North Maharashtra University, Jalgaon

(NAAC Accredited 'A' Grade University)
FACULTY OF SCIENCE
INTEGRATED MCA (I-MCA)

Syllabus (With effect from July 2017-18)

First Year I-MCA – (Sem I & II) w.e.f. AY 2017-18			
Paper	**Semester-I**	**Paper**	**Semester-II**
CA-1.1	Mathematical Foundations in Computer Science	CA-2.1	Discrete Mathematics
CA-1.2	Computer & Internet Fundamentals	CA-2.2	System Programming
CA-1.3	Computer Organization & Architecture	CA-2.3	Object Oriented Analysis & Design
CA-1.4	Programming using C	CA-2.4	Programming using C++
CA-1.5	Essentials of Web Designing	CA-2.5	Data Structure – I
CA-1.6	Lab on Programming using C	CA-2.6	Lab on Programming using C++
CA-1.7	Lab on Essentials of Web Designing	CA-2.7	Lab on Data Structure - I

Second Year I-MCA – (Sem III & IV)			
Paper	**Semester-III**	**Paper**	**Semester-IV**
CA-3.1	Computer Networks	CA-4.1	Basics of Accounting
CA-3.2	Operating System – I	CA-4.2	Operating System - II
CA-3.3	System Analysis and Design	CA-4.3	Network Security
CA-3.4	Programming using C#.NET	CA-4.4	Java Programming
CA-3.5	Data Structure – II	CA-4.5	Database Management System
CA-3.6	Lab on Programming using C#.NET	CA-4.6	Lab on Java Programming
CA-3.7	Lab on Data Structure - II	CA-4.7	Lab on DBMS

Third Year I – MCA – (Sem V & VI)			
Paper	**Semester-V**	**Paper**	**Semester-VI**
CA-5.1	Theoretical Computer Science	CA-6.1	Automata Theory and Computability
CA-5.2	Software Engineering-I	CA-6.2	Software Engineering-II
CA-5.3	Computer Graphics	CA-6.3	Advanced Data Base Management System
CA-5.4	Advanced Java	CA-6.4	Linux Operating System
CA-5.5	UI Design Technologies-I	CA-6.5	UI Design Technologies– II
CA-5.6	Lab on Computer Graphics	CA-6.6	Lab on Linux and UID-II
CA-5.7	Lab on Advanced Java and UI Design Technologies-I	CA-6.7	Project and Viva-Voce

Fourth Year I – MCA – (Sem VII & VIII)			
Paper	**Semester-VII**	**Paper**	**Semester-VIII**
CA-7.1	Cloud Computing	CA-8.1	Machine Learning
CA-7.2	Artificial Intelligence	CA-8.2	Digital Image Processing
CA-7.3	Data Warehousing & Mining	CA-8.3	Optimization Algorithms
CA-7.4	Web Scripting with PHP & MySQL	CA-8.4	Network Programming
CA-7.5	Design And Analysis of Algorithm	CA-8.5	Internet Programming with ASP.NET
CA-7.6	Lab on Web Scripting with PHP & MySQL	CA-8.6	Lab on Network Programming
CA-7.7	Lab on Design And Analysis of Algorithm	CA-8.7	Lab on Internet Programming with ASP.NET

Fifth Year I – MCA – (Sem IX & X)			
Paper	**Semester-IX**	**Paper**	**Semester-X**
CA-9.1	Natural Language Processing	CA-10	Full time Industrial Training
CA-9.2	Compiler Construction		
CA-9.3	Drupal CMS		
CA-9.4	Mobile Computing Trends		
CA-9.5	Programming in Python		
CA-9.6	Lab on Drupal CMS		
CA-9.7	Lab on Mobile Computing Trends and Python programming		

Degree Name	**:**	**Integrated master in computer application (I-MCA)**
Faculty	**:**	**Science and Technology**
Duration	**:**	**Full Time Five Years Course**
Medium Of Instruction	**:**	**English**
Pattern	**:**	**Semester Pattern(10 Semester)**
Examination Pattern	**:**	**60%(External Assessment) + 40% (Internal Assessment)**
Passing Standard		**Separate Head of Passing for Internal Assessment as well as External Assessment**
Evaluation Mode	**:**	**CGPA**
Lecture	**:**	**Clock Hour(60 Minutes)**

Objectives

- Students of the program will possess strong fundamental concepts in mathematics, science, engineering and Technology to address technological challenges.
- Possess knowledge and skills in the field of Computer Science and Information Technology for analysing, designing and implementing complex problems of any domain with innovative approaches.
- Possess an attitude and aptitude for research, entrepreneurship in the field of Computer Science and Information Technology.
- Have commitment to ethical practices, societal contributions through communities and life-long learning.
- Possess better communication, presentation, time management and team work skills leading to responsible & competent professionals and will be able to address challenges in the field of IT at global level.

Rules

- The rules and regulations for the academic conduct of the **Integrated MCA** course will be same as the rules and regulations for the academic conduct of **MCA** course as specified by North Maharashtra University, Jalgaon.
- The **evaluation and examination pattern** for theory and practical of all semesters of I-MCA course will adhere to the policy and guidelines specified for MCA course and rules for the admission to subsequent year during the course will also be same as that of regular MCA course.

Program Outcomes

The students in the IMCA course will attain:

- An ability to define a problem and provide a systematic solution with the help of conducting experiments, as well as analysing and interpreting the data;
- An ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints;
- An ability to identify, formulate, and provide systematic solutions to complex problems;
- An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems with necessary constraints and assumptions;
- An ability to function effectively as an individual or as a team member to accomplish a desired goal(s);
- An ability to engage in life-long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra-curricular activities;
- An ability to apply design and development principles in the construction of software systems of varying complexity.

SEMESTER – I

Course Code: **CA-1.1 Mathematical Foundations in Computer Science** *Clock Hours:* **60**
Total Marks: **100**

UNIT –I **[14-M] [5-L]**

SETS: Meaning of a Set, Method of Describing a Set, Tabular Form, Set Builder Form, Types of A Set: Finite Set, Infinite Set, Equal Sets, Overlapping Sets, Disjoint Sets, Complementary Set. Operations on Sets: Union of Sets, Intersection of Sets, Difference of Sets, Demerger's laws (Without Proof), Venn Diagrams, Cartesian product Of Two Sets.

UNIT –II **[15-M] [8-L]**

MATRICES AND DETERMINANTS: Meaning Of A Matrix, Order Of Matrix, Types of Matrix: Zero Matrix, Column Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Symmetric c Matrix, Skew-Symmetric Matrix, Transpose of A Matrix: Singular Matrix & Non-Singular Matrix. Algebra of Matrices: Equality of Matrices, Multiplication of Matrix by a Scalar, Addition of Matrices, Subtraction of Matrices, Multiplication of Matrices.
Determinants: Meaning of Determinant, Evaluation of Second and Third Order Determinants, Minor, Cofactor of an Element Adjoint of Matrix, Meaning of Inverse of a Matrix, Matrix Inversion by Adjoint Method, Cramer's rule and matrix inversion method to solve system of linear equations in two and three variables.

UNIT –III **[15-M] [7-L]**

FUNCTION: Meaning of a Function, Methods of Describing A Function, Meaning of Domain, Co-Domain, Image, and Range of A Function. Types Of A Function: One-One Function, One Two Functions, Many-One Function, Constant Function, Identity Function, Polynomial Function, Linear Function, Rational Function, Exponential Function, Logarithmic Function, Explicit And Implicit Functions, Even Function, Odd Function, Composite Function.

UNIT –IV **[15-M] [12-L]**

COORDINATE SYSTEM: Introduction to Coordinate System, Coordinates of a Point, Quadrants, Plotting he Points, Drawing a Straight Line Passing through Two Given Points, Solving a System of Linear Inequalities in Two Variables Graphically.

UNIT –V **[13-M] [12-L]**

PERMUTATION AND COMBINATION: Meaning of Factorial of a Number, Meaning of Permutation and Combination, Statement of Fundamental Principle Of Counting, Determination of Number of Permutations Of N Objects Taken R Objects At A time (When All N Objects Are Different), Determination of Number of Combination All N Objects Are Different).

UNIT –VI **[10-M] [8-L]**

INTRODUCTION TO STATISTICS :Meaning of Statistics, Importance and Limitations of statistics, meaning of data, Raw data, Primary data, Secondary data Variable and attribute, Types of variable: - districts and continuous, Meaning of Population and sample, Introduction to methods of sampling: - simple random sampling and Stratified random sampling.

UNIT -VII **[08-M] [8-L]**

MEASURES OF CENTRAL TENDENCY : Meaning and central tendency, Statement of measures of central tendency: - arithmetic mean, geometric mean, harmonic mean, median and mode, Computation of these measures of central tendency for given raw data, Partition values: - quartiles, deciles and percentiles

REFERENCES

- Kapoor V.K. , Sancheti D.C., (2014), Business Mathematics, Sultan Chand & sons, ISBN No.: 978-81-8054-538-2
- Anand Sharma, (2008), Business Mathematics & Analytics, Himalaya Publishing house, ISBN NO.:1234029928
- S P Gupta, M.P.Gupta, (2014), Business Statistics, Sultan Chand & Co. New Delhi, ISBN No.: 9788180549458
- Gupta, S. C. and Kapoor, V. K., (1983, Reprint 2002), Fundamentals of Mathematical Statistics, Eighth Edition, Sultan Chand and Sons Publishers, ISBN No.:81-7014-791-3
- Freund, J. E., (1977),Modern Elementary Statistics, Fourth Edition, Prentice Hall of India Private Limited, New Delhi, , ISBN No: 978-0138582913

Course Code: **CA-1.2 Computer & Internet Fundamentals** *Clock Hours:* **60**
Total Marks: **100**

UNIT –I **[12-M] [8-L]**

INTRODUCTION TO COMPUTER : Definition of computer, Block Diagram of Computer, Types of computer, Memory: Primary Memory, RAM, ROM, EPROM, PROM, Secondary Memory, Hard Disk, Pen Drive Definition: Program, Hardware, Software, Firmware, Interpreter, Compiler.

UNIT –II **[10-M] [06-L]**

INPUT AND OUTPUT DEVICES : Input Devices: Keyboard, Mouse, Scanner, Web Camera etc. Output Devices: Monitor, Printer, Plotter etc.

UNIT –III **[08-M] [06-L]**

ALGORITHM AND FLOWCHARTS : Algorithm: Basic notation of algorithm Flowcharts: Definition, Symbols of flow charts, Examples of algorithms and flowcharts.

UNIT –IV **[15-M] [10-L]**

OPERATING SYSTEM: What is booting, Definition of operating system, functions of operating system, types of operating system, batch operating system, time sharing, multi programming, multiuser & multi tasking.

UNIT –V **[18-M] [10-L]**

CONCEPTS OF SOFTWARE : Types of software: System Software, Application Software, System Software: Anti Virus, Honey pot system, Application Software: Word Processing, Spreadsheet, Presentation, Programming Languages: High level, Middle Level, Low Level, 4GL.

UNIT –VI **[15-M] [10-L]**

FUNDAMENTALS OF INTERNET : What is Computer Network? Types of Networks: LAN, MAN, WAN, History of Internet, Working of Internet, Use of Internet, Application s of Internet, Types of Connections- Dial-Up, Shell, TCP/IP.

UNIT –VII **[12-M] [10-L]**

INTERNET SERVICES : Communication Services, Information Retrieval Services, Web Services, WWW, e-mail, FTP, Telnet

REFERENCES

- V. Rajaraman,(2010) Fundamentals of Computers, 5th edition ,PHI publication, ISBN 10: 8120340116 .

- Roger Hunt and John Shelley,(2007), Computers and Commonsense, Penguin edition, PHI publication, ISBN 10: 0131646737.
- Abrham Silberschatz ,(2001) , Operating System concepts, 6th Edition, John Wiley & sons INC,ISBN:0471417432
- A. S.Tananbaum, (2013),Computer Network, 5th Edition, Pearson, ISBN: 1292024224
- Subhash Mehata,(2014), Understanding and Using Internet, Global Business Press, ISBN : 8185185506.
- Freund. J. E, (1977) ,Modern Elementary Statistics ,Fourth Edition ,Prentice Hall of India Private Limited, ISBN: 0136027563

Course Code: **CA-1.3 Computer Organization & Architecture** *Clock Hours:* **60**
Total Marks: **100**

UNIT –I **[15-M] [05-L]**

INTRODUCTION TO COMPUTERS : Basic of Computers, Von Neumann Architecture, Generation of Computers, Classification of Computers, Digital Computers - Logic gates - Boolean algebra - Map Simplifications.

UNIT –II **[15-M] [05-L]**

COMBINATIONAL & SEQUENTIAL CIRCUITS : Combinational Circuits: Half-Adder, Full-Adder, decoders, Encoders, Multiplexers, And Sequential Circuits: Flip flops, Registers, Shift Registers, Binary Counters - Memory Unit.

UNIT –III **[15-M] [15-L]**

DATA REPRESENTATION AND ARITHMETIC : Data Types - Number Representation, Octal and Hexadecimal Numbers, Decimal Representation Alpha numeric Representation, Signed Magnitude: 1's Complements, 2's Complements, Floating Point data, other Representation: BCD, Gray Code, Arithmetic operations: Addition, Subtraction, Multiplication, Division.

UNIT –IV **[10-M] [08-L]**

PROCESSOR ORGANIZATION : General Register Organization - ALU - Instruction codes Instruction Formats- Instruction sets - Stack Organization - Addressing modes.

UNIT –V **[15-M] [7-L]**

CONTROL UNIT: Register transfer, Bus and memory transfer, micro operations, Timing and Control, Control Memory, micro programming, hardwired control, RISC, CISC.

UNIT – VI **[10-M] [10-L]**

INPUT/OUTPUT ORGANIZATION : I/O interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access.

UNIT – VII **[10-M] [10-L]**

MEMORY ORGANIZATION: Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory, Segmentation and paging.

REFERENCES

- M. Morris Mano, (1992),Computer System Architecture, Eastern Economy Edition (Third Edition), Prentice Hall of India Pvt. Ltd, ISBN: 9780131755635
- Wiliam Stallings , Computer Organization and Architecture Describing for Performance, Eastern Economy Edition. (Fourth Edition),ISBN: 13: 9780136073734.
- John. P. Hayes, (1998),Computer System Architecture, 3rd edition, Prentice Hall of India Pvt. Ltd, ISBN: 0071159975
- Hwang K. Briggs, (1984), Computer Architecture and parallel Processing,3rd edition, McGraw-Hill, ISBN:0070315566.

Course Code: **CA-1.4 Programming using C** *Clock Hours:* **60**
Total Marks: **100**

UNIT-I **[02-M] [02-L]**

OVERVIEW OF C: History of C, Special features and application areas, structured programming approach & feature.

UNIT-II **[16-M] [12-L]**

INPUT-OUTPUT, VARIABLES, OPERATORS AND DATA TYPES : Standard Input-output, Pre-processor directives in C, Operators and expressions, variable name, data type and size contents, declaration, arithmetic operators, relational operators, logical operators, Bit wise operators, increment, decrement operators, assignment operators, compound assignment operator, conditional expression, special operators, precedence and order of evaluation.

UNIT-III **[04-M] [06-L]**

DECISION MAKING AND LOOPING STRUCTURES: Decision Making: if- else- if, switch, break, continue, **Looping Structures:** while, for, do-while, nesting of loops, go to.

UNIT-IV **[18-M] [10-L]**

FUNCTIONS: Basics of functions function prototype, definition of function, function argument (formal arguments, local arguments), function with default argument, arguments and function with return value, Recursive functions.

UNIT-V **[18-M] [12-L]**

ARRAY, POINTER AND STRING: Array: Declaration and defining of an array, Types of array (Single and multidimensional). **Pointer:** Address of variable, Declaration of Pointer, storing address into pointer variable, pointers arithmetic, array of pointers, initialization of pointer array, pointer to pointers, pointer to function.

UNIT-VI **[12-M] [06-L]**

STRINGS AND FUNCTIONS: Strings: Defining string, and String functions, Manipulating Strings, Functions with array as argument, Types of parameters,

UNIT-VII **[12-M] [08-L]**

STRUCTURE AND UNION: Structure Basics, Nested structure, Pointer to structure, Self-referential structure, Union, Difference between structure and union.

UNIT-VIII **[08-M] [04-L]**

FILE HANDLING: File handling functions in C, File opening modes, File creation, reading file, writing to file.

REFERENCES

- Brian W. Kernighan, Dennis Ritchie,(1988), C Programming Language, 2nd Ed.,Prentice Hall Publication, ISBN 0131103709
- E. Balagurusamy, (2008), Programming in ANSI C, Tata McGraw-Hill Education, ISBN-0070648220
- Yashavant P. Kanetkar, (2016),Let us C, BPB Publication, ISBN - 8183331637

Course Code: **CA-1.5 Essentials of Web Designing** *Clock Hours:* **60**
Total Marks: **100**

UNIT –I **[02-M] [02-L]**

INTRODUCTION TO HTML: A Web of Structured Documents, Introducing HTML5.

UNIT-II **[16 M] [10 L]**

STRUCTURING DOCUMENTS FOR THE WEB: Attribute Groups, Core Elements, Basic Text, Formatting, Understanding Block and Inline Elements, Grouping Content, Working with Lists.

UNIT-III **[10M] [06 L]**

FINE-TUNING YOUR TEXT: Elements That Describe Text-Level Semantics, Editing Text, Using Character Entities for Special Characters, Comments.

UNIT-IV **[10M] [06 L]**

LINKS AND NAVIGATION: Basic Links, Understanding Directories and Directory Structures, Understanding URLs, Creating In-Page Links with the <a> Element, Advanced E-mail Links.

UNIT-V **[12 M] [08 L]**

IMAGES, AUDIO, AND VIDEO: Adding Images Using the <img> Element, Using Images as Links, Choosing the Right Image Format, Adding Flash, Video, and Audio to Your Web Pages.

UNIT-VI **[12 M] [08 L]**

TABLES: Introducing Tables, Basic Table Elements and Attributes, Adding a Caption to a Table, Grouping Sections of a Table, Nested Tables, Accessible Tables.

UNIT-VII **[12M] [08 L]**

INTRODUCTION TO CASCADING STYLE SHEETS: Introducing CSS, Where You Can Add CSS Rules, CSS Properties, Controlling Text, Text Formatting.

UNIT-VIII **[16 M] [12 L]**

FORMATTING USING CASCADING STYLE SHEETS: Styling Text, Selectors, Lengths, Introducing the Box Model, Creating a Style Sheet for Code, Links, Backgrounds, Lists, Tables, Outlines.

REFERENCES

- Rob Larsen, (2013),Beginning HTML and CSS, ISBN: 9781118340189
- Jon Duckett, (2011) Beginning HTML, XHTML, CSS, & JavaScript, ISBN: 9780470540701

Course Code: **CA-1.6 Lab on Programming using C** *Total Marks*: **100**

1) Variables, Operators and Data Types

a) Practical based on use of Input-Output,

b) Practical based on use of Variables and Data Types.

c) Practical based on use of Operators.

