ADIKAVI NANNAYA UNIVERSITY

UNIVERSITY COLLEGE OF ENGINEERING

R A J A M A H E N D R A V A R A M

Department of
Computer Science and Engineering

BTech (CSE)

SYLLABUS &
MODEL QUESTION PAPERS

II, III & IV YEAR
(*For the admitted batch of* 2019-20)

Board of Studies

University College of Engineering

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)
Semester III (Second year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PCC-CS301	Database Management System	75	25	100	3	0	0	3
PCC-CS302	Software Engineering	75	25	100	3	0	0	3
PCC-CS303	Data Structures	75	25	100	3	0	0	3
PCC-CS304	Operating System	75	25	100	3	0	0	3
BSC-CS305	Probability Statistics and Queuing Theory	75	25	100	3	0	0	3
LC-CS306	Database Management System Lab	50	50	100	0	0	3	1.5
LC-CS307	Data Structures Lab	50	50	100	0	0	3	1.5
LC-CS308	Operating System Lab	50	50	100	0	0	3	1.5
MC-CS309	Essence of Indian Traditional Knowledge	75	25	100	2	0	0	0
MC-CS310	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							21.5

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)
Semester IV(Second year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
ESC-CS401	Computer Organization and Architecture	75	25	100	3	0	0	3
PCC-CS402	Computer Networks	75	25	100	3	0	0	3
PCC-CS403	Object Oriented Programming through JAVA	75	25	100	3	0	0	3
BSC-CS404	Discrete Mathematical Structures	75	25	100	3	0	0	3
HSMC-CS405	Management Science	75	25	100	3	0	0	3
LC-CS 406	Computer Organization and Architecture Lab	50	50	100	0	0	3	1.5
LC-CS407	Computer Network Lab	50	50	100	0	0	3	1.5
LC-CS408	Object Oriented Programming through JAVA Lab	50	50	100	0	0	3	1.5
MC-CS409	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)
Semester V (Third year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
ESC-CS501	Micro Processors and Micro Controllers	75	25	100	3	0	0	3
PCC-CS502	Formal Languages and Automata Theory	75	25	100	3	0	0	3
PCC-CS503	Design and Analysis of Algorithms	75	25	100	3	0	0	3
PCC-CS504	Object Oriented Analysis & Design with UML	75	25	100	3	0	0	3
PEC-CS505	Elective-I 1.Artifitial Intelligence & Neural Networks 2.Distributed Operating Systems 3.Internet of Things	75	25	100	3	0	0	3
LC-CS506	Micro Processor and Micro Controller Lab	50	50	100	0	0	3	1.5
LC-CS507	Object Oriented Analysis & Design with UML Lab	50	50	100	0	0	3	1.5
MC-CS508	Constitution of India	75	25	100	2	0	0	0
MC-CS509	Skill Development Course	--	50	50	1	0	2	2
MC-CS510	SUMMER INTERNSHIP							1.5
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week
Summer Internship 2 Months (Mandatory) after second year(to be evaluated during V semester

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)
Semester VI (Third year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PCC-CS601	Network Security and Cryptography	75	25	100	3	0	0	3
PCC-CS602	Data Warehouse and Data Mining	75	25	100	3	0	0	3
PCC-CS603	Web Technologies	75	25	100	3	0	0	3
PEC-CS604	Elective-II 1.Cloud Computing 2.Grid Computing 3.Mobile Computing	75	25	100	3	0	0	3
OEC-CS605	Open Elective-I 1. Compiler Design 2. Embedded Systems 3. Robotics	75	25	100	3	0	0	3
LC-CS606	Network Security and Cryptography Lab	50	50	100	0	0	3	1.5
LC-CS607	Data Mining with R Lab	50	50	100	0	0	3	1.5
LC-CS608	Web Technologies Lab	50	50	100	0	0	3	1.5
MC-CS609	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)
Semester VII (Fourth year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PEC-CS701	Elective-III 1.Software Testing and Quality Assurance 2.Software Architectures and Design Patterns 3.Agile Software Development	75	25	100	3	0	0	3
PEC-CS702	Elective-IV 1.Python Programming 2.AJAX/JSON 3.PHP Programming	75	25	100	3	0	0	3
PEC-CS703	Elective-V 1.Computer Vision and Pattern Recognition 2 Machine Learning 3.Big Data Analytics	75	25	100	3	0	0	3
OEC-CS704	Open Elective-II 1.Business Intelligence and Visualization 2.Natural Language Processing 3.Advanced Databases	75	25	100	3	0	0	3
OEC-CS705	Open Elective-III 1.Foundations of Data Science 2.Block Chain Technology 3.Computer Forensics	75	25	100	3	0	0	3
HSMC-CS706	Managerial Economics and Financial Accounting	75	25	100	3	0	0	3
MC-CS707	Skill Development Course		50	50	1	0	2	2
MC-CS708	SUMMER INTERNSHIP							1.5
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week
Summer Internship 2 Months (Mandatory) after third year(to be evaluated during VII semester

