server conceptual working, Installation and Configuration, httpd.conf file, Logging, Security, Running a website, MySQL, ER diagram, Relational database, Installation, Configuration, Administration, Common SQL queries, PHP, Dynamic content, Server side scripting, Installation, Configuration, Administration, Language syntax, Built-in functions, PHP and MySQL connectivity.

UNIT- IV (12 Hrs.)

Open Source Ethics -Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, shared software, Shared source.

Programming on XHTML and XML - Editing XHTML, W3C XHTML validation services, designing XHTML by using XHTML tables, frames, forms and other elements. CSS and its types. XML, XML namespaces, DTD, XML schema, XML vocabularies, DOM and its methods, SOAP.

R**ecommended Books**

1. B. Ware, B. Lee J., 'Open Source Development with Lamp: Using Linux, Apache, MySQL, Perl, and PHP', 1st Edn., Addison-Wesley Professional, **2003**.
2. Rosebrock E., Filson E., 'Setting Up LAMP – Getting Linux, Apache, MySQL, and PHP Working Together', SYBEX Inc., 1st Edn., **2004**.
3. Deitel, 'Internet and World wide web, How to Program', 4th Edn., Prentice Hall, **2008**.

DATABASE ADMINISTRATION

Subject Code: MCAP1-566 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Learning Outcomes:

After completion of this course, the students would be able to:

1. Learn install and configure various database packages. The student will also learn various database objects like tables, views and indexes.
2. Learn various database tasks like data migration, Importing and Exporting data.
3. Learn to create user accounts, grant privileges and implement database encryption.
4. Learn Database backup and recovery and perform database tuning and optimization.

UNIT-I (12 Hrs.)

Introduction - Understanding role and responsibilities of DBA, Database Environment management (network, CPU, disk and RAM), Installing and upgrading various database packages (MS SQL Server, Oracle, MySQL), Comparing various database packages, configuring various services and components, Understanding the client/server model, Communication protocols, Database instance management, Creating and managing various database objects (tables, views, indexes).

UNIT-II (12 Hrs.)

Managing Database Servers - Understating client tools for administrative tasks, Task Automation, implementing migration, consolidation and upgrade strategy, Hardware resource allocation, Business policy implementation, Monitoring and trouble-shooting, implementing database compression, Database Replication and multiple servers, Exporting and Importing data, Managing Data integrity.

UNIT-III (10 Hrs.)

Security and Availability - Understanding User Access and Security, Creating and modifying user accounts, Creating, Modifying and Using roles, Granting and Revoking Privileges, querying role information, Database backup, restoration and recovery, Types of failure, defining a backup and recovery strategy, Testing the backup and recovery plan, RAID implementation.

UNIT-IV (11 Hrs.)

Performance Tuning - Introduction to performance tuning and its requirement, performance tuning methodology, Monitoring status variables that affect performance, General Table Optimizations, using indexes to improve performance, Monitoring and optimizing the

performance of the database, identifying full-table scans, Re-writing SQL queries, tuning sub-queries, Database mirroring, clustering.

Recommended Books:

1. Adam Jorgensen, Jorge Segarra, Patrick Leblanc, Jose Chinchilla and Aaron Nelson, 'Microsoft SQL Server 2012 Bible', Wiley India Pvt Ltd., **2012**.
2. Ken Simmons and Sylvester Carstarphen, 'Pro SQL Server 2012 Administration', 2nd Edn., Dreamtech Press, **2012**.
3. Sam R. Alapati, 'Expert Oracle Database 11g Administration', Dreamtech Press, **2009**.
4. Sheeri K. Cabral and Keith Murphy, 'MySQL Administrator's Bible', John Wiley & Sons, **2009**.

SOFTWARE LAB-IX (LAMP TECHNOLOGIES)

Subject Code: MCAP1-567 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-565. Students are required to do at least 8 assignments based on the paper.

SOFTWARE LAB-X (DATABASE ADMINISTRATION)

Subject Code: MCAP1-568 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-566. Students are required to do at least 8 assignments based on the paper.

CURRENT TRENDS AND TECHNOLOGY

Subject Code: MCAP1-626 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to

1. Recognise the concepts of emerging technologies.
2. Analyse the components of cloud computing.
3. Critically analyse case studies to derive the best practice model to apply when developing and deploying parallel, distributed, cloud and IoT based applications.

UNIT–I (10 Hrs.)

Introduction to Computing-Emerging Trends in Computing like Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Utility Computing, Cloud Computing, High Performance Computing, Autonomic Computing.

UNIT–II (11 Hrs.)

Cloud Computing-Introduction, Cloud Types, Uses of Cloud, Components of Cloud Computing - Software as a Service, Platform as a Service, Infrastructure as a Service, Virtualization in Cloud Computing, Concept of Green Clouds.