2) Input-Output, Decision Making and Looping Structures

a) Practical based on use of Decision Making Structures

b) Practical based on use of Looping Structures

3) Functions

a) Practical based on use of Functions.

b) Practical based on function argument (formal arguments, local arguments)

c) Practical based on function with default arguments

d) Practical based on function with return value.

e) Practical based on Recursive functions.

4) Array, Pointer and String

a) Practical based on use of one dimensional Array.

b) Practical based on use of multidimensional Array.

c) Practical based on use of Pointers, Pointer to pointers, Pointers arithmetic, Array of pointers, pointer to function.

d) Practical based on use of character array-String.

e) Practical based on functions with array as argument.

5) Strings and Functions

a) Practical based on Types of function parameters.

b) Practical based on String manipulation using character array and pointers.

c) Practical based on construction of string functions similar to predefined functions.

6) Structure and Union

a) Practical based on Structure, nested structure.

b) Practical based on Self-referential structure, , pointer to structure.

c) Practical demonstrating difference between structure and union.

7) File Handling

a) Practical based on file creation, reading from file and writing to file.

Course Code: **CA-1.7 Lab on Essentials of Web Designing** *Total Marks*: **100**

1. Create a HTML document to display “Hello World” to demonstrate File creation & HTML Form structure.
2. Create a HTML document to demonstrate Use of The <H> Tag (h1 to h6).
3. Create a HTML document to demonstrate commonly used HTML Tags.
4. Create a HTML document to demonstrate The Text Attributes.
5. Create a HTML document to demonstrate Adding Images / Graphics to HTML.
6. Create a HTML document to demonstrate Lists (all), Links, Images as hyperlinks, Frames.
7. Create a HTML document to demonstrate Tables, Table Attributes, Table Properties.
8. Create a HTML document to demonstrate HTML form using Elements-Label, TextBox, Button, Submit, Reset, CheckBox, Radio, TextArea, Select and Option elements, Hidden Field Element in Table Tag.
9. Create a HTML document to demonstrate Images, List and Links With CSS.
10. Create a HTML document to demonstrate Table and Forms With CSS.
11. Create a HTML document with HTML tags and apply CSS for Font Faces, Manipulating the display of Text, Background Colors and Images.

Course Code: **CA-2.1 Discrete Mathematics** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[15-M] [16-L]**

MATHEMATICAL LOGIC: Meaning of Statement, Logical Operations: Negation, Conjunction & Disjunction Implication, Double Implication, Equivalence, Equivalence of Logical Statements, Truth Tables & Construction of Truth Tables, Tautology and Contradiction, Argument: Valid and Invalid Arguments, Normal Forms using truth table, Statement calculus: Theory of inference (without truth table), Introduction to quantifiers

UNIT – II **[15-M] [08-L]**

ALGEBRAIC STRUCTURES: Groups, Semigroup, Monoid, Abelian Monoid, Abelian Group, Group Codes, Error Detection in Group Codes, Parity Check Matrix

UNIT – III **[15-M] [12-L]**

RELATIONS: Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Congruence Relation

UNIT – IV **[25-M] [12-L]**

GRAPHS: Introduction to Graphs and Graph Models, Terminology and Special Types of Graphs, Representations of Graphs, List Structures and storage representation of Graphs, Isomorphism, Connectivity, Euler and Hamiltonian Paths -Shortest Path problems- Dijkstra's shortest path algorithm Planar Graphs- Graph Coloring,

UNIT – V **[20-M] [12-L]**

TREES: Introduction to Trees, Applications of Trees, Traversals, Spanning Trees, Minimum Spanning Trees- Kruskal's (without theorem).

REFERENCES

- Kenneth. H. Rosen (2007), Discrete Mathematics and its Applications, TataMcGraw-Hill Publishing Company, ISBN No: 978-0-07-064824-1
- Tremblay (2001), Discrete Mathematics, TATA McgrawHill, ISBN No: 9780074631133
- G. S. S. Bhishma Rao (2005), Mathematical Foundation of Computer Science, Edition 2nd, Scitech publication, India Pvt. LTD., ISBN No.: 9788183710435
- G. S. S. Bhishma Rao, "Discrete structure & Graph Theory", Edition 3rd, Scitech publication, India Pvt. LTD, ISBN No.: 9788187328995

Course Code: **CA-2.2 System Programming** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[06-M] [04-L]**

INTRODUCTION TO SYSTEM PROGRAMMING: Types of Software, Components of System Software, Comparison of System and Application Software

UNIT – II **[12-M] [08-L]**

ASSEMBLY LANGUAGE PROGRAMMING: Introduction to Assembly Language Programming - Introduction to Instruction Formats, Data formats - Role of Base Register, Index Register

UNIT – III **[18-M] [12-L]**

ASSEMBLER: Introduction to Assembler, Databases used in Assembler Design, Design of Assembler - Single Pass & Double Pass.

UNIT – IV **[14-M] [10-L]**

MACRO PROCESSOR: Introduction to Macros, Various types of Macros, Overview of Macro Processor

UNIT – V **[12-M] [08-L]**

LINKERS & LOADERS: Introduction to Loaders & Linker, Functions of a Loader, Loader Schemes – Compile & Go Loader, Absolute Loader, Relocation, Linking, Dynamic Linking, Overlay Structure

UNIT – VI **[08-M] [04-L]**

GRAMMARS: Introduction to grammars, Languages, Finite State Machines

UNIT –VII **[12-M] [08-L]**

COMPILERS: Introduction to compilers: Brief discussion on various Phases of Compilers

UNIT – VIII **[08-M] [06-L]**

SOFTWARE TOOLS: Introduction to Software Tools, Text Editors, Interpreters, Program Generators, Debug Monitors.

REFERENCES

- Dhamdhere D.M (2011), System Programming, (IInd Revised Edition), Tata McGraw Hill, ISBN : 9780071333115
- Donovan (2001), Systems Programming, Tata McGraw Hill, ISBN : 9780074604823
- Leland. L. Beck (1997) , System Software, Pearson Education. ISBN-13: 9788177585551

Course Code: **CA-2.3 Object Oriented Analysis & Design** *Clock Hours:* **60**
Total Marks: **100**

UNIT –I **[10-M] [08-L]**

INTRODUCTION TO OOAD: What is OOAD? Class and Objects, Object State and Properties Introduction, Object Oriented Development Models- Static and Dynamic Models.

UNIT-II **[15-M] [08-L]**

REVIEW OF OBJECT ORIENTATION: Objects, Classes, Links and Associations, Generalization and Inheritance, Aggregation, Generalization.

UNIT-III **[20 -M] [10-L]**

OBJECT MODELING TECHNIQUE: Rumbaugh, Booch and Jacobson's Methods, Patterns, Frameworks and Documentation.

UNIT-IV **[15-M] [12-L]**

UNIFIED MODELING LANGUAGE: Identifying Use Case, UML: Sequence Diagrams, Use Case design and diagram, UML Package Diagram, UML Interaction Diagrams.

UNIT-V **[15-M] [12-L]**

OBJECT ORIENTED ANALYSIS: Dynamic Modeling, Events and States, Operations, State Diagram, Functional Modeling, Data Flow Diagram.

UNIT-VI **[15-M] [10-L]**

OBJECT ORIENTED DESIGN: Design Process, Axioms, Corollaries, Coupling, Cohesion, Designing Classes, Designing Interface Objects – Macro and Micro Level Processes.

REFERENCES

- Ali Bahrami,(1999),Object Oriented System Development, McGraw Hill International Edition. ISBN – 9780256253481
- Booch, Jacobson, Rumbaugh , (2010),Object Oriented Analysis and Design with Applications, Third Ed., Pearson Education. ISBN-13: 978-0201895513
- Rumbaugh, Blaha, Premerlani, Eddy, Lorsen, (2014),Object Oriented Modeling and Design, Third Ed., Pearson Education ISBN-13: 978-8120310469

Course Code: **CA-2.4 Programming using C++** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[02-L][03-M]**

INTRODUCTION: Introduction to Object Oriented Paradigm, Need Object-Oriented Programming, Characteristics of Object-Oriented Programming. Difference of Structured Vs OOPs, Difference C++ and C.

UNIT-II **[08-L][12-M]**

OBJECT AND CLASSES: Making sense of core object concepts (Encapsulation Abstraction, Polymorphism, Classes, Messages, Aggregation: Class within Class) Implementation of Class in C++, C++ Objects, Constructors and Destructor, The Default Copy Constructor, Object as Function Arguments, Returning Object from Function, Friend Function, Friend Class, Static Data members & functions, Structures and Classes, Structures & Unions. Difference between Class, Structures and Union.

UNIT-III : **[08-L][12-M]**

REVISING PROGRAMMING BASICS WITH CLASSES AND OBJECTS: Datatypes and Operators in C++: Standard Input/ Output Statements, Data Types, Size contents, Variables, variable name, Declaration, Operators and expressions: arithmetic, relational, logical, Bit wise, increment, decrement, assignment, compound assignment, conditional, special, Operator precedence and order of evaluation.

Decision Making and Looping Structures: Decision Making: if, if-else, switch, break, continue, go to, Looping Structures: while, for, do-while, nesting of loops.

Functions: Function and its components, Different types of parameters-arguments, Types of parameter passing mechanisms, Overloaded Function, Inline Function.

Arrays and String: Arrays Fundamentals. Arrays as a Member Data, Strings, Array of String, Array of objects,

Pointer: Addresses and pointers, The Address-of Operator, Pointer and Arrays, Pointer and Function, Pointer and Strings, Memory Management: New and Delete.

UNIT-IV **[10-L][15-M]**

OPERATOR OVERLOADING: Overloading Unary Operators., Overloading Binary Operators, Overloading and Friend Function, Data Conversion, Disadvantages & Advantages of Operators Overloading.

UNIT-V **[08-L][12-M]**

INHERITANCE: Concept of Inheritance, Derived Class and Base Class, Types of inheritance, Derived Class Constructors, Overriding Member Function, Class Hierarchies, Public and Private Inheritance, Levels of Inheritance, Multiple Inheritance, Ambiguity in Multiple Inheritance, Inheritance and program Development.

UNIT-VI **[06-L][09-M]**

VIRTUAL FUNCTIONS : Difference between Static & Dynamic binding, Virtual Function, Pointers to Objects, this Pointer, Pure Virtual Functions, Abstract classes, and methods.

UNIT-VII **[06-L][09-M]**

TEMPLATES: Function Templates, Class Templates, Templates with types of parameters

UNIT-VIII **[06-L][09-M]**

EXCEPTIONS: Exceptions: Difference between exception and error, Basics of exception handling in C++, User define exceptions.

UNIT-XI **[06-L][09-M]**

STANDARD TEMPLATE LIBRARY: Introduction Algorithms, Sequence Containers, Iterators, Specialized Iterators, Associative Containers.

REFERENCES

- K. R. Venugopal, B. Rajkumar, and T. RaviShankar, (2006), Mastering C++, Tata McGraw Hill, New Delhi, ISBN-10/ASIN: 0074634542, ISBN-13: 9780074634547
- Ashok Kamthane,(2006), Object-Oriented Programming with ANSI and Turbo C++ , Pearson India, ISBN: 9788131703830
- Robert Lafore, (2002), Object Oriented Programming in C++, 4thEdition, Pearson India, ISBN: 9788131722824, 8131722821
- Herbert Schildt, (2003), C++: The Complete Reference, 4th Edition, Tata McGraw-Hill Education Pvt. Ltd., ISBN 10: 007053246X / ISBN 13: 9780070532465
- Saurav Sahay, (2012),Object Oriented Programming in C++, Oxford University Press, ISBN: 9780198065302
- Ali Bahrami, (2008), Object Oriented Systems Development, Tata McGraw-Hill Education Pvt. Ltd., ISBN 10: 0070265127 / ISBN 13: 9780070265127.
- Booch, Jacobson, Rumbaugh, (2010),Object Oriented Analysis and Design with Applications, 3rdEdition, Pearson Education, , ISBN-13: 978-0201895513 / ISBN-10: 020189551X
- Cay S. Horstmann, Timothy A. Budd, (2008), Big C++,2nd Edition, Wiley Publication, ISBN : 978-0-470-38328-5

Course Code: **CA-2.5 Data Structure – I** *Clock Hours:* **60**

Total Marks: **100**

UNIT I **[08-M] [06-L]**

INTRODUCTION TO DATA STRUCTURE: Data, Data Structure Concepts, Types of data structures, Data types, ADT (Abstract Data Type),

UNIT II **[10-M] [06-L]**

ARRAYS: Array as linear data structure, Representation of array in memory, Operations on Array, List and Strings as ADT, structure and pointer in C/C++.

UNIT III **[12-M] [08-L]**

SORTING & SEARCHING: Sorting: General Background, Bubble Sort, Selection Sort, Insertion Sort. Searching: Linear and Binary search.

UNIT IV **[25-M] [16-L]**

LINKED LIST: Introduction, Dynamic representation, Types – Singly, doubly, singly circular, doubly circular, Operations on Linked Lists – Insert, Delete, Traverse, Search, Sort, Reverse, etc.

UNIT V **[20-M] [14-L]**

STACK : Introduction, Static and Dynamic representation, Operations on stack – PUSH, POP, PEEP, Traverse, Applications of Stack- Infix to Postfix, Evaluation of Postfix expression, Recursion : Definition and Processes, Writing recursive algorithms, Simulating recursion using stack.

UNIT VI **[15-M] [10-L]**

QUEUE: Introduction, Static and Dynamic representation, Operations on queue – Insert, Delete, Traverse, Types of Queues - Circular Queue, Priority Queue and DeQueue.

REFERENCES

- Horowitz, Sahni, Mehta, (2008),Fundamentals of Data Structures in C++, 2nd Edition, Universities Press, , ISBN 10: 8173716064 ISBN 13: 9788173716065
- Tenenbaum, Langsam, Augenstein, (1998),Data Structures using 'C', 2nd Edition, Pearson Education, ISBN-10: 8120311779, ISBN-13: 978-0387202778
- Bala Guruswamy, (2013), Data Structures Using 'C', Tata McGraw Hill Education Private Limited, ISBN-10: 0070701989, ISBN-13: 978-0070701984
- Mark A. Weiss, (2002), Data Structures Using 'C', 2nd Edition, Pearson Education India, ISBN-10: 8177583581, ISBN-13: 978-8177583588
- Seymour Lipschutz, Schaum's Outlines, Data Structures With C, Tata McGraw Hill Education Private Limited, ISBN-10: 938328658X, ISBN-13: 978-9383286584

Course Code: **CA-2.6 Lab on Programming using C++** *Total Marks*: **100**

1) Objects and Classes

a) Practical based on implementation of object oriented concepts (Encapsulation Abstraction, Polymorphism, Classes, Messages, Aggregation)

b) Practical based on implementation of Constructors and types of constructors

c) Practical based on object as function arguments, returning object from function,

d) Practical based on Function overloading.

e) Practical based on Friend Function and Friend Class.

f) Practical based on Array of objects,

g) Practical based on implementation of Static Data members & functions.

2) Operator Overloading:

a) Practical based on implementation of Overloading Unary Operators, Binary Operators.

b) Practical based on implementation of Overloading using Friend Function.

c) Practical based on implementation of types of Data Conversion.

3) Inheritance:

a) Practical based on implementation of types of inheritance.

b) Practical based on implementation of Derived Class Constructors, Overriding Member Function.

c) Practical based on implementation of resolving ambiguity in Multiple Inheritance.

4) Virtual Functions:

a) Practical based on implementation of dynamic binding.

b) Practical based on implementation of Virtual Function, Pure Virtual Functions, Abstract classes.

5) Templates:

a) Practical based on implementation of function Templates, Templates with types of parameters

b) Practical based on implementation of Class Templates, Templates with types of parameters

6) Exceptions:

a) Practical based on implementation of Exceptions handling.

b) Practical based on implementation of User define exceptions handling.

7) Standard Template Library:

a) Practical based on use of STL: Algorithms, Sequence Containers, Iterators, Specialized Iterators, Associative Containers.

Course Code: **CA-2.7 Lab on Data Structure - I** *Total Marks*: **100**

1) **Implementation of programs based on the following:**
   a) Liner List using Array. Implementing Operations : Insert, Delete, Traverse, Search
   b) STRING as ADT Implementing Principle operations of a String.
2) **Implementation of programs for sorting techniques for various type of 'data'**
   a) Bubble sort
   b) Selection sort
   c) Insertion sort
3) **Implementation of programs for Searching techniques on various type of 'data'**
   a) Linear Search
   b) Binary Search
4) **Implementation of programs for Dynamic structures**
   a) Singly Linked List. Implementing Operations : Insert, Delete, Traverse
   b) Singly Circular Linked List. Implementing Operations : Insert, Delete, Traverse
   c) Singly Linked List. Implementing Operations : Search, Sort, Reverse
   d) Polynomial arithmetic using linked list.
   e) Merging of two Linked Lists
   f) Splitting of Linked List in to two Lists.
   g) Doubly Linked List. Implementing Operations : Insert, Delete, Traverse
   h) Doubly Circular Linked List. Implementing Operations : Insert, Delete, Traverse
5) **Implementation of programs based on the following:**
   a) Stacks (Static and Dynamic)
   b) Application 1 : Validation of Arithmetic Expression
   c) Application 2 : Infix to Postfix Conversion of Arithmetic Expression
   d) Application 3 : Evaluation of Postfix Expression
   e) Application 4 :Simulating recursion using stack
6) **Implementation of programs based on the following:**
   a) Queue (Static and Dynamic)
   b) Circular Queue (Static and Dynamic)
   c) Priority Queue (Static and Dynamic)
   d) DeQueue (Static)

SEMESTER – III

Course Code: **CA-3.1 Computer Networks** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[15-M] [08-L]**

INTRODUCTION TO COMPUTER NETWORKS & TYPES : Introduction: Need of Computer Networks, Advantages of Networks, Point-to-Point & Broadcast Links, Network Classification: LAN, MAN, WAN, Wireless Networks, Transmission Path: Twisted Pair, Coaxial Cable, Fiber Optics

Topologies: Star, Tree, Bus, Ring, Mesh, Fully Connected

UNIT-II **[15-M] [07-L]**

REFERENCE MODEL: ISO OSI Reference Models, TCP / IP Reference Model & their Comparison.

UNIT-III **[15-M] [15-L]**

PHYSICAL LAYER: Data and Signals : Analog and digital signal, data; Analog signal characteristics, digital signal characteristics, transmission impairment, Nyquist theorem, Shanon's noisy channel theorem, bandwidth and throughput.

Modulation: Analog to Digital conversion, Digital to Analog conversion, Analog to Analog Conversion.

Multiplexing: Frequency Division multiplexing, Time division multiplexing, Wavelength division multiplexing.

UNIT-IV **[15-M] [15-L]**

DATA LINK LAYER: Data Link Control : Services Provided to Network Layer, Framing, Error Control, Flow Control, Error Correction – Redundancy, Parity Check, Checksum & CRC, Error Detection – Hamming Code, An Unrestricted Simplex Protocol, Stop & Wait protocol, One bit Sliding Window Protocol, A Protocol using Go Back N.

Media Access Control: Random access: ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled access: Reservation, Polling, Token passing

Wired LANs : Ethernet Technology, Standard Ethernet, Fast, Gigabit Ethernet.

