MASTER OF SCIENCES
COMPUTERSCIENCES

SYLLABUS & REGULATIONS

WITH EFFECT FROM 2025-2026

M.Sc. COMPUTER SCIENCES
P.G. Degree Programme (CBCS) Regulations-2016
Amended as per NEP-2020
(with effect from the batch admitted in the academic year 2024-25)
CHOICE BASED CREDIT SYSTEM (CBCS)

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)
SRI VENKATESWARA UNIVERSITY
Accredited by "NAAC" with A+ Grade
Tirupati, Andhra Pradesh - 517502

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)
SRI VENKATESWARA UNIVERSITY::TIRUPATI
S.V.U.COLLEGE OF SCIENCES
DEPARTMENT OF COMPUTER SCIENCES**S**

(Revised Scheme of Instruction and Examination, Syllabus etc., (with effect from the Academic Years 2024-2025)

M.Sc., - COMPUTER SCIENCES

Semester-I

Sl. no	Code	Title of the course	Hrs/ week	No. of Credits	Uni. Exams (Hour	IA	Semester end exam	Total Marks
1.	CS 101	**Computer Organization**	**6**	**4**	**3**	**30**	**70**	**100**
2.	CS 102	**Object Oriented Programming through JAVA**	**6**	**4**	**3**	**30**	**70**	**100**
3.	CS 103	**Operating Systems**	**6**	**4**	**3**	**30**	**70**	**100**
4.	CS 104	Mathematical Foundations for Computer Science(Descrete Maths)	**6**	**4**	**3**	**30**	**70**	**100**
5.	CS 105	**Design and Analysis of Algorithms**	**6**	**4**	**3**	**30**	**70**	**100**
6.	CS 106	**Practical –I(JAVA)**	**6**	**4**	**3**	**30**	**70**	**100**
7.	CS 107	**Practical –II(Operating Systems)**	**6**	**4**	**3**	**30**	**70**	**100**
		TOTAL	**42**	**28**		**210**	**490**	**700**

Semester-II

Sl. no	Code	Title of the course	Hrs/ week	No. of Credits	Uni. Exams (Hour	IA	Seme-ster end exam	Total Marks
1.	CS 201	**Cryptography and Network Security**	**6**	**4**	**3**	**30**	**70**	**100**
2.	CS 202	**Python Programming**	**6**	**4**	**3**	**30**	**70**	**100**
3.	CS 203	**Software Engineering**	**6**	**4**	**3**	**30**	**70**	**100**
4.	CS 204	**Artificial Intelligence**	**6**	**4**	**3**	**30**	**70**	**100**
5.	CS 205	**Computer Vision**	**6**	**4**	**3**	**30**	**70**	**100**
6.	CS 206	**Practical –I (Cryptography and Network Security)**	**6**	**4**	**3**	**30**	**70**	**100**
7	CS 207	**Practical –II (Python Programming)**	**6**	**4**	**3**	**30**	**70**	**100**
		TOTAL	**42**	**28**		**210**	**490**	**700**

Semester-III

Sl. no	Code	Title of the course	Hrs/ week	No. of Credits	Uni. Exams (Hour	IA	Seme-ster end exam	Total Marks
1.	CS 301	Cloud Computing	**6**	**4**	**3**	**30**	**70**	**100**
2.	CS 302	Computer Graphics	**6**	**4**	**3**	**30**	**70**	**100**
3.	CS 303	Natural Language Processing	**6**	**4**	**3**	**30**	**70**	**100**
4.	CS 304	Machine Learning	**6**	**4**	**3**	**30**	**70**	**100**
5.	CS 305	Big Data Analytics	**6**	**4**	**3**	**30**	**70**	**100**
6.	CS 306	Devops	**6**	4	**3**	**30**	**70**	**100**
7	CS 307	Practical I on Core -Cloud Computing	**6**	4	**3**	**30**	**70**	**100**
8	CS 308	Minor Project work	**6**	**4**	**3**	**30**	**70**	**100**
		TOTAL	**48**	**32**		**240**	**560**	**800**