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)
Semester VIII (Fourth year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PROJ-CS801	Project-I				-	-	-	14
	Total Credits							14

CONTENTS

Branch/Course: Computer Science and Engineering
Semester III (Second year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PCC-CS301	Database Management System	75	25	100	3	0	0	3
PCC-CS302	Software Engineering	75	25	100	3	0	0	3
PCC-CS303	Data Structures	75	25	100	3	0	0	3
PCC-CS304	Operating System	75	25	100	3	0	0	3
BSC-CS305	Probability Statistics and Queuing Theory	75	25	100	3	0	0	3
LC-CS306	Database Management System Lab	50	50	100	0	0	3	1.5
LC-CS307	Data Structures Lab	50	50	100	0	0	3	1.5
LC-CS308	Operating System Lab	50	50	100	0	0	3	1.5
MC-CS309	Essence of Indian Traditional Knowledge	75	25	100	2	0	0	0
MC-CS310	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							21.5

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week or 2 Theory Hrs/ Week for SKILL DEVELOPMENT COURSE

Course Code &Title: PCC-CS301 DATABASE MANAGEMENT SYSTEMS
Semester & Year of study: III & 2020-2021
Course Index: C301

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Introduction of Database System, Data Modeling Using the Entity-Relationship Model
To learn about Relational Data Model and Relational Database Constraints, Relational Algebra and Relational Calculus, Schema Definition, Basic Constraints and Queries
To learn about Relational Database Design, Indexing Structures for files
To learn about Transaction Processing, Concurrency Control Techniques

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C301.1	Able to understand the Introduction of Database System, Data Modeling Using the Entity-Relationship Model
C301.2	Able to understand Relational Data Model and Relational Database Constraints, Relational Algebra and Relational Calculus, Schema Definition, Basic Constraints and Queries
C301.3	Able to understand Relational Database Design, Indexing Structures for files
C301.4	Able to understand Transaction Processing, Concurrency Control Techniques

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
PCC-CS301: DATABASE MANAGEMENT SYSTEMS

Theory : 3Hrs/week **Credits: 3**
Int Marks:25 **Ext Marks :75**

UNIT I

Database System Introduction: Data, DBMS, Database Users, Advantages and Applications of DBMS, DBMS Concepts: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architectures for DBMS, Classification of DBMS.

Data Modeling Using the Entity-Relationship Model: Using High-Level Conceptual Data Models for Database Design, Entity Types, Entity Sets Attributes and Keys, Relationships Types, Relationship Sets, Roles and Structural Constraints, Weak Entity types, ER diagrams, Naming Conventions and Design Issues, Enhanced Entity Relationship model.

UNIT II

Relational Data Model and Relational Database Constraints: Relational Model Concepts, Constraints and Relational Schemas, Update Operations and Dealing with Constraint Violations, Relational Database Design Using ER to Relational Mapping.

Relational Algebra and Relational Calculus: Unary Relational Operations, Relational Algebra Set Operations, Binary Relational Operations, Additional Relational Operations, Examples of Queries in Relational Algebra, Tuple and Domain Relational Calculus.

Schema Definition, Basic Constraints and Queries: SQL Data definition, Specifying Basic Constraints in SQL, Schema Change Statements in SQL, Insert, Delete, Update Queries in SQL, More Complex SQL queries, Views in SQL, Data base Stored Procedures.