UNIT – V **[15-M] [08-L]**

NETWORK LAYER: Network layer services, Switching: Circuit Switching, Message Switching, Packet Switching, Network layer performance, IPV4 addresses: address space, classfull, classless addresses

UNIT – VI **[15-M] [07-L]**

TRANSPORT LAYER : Process-To-Process delivery, User Data Gram, Transmission Control Protocol.

REFERENCES

- Behrouz A. Forouzan (2017), Data Communications and Networking, 3rd Edition, Tata McGrawHill Publishing Co. ISBN-13: 978-0070634145
- A. S. Tanenbaum (2013), Computer Networks, Pearson Education. ISBN-10: 9332518742, ISBN-13: 978-9332518742
- William A Shay (1998), Understanding Data Communications and Networks, 2nd Edition, Vikas Publishing House. ISBN-10: 053495054X, ISBN-13: 978-0534950545

Course Code: **CA-3.2 Operating System – I** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[12-M] [09-L]**

INTRODUCTION TO OS: What is an Operating System? What are the components of an OS? Different types of OS. What is System Call?

UNIT – II **[13-M] [10-L]**

COMPUTER SYSTEM STRUCTURES: Computer System Operation, I/O Structure, Storage Structure, Storage Hierarchy, Hardware Protection, General System Architecture.

UNIT – III : [15-M] [08-L]

OPERATING SYSTEM STRUCTURES: System Components, Operating System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation.

UNIT – IV **[15-M] [10-L]**

PROCESSES: Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Interposes Communication, Communication in Client-Server Systems.

UNIT – V **[05-M] [03-L]**

THREADS: Overview, Multithreading Models, Thread Libraries, Thread Pools.

UNIT – VI **[15-M] [10-L]**

CPU SCHEDULING :Basic Concepts, Scheduling Criteria, Scheduling Algorithms, FCFS, SJF, Priority, Round Robin, Multiple-Processor Scheduling, Algorithm Evaluation.

UNIT – VII **[15-M] [10-L]**

DEADLOCKS : Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

REFERENCES

- Nutt, Chaki, Neogy (2009), Operating systems, Third Edition,Pearson Education. ISBN 10: 8131723593 / ISBN 13: 9788131723593
- Peterson Silberschats, Galvin (2005), Operating System Concepts, Addition Wesley Publication. ISBN-10: 8126554274 ISBN-13: 978-8126554270
- Achyut Godbole (2005), Operating System, TMH. ISBN : 9780070591134
- Andrew S. Tenenbaum, A.S. Woodhill,Operating Systems Design & Implementation, Pearson Education. ISBN-10: 9332518742, ISBN-13: 978-9332518742

Course Code: **CA-3.3 System Analysis and Design** *Clock Hours:* **60**
Total Marks: **100**

UNIT-I **[15-M] [10-L]**

SYSTEM CONCEPT AND INFORMATION : System Environment, The system concepts, Characteristics of system, Elements of System, General Business Knowledge, Problem Solving Skills

UNIT-II **[15-M] [10-L]**

SYSTEM DEVELOPMENT LIFE CYCLE: Recognition of Need, Problem Definition, Feasibility Study, Analysis, Design Implementation, Post Implementation and Maintenance, Factors affecting the system , SDLC Models –Waterfall, Spiral & RAD

UNIT-III **[15-M] [10-L]**

SYSTEM PLANNING AND INITIAL INVESTIGATION: Strategies for Determining Information Requirement, Definition and Project Initiation Background Analysis, Fact Analysis, Review of Written Documents, Onsite observations, Interview and Questionnaires, Efficiency Analysis, Service Analysis

UNIT–IV **[15-M] [10-L]**

TOOLS FOR STRUCTURED: Data Flow Diagram (DFD), ERD, Data Dictionary, Decision Tree and Structured English, Decision Tables, Pros and cons of Each tool

UNIT-V **[15-M] [10-L]**

CODING, TESTING, IMPLEMENTATION & MAINTENANCE :Coding- Programming Environments, Generating codes, Testing-Unit, Integrated, System, Implementation, Maintenance.

UNIT-VI **[15-M] [10-L]**

INTRODUCTION TO CASE TOOL :History, Need, Drawbacks of CASE Tool.

REFERENCES

- Pressman. R., NY, (1987), Software Engineering: A Practitioner's Approach, 2nd edition, McGraw-Hill ,New York. ISBN:0-070-50783-X
- ISRD Group, (2006),Structured System Analysis and Design, McGraw Hill Education ,ISBN: 9780070612044

Course Code: **CA-3.4 Programming using C#.NET** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[15-M] [10-L]**

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, Advantages & Disadvantages of C#

UNIT-II **[10-M] [10-L]**

C# LANGUAGE: Data Types, Identifiers, Variables, Constants, Literals, Operators, Control Statements, Looping, Array and Strings.

UNIT-III **[20-M] [10-L]**

OBJECT ORIENTED PROGRAMMING IN C#: Object and Classes, Constructor, Destructor, Access Modifiers, Inheritance and Polymorphism, Operator Overloading & Overriding, Interfaces, Delegates and Events Type conversion, Sealed Classes

UNIT-IV **[12-M] [08-L]**

ADVANCED FEATURES IN C# & EXCEPTION HANDLING :Using Properties and Indexes, Boxing and Unboxing, Types of errors, Syntax of exception handling code, Try and catch block , Multiple Catch Blocks

UNIT-V **[18-M] [14-L]**

WINDOWS APPLICATIONS IN C#.NET : Introduction to GUI Programming, GUI Components/ Controls (Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, Radio Buttons, List Boxes, Combo Boxes, Picture Boxes, Timer, Scrollbars, Menus, Built-in Dialogs, Image List, Tree Views, List Views)

UNIT-VI **[15-M] [08-L]**

ADO.NET: Introduction to ADO.NET, Components of ADO.NET, ADO.NET Data Providers, Working with Connected and Disconnected Data

REFERENCES

- Solis, (2008), Illustrated C#, Publication APRESS, ISBN: 978-81-8128-958-2
- Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson and Morgan Skinner, (2010), Professional C# 4.0 and .NET 4, WROX, ISBN: 978-0-470-50225-9
- Dan Clark, (2011),Beginning C# Object-Oriented Programming, 2nd Edition, Apress, ISBN-13: 978-1430249351.
- Blackburn, Peter D., Vaughn, William ,(2002),ADO.NET Examples and Best Practices for C# Programmers, Apress Berkely, ISBN:1-59059-012-0
- Carsten Thomsen, (2002), Database Programming with C#, Apress, ISBN: 978-1-4302-1098-6.

Course Code: **CA-3.5 Data Structure – II** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[08-M] [06-L]**

INTRODUCTION: Revision of Data Structure Concepts, Types of data structures, Non-Linear Data Structure and types. Algorithm Analysis: Space complexity, Time complexity, Asymptotic Notations (Big O, Omega, Theta)

UNIT-II **[09-M] [06-L]**

SORTING : Quick sort, Merge sort and Radix Sort, Comparing time complexities.

UNIT-III **[15-M] [10-L]**

TREE: Concept, Tree Data Structure, Tree Terminology, Binary Tree - Representation: Static and Dynamic, Types: Full, Complete, Skewed. Traversal: Recursive and Non-Recursive - Inorder, Preorder, Postorder.

UNIT-IV **[20-M] [14-L]**

TYPES OF TREES: Expression Tree: Application – Evaluation of Expression, Heap Tree: Application - Heap Sort, Binary Search Tree : Concept & Operations - Insert, Delete, Traverse. Height Balanced Tree – AVL tree, Concept, Construction

UNIT-V **[16-M] [10-L]**

GRAPH: Concept, Graph Terminologies, Representation in memory: Adjacency List, Adjacency Matrix, Path Matrix, Weighted Matrix, Traversal: Depth First Search, Breadth First, Search, Spanning Tree, Minimum Spanning Tree Problem-Prim's Algorithm, All Pair Shortest Path Problem – Floyd Warshall Algorithm

UNIT-VI **[12-M] [08-L]**

HASHING: Concept, Hashing Techniques, Hash function, Address calculation techniques, Common hashing functions, Collision resolution, Linear Probing, Quadratic, Double hashing. Bucket addressing, Deletion and rehashing.

UNIT-VII **[10-M] [06-L]**

FILE STRUCTURES: File systems organization: Sequential, Relative, Indexed and Random access, Sequential organization and access, Relative file organization, files(ISAM).

REFERENCES

- Horowitz, Sahni, Mehta, (2008),Fundamentals of Data Structures in C++, 2nd Edition, Universities Press, , ISBN 10: 8173716064 ISBN 13: 9788173716065
- Tenenbaum, Langsam, Augenstein, Data Structures using 'C', Pearson Education, 2nd Edition,
- , ISBN-10: 8120311779, ISBN-13: 978-0387202778

- Bala Guruswamy, (2013), Data Structures Using 'C', Tata McGraw Hill Education Private Limited, ISBN-10: 0070701989, ISBN-13: 978-0070701984
- Mark A. Weiss, (2002), Pearson Education India, Data Structures Using 'C++', 4th Edition, ISBN-10: 013284737X, ISBN-13: 978-0132847377
- Seymour Lipschutz, Schaum's Outlines, Data Structures With C, Tata McGraw Hill Education Private Limited, ISBN-10: 938328658X, ISBN-13: 978-9383286584

Course Code: **CA-3.6 Lab on Programming using C#.NET** *Total Marks*: **100**

1. Write a program to print given string in number of times
2. Write a program to show use of different operators
3. Write a program to show use of Looping Constructs
4. Write a program to show use of Constructor
5. Write a program to demonstrate Inheritance
6. Write a program to demonstrate the concept of boxing and unboxing
7. Write a program to demonstrate the concept of Properties and Indexing
8. Write a program to show use of Exception Handling
9. Create a simple C# application using Label, TextBox, Button control
10. Create a C# application using ListBox, ComboBox control
11. Demonstrate the use of Timer control in C#
12. Create a C# application using PictureBox, ScrollBar control
13. Demonstrate Simple Database Connectivity using wizard.

Course Code: **CA-3.7 Lab on Data Structure – II** *Total Marks*: **100**

1) **Implementation of programs for sorting techniques for various type of 'data' & finding time of execution**
   a) Merge Sort
   b) Heap Sort
   c) Radix Sort
2) **Implementation of programs based on Binary Tree**
   a) Binary Tree
   b) Binary Tree Traversal Techniques (recursive and non-recursive)
      i) Inorder,
      ii) Preorder
      iii) Postorder
3) **Implementation of programs based on Types of Trees**
   a) Expression Tree Creation using Postfix Expression and Evaluation.
   b) Heap Tree : Min Heap / Max Heap
   c) Application – Heap Sort
   d) Binary Search Tree : Implementation of operations – Search, Insert and Delete
   e) Height Balanced Tree : Implementation of operations – Insert and Delete
4) **Implementation of programs based on Graphs**
   a) Depth First Traversal
   b) Breadth First Traversal
   c) Obtaining Shortest Path
   d) Minimum spanning tree

Course Code: **CA-4.1 Basics of Accounting** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[12-M] [08-L]**

BASICS IN BOOKKEEPING AND ACCOUNTING: Meaning of bookkeeping and accounting, Purpose of book keeping and Accounting,

UNIT-II **[12-M][08-L]**

ACCOUNTING TERMS : Basic accounting concepts, principles and conventions, important accounting terms.

UNIT-III **[15-M] [12-L]**

TYPES OF ACCOUNTS: Journal, subdivision of journal, different types of cash books, Ledger, trial balance.

UNIT-IV **[15-M] [12-L]**

RECTIFICATION OF ERRORS : Types of errors, difference in trial balance, suspense account.

UNIT-V **[20-M] [10-L]**

FINAL ACCOUNT: Final accounts of sole proprietor, trading account, profit and loss account and balance sheet.

UNIT-VI **[16-M] [10-L]**

BANK RECONCILIATION STATEMENT: Causes of Bank Reconciliation. Disagreement between Cash Book and Pass Book.

REFERENCES

- T. S. Grewal & S.C.Gupta, S Chand , (2009), Introduction to Accountancy, 5th Edition, S Chand Publication, ISBN : 9788121905695.
- Anil Chaowdhary, (2009), Fundamentals of Accounting and Financial Analysis, 6th Edition, Pearson Education, ISBN : 9788131724101.
- Rajesh Agarwal and R. Shriniwasan, (2005), Accounting made easy, 1st Edition, Tata McGraw-Hill, ISBN : 0070600600.
- Dr. S. N. Maheshwari, (2009), Fundamentals of Accounting, Vikas Publishing house, ISBN : 8125927999.

Course Code: **CA-4.2 Operating System – II** *Clock Hours:* **60**
Total Marks: **100**

UNIT – I **[18-M][15-L]**

MEMORY MANAGEMENT: Address Binding - Linking and Loading, Swapping, Contiguous Allocation Paging, Segmentation, Demand Paging, Process Creation, Page Replacement - FIFO, OPT, LRU, Allocation of Frames

UNIT – II **[17-M][07-L]**

VIRTUAL MEMORY: Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing.

UNIT – III **[17-M] [10-L]**

PROCESS SYNCHRONIZATION: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors.

UNIT – IV **[12-M][11-L]**

FILE SYSTEM: File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, Protection.

UNIT – V **[18-M] [11-L]**

FILE SYSTEM STRUCTURE: File structure: Logical storage unit-Collection of related information, File system resides on secondary storage (disks), File system organized into layers, File control block – storage structure consisting of information about a file.

UNIT – VI **[08-M] [06-L]**

MASS STORAGE: Overview of Mass Storage, Disk Mechanism, Disk Structure, Disk Scheduling.

REFERENCES

- Nutt, Chaki, Neogy (2009), Operating systems, Third Edition, Pearson Education. ISBN 10: 8131723593 / ISBN 13: 9788131723593
- Peterson Silberschats, Galvin (2005), Operating System Concepts, 7th Edition, Addition Wesley Publication. ISBN-10: 8126554274 ISBN-13: 978-8126554270
- Achyut Godbole (2005), Operating System, 3rd Edition, TMH, ISBN : 9780070591134
- Andrew S. Tenenbaum, A.S. Woodhill,Operating Systems Design & Implementation, 3rd Edition, Pearson Education. ISBN-10: 9332518742, ISBN-13: 978-9332518742

Course Code: **CA-4.3 Network Security** *Clock Hours:* **60**

Total Marks: **100**

UNIT –I [14-M] [08-L]

INTRODUCTION: Attacks, services and mechanisms, security attacks, security services, integrity check, digital signature, authentication, hash algorithms.

UNIT –II : [18-M] [10-L]

SECRET KEY CRYPTOGRAPHY: Block encryption, DES rounds, S-Boxes IDEA: overview, comparison with DES, Key expansion, IDEA rounds, Uses of secret key cryptography; ECB, CBC, OFB, CFB, Multiple encryptions DES.

UNIT –III [18-M] [10-L]

HASH FUNCTIONS AND MESSAGE DIGESTS: Length of hash, uses, algorithms (MD2, MD4, MD5, SHS) MD2: Algorithm (padding, checksum, passes). MD4 and 5: algorithm (padding, stages, digest computation) SHS: overview, padding, stages.

UNIT –IV [18-M] [15-L]

PUBLIC KEY CRYPTOGRAPHY: Algorithms, examples, Modular arithmetic (addition, multiplication, inverse, and exponentiation) RSA: generating keys, encryption and decryption. Other Algorithms: PKCS, Diffie-Hellman, El-Gamal signatures, DSS, zero-knowledge signatures.

UNIT –V [22-M] [17-L]

AUTHENTICATION: Password based, address based, cryptographic authentication Passwords: in distributed systems, on-line vs off-line guessing, storing. Cryptographic authentication: passwords as keys, protocols, KDC's, Certification Revocation, inter-domain, groups, delegation. Authentication of People: Verification techniques, passwords, length of passwords, password distribution, smart cards, biometrics.

REFERENCES

- Atul Kahate (2008), Cryptography and Network Security, McGraw Hill. ISBN : 9780070648234
- Kaufman, C. Perlman, R and Speciner, M. ,(2002),Network Security, Private Communication in a public world, 2nd edition, prentice hall, ISBN-13: 978-0130460196, ISBN-10: 0130460192
- W. Stallings, (2003), Cryptography and Network Security: Principles and Practice, 3rd edition, Prentice hall PTR, ISBN – 1360993259.
- W. Stallings, (2000), Network security Essentials: Applications and Standards, 3rd Edition, Prentice Hall, ISBN : 9788131716649
- Behrouz Forouzan, (2008), Cryptography and Network Security, McGraw Hill. ISBN : 0071263616, 9780071263610

Course Code: **CA-4.4 Java Programming** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[12-M] [07-L]**

INTRODUCTION AND OBJECT ORIENTED PROGRAMMING CONCEPT: Features of java, JDK Environment & tools like (java, javac, javadoc, jdb), Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++, C# and JAVA

UNIT-II **[13-M] [06-L]**

JAVA PROGRAMMING FUNDAMENTAL: Structure of java program Data types, Variables, Operators, Keywords, Naming Convention,Decision Making (if, switch), Looping (for, while), Type Casting.

UNIT-III **[15-M] [10-L]**

CLASSES AND OBJECTS: Creating Classes and objects, Memory allocation for objects, Constructor,Implementation of Inheritance: Simple, Multilevel, and Hierarchical Implementation of Polymorphism: Method Overloading, MethodOverriding, Nested and Inner classes.

UNIT-IV **[10-M] [07-L]**

ARRAYS STRING AND VECTOR: Arrays: Creating an arra, Types of Array: One Dimensional arrays, Two Dimensional array
Strings: String – Arrays, String Methods, String Buffer class, Vectors, Wrapper classes

UNIT-V **[15-M] [08-L]**

ABSTRACT CLASS, INTERFACE AND PACKAGES: Modifiers and Access Control: Default, public, private, protected, Abstract classes and methods, Interfaces, Packages- Packages Concept, Creating user defined package, Java Built in packages, Java.lang->math , Java.util->Random, Date, Hash Table.

UNIT-VI **[10-M] [10-L]**

EXCEPTION AND FILE HANDLING: Exception types, Using try catch and Multiple catch, Nested try, throw , throws and finally,Creating User defined Exceptions, File Handling: Byte Stream, character stream, File IO Basics, File Operations (Creating file, Reading file (Character, byte), Writing File (Character, byte)).

UNIT-VII **[15-M] [12-L]**

AWT COMPONENT, SWING COMPONENT AND EVENT HANDLING: Components used in AWT, AWT controls and Layout managers, Introduction to Swing, Component and

container used in Swing, Event handling : Event Model: Event, Sources of Event , Event Classes: Action Event, Key Event, MouseEvent, WindowEvent., Listener Implementation of EventListener Interfaces, Adapter classes

REFERENCES

- Herbert Schildt , (2011),Java The Complete Reference, 7th Edition, Publisher McGraw-Hill Osborne Language English, ISBN: 9780071631778
- Cay's Horstmann and Gary Cornell, (2012), Core Java Volume -1 Fundamentals, 9th Edition, Prentice Hall, ISBN-13: 9780137081899 ISBN-10: 0137081898
- E Balguruswamy, (2000), Programming in Java, Tata McGraw-Hill Publication, 3rd Edition, ISBN- 0070617139

Course Code: **CA-4.5 Database Management System** *Clock Hours:* **60**
Total Marks: **100**

UNIT – I **[10-M] [04-L]**

INTRODUCTORY CONCEPTS: Databases Concepts, Database Users, and Database architecture.