UNIT–III (12 Hrs.)

Soft Computing-Soft Computing VS Hard Computing; Introduction to Neural Networks – Intelligence, Neurons, Artificial Neural Networks, Application Scope of Neural Network, Brain VS Computer.

UNIT–IV (12 Hrs.)

IoT and Fog Computing-Topologies, Edge Routers, Client-Server Architecture, P2P, M2M, Introduction to Fog Computing, Benefits of Fog Computing.

Recommended Books

1. Joshy Joseph, Craig Fellenstein, 'Grid Computing', Prentice Hall Professional, 1st Edn., **2004**.
2. Rajkumar Buyaa, James Broberg, Andrzej Goscinski, 'Cloud Computing Principles Paradigms'. 1st Edn., Wiley, **2011.**
3. Tettamanzi, Andrea, Tomassini and Macro, 'Soft Computing', Springer, **2001**.
4. Rajkumar Buyaa, Vecchiola, Selvi, 'Mastering Cloud Computing', McGraw Hill, 1st Edn., **2013**.
5. Arshdeep Bahga, Vijay Madisetti, 'Internet of Things (A Hands -on- Approach)', VPT, 1st Edn., **2014**.

PROJECT (IMPLEMENTAION AND EXECUTION)

Subject Code: MCAP1-627 **L T P C** **Duration: 45 Hrs.**
0 0 20 10

The Implementation of the Project is based on concepts build in **MCAP1-523 Project Planning & designing** and will help to put the project into an action. The Implementation phase consists of four sub phases: Execution, Monitoring & Control, and Move to Production. Project implementation where *visions* and plans become reality.

BIG DATA

Subject Code: MCAP1-669 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes: After completion of this course, the students would be able to:

1. Model and implement efficient big data solutions for various application areas using appropriately selected algorithms and data structures.
2. Analyze methods and algorithms, to compare and evaluate them with respect to time and space requirements, and make appropriate design choices when solving real-world problems.
3. Apply non-relational databases, the techniques for storing and processing large volumes of structured and unstructured data, as well as streaming data.

UNIT-I (10 Hrs.)

Introduction to Big Data-Introduction – distributed file system – Big Data and Its Importance, Four Vs, Drivers for Big Data, Big Data Applications, Algorithms using Map Reduce, Matrix-Vector Multiplication by Map Reduce, Clustering

UNIT-II (10 Hrs.)

Big Data Technology Landscape-Fundamentals of Big Data Types, Big data Technology Components, Big Data Architecture, Big Data Warehouses, Functional vs. Procedural Programming Models for Big Data.

UNIT-III (10 Hrs.)

Big Data Analytics-Big Data Analytics, Framework for Big Data Analysis, Approaches for Analysis of Big Data, ETL in Big Data, Introduction to Hadoop Ecosystem, HDFS, Understanding Text Analytics and Big Data, Predictive analysis on Big Data, Role of Data analyst.

UNIT-IV (15 Hrs.)

Big Data Implementation-Big Data Workflow, Operational Databases, Graph Databases in a Big Data Environment, Real-Time Data Streams and Complex Event Processing, Applying Big Data in a Business Scenario, Security and Governance for Big Data, Big Data on Cloud,

Best Practices in Big Data Implementation, Latest Trends in Big Data, Big Data Computation, More on Big Data Storage, Big Data Computational Limitations.

Recommended Books:

1. Michael Minelli, Michele Chambers, Ambiga Dhiraj, 'Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses', Wiley, 1st Edn., **2013**.
2. White T., 'Hadoop: The Definitive Guide', O' Reilly Media, 3rd Edn., **2012.**

CLOUD COMPUTING

Subject Code: MCAP1-670 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Learning Outcomes

1. To understand the basic concepts Cloud Computing.
2. To understand the taxonomy and types of Cloud Computing.
3. To understand different hypervisors of Clouds for the Virtualization.

UNIT-I (10 Hrs.)

Evolution of Cloud Computing - Vision of Cloud Computing, Definition, Deployment models, Reference models, Benefits and Challenges to Cloud Computing, already using Cloud Computing; Electronic Faxing, Voice in the Cloud, Commerce in the Cloud, Distributed Hosting in the Cloud, Accounting and Online Banking in the Cloud, Cloud Computing Applications.

UNIT-II (10 Hrs.)

Cloud Service Providers and Cloud Vendor's - IaaS Providers, PaaS Providers, SaaS Providers, Specialized Cloud Software Providers. Cloud Vendor's IBM, Amazon AWS, HP, Oracle.

UNIT-III (13 Hrs.)