UNIT III

Relational Database Design: Informal Design Guidelines for Relation Schema, Functional Dependencies, Normal Forms Based on Primary keys, General definitions of Second and Third Normal forms, BCNF, Properties of Relational Decomposition, Algorithm for Relational Database Design, Multi-Valued Dependencies and Fourth Normal form

Indexing Structures for files: types of single level ordered indexes, multilevel indexes, dynamic multilevel indexes using B Trees and B + TREES, Indexes on multiple keys.

UNIT IV

Transaction Processing: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Characteristics of Transactions, Characterizing Schedules Based On Recoverability and Serializability.

Concurrency Control Techniques: Two Phase Locking, Timestamp Ordering, Validation Concurrency Control, Multiple Granularity Locking

Database Recovery Techniques: Recovery Concepts, Recovery Based On Deferred and Immediate Updates, Shadow Paging.

TEXT BOOK:

1. Fundamentals of Database System, Elmasri, Navathe, PearsonEducaiton.

REFERENCES BOOKS:

1. Database Management Systems, RaghuRamakrishnan,Johannes Gehrke, McGraw-Hill.
2. Database Concepts, Abraham Silberschatz, Henry F Korth, S Sudarshan,McGraw-Hi

Course Code &Title: PCC-CS302 SOFTWARE ENGINEERING
Semester & Year of study: III & 2020-2021
Course Index: C302

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Software Engineering Process Models, Waterfall Model
Learn about Software Requirements Analysis and Specification, Planning, Software Architecture
Learn about Design Concepts, Coding Principles and Guidelines
Learn about Unit Testing, Testing concepts

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C302.1	Understand about Software Engineering Process Models, Waterfall Model
C302.2	Understand about Software Requirements Analysis and Specification, Planning, Software Architecture
C302.3	Understand about Design Concepts, Coding Principles and Guidelines
C302.4	Understand about Unit Testing, Testing concepts

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
PCC-CS302: SOFTWARE ENGINEERING

Theory : 3Hrs/week **Credits: 3**
Int Marks:25 **Ext Marks :75**

UNIT-I

Software Engineering Process Models: The Software Problem, Cost, Schedule, and Quality, Scale and Change, Software Processes: Process and Project, Component Software Processes, Software Development Process Models: Waterfall Model, Prototyping, Iterative Development, Rational Unified Process, Timeboxing Model, Extreme Programming and Agile Processes, Using Process Models in a Project, Project Management Process

UNIT-II

Software Requirements Analysis and Specification: Value of a Good SRS, Requirement Process, Requirements Specification, Desirable Characteristics of an SRS, Components of an SRS, Structureof a Requirements Document, Data Flow Diagrams for analysis.

Planning: Effort Estimation, Top-Down Estimation Approach, Bottom-Up Estimation Approach, Project Schedule and Staffing, Quality Planning, Risk Management Planning, Risk Management Concepts, Risk Assessment, Risk Control, A Practical Risk Management Planning Approach, Project Monitoring Plan, Measurements, Project Monitoring and Tracking, Detailed Scheduling.

Software Architecture: Role of Software Architecture, Architecture Views, Component and Connector View: Components, Connectors, Architecture Styles for C&C View, Pipe and Filter, Shared-Data Style, Client-Server Style.

UNIT-III

Design: Design Concepts, Coupling, Cohesion, The Open-Closed Principle, Function-Oriented Design, Structure Charts, Structured Design Methodology, An Example

Coding: ProgrammingPrinciplesandGuidelines,StructuredProgramming,InformationHiding,Some Programming Practices, Coding Standards, Incrementally Developing Code, An Incremental Coding Process, Test-Driven Development, Pair Programming. Managing Evolving Code: Source Code Control and Build, Refactoring.

UNIT-IV

Testing: Testing Concepts, Error, Fault, and Failure, Test Case, Test Suite, and Test Harness, Levels of Testing, Testing Process, Test Plan, Test Case Design, Test Case Execution, Black-Box Testing, Equivalence Class Partitioning, Boundary Value Analysis, Pairwise Testing, State-Based Testing, White-Box Testing, Control Flow-Based Criteria, Test Case Generation and Tool Support, Metrics, Coverage Analysis, Reliability, Defect Removal Efficiency.