UNIT – II **[10-M] [04-L]**

E-R DIAGRAM CONCEPTS: ER Modeling concepts, ER Diagrams, Cardinality constraints, Higher-order relationships, Weak-entity types, Subclasses and inheritance, Specialization and Generalization.

UNIT – III **[10-M] [10-L]**

RELATIONAL MODEL: Relational algebra, Relational model concepts, Relational integrity constraints, Update operations on relations, Relational algebra model, ER to relational mapping.

UNIT – IV **[12-M] [12-L]**

STRUCTURES QUERY LANGUAGE:SQL, Queries and update statements, Views, Integrity constraints.

UNIT – V **[16-M] [10-L]**

FUNCTIONAL DEPENDENCY AND NORMAL FORMS: Functional dependencies: Keys in a relational model, Concept of functional dependencies, First Normal Form, Second Normal Form, Third Normal Form.

UNIT – VI : TRANSACTIONS: **[16-M] [10-L]**

Transaction Fundamentals, OLTP environments, Concurrency issues, need for transactions, Necessary properties of transactions (ACID properties), Transaction states.

UNIT – VII **[16-M] [10-L]**

CONCURRENCY CONTROL: Two-phase locking (2PL) protocol, Timestamp-ordering based protocol, Deadlock prevention protocols, Wait-die and wound-wait schemes, Deadlock recovery.

REFERENCES

- Elmasri, Navathe, (2004), "Fundamentals of Database Systems", 3rd Edition, Pearson Education, ISBN - 9788131716250
- J. Ullman,(2010), "Principles of Database Systems", GALGOTIA Publications, ISBN : 9788120346741
- S. K. Singh, (2006), " Database Systems: Concepts, Design and Applications", 2nd Edition, Pearson Education,. ISBN : 8131760928
- Silberschatz, Korth and Sudarshan, (1986), "Database System Concepts, McGraw-Hill Education,

Course Code: **CA-4.6 Lab on Java Programming** *Total Marks*: **100**

1. Write a program that demonstrates program structure of java program.
2. Write a Java Program that will display Factorial of the given number.
3. Write a Java Program that will display 25 Prime nos in given range.

   Try this mathematics-

   i. We know a number N is prime if it is not divisible by any number than 1 and itself.

   ii. Try this - we can prove that N is prime by checking its divisibility with numbers from 2 to N/2.

   iii. Also try this - we can check the divisibility from 2 to square root of N.

   iv. It is mathematically proved that if it is not divisible by number in above ranges the number is prime.
4. Write a Java Program that will accept command-line arguments and display the same.
5. Write a Java Program to sort the elements of an array in ascending and descending order.
6. Write a java program which demonstrates the different types of constructors of same class.
7. Write a java program which demonstrates the use of methods overloading.
8. Write a java program which demonstrates the use of static members.
9. Write a java program which demonstrates the use of package. Use at least two different class definitions using two different folders
10. Write a java program which explains the concept of single and multilevel inheritance with the use of all access specifiers.
11. Write a java program which demonstrates the method overriding.
12. Write a java program to implement an interface – driving(vehicle type, speed, mileage) with methods turnleft(), turnright(), accelerate(), moveForward(), reverse().
13. Write the interface definition and class vehicle(Vehicle No, Name, Make, color) that implements the interface. Write main application which uses the vehicle class to demonstrate the implementation.
14. Write java program(s) that demonstrates Java streams
15. Write a Java Program which will read a file name and count and display number of lines, number of words and number of characters in that text file.
16. Write a java program to demonstrate drawing line, rectangle , ellipses, circle using graphics on frame using swing and awt component.

17. Write a Java Program that demonstrate use of different swing and awt components (at least five components) and corresponding event handling using listener interfaces.
18. Write a simple Java program to demonstrate use of Thread class and Runnable interface for threading in applications.
19. Write a simple java program to demonstrate exception handling using try ..catch..finally blocks.
20. Show use of multiple catch blocks.

Guidelines for students

- **Assignment 16** - Understanding of paint component, paint, repaint is necessary for these programs. Try different applications using JApplet, JFrame and JPanel classes in these application
- **Assignment 17** - Understanding of listener interfaces, inner class, anonymous inner class concepts is necessary. For this practice on different swing components for different applications (at least 5) using different combinations of above concepts is expected.

Course Code: **CA-4.7 Lab on DBMS** *Total Marks*: **100**

1. Assignment on DDL Commands
2. Assignment on DML Commands
3. Assignment on various types of Constraints.
4. Assignment on select clause, where clause, Ordered By, Distinct, Group By etc.
5. Assignment on Aggregate Functions.
6. Assignment on String functions.
7. Assignment on Date and Time Functions.
8. Assignment on Union, Intersection and Set difference.
9. Assignment on Nested Queries.
10. Assignment on Views.
11. Assignment on Normalization:
    i) Create a Database of your choice with at least four tables.
    ii) While creating tables make use of all required constraints like not null, unique, primary key, check, foreign key.
    iii) Insert at least 5 records in each table.
    iv) Convert the above created database into 1NF, 2NF and 3NF.

Course Code: **CA-5.1 Theoretical Computer Science** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[15-M] [20-L]**

FINITE AUTOMATA : Sets, relations, functions, graphs, trees, mathematical induction, Finite Automata(FA), definition, description, transition systems, acceptability of a string, NFA, DFA, equivalence of DFA and NFA, Melay Moore model, minimization of automaton, Applications.

UNIT – II **[20-M] [10-L]**

FORMAL LANGUAGES :Formal languages, Chomsky classification of languages, languages, their relation and automaton.

UNIT – III **[20-M] [10-L]**

REGULAR EXPRESSIONS: Regular expressions, FA and regular expressions, pumping lemma for regular sets, applications of pumping lemma, closure properties of regular sets, regular sets and regular grammars.

UNIT – IV **[20-M] [10-L]**

CONTEXT FREE LANGUAGES: CFLs and derivation trees, ambiguity in Context-Free Grammars (CFGs), simplification of CFGs, Normal Forms for CFGs(CNF and GNF), pumping lemma for CFLs, decision algorithms for CFLs.

UNIT – V **[15-M] [10-L]**

PUSH DOWN AUTOMATA: Pushdown Automaton (PDA), informal description, basic definitions, acceptance by a PDA, PDA and CFLs.

REFERENCES

- Smita Rajpal, (2004), Theory of Automata and Formal Languages, 2st Edition, GALGOTIA Publications.
- J. E. Hopcraft, R. Motwani and J. D. Ullman, Introduction to Automata Theory languages & Computation, Pearson Education Asia.
- K.L.P.Mishra, N. Chandrashekharan, (2007), Theory of Computer Science, 3rd Edition, PHI, ISBN : 8120329686
- Martin John C., (2003), Introduction to Language & Theory of computation, TMH. ISBN: 0072322004, 9780072322002.

Course Code: **CA-5.2 Software Engineering - I** *Clock Hours:* **60**

Total Marks: **100**

UNIT –I **[15-M][12-L]**

INTRODUCTION: Introduction to software Engineering, Software characteristics, Software components, Software applications, Software Engineering Principles, Software metrics and measurement, monitoring and control. Software development life-cycle Models: Software development life-cycle, Water fall model, prototyping model, Incremental model, Iterative enhancement Model, Spiral model.

UNIT –II **[10-M][08-L]**

SOFTWARE REQUIREMENT SPECIFICATION : Requirements Elicitation Techniques, Requirements analysis, Models for requirements analysis, requirements specification, requirements validation,

UNIT –III **[10-M][10-L]**

SYSTEM DESIGN: DESIGN PRINCIPLES : Problem partitioning, abstraction. Top down and bottom up – design, structured approach, Functional versus object oriented approach of design, design specification, Cohesiveness and Coupling. Overview of SA/SD Methodology, structured analysis, data flow diagrams, extending DFD to structure chart

UNIT –IV **[10-M][08-L]**

SOFTWARE PROJECT MANAGEMENT : Project planning and Project scheduling. Software Metrics: Size Metrics like LOC, Token Count, and Function Count. Cost estimation using models like COCOMO. Risk management activities.

UNIT -V **[10-M][04-L]**

SOFTWARE RELIABILITY AND QUALITY ASSURANCE : Reliability issues, Reliability metrics, reliability models, Software quality, ISO 9000 certification for software industry, SEI capability maturity model.

UNIT –VI **[15-M][08-L]**

TESTING :Verification and validation, code inspection, test plan, test case specification. Level of testing: Unit, Integration Testing, Top down and bottom up integration testing, Alpha and Beta testing, System testing and debugging. Functional testing, structural testing, Software testing strategies.

UNIT –VII **[10-M][04-L]**

SOFTWARE MAINTENANCE :Structured Vs unstructured maintenance, Maintenance Models, Configuration Management, Reverse Engineering, Software Re-engineering.

UNIT –VIII **[10-M] [06-L]**

ADVANCED RESEARCH TOPICS : Object oriented methodologies, quality assurance, quality criteria, extreme programming, object oriented analysis and design, object oriented metrics, software verification techniques, software rejuvenation.

REFERENCES

- R. S. Pressman,(1992), Software Engineering – A practitioner's approach, 3rd ed., McGraw Hill Int. Ed., ISBN : 007301933X
- Ian Somerville, Addison Wesley, (2001), Software Engineering, 6th Edition, ISBN: 020139815X.
- K. K. Aggarwal & Yogesh Singh, (2005), Software Engineering, 2nd Ed., New Age International, ISBN : 8122416381.
- James F. Peters, WitoldPedrycz,(2000), John Wiley,Software Engineering, An Engineering Approach,John Wiley and Sons Ltd, ISBN: 9780471189640
- Sommerville,(2006),Software Engineering ,Pearson Education, 7th edition,ISBN:9780321313799
- Waman S Jawadekar,Software,(2004),Engineering principles and practice, The McGraw-Hill Companies,ISBN: 9786612129810

Course Code: **CA-5.3 Computer Graphics** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[06-M] [04-L]**

INTRODUCTION TO COMPUTER GRAPHICS : Overview of Computer Graphics, Computer Graphics Application and Software, Description of some graphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Color CRT Raster Scan Basics, Video Basics, The Video Controller, Random-Scan Display Processor, LCD displays.

UNIT – II **[24-M] [16-L]**

SCAN CONVERSION: Scan Converting Lines, Mid-point criteria, Problems of Aliasing, end-point ordering and Clipping lines, Scan Converting Circles, Scan Converting Ellipses.

Polygon Filling: Filling techniques, Types of Seed Filling,Scan-line Filling algorithm, Edge data structure

Clipping algorithms: Lines Clipping algorithms – Cyrus-Beck, Cohen-Sutherland and Liang-Barsky, Nicholl-Lee-Nicholl Line Clipping, Polygon Clipping algorithms – problem with multiple components.

UNIT – III **[12-M] [08-L]**

TWO-DIMENSIONAL TRANSFORMATIONS: Transformations and Matrices, Transformation Conventions, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation, Transformation of Points, Transformation of the Unit Square, Rotation about an Arbitrary Point, Reflection through an Arbitrary Line, A Geometric Interpretation of Homogeneous Coordinates, The Window-to-Viewport Transformations.

UNIT – IV **[12-M] [08-L]**

THREE-DIMENSIONAL TRANSFORMATIONS : Introduction, Three-Dimensional Scaling, Three-Dimensional Shearing, Three-Dimensional Rotation, Three-Dimensional Reflection, Three-Dimensional Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Matrix Representation of 3D Transformations, Composition of 3D Transformations.

UNIT – V **[06-M] [04-L]**

VIEWING IN 3D: Stages in 3D viewing, Canonical View Volume (CVV), specifying an arbitrary 3D View, Examples of 3D Viewing, The Mathematics of Planar Geometric Projections, Combined Transformation matrices for projections and viewing, Coordinate Systems and matrices, Camera model and viewing pyramid.

UNIT – VI **[12-M] [08-L]**

VISIBLE-SURFACE DETERMINATION : Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-

line method, Painter's algorithms (depth sorting), Area sub-division method, BSP trees, Visible-Surface Ray Tracing, comparison of the methods.

UNIT – VII **[06-M] [04-L]**

ILLUMINATIONS AND SHADING: Illumination and Shading Models for Polygons, Reflectance properties of surfaces, Ambient, Specular and Diffuse reflections, Atmospheric attenuation, Phong's model, Gouraud shading, some examples.

UNIT – VIII **[12-M] [08-L]**

PLANE CURVES AND SURFACES: Curve Representation, Nonparametric Curves, Parametric Curves, Parametric Representation of a Circle, Parametric Representation of an Ellipse, Representation of Space Curves, Cubic Splines, Bezier Curves, Bspline Curves, B-spline Curve Fit, B-spline Curve Subdivision, Parametric Cubic Curves, Quadric Surfaces. Bezier Surfaces.

REFERENCES

- J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, (1995), Computer Graphics – Principles and Practice, 2ndEdition in C, Pearson Education India, ISBN-13: 978-0201848403, ISBN-10: 0201848406
- D. Hearn and M. Pauline Baker, (2002), Computer Graphics (C Version), 2nd Edition, Pearson Education India, ISBN-10: 817758765X, ISBN-13: 978-8177587654
- D. F. Rogers and J. A. Adams, (1989), Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition, ISBN 10: 0070535302 ISBN 13: 9780070535305
- A. P. Godse, (2011), Computer Graphics, 2nd Edition, Technical Publications, ISBN 10: 9350381273 / ISBN 13: 9789350381274

Course Code: **CA-5.4 Advanced Java** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[10-M] [8-L]**

JDBC: The design of JDBC, Basic JDBS program Concept, Drivers, Making the Connection, Statement, Result Set, Executing SQL commands, Executing queries.

UNIT – II **[13-M] [8-L]**

MULTI THREADING : Threading basics, Life cycle of thread, Creating Threads, Priorities and Synchronization, Inter Thread Communication, Runnable Interface**.**

UNIT – III **[12-M] [10-L]**

COLLECTION FRAMEWORK: Collection Interface List, sets, Sortedset, Collectionclasses, Linked list, Array list,Vectors, Hashset, Tree set, Using Iterators and enumerations, working with maps, Map interfaces, Map classes

UNIT – IV **[10 -M] [8-L]**

REMOTE METHOD INVOCATION: Introduction to remote object, RMI architecture, Stubs and skeleton, Registry, Setting up RMI

UNIT – V **[15-M] [10 L]**

SERVLET AND JAVA SERVER PAGES (JSP) : Introduction Life cycle of servlet, Types of servlet, SessionTracking, Cookieclass, Servlet- Jdbc, Components of JSP – Directives, Tags, Scripting,Containers, Architecture, API, JSP Objects, JSP and JavaBeans, JSP and Servlets Building a simple application using JSP.

UNIT – VI **[15-M] [8-L]**

JAVA BEANS AND ENTERPRISE JAVABEANS (EJB) : What is bean? Advantages, Using Bean Development kit (BDK), Introduction to jar and manifest files, Introduction to EJB, Specification of EJB, Architecture of EJB, Container, Types, Life cycle, Applications.

UNIT – VII **[15-M] [8-L]**

STRUTS: Introduction, understanding Scopes and Custom Tags, The MVC Design Pattern, PerformSimpleValidation, Processing Business logic, Basic Strut tags, Configuring Struts, Introduction to String and Hibernate.

REFERENCES

- Herbertz Schildt, (2011), Java The Complete Reference, 7th Edition, McGraw-Hill Osborne, ISBN: 978-0-07-163177-8

- Cay S. Horstmans, Gary Coronell, (2013) Core Java Vol. II – Advanced Features, Ninth Edition, Prentice Hall Publication, , ISBN-13: 978-0-13-708160-8 ISBN-10: 0-13-708160-X
- Sharanam Shah, Vaishali Shah, (2013), Java EE 6 for Beginners, Shroff Publishers and Distributors Pvt. Ltd., 6th Edition, ISBN-13: 9788184049398.
- Kogent Learning Solutions Inc, (2014), Java Server Programming Java EE7 (J2EE1.7) Black Book, , Dreamtech Press, 7th Edition, ISBN 13 : 9789351194170,

Course Code: **CA-5.5 UI Design Technologies – I** *Clock Hours:* **60**
Total Marks: **100**

UNIT I **[04-M] [02-L]**

INTRODUCTION TO JAVASCRIPT : Basic HTML and CSS Knowledge, Basic Text Editor and Web Browser Knowledge, Object Based, Client Side, Scripting Language.

UNIT II **[04-M] [02-L]**

PLACING JAVASCRIPT IN AN HTML FILE : Using the HTML Script Tags, Identifying the Scripting Language, Calling External, using <noscript></noscript> Tags, Creating Your First Script, Writing a "Hello World" Script.

UNIT III **[06-M][06-L]**

VARIABLES AND OPERATORS: Variables: Understanding Variables, Why Variables Are Useful, Variables as Placeholders for Unknown Values, Variables as Time-Savers, Variables as Code Clarifiers, Defining Variables for Your Scripts, Declaring Variables, Assigning Values to Variables, Naming Variables, Understanding Variable Types.

Operator: Operator Types, Mathematical Operators, Assignment Operators, Comparison Operators, Logical Operators, Special Operators, Order of Operations.

UNIT IV **[06-M] [06-L]**

CONDITIONAL STATEMENTS AND LOOPS : Defining Conditional Statements, Using Conditional Statements, Defining Loops, Using Loops, using break and continue.

UNIT V **[16-M] [12-L]**

FUNCTIONS AND EVENT HANDLERS: Functions: What a Function Is, Why Functions Are Useful, Structuring Functions, Calling Functions in Scripts.

Event Handlers: What Is an Event Handler? Why Event Handlers Are Useful, Understanding Event Handler Locations and Uses, Learning the Event Handlers (all events and handlers), Creating Scripts Using Event Handlers, Other Ways to Register Events.

UNIT VI **[18-M] [08-L]**

OBJECTS : Defining Objects, Creating Objects, JavaScript Objects (The Navigator Object, The History Object, Document Object, Window Object)

UNIT VII **[16-M] [10-L]**

ARRAYS & STRINGS : Defining and Accessing Arrays, Understanding the Properties and Methods of the Array Object, Using Arrays with Loops, Using Associative Arrays. Strings: Introduction to the String Object, Using the Properties of the String Object, Using the Methods of the String Object, Using Regular Expressions

UNIT VIII FORMS & FRAMES **[16-M] [10-L]**

Forms: Accessing Forms, Using the Properties and Methods of the Form Object, Ensuring the Accessibility of Forms, Validation.

Frames: An Introduction to Frames, Accessing Frames, Changing Frames, Frame Navigation, Using Variables Across Frames

UNIT IX **[04-M] [04-L]**

XML : What Is XML?,Origin of the XML Standards, Where XML Can Be Used, and What You Can Use It For, Parsing XML, Attributes, Comments, Empty Elements, XML Declarations, Processing Instructions.