Semester-IV

Sl. no	Code	Title of the course	Hrs/ week	No. of Credits	Uni. Exams (Hour	IA	Seme-ster end exam	Total Marks
1.	CS 401	MajorProjectWork	**24**	**12**	**3**	**100**	**200**	**300**
		TOTAL	**24**	**12**	**3**	**100**	**200**	**300**
AllSemesters - Total				**24**				**2500**

CENTRE FOR DISTANCE AND ONLINE EDUCATION (CDOE)
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M.Sc., - COMPUTER SCIENCES
Semester-I

CS 101: Computer Organization

UNIT-I

DIGITAL COMPUTERS, REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS AND BASIC COMPUTER ORGANIZATION AND DESIGN

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT-II

MICROPROGRAMMED CONTROL AND CENTRAL PROCESSING UNIT

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT-III

DATA REPRESENTATION, COMPUTER ARITHMETIC and INPUT-OUTPUT ORGANIZATION

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT-IV

REDUCED INSTRUCTION SET COMPUTER

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

REFERENCE BOOKS

1. Computer Organization and Architecture Dr. P. Santosh Kumar Patra, Dr. B. MadhavaRao, Dr. B. Rajalingam, SunRaise International Publishers
2. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.
3. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, V th Edition, McGraw Hill.
4. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
5. Structured Computer Organization – Andrew S. Tanenbaum, 4 th Edition, PHI/Pearson.

CS 102:OBJECT ORIENTED PROGRAMMING THROUGH JAVA

UNIT-I

OBJECT ORIENTED THINKING AND JAVA BASICS

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT-II

INHERITANCE, PACKAGES AND INTERFACES

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT-III

EXCEPTION HANDLING AND MULTITHREADING

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception subclasses. String handling, Exploringjava.util. Differences between multithreading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, autoboxing, annotations, generics.

UNIT-IV

EVENT HANDLING and APPLETS

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

REFERENCE BOOKS

1. Object Oriented Programming through Java, Dr. P. Santosh Kumar Patra, Dr. R. Santhosh Kumar, Ms. Afreen Begum, Surneni International Book Publishers
2. Java the complete reference, 7th edition, Herbert schildt, TMH.
3. Understanding OOP with Java, updated edition, T. Budd, Pearson education.
4. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley& sons.
5. An Introduction to OOP, third edition, T. Budd, Pearson education.
6. Introduction to Java programming, Y. Daniel Liang, Pearson education.
7. An introduction to Java programming and object-oriented application development, R.A. Johnson- Thomson.
8. Core Java 2, Vol 1, Fundamentals, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education.
9. Core Java 2, Vol 2, Advanced Features, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education
10. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
11. Java and Object Orientation, an introduction, John Hunt, second edition, Springer. Maurach‟s Beginning Java2 JDK 5, SPD.

CS 103:Operating Systems

UNIT-I INTRODUCTION

Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT-II

CPU SCHEDULING

CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling. System call interface for process management-fork, exit, wait, waitpid, exec Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

UNIT-III

PROCESS MANAGEMENT AND SYNCHRONIZATION

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors Interprocess Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT-IV

MEMORY MANAGEMENT, FILE SYSTEM INTERFACE AND OPERATIONS

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

REFERENCE BOOKS

1. Operating System, Dr. V. K. SenthilRagavan, Mrs. E. Soumya, Mr. P. Mahesh, Spectrum University Press

2. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.

3. Advanced Programming in the UNIX environment, W.R. Stevens, Pearson education.

4. Operating Systems- Internals and Design Principles, William Stallings, Fifth Edition–2005, Pearson Education/PHI

5. Operating System A Design Approach- Crowley, TMH.

6. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI

7. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education

8. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

CS104:Mathematical Foundations for Computer Science

UNIT-I
MATHEMATICAL LOGIC

Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT-II
SET THEORY AND ALGEBRAIC STRUCTURES

Set Theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.