Unit Testing: Testing Procedural Units, Code Inspection, Planning, Group Review Meeting, Metrics, Size Measures, Complexity Metrics

TEXT BOOK:

1. A Concise Introduction to Software Engineering – Pankaj Jalote, Springer Publications.

REFERENCE BOOKS:

1. Software Engineering: A Practitioner's Approach – Roger S Pressman, Seventh Edition McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
3. Fundamentals of Software Engineering. Rajib Mall. Third Edition PHI.

Course Code &Title: PCC-CS303 DATA STRUCTURES
Semester & Year of study: III & 2020-2021
Course Index: C303

Course Objectives:
The learning objectives of this course are:

Course Objectives
Explain the various linear data structures.
Identify linear and nonlinear data structures and solve the real world problems.
Summarize the various searching and sorting methods.
Fundamentals of C Language like structures, pointers, arrays

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C303.1	Explain the various linear data structures.
C303.2	Identify linear and nonlinear data structures and solve the real world problems.
C303.3	Summarize the various searching and sorting methods.
C303.4	Fundamentals of C Language like structures, pointers, arrays

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
PCC-CS303: DATA STRUCTURES

Theory :3Hrs/week **Credits: 3**
Int.Marks:25 **Ext.Marks: 75**

UNIT – I

Introduction to DS & Linked Lists: Definition, Linear and Non Linear DS, List of Data Structures, Applications of DS, Motivation, Linked List; SLL: Introduction, Definition, Defining Node; Operations on SLL: Creation, Traversal, And Insertion at Begin, End, And Middle; Header, Node, Deleting SLL: Deletion; Circular Linked Lists, Double Linked Lists. Working examples on Linked Lists.

UNIT-II

Stacks: Introduction, Array representation, Operations on Stack. Linked List representation of stack, Application of Stack Introduction, Array representation, Linked representation
Queues: Introduction of Queues, Array representation, Linked representation Circular Queues, Dequeue, Priority Queues, Application of Queues.

UNIT-III

Trees: Basic Terminologies, Types of trees, traversing a Binary tree, Huffman tree Introduction, Operations on BST. Introduction and operations on AVL tree and applications, Introduction, & Properties of Red-Black Tree, Operations on Red-Black Tree, Applications, Introduction & Properties of B Tree, Operations on B Tree, Applications.
Graphs and Their Application: Definition of Graphs, Representation of Graphs, Transitive closure, Linked Representation of Graphs, Topological Ordering of nodes, Graph Traversal and Spanning Forests, Undirected Graphs and their Traversals, Applications of Graphs, Minimal Spanning Trees.

UNIT-IV

Searching: Basic Searching Techniques: Sequential Searching and its Efficiency, Binary Search and its Efficiency.
Sorting: Bubble Sort and Quick Sort and their Efficiency, Selection Sorting, Heap Sort, Insertion Sorts, Shell Sort, Address calculation Sort, Merge and Radix Sorts.
Heaps &Hashing: Introduction to Heap; Heap tree construction, Up Heap; Down Heap; Min and Max Heap, Introduction Hash Tables and Functions, Types of Hash Functions, Trie data structure.

TEXTBOOKS:

1. 1. Data Structures Using C and C++ Yddish Langsam, Moshe J. Augenstein and Aaron M. Tanenbaum, Prentice Hall Of India (2ndEdition)
2. Reema Thareja, “Data Structures using C” Oxford Publications, Second Edition,2014.

REFERENCE BOOKS:

1. Data Structures and Algorithms, 2008,G.A.V.Pai, TMH
2. Cormen, Leiserson, Rivest, and Stein, “Introduction to Algorithms”, Second Edition,2002.
3. Fundamentals of Data Structure in C, 2/e, Horowitz, Sahni, Anderson Freed, University Press

Course Code &Title: PCC-CS304 OPERATING SYSTEMS
Semester & Year of study: III & 2020-2021
Course Index: C304

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Introduction of Operating System, Concurrent Processes
Learn about CPU Scheduling, Deadlocks
Learn about Memory Management
Learn about I/O Management and Disk Scheduling

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C304.1	Understand about Introduction of Operating System, Concurrent Processes
C304.2	Understand about CPU Scheduling, Deadlocks
C304.3	Understand about Memory Management
C304.4	Understand about I/O Management and Disk Scheduling

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
PCC-CS304: OPERATING SYSTEMS

Theory: 3Hrs/week **Credits: 3**
Int Marks: 25 **Ext Marks :75**

UNIT – I

Introduction: Operating system and functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocessor Systems, Multithreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services.