Securing the Cloud- Reliability, Availability and Security: FUDD Factor, DoS Attack, Trust, Standard and Vendor Selection, SAS70 and Cloud Computing, Cloud Security Alliance, SysTrust Certification, Cloud Audit.

UNIT-IV (12 Hrs.)

Demystifying the Cloud- A Case Study using Amazon's Cloud Service, Using Amazon's S3 Functionality, moving a Simple Application to the Cloud; Step1, Move Static Content to S3, Step2; Move Web Servers and Backend, Moving the database, Eucalyptus, Nimbula.

Recommended Books

1. Rajkumar Buyaa, James Broberg, Andrzej Goscinski, 'Cloud Computing Principles and Paradigms' Wiley, 1st Edn., **2011.**
2. David E.Y. Sarna, 'Implementing and Developing Cloud Computing Applications', CRC Press, 1st Edn., **2011**.
3. Chris Wolf, Erick M. Halter, 'Virtualization: From the Desktop to the Enterprise', A Press, 1st Edn., **2005**.
4. George Reese, 'Cloud Application Architectures: Building Applications and Infrastructure in the Cloud', O'Reilly Publishers, 1st Edn., **2009**.

DOT NET FRAMEWORK

Subject Code: MCAP1-671 **L T P C** **Duration: 45 Hrs.**

3 1 0 4

Learning Outcomes

1. To know about basic goals of the .NET Framework.

2. A working knowledge of the C# programming language.
3. An understanding of how to use forms to develop GUI programs under .NET.
4. Knowledge of some of the tools available in the .NET Framework class library.

UNIT-I (10 Hrs.)

The .Net framework - Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In –Time Compilation, Framework Base Classes.

UNIT-II (10 Hrs.)

C - Sharp Language (C#) - Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array and Strings, Object and Classes, Inheritance and Polymorphism, Operator Overloading, Interfaces, Delegates and Events, Type conversion.

UNIT-III (13 Hrs.)

C# Using Libraries - Namespace- System, Input-Output, Multi-Threading, Networking and sockets, Managing Console I/O Operations, Windows Forms, Error Handling.

UNIT-IV (12 Hrs.)

Advanced Features Using C# - Web Services, Window Services, ASP.NET Web Form Controls, ADO.Net. Distributed Application in C#, Unsafe Mode, Graphical Device interface with C#.

Recommended Books

1. E. Balagurusamy, 'Programming in C#', 3rd Edn., Tata McGraw Hill, **2010**.
2. Mark Michaelis, 'Essential C# 3.0: For .NET Framework 3.5', Addison Wesley, 2nd Edn., **2008.**
3. Kogent Learning Solutions Inc, 'C# 2012 Programming Black Book Covers .NET 4.5', Dreamtech Press, 1st Edn., **2012.**

MOBILE COMPUTING & ANDROID

Subject Code: MCAP1-672 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

UNIT-I (12 Hrs.)

Introduction to Android - Installing Android Studio, Layouts, Views and Resources, Scrolling Views, Working with TextView Elements.

Activities and Intents - Create and Start Activities, Lifecycle and State Callbacks, Testing and Debugging, and Backwards Compatibility: Debugging and Testing app, Support libraries.

UNIT-II (9 Hrs.)

User Interaction and Navigation - User Input Controls: Use Keyboards, Input Controls, Alerts, and Pickers, Menus and Radio Buttons, Screen Navigation.

Themes and Styles: Theme, Custom Styles, Drawables, adapt layouts for multiple devices and orientations, Using Espresso to test UI

UNIT-III (13 Hrs.)

Connect to the Internet -Google APIs Explorer, JSON, Books API, Use AsyncTaskLoader Triggering, Scheduling, and Optimizing, Background Tasks: Alarm Manager, Job Scheduler, Firebase Job Dispatcher.

UNIT- IV (11 Hrs.)

Data Saving, Retrieving, Loading - Storing Data using SQLite, Sharing Data: Implement a Content Provider, Loading Data using Loaders, publishing app: Permissions and Libraries, monetizing your app, Making and publishing APKs.

Windows Phone 7- Windows Phone 7 Project, Building an App in Windows Phone 7, Distribution.

1. Jeff Mcwherter, Scott Gowell, 'Professional Mobile Application Development', Wrox Publisher, 1st Edn., **2012**.
2. Lauren Darcy and Shane Conder 'Teach Yourself Android Application Development in 24 Hrs', Sams Publications, 1stEdn., **2009.**
3. Himanshu Dwivedi, Chris Clark, David Thiel, 'Mobile Application Security', Tata McGraw Hill, 1st Edn., **2010**.