UNIT-III
ELEMENTARY COMBINATORICS

Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT-IV
GRAPH THEORY

Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler‟s Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

REFERENCE BOOKS

1. Discrete Mathematics, Dr. P. Santosh Kumar Patra, Dr. D. Ranadheer Reddy, Mr. K. Upender Reddy, Spectrum University Press
2. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
3. Discrete Mathematics for Computer Scientists & Mathematicians: Joe l. Mott, Abraham Kandel, Teodore P. Baker, Prentis Hall of India, 2nd ed.
4. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearson education, 5th edition.
5. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

CS 105: Design and Analysis of Algorithms

UNIT-I

INTRODUCTION

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations- Big oh notation, Omega notation, Theta notation and Little oh notation.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II

GREEDY METHOD, BASIC TRAVERSAL AND SEARCH TECHNIQUES

Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected components, Biconnected components.

UNIT-III

DYNAMIC PROGRAMMING, DISJOINT SETS & BACKTRACKING

Dynamic Programming: General method, applications- Optimal binary search tree, 0/1 knapsack problem, All pairs shortest path problem, Traveling salesperson problem, Reliability design.

Disjoint Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graphColoring, hamitonian cycles.

UNIT-IV

BRANCH & BOUND, NP-HARD & NP-COMPLETE PROBLEMS

Branch and Bound: General method, applications - Traveling salesperson problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP-Hard and NP-Complete classes, Cook's theorem.

REFERENCE BOOKS

1. Algorithm Design and Analysis, Dr. P. Santosh Kumar Patra, Dr. V. K. SenthilRagaven, Dr. K. Srinivas, Dr. N. Krishnaiah, Sun Techno Publications

2. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharan, University press, 1998.

3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.

4. Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education.

5. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

CS 106: Practical –I(JAVA)

LIST OF EXPERIMENTS

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3. A) Develop an applet in Java that displays a simple message.

B) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

6. Write a Java program for the following:

Create a doubly linked list of elements.

Delete a given element from the above list.

Display the contents of the list after deletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in the selected color. Initially, there is no message shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle,

and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas.

Write a java program to display the table using Labels in Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

12. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.

13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

REFERENCE BOOKS

1. Arnold Ken, Gosling J, "The Java Programming Language", Addison Wesley.
2. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
5. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

CS 107: Practical –II(Operating Systems)

LIST OF EXPERIMENTS

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation
7. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal.

REFERENCE BOOKS

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.
3. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition– 2005, Pearson Education/PHI
4. Operating System - A Design Approach-Crowley, TMH.
5. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
6. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
7. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

M.Sc., - COMPUTER SCIENCES
Semester-II

CS 201: CRYPTOGRAPHY AND NETWORK SECURITY

UNIT-I

INTRODUCTION

Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT-II

SYMMETRIC KEY CIPHERS, ASYMMETRIC KEY CIPHERS

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

UNIT-III

CRYPTOGRAPHIC HASH FUNCTIONS,MESSAGE AUTHENTICATION CODES

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512),Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

UNIT-IV

TRANSPORT LEVEL SECURITY,WIRELESS NETWORK SECURITY and E-MAIL SECURITY

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, Internet Key Exchange

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

REFERENCE BOOKS

1. Cryptography and Network Security, Dr. P. Santosh Kumar Patra, Dr. R. Santhosh Kumar, Mr. J. Raja, Mr. S. Bavan Kumar, Sun Techno Publications

2. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

3. Cryptography and Network Security: AtulKahate, McGraw Hill, 3rd Edition

4. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, WileyIndia, 1st Edition.