REFERENCES

- Paul Wilton, Jeremy McPeak, (2009), JavaScript - A Beginner's Guide, 3rd Edition, Wrox Publication, ISBN: 9780071632966
- Paul Wilton, Jeremy McPeak, (2009), Beginning JavaScript, 4th Edition, WROX Publication, ISBN: 9780470525937
- Nicholas C. Zakas, (2011), Professional JavaScript for Web Developers, 3rd Edition, WROX Publication, ISBN - 0764579088
- David Hunter, Jeff Rafter, Joe Fawcett , (2004),Beginning XML, 3rd Edition, WROX Publication, ISBN - 8126513031

Course Code: **CA-5.6 Lab on Computer Graphics** *Total Marks*: **100**

1) Line drawing algorithm
    a) DDA Line algorithm
    b) Bresenham's Line algorithm
2) Circle drawing algorithm
    a) DDA Circle algorithm
    b) Bresenham's Circle algorithm
    c) Mid Point Circle algorithm
3) Ellipse drawing algorithm
4) Polygon filling algorithm
    a) Seed Fill algorithms
    b) Scan Line Fill algorithm
5) Windowing and clipping algorithm
    a) Point clipping algorithm
    b) Line clipping algorithms
    c) Polygon clipping algorithm
    d) Window to Viewport Transformation.
6) Composite 2-D transformation
    a) 2-D Translation
    b) 2-D Rotation
    c) 2-D Scaling
    d) 2-D Reflection
    e) 2-D Shearing
7) 3-D geometric transformation
    a) 3-D Translation
    b) 3-D Rotation
    c) 3-D Scaling
    d) 3-D Reflection
8) 3-D Curve and surface representation i.e. B-spline curves and Surfaces, polynomial curves and surfaces, Bezier curves and Surfaces.
    a) Bezier curve using periodic cubic polynomial function
    b) Bezier curve using Midpoint / Sub division method.

c) Curve using B-Spline basis function (use open uniform knot vector)

9) Determination of visible surfaces and lines. (Any one algorithm)

10) Line drawing algorithm

a) DDA Line algorithm

b) Bresenham's Line algorithm

11) Circle drawing algorithm

a) DDA Circle algorithm

b) Bresenham's Circle algorithm

c) Mid Point Circle algorithm

12) Ellipse drawing algorithm

13) Polygon filling algorithm

a) Seed Fill algorithms

b) Scan Line Fill algorithm

14) Windowing and clipping algorithm

a) Point clipping algorithm

b) Line clipping algorithms

c) Polygon clipping algorithm

d) Window to Viewport Transformation.

15) Composite 2-D transformation

a) 2-D Translation

b) 2-D Rotation

c) 2-D Scaling

d) 2-D Reflection

e) 2-D Shearing

16) 3-D geometric transformation

a) 3-D Translation

b) 3-D Rotation

c) 3-D Scaling

d) 3-D Reflection

17) 3-D Curve and surface representation i.e. B-spline curves and Surfaces, polynomial curves and surfaces, Bezier curves and Surfaces.

a) Bezier curve using periodic cubic polynomial function

b) Bezier curve using Midpoint / Sub division method.

c) Curve using B-Spline basis function (use open uniform knot vector)

18) Determination of visible surfaces and lines. (Any one algorithm)

Course Code: **CA-5.7 Lab on Advanced Java and UI Design Technologies-I** *Total Marks*: **100**

Practical assignments of UID Technologies-I

1. Create a HTML document to display "Hello World" and apply inline & external JavaScript
2. Create a HTML with the use of Identifiers, variables, All Data Types & operators & display value hold by various variables & identifiers.
3. Create a HTML document using JavaScript to demonstrate Conditional Statements & Lopping Statements.
4. Create a HTML document using Functions with and without Arguments, function returning value and no value return.
5. Create a HTML document using JavaScript to display use of Primitive and Reference Values and display them.
6. Create a HTML document using JavaScript to show use of garbage collection, Execution Context & Scope of variables & identifiers as-local & global with the use of functions & strict mode.
7. Create a HTML document using JavaScript to check the type and demonstrate The Object Type, Array Type.
8. Create a HTML document using JavaScript to demonstrate the object, create object and perform inheritance.
9. Create a HTML document using JavaScript to demonstrate use of The Window Object, The location Object, The Navigator Object, The Screen Object, The History Object.
10. Create a HTML document using JavaScript to demonstrate Event Flow & Event Handlers, The Event Object, Event Types
11. Create a HTML document using JavaScript to demonstrate Event Bubbling.

Practical assignments of Advanced Java

1. Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations. Create Appropriate GUI using awt for user interaction.

2. Write a Java program(s) that demonstrates the use of Collection Classes.

3. Implement the Java program(s) for server and client to demonstrate networking in Java using Sockets. (Single server and single client, Single server and multiple clients).

4. Write a Java program(s) that demonstrates the use of RMI technology.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread

computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number

6. Create a Simple Java Web Application Using Servlet, JSP and JDBC.

7. Create a Java Web Application which show the login page with Username, password and login And register button.
On login button it validate the user name and password entered by user with database information stored in login info database table if it is correct then show message login successful and open home page which will show all the record of login info table into grid. If information is incorrect then show message invalid credentials.
On Register Button show the register page, on this page show the username, password, date of Birth field to save this information into login info database table.
On register page show two button save and cancel.
On save button record should be saved to database table login info and login page should be Opened. Cancel it will returns back to login page.

8. Write a Java program(s) that demonstrates Java Bean.

9. Write a Java program(s) that demonstrates EJB.

Course Code: **CA-6.1 Automata Theory and Computability** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[24-M] [12-L]**

FINITE AUTOMATA : FA,NFA, NFA with € moves, Regular expressions, Equivalence of regular expression and FA, Equivalence of type 3 grammars and FA, Pumping lemma, Closure and decidability results, Myhill- Nerode theorem, Minimization, FA with output, Problems.

UNIT- II **[24-M] [14-L]**

IIOVERVIEW OF GRAMMERS: Grammars, Chomsky Hierarchy, CFG, Ambiguity, Reduced grammars, Context free Grammars: Greibach Normal Form (GNF) and Chomsky Normal Form (CNF), Ambiguity, Parse Tree Representation of Derivations, Equivalence of PDA's and CFG's. Parsing techniques for parsing of general CFG's-Early's, Cook-Kassami-Younger (CKY) and Tomita's parsing

UNIT-III **[12-M] [10-L]**

PUSH DOWN AUTOMATA: Pushdown Automata, Acceptance by final state and empty store, Equivalence to CFG, Deterministic PDA

UNIT-IV **[18-M] [14-L]**

TURING MACHINES: Turing Machines -Construction, Techniques of TM construction, TM as acceptor and i/o device, Halting problems - Universal TM-recursive and recursively enumerable sets - Decidability -Rice's Theorem.

UNIT-V **[12-M] [10-L]**

COMPLEXITY THEORY: Time and Space complexity, Intractable Problems - P and NP, Cook's theorem,- NP Complete Problems.

REFERENCES

- K.Krithivasan and R.Rama (2009), Introduction to Formal Languages, Automata Theory and Computation, Pearson Education, ISBN: 9788131723562.
- J.E.Hopcroft, R.Motwani and J.D.Ullman (2001), Introduction to Automata Theory Languages and computation, second Edition, Pearson Education Asia
- Peter Linz (2006), An Introduction to Formal Language and Automata, Fourth Edition, Narosa Publishing house, ISBN : 9780763737986
- M.Sipser (1997), Introduction to the Theory of Computation, PWS Publishing Company , ISBN: 9780534947286
- John.C.Martin (2003), Introduction to the Languages and the Theory of Computation, Third edition, Tata McGrawHill, ISBN : 9780072322002
- Wayne Goddard (2010), Introducing the Theory of Computation, First edition, Jones and Edition, ISBN: 9780763741259

Course Code: **CA-6.2 Software Engineering-II** *Clock Hours:* **60**
Total Marks: **100**

UNIT –I **[15-M] [10-L]**

SOFTWARE ENGINEERING PROCESS : Nature of Software –Application domains, web-apps, mobile-apps, cloud computing, product line software, Introduction to Software Engineering –The discipline, layers, the process (guiding principles), the practice (guiding principles) and myths Process Models – Generic process model, process assessment and improvement, prescriptive models, specialized models, unified process, product and process.

UNIT –II **[15-M] [10-L]**

AGILE DEVELOPMENT PROCESS : Agile Development –Agile manifesto, agility and cost of change, agility principles, myth of planned development, toolset for the agile process Extreme Programming –XP values, process, industrial XP SCRUM – process flow, scrum roles, scrum cycle description, product backlog, sprint planning meeting, sprint backlog, sprint execution, daily scrum meeting, maintaining sprint backlog and burn-down chart, sprint review and retrospective Agile Practices -test driven development, refactoring, pair Programming, continuous integration, exploratory testing versus scripted testing .

UNIT –III **[15-M] [10-L]**

REQUIREMENTS ENGINEERING : Requirements Capturing -requirements engineering (elicitation, specification, validation, negotiation), eliciting requirements, elicitation techniques, developing use cases, building requirements model, negotiating requirements, requirements monitoring, validating requirements, prioritizing requirements (kano diagram) ,Requirements Analysis –basics, scenario based modeling, UML models, data modeling, data and control flow model, behavioral modeling using state diagrams Agile Requirements - user stories, 3 Cs of user story, INVEST characteristics.

UNIT –IV **[15-M] [10-L]**

SOFTWARE DESIGN : Software Design–definition of design, translating requirements model to design model, design considerations (quality guidelines and attributes), design concepts, design model, design strategies or methods (function-oriented, data-flow-oriented, object-oriented, data-structure-centered, aspect-oriented), design methods classification, design trade-offs, Software architecture, architectural styles (data-centered, data-flow, call and return, layered, peer-to-peer, publish-subscribe, event-based, client-server), architectural trade-off analysis method (ATAM), domain-specific architectures and product-lines

UNIT –V **[15-M] [10-L]**

USER INTERFACE DESIGN : User Interface–Seeheim model and definition of user interface User-centeredness in design -dealing with different types of users, collecting user-requirements, building narratives, creating personas and scenarios Interface design principles–place the user in control, reduce user's memory load, make interface consistent, Shneiderman's 8 Golden Rules UI Analysis – context of use, user analysis, task analysis Interface design steps –user interface design process, applying design steps,

interface design issues Usability - characteristics (ISO, Shneiderman, Nielson), principles (principle of proximity, visibility, visual feedback, visual prominence, mental models and metaphors, consistency, affordance and constraints, confirmation, Hick's law, Fitt's law)

UNIT –VI **[15-M] [10-L]**

FORMAL METHODS, AUTOMATION AND TRENDS IN SOFTWARE ENGINEERING : Clean room Design –cleanroom strategy, process model, black-box, state-box, clear-box specifications, design refinement and verification, cleanroom testing Software configuration management –SCM basics, SCM repository, SCM process CASE –taxonomy, tool-kits, workbenches, environments, components of CASE, categories (upper, lower and integrated CASE tools) Emerging software engineering trends –technology evolution, process trends, collaborative development, model-driven development, test-driven development, challenges of global software development

REFERENCES

- Vliet, H. (2012), Software Engineering: Principles and Practice, 3rdEd, New Delhi: Wiley India Pvt Ltd, ISBN : 9780470031469
- Ian Somerville, Peter Sawyer (1997) , Requirement Engineering A Good Practice Guide, Wiley India Edition, Wiley Publication, ISBN: 9788126524570
- Frederick P. Brooks (1995), The Mythical Man Month - Essays on Software Engineering ANV SUB, 2nd Edition, Addison Wesley , ISBN -9780201835953
- New Jersey, Somerville, I. (2010), Software Engineering, 9th Ed., Pearson Education, ISBN - 9788131762165
- Mall, R. (2009), Fundamentals of Software Engineering, 3rd Ed., Prentice Hall India, ISBN - 978812033819
- Jalote, P. (2011), An Integrated Approach to Software Engineering, 3rd Ed. , Narosa Publishing House, ISBN - 9788173197024
- Cohn, M. (2010), Succeeding with Agile: Software Development Using Scrum, 1st Edition , Pearson Education, ISBN – 9788131732267
- Pressman, R. (2010), Software Engineering: A Practitioner's Approach,7th Or 8th Ed. Singapore: McGraw Hill. , ISBN -9780071267823
- Schwaber, K. and Beedle, M. (2001), Agile Software Development with SCRUM, 1st Ed. New Jersey: Pearson. , ISBN -9780130676344

Course Code: **CA-6.3 Advanced Data Base Management System** *Clock Hours:* **60**
Total Marks: **100**

UNIT-I **[15-M] [10-L]**

REVISITING DBMS: Introduction to Database, Database System Environment – an Example, Data Models, Schema and Instances, Three Schema Architecture of Database, Component Modules of Database Systems, Database System Utilities, Memory Hierarchy and Storage Devices, Storage of Databases, Buffering of Blocks, Places File Record on Disk, Files of Unordered Records and Unordered Records.

UNIT-II **[15-M] [10-L]**

DATABASE TUNING AND DATABASE SECURITY : Physical Database Design in Relational Database, Overview of Database Tuning and Relational Systems, Database Security and its Issues, Granting and Revoking Privileges, Role Based Access Control for Multilevel Security, Encryption and PKI.

UNIT- III

[15-M] [10-L]

BACKUP & RECOVERY IN DATABASE AND DATABASE INDEXING

Providing Backup and Recovery, Recovery Concepts, Recovery Techniques Based on Deferred Update and Immediate Update, Recovery in Distributed Database, Distributed Database in Oracle, Types of Single Level Ordered Indexes, Primary Index, Cluster Index, Secondary Index, Multilevel Index.

UNIT- IV

[15-M] [10-L]

IVMANAGING DIFFERENT DATABASES AND DISTRIBUTED DATABASES : Overview of Temporal and Deductive Databases, Temporal Database Concepts, Deductive Database, Distributed Database Concepts, Data Fragmentation, Allocation Techniques for Distributed Database Design, Types of Distributed Database Systems

UNIT-V **[15-M] [10-L]**

EMERGING DATABASE TECHNOLOGIES AND OBJECT-RELATIONAL DATABASES Overview of Object Relational Features, Current Trends of Database Technology, Implementation and Relational Issues of Extended Type, Nested Relational Model, Mobile Databases, Multimedia Databases, Geographic Information Systems, Genome Database Systems.

UNIT-VI **[15-M] [10-L]**

ORACLE NET, UTILITIES, BACKUP AND RECOVERY : Oracle Net Configuration, Concept of Service Name, Listener, Using Oracle Net Configuration Assistant, Using Oracle Net Manager, Bulk Insert: Using SQL*Loader, Managing Large Databases.

REFERENCES

- Sam R. Alapati (2003), Expert Oracle9i Database Administration, 1St Edition, Apress, ISBN: 9781430207733
- Bob Bryla, Kevin Loney (2008), Oracle Database 11g DBA Handbook, Oracle Press, TMGH Publication, ISBN: 9780071496636
- S. K. Singh, Bob Bryla, Kevin Loney (2009), Database Systems Concepts, Design & Applications, Pearson Education. ISBN: 9788177585674
- Ramesh Elmasari, Shamkant B. Navathe (2007), Fundamentals of Database Systems, 5th Edition , Pearson Education, ISBN: 0321369572
- Kevin Loney, Maklene Therialt (2001) , Oracle 9i, DBA Handbook, 1st Edition ,Oracle Press, TMGH Publications, ISBN: 0072193743

Course Code: **CA-6.4 Linux Operating System** *Clock Hours:* **60**
Total Marks: **100**

UNIT – I **[06-M] [04-L]**

HISTORY & DEVELOPMENT OF LINUX: A Brief History of Linux, Benefits of Linux, Acquiring and Using Linux, Examining Linux Distributions, Logging In and Using the Linux System, Linux Commands, Logging in and Using Remote Linux Systems.

UNIT – II **[12-M] [08-L]**

LINUX FILE SYSTEM : File system Navigation, Managing the File system, Performing File system Maintenance andLocating Files. Internal representation of files: Inodes – Structure of a regular file (algorithm: bmap)–Directories – Conversion of a path name to an Inode (algorithm: namei) – Super block –Inode assignment to a new file (algorithm: ialloc) – Allocation of disk blocks.

UNIT – III **[10-M] [06-L]**

MANAGING USERS & LINUX PERMISSIONS : Creating Additional User Accounts, Creating &Managing Groups, Managing Users, Understanding Permissions, Changing File and Directory Permissions, Changing Default Permissions and Ownership, Setting Daemon and Process Permissions, Evaluating System Security.

UNIT – IV **[20-M] [18-L]**

SHELL SCRIPTING : Shell: Types of Shell: Bourne Again Shell (BASH), TCSH, KSH, command line, editing, arguments, history, shell variables.

Redirection: standard input and output, redirection using >, >>, < and | (pipe), Redirecting the Standard Error:2>, >>, running jobs in background,

Commands: ls, cat, find, cut, paste, grep, more, less, head, tail, date, who, expressions.

Control structures: if..then..fi, if then elif…, Loop Control Structures: while, until, for, for-in,select

Job handling: running jobs in background, bringing to foreground, suspending, cancelling, job notification, Ending Processes: ps and kill

UNIT – V **[14-M] [08-L]**

CREATING & VIEWING FILES & ARCHIVING FILES : Using the vi Editor, Using Other Editors, Examining File Contents, Redirection. ArchivingFiles with tar, Archiving Files with cpio, Archiving Files with Other Utilities, Zipping Files, and Examining Backup Issues.

UNIT – VI **[14-M] [08-L]**

WORKING IN X WINDOWS: Introduction to X Windows and GNOME, Managing Files and File systems, Customizing XWindows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access.

UNIT – VII **[06-M] [02-L]**

PRINTING FILES: Configuring a Local Printer, Printing, Managing Print Spools and Queues, ConfiguringRemote Printers.

UNIT – VIII

[08-M] [06-L]

PACKAGE MANAGEMENT & CONFIGURING LINUX ENVIRONMENT : Examining Package Solutions, Managing Packages with RPM, Verifying and Repairing Applications, Upgrading and Freshening Packages. Examining Shells, Using Variables ,Examining Linux Configuration Script Files, Examining System Startup Files, Examining the/etc/fstab File, Examining the cron System, Creating a Shell Scripts.

REFERENCES

- E. Nemeth, G. Snyder, T. Hein ,(2010),Linux Administration Handbook,4th Edition, Pearson Education,ISBN: 9780132117364
- McCallister, (2006), Suse Linus-1, Pearson Education, and ISBN: 0672327260.
- Ball,(1998),Using Linux, PHI, ISBN: 9780789716231
- Das,(2006), UNIX: Concepts and Applications, 4th Edition, TMH,ISBN: 9780070611085.
- Foster Johnson Welch, Anderson,(2006),Beginning Shell Scripting, Wiley India (Wrox),ISBN:9780764597916
- Neil Mathew, Richard Stones,(2011),Beginning Linux Programming,4th Edition, Wiley India(Wrox), ISBN:1118058615
- Peterson, (2007), Linux: Complete Reference, 6th Edition, TMH, ISBN: 9780070222946.
- Maurice J. Bach,(1986),Design of the Unix Operating System, , Pearson Education,ISBN: 9780132017572.