SOFT COMPUTING

Subject Code: MCAP1-673 **L T P C** **Duration: 45 Hrs.**
3 1 0 4

Learning Outcomes

1. To know about the basics of soft computing techniques and also their use in some real life situations
2. To learn the key aspects of Soft computing
3. To understand the features of neural network and its applications

UNIT–I (11 Hrs.)

Introduction - Introduction to Soft Computing, Introduction to biological and artificial neural network, Introduction to fuzzy sets and fuzzy logic systems, Introduction to Genetic Algorithm, Genetic Operators and Parameters, Genetic Algorithms in Problem Solving, Theoretical Foundations of Genetic Algorithms, Implementation Issues.

UNIT–II (11 Hrs.)

Artificial Neural Networks - Different artificial neural network models, Learning in artificial neural networks, Neural network applications in control systems, Neural Nets and applications of Neural Network.

UNIT–III (12 Hrs.)

Fuzzy Systems - Fuzzy sets, Fuzzy reasoning, Fuzzy inference systems, Fuzzy control, Fuzzy clustering, Applications of fuzzy systems, Neuro-fuzzy systems, Neuro-fuzzy modeling, Neuro-fuzzy control.

UNIT–IV (11 Hrs.)

Applications - Pattern Recognitions, Image Processing, Biological Sequence Alignment and Drug Design, Robotics and Sensors, Information Retrieval Systems, Share Market Analysis, Natural Language Processing.

Recommended Books

1. S. Rajasekaran and G.A. Vijaylakshmi Pai, 'Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications', Prentice Hall India, 1st Edn., **2007**.
2. J.S.R. Jang, C.T. Sun and E. Mizutani, 'Neuro-Fuzzy and Soft Computing', Pearson Education, 1st Edn., **2015**.
3. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', Wiley, 3rd Edn., **2011**.

SOFTWARE LAB - XI (BIG DATA)

Subject Code: MCAP1-674 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-669. Students are required to do at least 10 assignments based on the paper.

SOFTWARE LAB - XII (CLOUD COMPUTING)

Subject Code: MCAP1-675 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-670. Students are required to do at least 10 assignments based on the paper.

SOFTWARE LAB - XIII (DOT NET FRAMEWORK)

Subject Code: MCAP1-676 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-671. Students are required to do at least 10 assignments based on the paper.

SOFTWARE LAB - XV (MOBILE COMPUTING & ANDROID)

Subject Code: MCAP1-677 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-672. Students are required to do at least 10 assignments based on the paper.

SOFTWARE LAB - XVII (SOFT COMPUTING)

Subject Code: MCAP1-678 **L T P C**
0 0 4 2

This laboratory course will comprise as exercises to supplement what is learnt under paper MCAP1-673. Students are required to do at least 10 assignments based on the paper.

ORGANIZATION BEHAVIOR

Subject Code: MBAD0-F95 **L T C P** **Duration: 40 Hrs.**
3 0 0 3

Course Outcomes: The course aims to provide an understanding of basic concepts, theories and techniques in the field of human behavior at the individual, group and organizational levels in the changing global scenario. The course must be taught using case study method.

UNIT – I (10 Hrs.)

Organizational Behavior: Concepts and contributing disciplines to OB, Challenges and opportunities for OB. Foundations of Individual Behavior: biographical Characteristics, Learning, Theories of Learning, Attitudes, Personality: Determinants of Personality, Perception.

UNIT – II (10 Hrs.)

Motivation: Definition, Maslow, Herzberg, XY & Z theory and Victor Vroom's Expectancy theory.

Job Satisfaction: Nature & Significance of Job satisfaction, Leadership: Theories of Leadership; Nature & Significance of Leadership; Leadership traits & Skills.

UNIT – III (10 Hrs.)

Foundations of Group Behavior: Nature, Concept, Stages & Theories of Group Formation. Teams, Difference between Group & Team.

Group Decision Making: Meaning, Nature & process of group decision making process Conflict Management: Definition of Conflict, transitions in Conflict thought; Functional Vs Dysfunctional Conflict.

Negotiations: Meaning, definition & Process; Issues in Negotiations.

UNIT – IV (10 Hrs.)

Organizational Change & Development: Definition, Change Agents & Resistance to Change. Power and Politics in Organization.

Stress Management: Meaning and Concept of stress, strategies to overcome the stress.

Recommended Books

1. Robbins, 'Organization Behaviour', Pearson Education.
2. Luthans, 'Organization Behaviour', Tata McGraw Hill.
3. Hersey, 'Management of Organizational Behaviour', Prentice Hall India.
4. Aswathappa, 'Organization Behaviour', Himalaya Publications.
5. L.M. Prasad, 'Organisation Behaviour', Sultan Chand.
6. Parikh, Gupta, 'Organisational Behaviour', Tata McGraw Hill.