5. Cryptography and Network Security: ForouzanMukhopadhyay, McGraw Hill, 3rd Edition

6. Information Security, Principles, and Practice: Mark Stamp, Wiley India.

7. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH

8. Introduction to Network Security: Neal Krawetz, CENGAGE Learning

9. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

CS 202:Python Programming

Unit-I: Introduction to Python

Introduction to Python: Installing Python. How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations, Operators. Type conversions, Expressions, More about Data Output. Decision Structures and Boolean Logic: if, if-else, if-elseif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. Repetition Structures: Introduction, while-loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Unit-II: Data Types and Expressions

Data types and Expressions: Strings, Assignment and Comments, Numeric Data Types and Character Sets, Expressions, Functions and Modules. Lists, Tuples, Dictionaries: Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, merge sort, histogram.

Unit-III: Design with Classes, Files and Exceptions

Design with Classes: Classes and Objects, Classes and Functions, Classes and Methods, Working with Instances, Inheritance and Polymorphism. Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes, techniques for Designing Classes. Files: Text files, reading and writing files; command line arguments, Illustrative programs: word count, copy file. Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exception.

Unit-IV: Expressions and Multithreading, Graphics and GUI Interfaces

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules.

Simple Graphics and Image Processing: Overview of Turtle Graphics, Two dimensional Shapes, Colors and RBG System, Image Processing. Graphical User Interfaces: Coding simple GU Ibased programs, other useful GUI resources. GUI Programming: Graphical User Interfaces, Using the tkinter Module**,** Display text with Label Widgets, Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

Reference Books

1.Python Programming, Theory, Concepts, and Applications Dr. P. Santosh Kumar Patra, Ms. Md. ZahedaParveen, Dr. N. Satheesh, Dr. T. Poongothai, StudentsHelpline Publishing House Pvt. Ltd.

2. A Practical Introduction to Python Programming, Brian Heinold.

3. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

4. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning.

5. Think Python First Edition, by Allen B. Downey, Orielly publishing

6. Introduction to Computation and Programming Using Python. John V. Guttag, TheMIT Press.

7. James Payne, Beginning Python using Python 2.6 and Python 3, Wrox publishing.

8. Paul Gries, Practical Programming: An Introduction to Computer Science using Python, The Pragmatic Bookshelf, 2nd edition (4 Oct. 2013).

9. Charles Dierach, Introduction to Computer Science using Python.

CS 203: SOFTWARE ENGINEERING

UNIT-I

INTRODUCTION TO SOFTWARE ENGINEERING

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI). Process models: The waterfall model, Spiral model and Agile methodology

UNIT-II

SOFTWARE REQUIREMENTS

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT-III

DESIGN ENGINEERING

Design Engineering: Design process and design quality, design concepts, the design model. Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT-IV

TESTING STRATEGIES AND RISK MANAGEMENT

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM. Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

REFERENCE BOOKS

1. Software Engineering, Dr. P. Santosh Kumar Patra, Mrs. T. Bhargavi, Mrs. A. Sravani, Mr. K. KoteswaraRao, Spectrum University Press

2. Software Engineering, A practitioner‟s Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.

3. Software Engineering- Sommerville, 7th edition, Pearson Education.

4. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

5. Software Engineering, an Engineering approach- James F. Peters, WitoldPedrycz, John Wiley.

6. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.

7. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education

CS 204:ARTIFICIAL INTELLIGENCE

UNIT-I

INTRODUCTION TO AI

Introduction to AI, Intelligent Agents, problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces

UNIT-II

PROBLEM SOLVING BY SEARCH-II AND PROPOSITIONAL LOGIC

Adversarial Search: Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions. Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT-III

LOGIC AND KNOWLEDGE REPRESENTATION, KNOWLEDGE REPRESENTATION & CLASSICAL PLANNING

First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic.

Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

Classical Planning: Definition of Classical Planning, Algorithms for Planning with State-Space Search,Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.

UNIT-IV

UNCERTAIN KNOWLEDGE AND LEARNING UNCERTAINTY

Uncertain knowledge and Learning Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster-Shafer theory.