Course Code: **CA-6.5 UI Design Technologies – II** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[10-M] [06-L]**

BASICS OF JQUERY : String, Numbers, Boolean, Objects, Arrays, Functions, Arguments, Context, Scope, Callback, Closures, Proxy Pattern, Built-in Functions, The Document Object Model.

UNIT-II **[10-M] [08-L]**

SELECTORS: The $() Function, Use of Selectors, Element Name Selector, Element ID Selector, Element Class Selector, Universal Selector, Multiple Elements Selector

UNIT-III **[20-M] [16-L]**

EVENTS HANDLING : Binding and Removing Event Handlers, Event Types, The Event Object, The Event Attributes, The Event Methods, Event Manipulation Methods, Event Helper Methods, Trigger Methods, Binding Methods.

UNIT-IV **[18-M] [10-L]**

AJAX: Loading Simple Data, Getting JSON Data, Passing Data to the Server, JQuery AJAX Methods, JQuery AJAX Events.

UNIT-V **[16-M] [10-L]**

EFFECTS : Showing and Hiding Elements, Toggling the Elements, JQuery Effect Methods, UI Library Based Effects.

UNIT-VI **[16-M] [10-L]**

USER INTERFACE AND PLUGING : Interaction, Widget and Theming, creating plugins, using plugins.

REFERENCES

- Jonathan Chaffer,(2011), Learning jQuery Fourth Edition ,4th Edition, Packt Publishing, ISBN: 9781782163145
- Troy Miles,(2016),JQuery Essentials, Packt Publishing Ltd, ISBN - 9781785282652

Course Code: **CA-6.6 Lab on Linux and UID – II** *Total Marks*: **100**

Instructor should ask students to give live demonstrations on:

1. **System Access:** Logging In, Linux Commands, Getting Help, Obtaining Information about Your System, Logging In and Using Remote Linux Systems.
2. **Starting and Stopping Linux**: Shutting Down a Linux System, Booting a Linux System, Other Boot Methods.
3. **User Accounts:** Creating Additional User Accounts, Groups, Managing Users and Groups using GUI and commands.
4. **File system:** File system Navigation, Managing the File system, Performing File system Maintenance, Locating Files.
5. **Working with Linux Permissions:** Understanding Permissions, Changing File and Directory Permissions, Changing Default Permissions and Ownership, chown, chgrp, chmod commands.
6. **Creating and Viewing Files:** Using the vi Editor, Using Other Editors, Examining File Contents Redirection.
7. **Archiving Files:** Archiving Files with tar, Archiving Files with cpio, Archiving Files Using gzip, guzip commands.
8. **Shell Scripts:** Creating a Shell Scripts (Create at least ten shell scripts).
9. **Working in X Windows:** Managing Files and File systems, Customizing X Windows, Configuring X Windows, Choosing and Changing Window Managers and Desktops, Remote X Window Access.
10. **Printing Files:** Configuring a Local Printer, Printing, Managing Print Spools and Queues Configuring Remote Printers.
11. **Configuring the Linux Environment:** Examining Shells, Using Variables, Examining Linux Configuration Script Files, Examining System Startup Files, Examining the /etc/fstab File, Examining the cron System.
12. **Multitasking:** Managing Jobs and Background Processes, Using the Process Table to Manage Processes, Delayed and Detached Jobs.

Course Code: **CA-6.7 Project and Viva-Voce** *Total Marks*: **100**

Guidelines for Project:

1. Each student shall have to carry out the project work based on computer application in a life situation based on the language / software learned in the course. A project may be on the activities carried out in outside organization or on a subsystem of an organization.

2. The project work should be carried out individually. No group work is allowed in the work. The project title should not be repeated.

3. The topic of the project should be decided with the consultation & guidance of a teacher of the institute/college. The project should be necessarily innovative and problem solving. No teacher shall be entrusted with more than 10 students for guidance.

3. The institute/ college shall submit the detailed list of candidates with Project Titles and guide to the university within a week of title finalization of such titles by the guide/ such title finalization must be completed before end of the second week of corresponding semester.

4. The student should clearly mention the need of project , database(s), files required for the DFD , Normalization, ERD, software used for the project, reasons for selection of software, inputs required, outputs produced etc.

5. Application should be menu driven and should provide the facilities of storage &modifications in existing data, deletion of unwanted data, and viewing of data.

6. The student has to write a report based on the actual work undertaken during the specific selected enterprise/organization or sub system and get it certified by teacher that the project report has been satisfactorily completed and submit the same to the Head / Director of the institute /Principal of the college.

7. One copy of the report submitted by the student shall be forwarded to the University.

8. The project work will carry maximum 100 marks, of which internal teacher shall award out of maximum 40 marks on the basis of project work done by the student as assessment.

9. Remaining marks shall be awarded out of maximum 60 marks by during Viva-voce, by the panel of the external examiners.

Course Code: **CA-7.1 Cloud Computing** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[20-M] [10-L]**

JOURNEY TO THE CLOUD : This unit focuses on the business drivers, definition, essential characteristics, and phases of journey to the Cloud. Business drivers for Cloud computing, Definition of Cloud computing , Characteristics of Cloud computing as per NIST, Steps involved in transitioning from Classic data center to Cloud computing environment.

UNIT – II **[12-M] [10-L]**

CLASSIC DATA CENTER (CDC) : This unit focuses on the key elements of CDC – compute, storage, and network, with focus on storage networking, business continuity, and data center management. Application, DBMS, compute, Storage and Networking, Object based and Unified storage technologies, Business continuity overview and backup, Replication technologies, CDC Management.

UNIT – III **[24-M] [15-L]**

VIRTUALIZED DATA CENTER (VDC) : This unit focuses on virtualization of core technologies in a data center, leading to Virtualized Data Center (VDC). It explains the fundamental concepts of compute, storage, networking, desktop and application virtualization. Concepts and techniques employed for ensuring business continuity in a virtualized data center. Compute, Storage, Network virtualization techniques, Virtual machine (VM) components and process of converting physical to VMs, Block and file level storage virtualization, Virtual provisioning and automated storage teirs, Virtual LAN (VLAN) and Virtual SAN (VSAN) and their benefits, Key network traffic management techniques in VDC, Methods for implementing desktop virtualization, their benefits, and considerations, Application virtualization methods, benefits, and considerations, Backup and recovery of Virtual Machines (VMs), VM replication and migration technologies, Recovery options from total site failure due to a disaster .

UNIT – IV **[24-M] [15-L]**

CLOUD COMPUTING AND INFRASTRUCTURE : This unit focuses on the essential characteristics of Cloud Computing, the different Cloud services and deployment models, the economics of Cloud, Cloud infrastructure components, and Cloud service creation processes. Cloud service management processes that ensure that the delivery of Cloud services is aligned with business objectives and expectations of Cloud service consumers. Cloud services models, Cloud deployment models, Economics of Cloud, Cloud infrastructure components, Cloud service creation processes, and Cloud service management processes.

UNIT – V **[10-M] [10-L]**

CLOUD SECURITY AND MIGRATION TO CLOUD : This unit focuses on security concerns and migration considerations to cloud. Key security concerns and threats and details Cloud model suitable for different categories of users. Security concerns and counter measures in a VDC and Cloud environment, Governance, Risk, and Compliance aspects in Cloud, Cloud security best practices, Cloud models suitable for different categories of users, Considerations for choosing applications suitable for Cloud, Different phases to adopt the Cloud.

REFERENCES

- Anthony T. Velte , (2009), Cloud Computing: A Practical Approach, Publisher: Tata Mcgraw Hill Education Private Limited,ISBN: 0070683514
- Halper Fern, Kaufman Marcia, Bloor Robin, Hurwit Judith ,(2009),Cloud Computing For Dummies, Wiley India Pvt. Ltd, ISBN: 8126524871
- RajkumarBuyya, Christian Vecchiola, and ThamaraiSelvi, (2013), Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, , ISBN : 978125902995.
- RajkumarBuyya, James Bromberg , Andrzej M. Goscinski , Cloud Computing: Principles andParadigms, , Wiley India Publication,ISBN: 9780470887998.
- Barrie Sosinsky, (2011),Cloud Computing bible, Wiley India Pvt Ltd, ISBN: 9780470903568.
- Dr. Kumar Saurabh, (2011),Cloud Computing, Wiley Publication,ISBN :9788126528837.
- Krutz, Vines, (2014) ,Cloud Security ,Wiley Publication,ISBN:1118817079.

Course Code: **CA-7.2 Artificial Intelligence** *Clock Hours:* **60**
Total Marks: **100**

UNIT-I **[05-M] [04-L]**

INTRODUCTION : What is Artificial Intelligence?, The AI Problems, The Underlying Assumption, What is an AI Technique, The Level of the Model, Criteria for Success, Some General References, One Final Word.

UNIT-II **[10-M] [08-L]**

PROBLEMS, PROBLEM SPACES, AND SEARCH: Defining the Problem as a State Space Search, Production systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs, Additional Problems.

UNIT-III **[10-M] [06-L]**

HEURISTIC SEARCH TECHNIQUES : Generate-and- Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.

UNIT-IV **[10-M] [08-L]**

KNOWLEDGE REPRESENTATION: Knowledge Representation Issues, Representations and Mappings, Approaches to knowledge Representation, Issues in Knowledge Representation, The Frame Problem.

UNIT-V **[15-M] [08-L]**

USING PREDICATE LOGIC : Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Natural Deduction.

UNIT-VI **[10-M] [05-L]**

REPRESENTING KNOWLEDGE USING RULES : Procedural Versus Declarative knowledge, Logic Programming, Forward versus Back ward Reasoning, Matching, Control Knowledge.

UNIT-VII **[10-M] [08-L]**

SYMBOLIC REASONING UNDER UNCERTAINTY : Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem solver, Implementation: Depth-First Search, Implementation: Breadth_First Search.

UNIT-VIII STATSTICAL REASONING **[10-M] [08-L]**

Probability and Bayes Theorem, Certainty Factors and Rule-Based Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic.

UNIT-XI WEAK SLOT-AND-FILLER STRUCTURES **[05-M] [03-L]**

Semantic Nets, Frames.

UNIT-X STRONG SLOT-AND FILLER STRUCTURES **[05-M] [02-L]**

Conceptual Dependency, Scripts, CYC.

REFERENCES

- Elaine Rich, Kevin Knight (1991), Artificial Intelligence, Tata McGrawHill. ISBN: 9780070522633
- Stuart Russel, Peter Norwig (2009), Artificial Intelligence – A Modern Approach, Pearosn Education. ISBN: 9780136042594

Course Code: **CA-7.3 Data Warehousing & Mining** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[15-M] [12-L]**

DATA WAREHOUSING: Introduction of Data Warehousing-Architecture of Data Warehouse, Mapping the Data Warehouse to a Multiprocessor Architecture -Metadata.

UNIT-II **[15-M] [12-L]**

BUSINESS ANALYSIS: Cognos Impromptu - Online Analytical Processing (OLAP) - Need - Multidimensional Data Model - Multidimensional versus Multi-relational OLAP - Categories of Tools - OLAP Tools and the Internet.

UNIT-III **[20-M] [10-L]**

DATA MINING : Introduction - Data - Types of Data - Data Mining Functionalities - Interestingness of Patterns - Classification of Data Mining Systems - Data Mining Task Primitives –Data Pre-processing.

UNIT-IV **[25-M] [14-L]**

ASSOCIATION RULE MINING AND CLASSIFICATION : Mining Frequent Patterns, Associations and Correlations - Mining Methods – Mining Various Kinds of Association Rules - Correlation Analysis - Constraint Based Association Mining - Classification and Prediction - Basic Concepts - Decision Tree Induction – Bayesian Classification - Rule Based Classification - Classification by Back propagation - Support Vector Machines

UNIT-V **[15-M] [12-L]**

CLUSTERING & APPLICATIONS AND TRENDS IN DATA MINING : Cluster Analysis - Types of Data - Categorization of Major Clustering Methods – K-means Partitioning Methods - Hierarchical Methods- Data Mining Applications.

REFERENCES

- Alex Berson and Stephen J. Smith (2007), Data Warehousing, Data Mining & OLAP,10th Reprint, Tata McGraw - Hill Edition,ISBN : 0070062722
- Jiawei Han and Micheline Kamber (2007), Data Mining Concepts and Techniques,2nd Edition, Elsevier. ISBN: 9380931913
- Pang-Ning Tan, Michael Steinbach and Vipin Kumar (2007), Introduction To Data Mining, Person Education, ISBN: 9780321321367
- K.P. Soman, Shyam Diwakar and V. Ajay (2006), Insight into Data mining Theory and Practice, Easter Economy Edition, Prentice Hall of India. ISBN : 8120328973
- G. K. Gupta (2006), Introduction to Data Mining with Case Studies, Easter Economy Edition, Prentice Hall of India, ISBN : 8120330536
- Daniel T.Larose (2006), Data Mining Methods and Models, Wile-Interscience. ISBN: 9780471666561

Course Code: **CA-7.4 Web Scripting with PHP & MySQL** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[10-M] [05-L]**

INTRODUCTION: Why PHP? Starting PHP Script, Printing Single Line, Variables and Constants, Comments, Installation.

UNIT- II LANGUAGE BASICS **[15-M] [05-L]**

Structure and syntax, If statement, Switch statement, For Loop, While Loop, Do - While Loop, Operators, Using PHP $_GET, $_POST, Working with forms: Processing forms, Form Validations, Linking form together Introduction to cookies and sessions

UNIT- III **[15-M] [05-L]**

ARRAYS: Declaring PHP Array, One Dimensional array, Two dimensional array, and Associated Array. Describing arrays, Sorting arrays, for each constructs, Taking Advantages of arrays in Application, PHP string Manipulation.

UNIT- IV **[20-M] [20-L]**

PHP FUNCTION: Understand what is function, Need of Function in PHP, Advantage of Function over statements PHP Function declaration with Example, PHP Function Calling, and PHP Function with arguments Default Arguments in Function, Types of arguments in Function, Function argument with call by value, Function argument with call by reference.

UNIT- V **[20-M] [15-L]**

USING PHP WITH MYSQL DB : Introduction to MySql db, Using SQL Commands, interacting with databases, modifying database records using php, Take Advantage of PHP built in functions which are related with db in general and MySql specifically.

UNIT- VI: **[10-M] [10-L]**

ADVANCED IN PHP : Emailing in PHP, Building CMS, Mailing.

REFERENCES

- Ivan Bayross, Sharanam Shah (2007), PHP for Beginners, THE X Team , SPD, ISBN: 9788184040753
- Dave Mercer, Allan Kent, Steven Nowicki, David Mercer, Dan Squier, Wankyu Choi, (2004),Beginning PHP5, Wiley Publishing(Wrox) ISBN: 0764557831
- Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner,(2004),Beginning PHP Apache, MySQL Web Development, Wiley Publishing(WROX), ISBN: 9780764557446

Course Code: **CA-7.5 Design and Analysis of Algorithm** *Clock Hours:* **60**
Total Marks: **100**

UNIT – I **[07-M] [05-L]**

INTRODUCTION : Problem, Instance, Analysis of Algorithms, Principles of Algorithm Design, Phases of Algorithm design and analysis, Asymptotic complexity, Recursion, Rules of Removal of Recursion,

UNIT – II **[08-M] [05-L]**

ELEMENTARY DATA STRUCTURES : Stack, Queue, Binary trees, Heap Tree and Heap sort, Sets and Disjoint Set Union, Graphs.

UNIT – III **[15-M] [10-L]**

DIVIDE AND CONQUER: Introduction, DC 1: Binary Search, DC 2: MaxMin, DC 3: Merge Sort, DC 4: Quick Sort, DC 5: Median Finding, DC 6: Strassen's Matrix multiplication.

UNIT – IV **[15-M] [10-L]**

GREEDY ALGORITHMS: Introduction, GA 1: Fractional Knapsack, GA 2: Huffman Coding, GA 3: Job Sequencing with deadlines, GA 4: Minimum spanning trees: Prims and Kruskal algorithm, GA 5: Single Source Shortest Path: Dijakstra's Algorithm.

UNIT – V: **[15-M] [10-L]**

DYNAMIC PROGRAMMING : Introduction, DP 1: Knapsack (0/1), DP 2: Longest common subsequence, DP 3: Matrix chain Multiplication, DP 4: All Pair Shortest Path.

UNIT – VI **[12-M] [08-L]**

BASIC SEARCH AND TRAVERSAL TECHNIQUES : Introduction, Binary Tree Traversal, Search and Traversal Techniques for Graphs, Topological sort, Code Optimization.

UNIT – VII **[12-M] [08-L]**

BACKTRACKING: Introduction, N-queen problem: 4 Queen, 8 Queen, Graph coloring problem, Branch and Bound technique, LC-search

UNIT – VIII **[06-M] [04-L]**

NP-COMPLETENESS: Non deterministic algorithms: searching, sorting, Introduction to NP-Complete, Search/Decision, SAT, Independent Set, 3VC, Subset Sum & Partition, Hamiltonian Circuit.

REFERENCES

- Horowitz and Sahni (2008), Fundamentals of Computer Algorithms, Galgotia publications, 2nd Edition, ISBN: 9788173716126
- Cormen, Leiserson and Rivest (2009), Introduction to Algorithms, 3rd Revised edition, Prentice Hall of India, ISBN: 9780262033848
- Anany Levitin, (2008), Introduction to the design and analysis of Algorithms, 2nd Edition, Pearson Education India, ISBN: 9788131718377.
- P. Dave, H. Dave, (2008), Design and Analysis of Algorithms, Pearson Education, ISBN 8131799433 .

- Sanjay Dasgupta, Christos Papadimitriou and Umesh Vazirani, (2006), Algorithms, 1st Edition, Tata McGraw-Hill Edition, ISBN : 9780073523408
- Aho, Hopcroft and Ullman (1974), The Design and Analysis of Algorithms, 1st Edition, Pearson India ,ISBN: 9788131702055

Course Code: **CA-7.6 Lab on Web Scripting with PHP & MySQL** *Total Marks*: **100**

1. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
2. Create Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
3. Write two different PHP script to demonstrate passing variables through a URL.
4. Write two different PHP script to demonstrate passing variables with sessions.
5. Write PHP script to demonstrate passing variables with cookies.
6. Write a program to keep track of how many times a visitor has loaded the page.
7. Write an example of Error-handling using exceptions.
8. Write a PHP script to connect MySQL server from your website.
9. Write a program to read customer information like cust_no, cust_name, Item_purchase, and mob_no, from customer table and display all these information in table format on output screen.
10. Write a program to edit name of customer to “Bob” with cust_no =1, and to delete record with cust_no=3.
11. Write a program to read employee information like emp_no, emp_name, designation and salary from EMP table and display all this information using table format.
12. Create a dynamic web site using PHP and MySQL.

Course Code: **CA-7.7 Lab on Design and Analysis of Algorithm** *Total Marks*: **100**

1) Removal of Recursion

a) Write a program to implement removal of recursion for –

b) Finding maximum from array.

c) Binomial Coefficient B(n,m)= B(n-1, m-1)+B(n-1,m), B(n,n)=B(n,0)=1

d) Searching element from array.

2) **Elementary Data Structure–Tree**

a) Write a program for creating Max/Min. heap using INSERT.

b) Write a program for creating Max/Min. heap using ADJUST/HEAPIFY.

c) Write a program for sorting given array in ascending/descending order with n=1000,2000,3000.Find exact time of execution using Heap Sort.

d) Write a program to implement Weighted UNION and Collapsing FIND operations.

3) **Divide and Conquer**

a) Write a program for searching element form given array using binary search forn=1000,2000,3000. Find exact time of execution.

b) Write a program to find minimum and maximum from a given array using MAXMIN.

c) Write a program for sorting given array in ascending/descending order withn=1000,2000,3000 find exact time of execution using –

d) Merge Sort

e) Quick Sort

f) Write a program for matrix multiplication using Strassen's Matrix Multiplication.

4) Greedy Algorithms

a) Write a program to find solution of Fractional Knapsack instance.

b) Write a program to find Minimum Spanning Tree using Prim's algorithm.

c) Write a program to find Minimum Spanning tree using Kruskal's algorithm.

d) Write a program to find Single Source Shortest Path using Dijkstra'salgorithm.

5) **Dynamic Programming**

a) Write a program to find solution of Knapsack Instance (0/1).

b) Write a program to find solution of LCS.

c) Write a program to find solution of Matrix Chain Multiplication.

d) Write a program to find shortest path using All Pair Shortest Path algorithm.

6) Basic Search and Traversal Techniques:

a) Write a program to Traverse Graph – Depth First Search.

b) Write a program to Traverse Graph – Breadth First Search.

c) Write a program to implement topological sort.

d) Write a program to implement CODE1.

e) Write a program to implement CODE2.

7) **Backtracking**

a) Write a program to find all solutions for N-Queen problem using backtracking.

b) Write a program to find only In-Equivalent solutions for N-Queen problem using backtracking.

c) Write a program for Graph Coloring using backtracking.

Course Code: **CA-8.1 Machine Learning** *Clock Hours:* **60**

Total Marks: **100**

UNIT –I **[08-M] [08-L]**

INTRODUCTION TO MACHINE LEARNING : What is Machine Learning?, Key Terminology, Types of Machine Learning, Issues in Machine Learning, Application of Machine Learning, How to choose the right algorithm, Steps in developing a Machine Learning Application.

UNIT –II **[06-M] [06-L]**

LEARNING WITH REGRESSION: Linear Regression, Logistic Regression

UNIT –III **[06-M] [08-L]**

LEARNING WITH TREES: Using Decision Trees, Constructing Decision Trees, Classification and Regression Trees (CART).

UNIT –IV **[15-M] [08-L]**

LEARNING WITH CLASSIFICATION: Rule based classification, classification by backpropoagation, Bayesian Belief networks, Hidden Markov Models.

UNIT –V **[15-M] [06-L]**

DIMENSIONALITY REDUCTION: Dimensionality Reduction Techniques, Principal Component Analysis, Independent Component Analysis.

UNIT –VI **[15-M] [08-L]**

LEARNING WITH CLUSTERING: K-means clustering, Hierarchical clustering, Expectation Maximization Algorithm, Supervised learning after clustering, Radial Basis functions.

UNIT VII **[15-M] [08-L]**

ARTIFICIAL NEURAL NETWORK : Introduction, neural network representation , problems for neural network learning, perceptrons, multilayer network & Back propagation Algorithm

UNIT VIII **[10-M] [08-L]**

GENETIC ALGORITHMS: Introduction, genetic operators, genetic programming, models of evolution & learning.

REFERENCES

- Peter Harrington ,(2011),Machine Learning In Action, DreamTech Press, ISBN: 9781617290183

- Ethem Alpaydın ,(2014),Introduction to Machine Learning , 3rd Edition, MIT Press,ISBN:9780262028182
- Tom M.Mitchell,(1997), Machine Learning, McGraw Hill,ISBN: 9780071154673
- Stephen Marsland,(2015),Machine Learning An Algorithmic Perspective ,2nd Edition, CRC Press,ISBN: 9781498759785
- William W.Hsieh,(2009),Machine Learning Mehods in the Environmental Sciences, Cambridge,ISBN:978 0521791928
- Han Kamber, (2001),Data Mining Concepts and Techniques, Morgann Kaufmann Publishers,ISBN: 9781558604896
- Margaret.H.Dunham, (2003),Data Mining Introductory and Advanced Topics, Pearson,ISBN: 9780130888921

Course Code: **CA-8.2 Digital Image Processing** *Clock Hours:* **60**

Total Marks: **100**

UNIT–I **[10-M] [05-L]**

INTRODUCTION: Definition of image, generation of image, steps in image processing, elements of digital image processing systems, image enhancements, restoration and analysis.

UNIT–II **[10-M] [05-L]**

DIGITAL IMAGE FUNDAMENTALS: Elements of visible perception, image model, sampling and quantization, relationships between pixels, imaging geometry.

UNIT–III **[15-M] [10-L]**

IMAGE TRANSFORMS: Introduction to D.F.T., 2-D.F.T., F.F.T., other separable image transforms (walsh, hadamard, discrete cosine, slant, KL)

UNIT–IV **[15-M] [10-L]**

IMAGE ENHANCEMENTS: Point operations, histogram modeling, spatial filtering-smoothing, sharpening, low pass, high pass, homomorphic filtering.

UNIT–V **[20-M] [15-L]**

IMAGE RESTORATION : Image observation models, inverse and wiener filtering, filtering using image transforms, least squares filters, generalized inverse, , recursive filtering, causal models, digital processing of speckle images, maximum entropy restoration.

UNIT–VI **[20-M] [15-L]**

IMAGE SEGMENTATION: Detection of discontinuities, age linking and boundary detection, thresholding, region oriented segmentation.

REFERENCES

- R. C. Gonzalez (1999), Image Processing, 2nd edition, Pearson Education, ISBN: 9780201180756
- A. K. Jain (1995), Fundamental of Digital Image Processing, 2nd edition, Prentice Hall India (PHI) , ISBN: 9788120309296
- C. Phillips ,(1995), Image Processing in C, BPB Publication, ISBN: 8170295157, 9788170295150
- D. Dutta Majumdar, B. Chanda (2000), Digital Image processing, 2nd Edition, Prentice Hall India, ISBN : 8120316185, 9788120316188
- Emmauel C. Ifeachor and Barry W. Jervis (2002), Digital Signal Processing, 2nd edition, Pearson Education, ISBN: 0201596199, 9780201596199.

Course Code: **CA-8.3 Optimization Algorithms** *Clock Hours:* **60**
Total Marks: **100**

UNIT- I **[10-M] [05-L]**

OVERVIEW OF OPERATIONS RESEARCH: OR models – OR Techniques

UNIT- II **[15-M] [20-L]**

LINEAR PROGRAMMING : Introduction – Graphical solution; Graphical sensitivity analysis– The standard form of linear programming problems – Basic feasible solutions - unrestricted variables – simplex algorithm – artificial variables – Big M method. Degeneracy - alternative optima – unbounded solutions – infeasible solutions.

UNIT- III **[15-M] [05-L]**

DUAL PROBLEMS: Relation between primal and dual problems – Dual simplex method.

UNIT- IV **[20-M] [10-L]**

TRANSPORTATION MODEL: Starting solutions, North West corner Rule - lowest cost method–Vogels approximation method Optimal solutions techniques: MODI, Stepping stone method –Assignment problem

UNIT- V **[15-M] [10-L]**

NETWORK MODELS: Definitions – CPM and PERT – Their Algorithms, Critical path computation: Construction of time schedule, crashing of project duration.

UNIT- VI **[15-M] [10-L]**

GAME THEORY: Two person Zero Sum Games – Mixed strategy games and their algorithms.

REFERENCES

- L.C. Jhamb, Quantitative Techniques, Everest Publishing house. **ISBN** : 4567162447, 1234567162444
- Handy A Taha, Operations Research – An Introduction, Pearson Education **ISBN** 0-13-1889234
- PanneerSelvan, Operations Research, Prentice Hall of India **ISBN** 10: 8120329287 **ISBN**13: 9788120329287

Course Code: **CA-8.4 Network Programming** *Clock Hours:* **60**

Total Marks: **100**

UNIT –I **[10-M] [08-L]**

INTERNET BASICS: What Is Internet, What Special About Internet? Dial Up Connection/Direct Connection; Slip Or PPPWWW: The Client Site, Server Site, Web Pages In HTML, CGI Programming Overview, Environment Variables, Difference Between HTML And DHTML, ECOM And Portals.

UNIT – II **[15-M] [08-L]**

INTERNET INTERNALS: Transmission Control Protocol/Internet Protocol (TCP/IP), FTP, HTTP, WAIS (Wide Area Information Service) TELNET, Domain Name System: Name for Machine, Flat Name Space, Hierarchical Names Internet Domain Names, Domain Name Resolution.

UNIT – III **[15-M] [10-L]**

NETWORK ADDRESSING: IP address, Physical address, Port address, Concepts & examples. IP Address, Electronic Mail Address, URL, E-Mail Basic, SMTP IPv4 , IPv6 addressing Concepts & examples, Differences ARP, RARP, BOOTP, DHCP

UNIT – IV **[15-M] [10-L]**

CLIENT SERVER SOFTWARE ISSUES The Client Server Model and Software design, Socket Interface, Concurrent Processing in Client-Server Software , Program Interface to Protocol, Algorithms and Issues in Client Software design, example Client Software,

UNIT – V **[15-M] [09-L]**

SERVER PROGRAMMING: Algorithms & Issues in Server Software Design, Iterative Connectionless Server, Iterative Connection Oriented Server, Single Process Concurrent Server , Concurrent Connection Oriented Server, Multiprotocol Server , Multi-Service Server, Super Server, Chat Server.

UNIT – VI **[10-M] [05-L]**

REMOTE PROCEDURE CALL: External Data Representation, Remote Procedure Call concept, RPCgen concept, Network File System (NFS).

UNIT – VII **[10-M] [10-L]**

BASICS OF SOCKET PROGRAMMING IN JAVA : Creating Socket, Sending & Receiving Data through a Socket, using Socket for Client Server, TCP Server, UDP Server.

REFERENCES

- Douglas E. Corner, David Stevens , Intranetworking with TCP/IP , volume III Client Server Programming and Applications, , PHI ,ISBN-81-7808-488-0.
- Douglas E. Corner, David Stevens, Internetworking with TCP/IP, volume I, Principles protocols & Architecture, 3rd edition, PHI , ISBN - 81-203-1053-5.

- Douglas E. Corner, David Stevens , Internetworking with TCP/IP , volume II Design Implementation, and internals, 3rd edition , , PHI., ISBN -81-203-0927-8,
- Scringer LaSalle, Parihar Gupta, Hungry Minds, TCP/IP Bible, 1st edition , IDG Looks India (P) Ltd.
- Lydia Parziale,David T. Britt, Chuck Davis(2006) ,TCP/IP Tutorial and Technical Overview, 8th edition, IBM Redbooks.
- Kenneth L. Calvert and Michael J. Donahoo (2009) , TCP/IP Sockets in Java: Practical Guide for Programmers, ; 2 edition, Morgan Kaufmann , ISBN: 0123745403

Course Code: **CA-8.5 Internet Programming with ASP.NET** *Clock Hours:* **60**
Total Marks: **100**

UNIT-I **[04-M] [02-L]**

INTRODUCING ASP.NET MVC 4: What Is ASP.NET?,ASP.NET Web Forms, ASP.NET Web Pages, ASP.NET MVC, The MVC Pattern, When to Use ASP.NET MVC, ASP.NET MVC Benefits, ASP.NET MVC Request Processing, ASP.NET MVC 4 Features

Installing ASP.NET MVC 4 : Software Requirements for ASP.NET MVC 4,Installing ASP.NET MVC 4 Development Components, Installing ASP.NET MVC 4 Server Components, Visual Studio Application Templates, Anatomy of an ASP.NET MVC 4 Internet Application

UNIT-II **[06-M] [04-L]**

THE "HAVE YOU SEEN ME?" ASP.NET MVC 4 WEB APPLICATION: Description of the Application, Administrative Section, Public Section, Members Section, Creating the ASP.NET MVC 4 Sample Application, Creating the Database, Defining Scripts to Create Database Tables, Running the Scripts

UNIT-III **[06-M] [04-L]**

CONTROLLERS: The Routing Engine, Creating Controllers, Working with Action Methods, Using File Result, Using HttpStatusCodeResult, UsingHttpNotFoundResult

UNIT-IV **[09-M] [06-L]**

VIEWS : Understanding View Engines, Working with Views,The Rendering Process, Understanding the Razor View Engine, Working with HTML Helper Methods, Working with View Data and View Bag, Working with strongly Typed Views, Introducing ASP.NET MVC 4 Mobile Features

UNIT- V **[08-M] [06-L]**

MODELS What Are Models? Creating the Data Model, What Are ORMs?Adding the Entity Framework Model, Adding a Business Model, Adding View Models, Understanding Model Binding

UNIT-VI **[09-M] [06-L]**

DATA VALIDATION: The Validation Workflow, Manual Validation, Validation with Data Annotations, Creating Custom Data Annotations

UNIT-VII **[10-M] [08-L]**

AJAX AND JQUERY : Introducing jQuery, Working with jQuery, jQuery Selectors, Event Handling with jQuery, Understanding Unobtrusive JavaScript, Working with Ajax, Triggering Ajax Calls, Creating Ajax Forms, Creating Ajax Action links, Implementing Ajax Callbacks, Making Ajax Requests Directly with jQuery, Working with JSON, Returning JSON from an Action Method, Using JSON in the Browser, Introducing Web API, Using the ASP.NET MVC 4 Web API Project Template, Creating Web API Controllers,

UNIT-VIII **[012-M] [08-L]**

SECURITY : Authentication and Authorization, Using Windows Authentication, Using Forms Authentication, Securing Controllers and Action Methods, Authenticating with External Sources, , Implementing Membership and Roles, Configuring ASP.NET Membership and Roles, Using the ASP.NET Simple Membership API, Using the ASP.NET Membership API,

UNIT-IX **[012-M] [08-L]**

ROUTING: Routing Concepts, URL Pattern, Routes, Creating Custom Routes, Creating a Catch-all Segment, Adding Constraints to Routes.

UNIT-X **[014-M] [08-L]**

TESTING THE APPLICATION: Understanding Unit Testing, Defining a Unit Test, Structure of Unit Tests, Understanding Isolation, Naming Unit Tests, Testing Frameworks, Benefits of Unit Testing, Examining the Test Project, Creating a Test Project, Running Tests, Testing Business Models.

REFERENCES

- Jose Rolando Guay Paz (2013) , Beginning ASP.NET MVC 4, Apress Publication, ISBN: 978-1430257523
- Adam Freeman (2013), Pro ASP.NET MVC 4, Fourth Edition, Apress Berkely, ISBN: 1430242361 9781430242369.
- Brad Wilson, K. Scott Allen, David Matson Jon Galloway (2013), Professional ASP.NET MVC 5, WROX Publication

Course Code: **CA-8.6 Lab on Network Programming** *Total Marks*: **100**

Note:-

- All assignments are to be implemented using C language in Linux.
- Install Ubantu /Fedora/ Red hat Linux
- Encourage students to demonstrate the experiments using networking between two
- separate machines for Client-Server programs.
- Encourage students to do at least one simple assignment using JAVA on Linux.

1) Implement TCP and UDP Client-Server programs for following services:
   a) Echo Service
   b) Day Time Service
   c) Chargen Service
   d) Mathematical Operation on numbers
   e) Checking number for prime, palindrome etc.
   f) Calculating factorial
   g) Calculating Fibonacci series
   h) Case conversion in given string
2) Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using single process.
3) Implement Client-Server programs for demonstrating working of Concurrent Connection Oriented Servers using multiple processes.
4) Implement Telnet Server program for providing different types of Telnet Services.
5) Demonstrate and implement the file transfer using FTP.
6) Demonstrate and implement Multiprotocol server.
7) Demonstrate and implement multiservice server.
8) Develop the Chat server program. The Server should be concurrent such as to provide Intercommunication between multiple clients with following feature
   a) Minimum 2 clients communicate with each other through chat server
   b) Each client makes registration, sending its name to server
   c) Client sends “Who” message to server to receive list of Active Clients.
   d) Sends “Hello to Client_Name”, from the active client list to initiate the chatting.
   e) Both clients communicate with each other.
   f) Terminates chat with “good bye” message.

Course Code: **CA-8.7 Lab on Internet Programming with ASP.NET** *Total Marks*: **100**

1) Design & Develop ASP.NET MVC Controller.
2) Design & Develop Model Templates using Metadata for data values.
3) Demonstrate ASP.NET MVC for Model Validation.
4) Design & Develop to demonstrate working with razor engine.
5) Design & Develop to demonstrate working ASPX view to razor view.
6) Design & Develop to demonstrate adding dynamic content to a razor view.
7) Design & Develop to demonstrate pactial views.
8) Demonstrate routing mechanism in ASP.NET MVC application.
9) Demonstrate routing with respect to using parameters, using constraints.
10) Demonstrate actions in areas for ASP.NET MVC application.
11) Demonstrate routing & URL generation with areas in ASP.NET MVC.
12) Design & Develop sample ASP.NET MVC application using JQuery.
13) Design & Develop web API controllers for ASP.NET MVC application.
14) Demonstrate database connectivity using ASP.NET MVC application.
15) Demonstrate roles and membership in ASP.NET MVC application.
16) Design and Develop ASP.NET web-api and using in Web Application.

SEMESTER – IX

Course Code: **CA-9.1 Natural Language Processing** *Clock Hours:* **60**
Total Marks: **100**

UNIT-I **[10-M] [06-L]**

INTRODUCTION TO NLP Brief History, Study of Language and Linguistic background, syntactical elements of language, grammar and sentence structure, NL tasks: Segmentation, Chunking, tagging, and Parsing. Concept of Ambiguity in language, need of Resolving ambiguity, Examples of Named Entity Recognition and Word sense disambiguation in English.

UNIT-II: **[10-M] [06-L]**

APPLICATION AND RESEARCH AREAS OF NLP : Speech to Text conversion, Story understanding, Question Answer System, Machine Translation (Examples of English to Marathi or Hindi), Text summarization, text classification, Sentiment Analysis; Text Entailment; Cross Lingual Information Retrieval (CLIR).

(Note: Students should be given group assignment and encouraged to read research papers and give presentations with internal evaluation on any one of above topics)

UNIT-III **[15-M] [08-L]**

MATHEMATICAL FOUNDATION: Elementary Probability Theory: Probability, conditional probability and independence, Bayes Theorem, Bayesian Statistics, Concepts: Maximum Likelihood estimation, Entropy, Noisy channel model.

UNIT-IV **[20-M] [13-L]**

LINGUISTIC ESSENTIALS AND GRAMMARS : Part of Speech : Word categorization, word forms and POS tagging , English Grammar and POS tags : noun, verb, adjective, determiners, adverbs, prepositions, particles, Phrases Structure: Noun Phrase, Verb Phrase, Prepositional Phrases, Phrase Structure: Penn tree bank, Tree, bracketed representations, ambiguity in phrase structure formation, Semantics & Pragmatics.