REFERENCE BOOKS

1. Artificial Intelligence, Dr. P. Santosh Kumar Patra, Dr. R. Santhosh Kumar, Mrs. E. Soumya, Mr. S. Bavan Kumar, Amaravathi Publishers
2. Artificial Intelligence: A Modern Approach, Third Edition, Stuart Russell and Peter Norvig,Pearson Education.
3. Artificial Intelligence, 3rd Edn, E. Rich and K. Knight (TMH)
4. Artificial Intelligence, 3rd Edn., Patrick Henry Winston, Pearson Education.
5. Artificial Intelligence, ShivaniGoel, Pearson Education.
6. Artificial Intelligence and Expert systems – Patterson, Pearson Education

CS-205 :Computer Vision

Unit-I: Image Processing Foundations

Review of image processing techniques – classical filtering operations – thresholding techniques– edge detection techniques – corner and interest point detection – mathematical morphology –texture

Unit-II: Shapes and Regions

Binary shape analysis – connectedness – object labelling and counting – size filtering – distancefunctions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion–boundary length measures – boundary descriptors – chain codes – Fourier descriptors – regiondescriptors moments.

Unit-III: Hough Transform

Line detection – Hough Transform (HT) for line detection – foot-of normal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection– accurate centre location – speed problem – ellipse detection – Case study: HumanIrislocation– hole detection – generalized Hough Transform (GHT) – spatial matched filtering –GHT for ellipse detection – object location – GHT for feature collation.

Unit-IV: 3D Vision and Motion, Applications

Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shapefrom texture – shape from focus – active range finding – surface representations – point-based representation – volumetric representations – 3D object recognition – 3D reconstruction –introduction to motion – triangulation – bundle adjustment – translational alignment – parametricmotion – spline-based motion – optical flow – layered motion.

Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearanceand 3D shape models of faces Application: Surveillance – foreground background separation –particle filters – Chamfer matching, tracking, and occlusion – combining views from multiple cameras – human gait analysis Application: In-vehicle vision system: locating roadway – roadmarkings – identifying road signs – locating pedestrians.

REFERENCE BOOKS

1.Computer Vision Dr. P. Santosh Kumar Patra, Dr. G. GovindaRajulu, Mr. J. Venkatarangan, Sun Techno Publications

2. Simon J. D. Prince, ―Computer Vision: Models, Learning, and Inference,Cambridge University Press, 2012.
3. Mark Nixon and Alberto S. Aquado, ―Feature Extraction & Image Processing for Computer Vision ‖, Third Edition, Academic Press, 2012.
4. E. R. Davies, ―Computer & Machine Vision, Fourth Edition, Academic Press, 2012
5. D. L. Baggio et al., ―Mastering OpenCV with Practical Computer Vision Project s‖, Packet Publishing, 2012.
6. Jan Erik Solem, ―Programming Computer Vision with Python: Tools and algorithms For analysing images, O'Reilly Media, 2012.
7.R. S zeliski, ―Computer Vision: Algorithms and Applications ‖, Springer 2011.

CS 206: Practical –I (Cryptography and Network Security)

LIST OF EXPERIMENTS

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and display the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
a. Ceaser cipher b. Substitution cipher c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement the RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA

REFERENCE BOOKS

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: ForouzanMukhopadhyay, McGraw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
7. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition
8. Cryptography and Network Security: AtulKahate, McGraw Hill, 3rd Edition

CS 207: Practical –II (Python Programming)

LIST OF EXPERIMENTS

Week -1:

1. i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.

ii) Start the Python interpreter and type help() to start the online help utility.

2. Start a Python interpreter and use it as a Calculator.

3. i) Write a program to calculate compound interest when principal, rate and numbers of periods are given.

ii) Given coordinates (x1, y1), (x2, y2) find the distance between two points

4. Read name, address, email and phone number of a person through keyboard and print the details.

Week - 2:

1. Print the below triangle using for loop.

5

4 4

3 3 3

2 2 2 2

1 1 1 1 1

2. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder)

3. Python Program to Print the Fibonacci sequence using while loop

4. Python program to print all prime numbers in a given interval (use break)

Week - 3:

1. i) Write a program to convert a list and tuple into arrays.

ii) Write a program to find common values between two arrays.

2. Write a function called gcd that takes parameters a and b and returns their greatest common divisor.

3. Write a function called palindrome that takes a string argument and returns True if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.

Week - 4:

1. Write a function called is_sorted that takes a list as a parameter and returns true if the list is sorted in ascending order and False otherwise.

2. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.

i). Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don‟t have to be in the same order.

ii). The word list I provided, words.txt, doesn‟t contain single letter words. So you might want to add “I”, “a”, and the empty string.

iii). Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.

3. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'

ii) Remove the given word in all the places in a string?

iii) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?

4. Writes a recursive function that generates all binary strings of n-bit length

Week - 5:

1. i) Write a python program that defines a matrix and prints

ii) Write a python program to perform addition of two square matrices

iii) Write a python program to perform multiplication of two square matrices

2. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.

3. Use the structure of exception handling all general purpose exceptions.

Week-6:

1. a. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.

b. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.

c. Write a function called draw_point that takes a Canvas and a Point as arguments and draws are presentation of the Point on the Canvas.

d. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.

2. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiple levels of Inheritances.

3. Write a python code to read a phone number and email-id from the user and validate it for correctness.

Week-7

1. Write a Python code to merge two given file contents into a third file.

2. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.

3. Write a Python code to Read text from a text file, find the word with most number of occurrences

4. Write a function that reads a file file1 and displays the number of words, number of vowels, blank spaces, lower case letters and uppercase letters.

Week -8

1. Import numpy, Plotpy and Scipy and explore their functionalities.

2. Install NumPy package with pip and explore it.

3. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR

4. Write a program to implement Half Adder, Full Adder, and Parallel Adder

5. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

REFERENCE BOOKS

1. Python for Data Science, Dr.Mohd. Abdul Hameed,Wiley Publications- 1st Ed. 2021.

2. Python Programming: A Modern Approach, VamsiKurama, Pearson

3. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, SheetalTaneja, Naveen Kumar, Pearson

4. Programming with Python, AUser‟s Book, Michael Dawson, Cengage Learning, India Edition

5. Think Python, Allen Downey, Green Tea Press

6. Core Python Programming, W. Chun, Pearson

7. Introduction to Python, Kenneth A. Lambert, Cengage

8. Supercharged Python: Take your code to the next level, Overland

9. Learning Python, Mark Lutz, O'reilly

CS 301: Cloud Computing

Unit-I: Computing Paradigms

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing,Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, QuantumComputing, Optical Computing, Nano computing.

Unit-II: Cloud Computing Fundamentals, Cloud Computing Architecture and Management

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing,Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, CloudComputing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, FourCloud Deployment Models

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing theCloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Applicationto Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

Unit-III: Cloud Service Models

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaSProviders, Other Cloud Service Models.

Unit-IV: Cloud Service Providers

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, CloudStorage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services,Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service,Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, CloudModels, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization ServicesProvided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space,VMware, Manjra soft, Aneka Platform.

REFERENCE BOOKS

1. Cloud Computing, Dr. P. Santosh Kumar Patra, Dr. V. K. SenthilRagavan, Dr. R. Santhosh Kumar, Mr. N. MahboobSubani, Sun Techno Publications

2. Cloud Computing: Principles and Para digms by RajkumarBuyya, James Broberg

AndAndrzej M.Goscinski,Wiley,2011.

3. CloudSecurityandPrivacy:AnEnterprisePerspectiveonRisksandCompliance,Tim Mather, Subra Kumara swamy, ShahedLatif,O'Reilly,SPD,rp2011

4. Essentials of cloud Computing: K. Chandrasekhra n, CRCpress,2014.

CS 302: Computer Graphics

UNIT-I

COMPUTER GRAPHICS AND OUTPUT PRIMITIVES, POLYGON FILLING

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random-scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (DDA and Bresenham's Algorithm) circle generating algorithms and ellipse - generating algorithms

Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT-II

2-D GEOMETRICAL TRANSFORMS AND 2-D VIEWING

2-D geometric transformations: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon clipping algorithm.