Parsing: Shallow Parsing; Named Entities; Parsing Algorithms: Top-Down, Bottom-up parsing, Comparison of both approaches, Context Free Grammar, Transition Networks: Finite State Machine, Recursive Transition Network. Chomsky Normal Form, CKY algorithm, The Earley Algorithm, dependency parsing;

UNIT-V: **[15-M] [12-L]**

WORDS AND MORPHOLOGY : Fundamental terminology of English Morphology, Minimum Edit Distance, Morphological Diversity of Indian Languages; Morphology Paradigms: inflectional, derivational morphology, Cliticization, Human Brain in Morphology, Construction of Finite State Lexicons, Finite State Transducers and Morphological Parsing; Lexicon Free FST: Porter Stemmer, Sentence Segmentation,

UNIT-VI **[10-M] [08-L]**

N-GRAM MODELS : Word Counting, Simple N-Gram model, Training Corpus, Information Theory, Cross Entropy, Sequence Classifier: Machine learning using Markov Chain, Hidden Markov Model, Verterbi Algorithm, Forward-Backward Model, Maximum Entropy Models.

UNIT-VII **[10-M] [07-L]**

SEMANTICS AND MEANING : Lexical Knowledge Networks, Thesaurus, Wordnet Theory; Indian Language Wordnets and Multilingual Dictionaries; Semantic Roles; Word Sense Disambiguation; Word Similarity: Distributional Method, Term Vector Similarity, Application: Information Retrieval.

REFERENCES

- Allen, James [1995], Natural Language Understanding, Second Edition, Benjamin/Cumming, ISBN : 0805303340, 9780805303346
- Charniack, Eugene [1993], Statistical Language Learning, MIT Press, ISBN : 0262531410, 9780262531412
- Jurafsky, Dan and Martin, James [2008], Speech and Language Processing, Second Edition, Prentice Hall, ISBN : 0130950696
- Manning, Christopher and Heinrich, Schutze [1999], Foundations of Statistical Natural Language Processing, MIT Press,
- Bharati, Akshar, et al. [1995] Natural language processing: a Paninian perspective, New Delhi: Prentice-Hall of India ISBN : 9788120309210

Course Code: **CA-9.2 Compiler Construction** *Clock Hours:* **60**

Total Marks: **100**

UNIT – I **[10-M] [10-L]**

INTRODUCTION TO COMPILATION: Compiler Basics, Issues in Compilation, Phases of Compilation: the Analysis – Synthesis Model, Compiler Construction Tools.

UNIT – II **[15-M] [10-L]**

DESIGNING A LEXICAL ANALYZER : Role of Lexical Analysis, Input Buffering, Specification of Tokens, Recognition of Tokens, Finite automata, Conversion from regular expression to NFA, Deterministic finite automata, Conversion from NFA to DFA, Minimization of DFA.

UNIT – III **[25-M] [20-L]**

DESIGNING SYNTAX ANALYZER : Role of Syntax Analyzer, Classification of parsers, Top-Down Parsing: Introduction, Problems in top-down parsing, Recursive Parsing, Problems in Recursive Procedures, Predictive Parsing, Error Handling in Predictive Parsers, Bottom Up Parsing: Shift Reduce Parser, Actions of shift reduce parser, Construction of parse tree, Operator Precedence Parsing, Components of operator precedence parsers, Parsing action, Construction of operator precedence parsers, Advantages and disadvantages of operator precedence Parsing. LR Parsing: Simple LR parser, LR(1) parser, LALR parser.

UNIT – IV **[15-M] [10-L]**

INTERMEDIATE CODE GENERATION: Need For Intermediate Code Generation, Intermediate Forms: Polish Notation, Quadruples, Triples, Indirect Triples & Blocks.

UNIT – V **[15-M] [05-L]**

CODE OPTIMIZATION : Introduction, need for code optimization, Classification of code optimization techniques: Optimization techniques that work on machine code, Optimization techniques that work on intermediate forms of source code i.e. Optimization with in Basic Blocks: Folding, Redundant operation elimination, Optimization with in Loop: Strength Reduction, Dead code elimination, Moving operation within block out of block.

UNIT – VI **[10-M] [05-L]**

SYMBOL TABLE ORGANIZATION: Introduction, Methods of organizing a symbol table: Unsorted, sorted symbol tables, binary search, hashing, its advantages, disadvantages, Collision, collision resolution techniques: Rehashing, Chaining.

REFERENCES

- Aho A.V., R. Sethi and J.D. Ullman,Addison Wesley, (1986) Compiler Principle Techniques and Tools , , ISBN: 978-0201100884

- Barret, Couch (1979), Compiler Construction Theory and Practice, , Revised edition edition, Sra , ISBN: 978-0574213358 .
- Dhamdhere D.M (1983), Compiler Construction Principle and Practice, Macmillan India ISBN: 0333904060, 9780333904060
- Gres D. (1971),Compiler Construction for Digital Computer, First Edition, Wiley, ISBN: 978-0471327769

Course Code: **CA-9.3 Drupal and CMS** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[15-M] [08-L]**

INTRODUCING AND INSTALLING DRUPAL : History of Drupal, The Drupal community, Professional support , The Drupal association, Installing a single Drupal website, Installation Profiles, Installing Drupal in Different Languages, Core Files ,Sites Folder, What's in a Site's Folder, Inheritance and Overrides.

UNIT-II **[20-M] [12-L]**

YOUR FIRST DRUPAL WEBSITE : Adding Content ,Differences between Articles and Pages ,Content Summaries , Modifying the Defaults, Modifying your Menus, Adding Blocks to your website, Getting in contact, Adding the Contact Form to Your Main Menu, Summing Up the Contact Form ,Exploring your site's permissions, Creating a members-only site, Exploring Roles, Wrapping up Users and Permissions.

UNIT-III **[25-M][16-L]**

ADMINISTRATION-CONFIGURATION, MODULES AND REPORTING : Configuration, System Site Information, System Actions, Regional and Language Settings, Media File System, Temporary Directory, PHP File Size Limitations, Media Image Toolkit, Web Services, Web Services RSS Publishing, Web Services Feed Aggregator, Content Authoring Text Formats, Explore the filtered html text format, Choosing Roles and the Importance of the Order.

UNIT-IV [15-M] [12-L]

ADMINISTRATION--BLOCKS, MENUS, THEMES AND CONTENT : Blocks, Block Visibility, Block Visibility Using PHP, Menus, Adding a Menu Link Directly on Content, Menu Settings, URL aliases aka custom paths, Themes, Theme Global Settings, Content, Nodes, Creating Custom Content types, Submission Form Settings, Publishing Options, Display Settings, Comment Settings, Menu Settings, Adding an Image Upload Field, Multiple Fields for Multiple Images, Permissions, Digging Deeper into Fields, Content Construction Kit (CCK),Views, Content Moderation, Comments, Permissions.

UNIT-V **[15-M][12-L]**

USER MANAGEMENT Creating User Accounts, Creating Accounts, Canceling Accounts, Setting Up Account E-Mails, using OpenID, Creating Roles and Permissions, Creating Custom User Profiles, User Sessions.

REFERENCES

- Jacob Redding, Beginning Drupal (Wrox Final), ISBN: 978-0-470-43852-7
- John VanDyk, Pro Drupal 7 Development, ISBN: 978-1-4302-2838-7; Edition Number: 3.
- James Barnett, Drupal 8 for Absolute Beginners, ISBN-13: 9781430264668

Course Code: **CA-9.4 Mobile Computing Trends** *Clock Hours:* **60**
Total Marks: **100**

UNIT-I **[06-M] [04-L]**

BASICS: Environment Setup, Architecture, Application Components, Hello World application.

UNIT-II **[10-M] [10-L]**

RESOURCES: Resources, Activities, Services, Broadcast Receivers, Content Providers, Fragments, Intents/Filters,

UNIT-III **[12-M] [10-L]**

USER INTERFACE : UI Layouts, UI Controls, Event Handling, Styles and Themes, Custom Components.

UNIT-IV: ADVANCED CONCEPTS **[20-M] [10-L]**

Drag and Drop, Notifications, Location Based Services, Sending Email, Sending SMS, Phone Calls, Publishing Android Application

UNIT-V: UI COMPONENTS **[30-M] [20-L]**

Alert Dialogs, Animations, Audio Capture, Audio Manager, Auto Complete, Best Practices, Bluetooth, Camera, Clipboard, Custom Fonts, Data Backup, Developer Tools, Emulator, Gestures, Google Maps, Image Effects, Image Switcher, Internal Storage, Login Screen, Media Player, Multitouch, Navigation, Progress Bar, Push Notification, Render Script, RSS Reader, Screen Cast.

UNIT-VI: SQLITE **[12-M] [06-L]**

Understanding SQLite database generation, SQLite database management, Connection with SQLite, retrieving data from SQLite, storing data in database from application.

REFERENCES

- Android Studio Cookbook , Packt Publishing ISBN-10: 1785286188
- Learn Android Studio ISBN-10: 1430266015.
- Murat Yener, Onur Dundar , Expert Android Studio,. ISBN: 978-1-119-08925-4
- Jerome F. Di Marzio, Beginning Android Programming with Android Studio, ISBN – 1118707427

Course Code: **CA-9.5 Programming in Python** *Clock Hours:* **60**

Total Marks: **100**

UNIT-I **[06-M] [04-L]**

PROGRAMMING BASICS AND STRINGS : The First Steps, Installing Python 3.1 on Non-Windows Systems, Using the Python Shell, Beginning to Use Python — Strings, What is a String?, Why the Quotes?, Why Three Types of Quotes?, Using the print() Function, Understanding Different Quotes, Putting Two Strings Together, Joining Strings with the Print() Function, Putting Strings Together in Different Ways

UNIT-II: **[15-M] [10-L]**

NUMBERS, OPERATORS, VARIABLES AND STATEMENTS : Different Kinds of Numbers, Numbers in Python, Using the Different Types, Basic Math, Some Surprises, Using Numbers, Order of Evaluation, Number Formats, Referring to Data — Using Names for Data, Changing Data Through Names, Copying Data, Naming Rules, Using More Built-in Types, Tuples, Lists, Dictionaries, Treating a String Like a List, Special Types, Other Common Sequence Properties, Referencing the Last Elements, Ranges of Sequences, Growing Lists by Appending Sequences, Comparing Values, Not Equal More Than or Equal, Less Than or Equal, Reversing True and False, Results of More Than One Comparison, How to Get Decisions Made, Repetition, How to Do Something — Again and Again, Stopping the Repetition, Handling Errors

UNIT-III: **[09-M][06-L]**

FUNCTIONS : Putting Your Program into Its Own File, Functions: Grouping Code under a Name, Choosing a Name, Describing a Function in the Function, The Same Name in Two Different Places, Making Notes to Yourself, Asking a Function to Use a Value You Provide, Checking Your Parameters, Setting a Default Value for a Parameter—Just in Case, Calling Functions from within Other Functions, Functions Inside of Functions, Flagging an Error on Your Own Terms, Layers of Functions, How to Read Deeper Errors

UNIT-IV: **[09-M] [06-L]**

CLASSES, OBJECTS AND ORGANIZING PROGRAMS : Thinking About Programming, What is an Object?, Objects You Already Know, Looking Ahead: How You Want to Use Objects, Defining a Class, How Code Can Be Made into an Object, Objects and Their Scope, Modules : Importing a Module So That You Can Use It, Making a Module from Pre-existing Code, Using Modules — Starting with the Command Line, Changing How Import Works — Bringing in More, Packages, Modules and Packages, Bringing Everything into the Current Scope, Re-importing Modules and Packages

UNIT-V **[06-M] [04-L]**

FILES AND DIRECTORIES : File Objects, Writing Text Files, Appending Text to a File, Reading Text Files, File Exceptions, Paths and Directories, Exceptions in os, Paths, Directory Contents, Obtaining Information about Files, Renaming, Moving, Copying, and Removing Files, Example: Rotating Files, Creating and Removing Directories, Globbing

UNIT-VI **[09-M] [06-L]**

OTHER FEATURES OF THE LANGUAGE : Lambda and Filter: Short Anonymous Functions, Map: Short-Circuiting Loops, Decisions within Lists — List Comprehension,

Generating Iterators for Loops, Special String Substitution Using Dictionaries, Featured Modules, Getopt — Getting Options from the Command Line, Using More Than One Process, Threads — Doing Many Things in the Same Process

UNIT-VII **[06-M] [04-L]**

TEXT PROCESSING : Why Text Processing Is So Useful, Searching for Files, Clipping Logs, Sifting through Mail, Navigating the File System with the OS Module, Working with Regular Expressions and the re Module

UNIT-VIII **[12-M] [08-L]**

WRITING A GUI WITH PYTHON : GUI Programming Toolkits for Python, Tkinter Introduction, Creating GUI Widgets with Tkinter, Resizing the Widget, Configuring Widget Options, Putting the Widgets to Work, Creating Layouts, Packing Order, Controlling Widget Appearances, Radio Buttons and Checkboxes, Dialog Boxes, Other Widget Types

UNIT-XI **[09-M] [06-L]**

ACCESSING DATABASES : Working with DBM Persistent Dictionaries, Choosing a DBM Module, Creating Persistent Dictionaries, Accessing Persistent Dictionaries, Deciding When to Use DBM and When to Use a Relational Database, Working with Relational Databases, Writing SQL Statements, Defining Tables, Setting Up a Database, Using the Python Database APIs, Downloading Modules, Creating Connections, Working with Transactions and Committing the Results

UNIT-X **[09-M] [06- L]**

USING PYTHON FOR XML : What Is XML?, A Hierarchical Markup Language, A Family of Standards, What Is a Schema/DTD?, What Are Document Models For?, Do You Need One?, Document Type Definitions, An Example DTD, DTDs Aren't Exactly XML, Limitations of DTDs, Schemas, An Example Schema, Schemas Are Pure XML, Schemas Are Hierarchical, Other Advantages of Schemas, XPath, HTML as a Subset of XML, The HTML DTDs, HTMLParser, XML Libraries Available for Python

REFERENCES

- Allen B. Downey, O'Reilly [2012], Think Python, 1st Edition, ISBN-10: 144933072X / ISBN-13: 978-1449330729
- T Hall and J-P Stacey [2009], Python 3 for Absolute Beginners, Apress, 1st Edition, ISBN-10: 1430216328 / ISBN-13: 978-1430216322
- Peter C. Norton, Alex Samuel and others [2005], Beginning Python, Wrox, 1st Edition, ISBN-10: 0764596543 / ISBN-13: 978-0764596544
- Luke Sneeringer, Wrox [2015], Professional Python, ISBN-10: 1119070856 / ISBN-13: 978-1119070856
- James Payne, Wrox [2010], Beginning Python: Using Python 2.6 and Python 3.1, ISBN-10: 0470414634 / ISBN-13: 978-0470414637

- Michael Urban and Joel Murach [2016], Murach's Python Programming , Murach Publication, ISBN-10: 1890774979 / ISBN-13: 978-1890774974

Course Code: **CA-9.6 Lab on Drupal and CMS** *Total Marks*: **100**

1. How to Create a Custom Block
2. How to Use PHP to Control Block Visibility
3. How to Add a New Link to the Main Menu
4. How to Create a Custom Path for the About Page
5. How to Adding an Image Field to your Gossip Content
6. How to Modify the Display Settings of Your Image Field
7. How to Add a CCK Field to Your Gossip Content Type
8. How to Enabling Comment Moderation
9. How to Import an RSS Feed
10. How to Enabling User Account Moderation
11. How to Unblocking New User Accounts
12. How to Customizing Your Welcome E-mail.
13. How to Creating a New Role

Course Code: **CA-9.7 Lab on MCT & Python** *Total Marks*: **100**

-- Lab on MCT –

1. Create an Android application for printing "Hello world".
2. Create an Android application for showing use of different resources.
3. Create an Android application for showing use UI Layouts.
4. Create an Android application for event handling.
5. Create an Android application for showing use of style and theme.
6. Create an Android application for showing use of notification.
7. Create an Android application for sending email.
8. Create an Android application for sending SMS.
9. Create an Android application for showing use of Alert Dialogs, Animations.
10. Create an Android application for showing use of Image Effects, Image Switcher.
11. Create an Android application for showing use of Login Screen.
12. Create an Android application for showing use of Progress Bar, Push Notification.
13. Create an Android application for showing use of RSS Reader.

-- Lab on Python --

1. Introduction to Python Programming

a. Installing python and setting up environment on Windows / Non-Windows Systems.

b. Program to demonstrate use of the Python Shell.

2. Programming Basics Numbers, Operators and Strings

a. Practical to based on Strings, Putting Two Strings Together, Joining Strings with the Print() Function, Putting Strings Together in Different Ways.

b. Practical based on Simple statements using Variables, Built-in Data Types, Arithmetic operations, etc.

3. Variables, Tuples, Lists and Dictionaries

a. Practical based on using Tuples, Lists, Dictionaries.

4. Making Decisions

a. Programs based on decision and looping statements, for statement and the range function; interactively using the built-in functions len, sum, max, min.

5. Functions

a. Programs based on using Functions, Function with parameters, Default Value for a Parameter.

b. Programs based on Functions Inside of Functions, Layers of Functions.

6. Classes and Objects

a. Program to demonstrate Defining a Class and Object.

7. Organizing Programs

a. Practical to Create, Import and use Package and Modules.

8. Files and Directories

a. Program to Writing Text Files, Appending Text to a File, Reading Text Files.

b. Program to demonstrate Paths and Directories, File Information, Renaming, Moving, Copying, and Removing Files.

9. Other Features of the Language

a. Programs using Anonymous Functions - Lambda and Filter.

b. Programs using Maps, List Comprehension, Dictionaries.

c. Program using Command Line and Getting Options from the Command Line – Getopt.

d. Program based on using Threads.

10. Building a Module

a. Practical based on Creating Modules and Packages.

b. Program based on Creating Classes, Extending Existing Classes.

11. Text Processing

a. Program based on Text Processing, Searching for Files.

b. Working with Regular Expressions and using the re Module.

12. Writing a GUI with Python

a. Program creating Types of GUI Widgets, Resizing, Configuring Options.

b. Programs Creating Layouts, Packing Order, Controlling Widget Appearances.

13. Accessing Databases

a. Practical based on using DBM - Creating Persistent Dictionaries and Accessing Persistent Dictionaries.

b. Practical based on using Relational Database - Writing SQL Statements, Defining Tables, Setting Up a Database.

c. Practical based on using Using the Python Database APIs, Creating Connections, Working with Transactions and Committing the Results.

14. Using Python for XML

a. Program to demonstrate processing XML document, using XML Libraries

b. Program to demonstrate HTML Parsing.

CA-10: Full Time Industrial Training

Maximum Total Marks: **300**

The full Industrial training project course, which will commence in tenth semester and the final work and report shall be completed at the end of tenth semester of Integrated MCA. The student is expected to work on software development project. The project work should have coding part. The student will have to submit the bound project report in the university prescribed format at the end of semester. The student will have to appear for the project viva-voce and the marks will be allotted at the end of tenth semester of Integrated MCA.