UNIT-III

3-D OBJECT REPRESENTATION, 3-D GEOMETRIC TRANSFORMATIONS AND 3-D VIEWING

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Polygon rendering methods, color models and color applications.

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping.

UNIT-IV

COMPUTER ANIMATION AND VISIBLE SURFACE DETECTION METHODS

Computer animation: Design of animation sequence, general computer animation functions, raster animations, computer animation languages, key frame systems, motion specifications.

Visible surface detection methods: Classification, back-face detection, depth-buffer method, BSPtree method, area sub-division method and octree method.

REFERENCE BOOKS

1. Computer Graphics, Dr. P. Santosh Kumar Patra, Dr. N. Krishnaiah, Dr. M. Vadivukarassi, Mr. D. Krishna Kishore, Surneni International Book Publishers

2. Computer Graphics C version, Donald Hearn and M. Pauline Baker, Pearson Education

3. Procedural elements for Computer Graphics, David F Rogers, Tata McGraw hill, 2nd edition.

4. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.

5. Principles of Computer Graphics, ShaliniGovil, Pai, 2005, Springer.

6. Computer Graphics Principles & practice, second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.

7. Computer Graphics, Steven Harrington, TMH. SMEC-R22 B.Tech CSE Syllabus

CS 303: Natural Language Processing

UNIT-I

FINDING THE STRUCTURE OF WORDS

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches, Features

UNIT-II

PARSING NATURAL LANGUAGE

Syntax I: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms

UNIT-III

MODELS FOR AMBIGUITY

Syntax II: Models for Ambiguity Resolution in Parsing, Multilingual Issues

Semantic Parsing I: Introduction, Semantic Interpretation, System Paradigms, Word Sense

UNIT-IV

SEMANTIC PARSING and LANGUAGE MODELING

Semantic Parsing II: Predicate-Argument Structure, Meaning Representation Systems

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Bayesian parameter estimation, Language Model Adaptation, Language Models- class based, variable length, Bayesian topic based, Multilingual and Cross Lingual Language Modeling.

REFERENCE BOOKS

1. Natural Language Processing Dr. P. Santosh Kumar Patra, Dr. B. Rajalingam, Dr. K. Srinivas, Mrs. C. UshaPriya, M/s SunRaise International Publishers

2. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and ImedZitouni, Pearson Publication.

3. Speech and Natural Language Processing - Daniel Jurafsky& James H Martin, Pearson Publications.

CS 304: Machine Learning

UNIT-I

INTRODUCTION

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants: – Perceptron – Linear Separability – Linear Regression..

UNIT-II

MULTI-LAYER PERCEPTRON & BACK-PROPAGATION

Multi-layer Perceptron– Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines

UNIT-III

CLASSIFICATION AND REGRESSION

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms

UNIT-IV

DIMENSIONALITY REDUCTION TECHNIQUES AND REINFORCEMENT LEARNING

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms.

Reinforcement Learning – Overview – Getting Lost Example Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

REFERENCE BOOKS

1. Machine Learning Dr. P. Santosh Kumar Patra, Dr. B. LaxmiKantha, Mr. B. Ramesh, Seven Hills International Publishers

2. Stephen Marsland, ―Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

3. Tom M Mitchell, ―Machine Learning, First Edition, McGraw Hill Education, 2013.

4. Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.

5. Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014

6. EthemAlpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014

CS 305: Big Data Analytics

UNIT-I

INTRODUCTION OF BIG DATA ANALYTICS

Types of Digital data: Classification of Digital Data, Introduction to Big Data: Evolution of Big Data, definition of big data, Traditional Business Intelligence vsBigData, Coexistence of Big Data and Data Warehouse. Big Data Analytics: introduction to Big Data Analytics, What Big Data Analytics Isn‟t, Sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data, Top Challenges Facing Big Data, Big Data Analytics Importance, Data Science, Terminologies used in Big Data Environments.

UNIT-II

HADOOP and PROCESSING DATA WITH HADOOP

Hadoop: Features of Hadoop, Key advantages of hadoop, versions of hadoop, overview of Hadoop ecosystem, Hadoop distributions. Need of hadoop, RDBMS vsHadoop, Distribution computing challenges, History of hadoop, Hadoop overview, HDFS

Processing data with hadoop, introduction to mapreduce programming, mapper, reducer, combiner, partitioner. NoSQL: Types of NoSQL Databases, advantages of NoSQL, Use of NoSQL in industry, SQL vsNoSQL, newSQL, comparison of Nosql, sql and newsql

UNIT-III

MONGODB

MongoDB, necessity of mongodb, terms used in mongodb and RDBMS, datatypes in mongoDB, mongodb query language

UNIT-V

INTRODUCTION TO R PROGRAMMING

Introduction to R programming, operators, control statements and functions, interfacing with R, vectors, matrices, lists, data frames, factors and tables, accessing input and output, graphs in R, R apply family

REFERENCE BOOKS

1.Big Data Analytics Dr. P. Santosh Kumar Patra, Dr. B. Rajalingam, Mr. N. MahboobSubani Spectrum University Press

2. Big Data Analytics, SeemaAcharya, SubhashiniChellappan, Wiley 2015.

3. R programming for beginners, sandhyaarora, lateshmalik, university press.

4. Chandramoulisubramanian, Asha A Geroge, C R Rene Robin, big data analytics, University press.

5. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today‟s Business, Michael Minelli, Michehe Chambers, 1st Edition, AmbigaDhiraj, Wiley CIO Series, 2013.

6. Hadoop: The Definitive Guide, Tom White, 3rd Edition, O'Reilly Media, 2012.

7. Big Data Analytics: Disruptive Technologies for Changing the Game, ArvindSathi, 1st Edition, IBM Corporation, 2012.

CS 306: Devops

UNIT-I

INTRODUCTION TO DEVOPS

Introduction to DevOps: Introduction, Agile development model, DevOps and ITIL. DevOps process and Continuous Delivery,Release management, Scrum, Kanban, delivery pipeline, identifying bottlenecks

UNIT-II

SOFTWARE DEVELOPMENT MODELS AND DEVOPS

Software Development Models and DevOps: DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, Handling database migrations, Micro services and the data tier, DevOps, architecture, and resilience.

UNIT-III

INTRODUCTION TO PROJECT MANAGEMENT

Introduction to project management: The need for source code control, the history of source code management, Roles and code, source code management system and migrations, shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT-IV

INTEGRATING THE SYSTEM and TESTING TOOLS AND DEPLOYMENT

Integrating the system: Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures.

Testing Tools and Deployment: Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development. Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, Salt Stack and Docker.

REFERENCE BOOKS

1. DevOps, Dr. P. Santosh Kumar Patra, Dr. R. Santhosh Kumar, Dr. G. Jawaherl Nehru Spectrum Educational Books

2. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint.Wiley publications.

3. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley

4. Joakim Verona., Practical DevOps, Packt Publishing, 2016.

CS 307: Practical I on Core -Cloud Computing

LIST OF EXPERIMENTS

1. Install Virtual box/VMware Workstation with different flavors of Linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance.
4. Install Google App Engine. Create a hello world app and other simple web applications using python/java.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
8. Install Hadoop single node cluster and run simple applications like word count.
9. Create a database instance in the cloud using Amazon RDS.
10. Create a database instance in the cloud using Google Cloud SQL

REFERENCE BOOKS

1. Cloud Computing: Principles and Paradigms by RajkumarBuyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. 2.Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
4. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014