Concurrent Processes: Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Semaphores; Classical Problem in Concurrency- Dining Philosopher Problem, Process Communication models and Schemes, Process generation.

UNIT – II

CPU Scheduling: SchedulingConcepts,PerformanceCriteria,ProcessStates,ProcessTransition Diagram, Schedulers, Process Control Block(PCB),Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Deadlock: System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.

UNIT – III

Memory Management: Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms.

UNIT – IV

I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, Filesystem implementation issues, File system protection and security.
Case Study.

TEXT BOOK:

1. Silberschatz, Galvin and Gagne, “Operating Systems Concepts”, Wiley

REFERENCE BOOKS:

1. Sibsankar Halder and Alex A Aravind, “Operating Systems”, Pearson Education
2. Harvey M Dietel, “ An Introduction to Operating System”, Pearson Education
3. D M Dhamdhere, “Operating Systems : A Concept based Approach”, McGraw Hill.
4. Charles Crowley,“OperatingSystems:ADesign-OrientedApproach”,TataMcGrawHill Education”.
5. Stuart E. Madnick & John J. Donovan. Operating Systems. McGraw Hill

Course Code &Title: PCC-CS305 PROBABILITY STATISTICS AND QUEUING THEORY
Semester & Year of study: III & 2020-2021
Course Index: C305

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Probability, Elementary Theorems, Bayes Theorem
Learn about Random Variables and Distribution
Learn about Sampling Distribution, Test of Significance
Learn about Curve Fitting and Correlation and Regression, Queuing Theory

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C305.1	Understand about Probability, Elementary Theorems, Bayes Theorem
C305.2	Understand about Random Variables and Distribution
C305.3	Understand about Sampling Distribution, Test of Significance
C305.4	Understand about Curve Fitting and Correlation and Regression, Queuing Theory

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
BSC-CS305: PROBABILITY STATISTICS AND QUEUING THEORY

Theory: 3Hrs/week **Credits: 3**
Int.Marks: 25 **Ext.Marks: 75**

UNIT-I

Basic Probability: Probability spaces, conditional probability, independent events and Bayes' theorem. Random variables: Discrete and continuous random variables, Expectation of Random Variables, Moments, Variance of random variables.

UNIT-II

Probability distributions: Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution, Continuous random variables and their properties, distribution functions and density functions, Normal and exponential, evaluation of statistical parameters for these distributions.

UNIT-III

Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation: Estimating the Mean, Standard Error of a Point Estimate, Estimating the Variance, Estimating a Proportional of single mean, Difference between Two Means, between Two Proportions for two Samples Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT-IV

Curve Fitting and Correlation And Regression: The Method of Least Squares, Inferences Based on The Least Squares Estimations, Curvilinear Regression, Multiple Regression- Correlation for Univariate and Bivariate Distributions.

Queuing Theory: Structure and Operating Characteristics of Queuing System, Transient and Steady States, Terminology of Queuing System, Deterministic Queuing Models - M/M/1 of Infinite and Finite Queues.

TEXT BOOK:

1. A Text Book Of Probability And Statistics- Dr.ShahnazBathul- Vgs.Boo Lin s
2. S.D.Sharma, Operations Resecarch, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCES:

1. Fundamentals Of Mathematical Statistics _S.E. Gupta & V.K. Kapoor-Sultan Chand &Sons
2. Probability & Statistics For Engineers And Scientists, Walpole ,Myers, Pearson Education
3. Operations Research, SD Sharma

Course Code &Title: LC-CS306 DATABASE MANAGEMENT SYSTEMS LAB
Semester & Year of study: III & 2020-2021
Course Index: C306

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Databases and Programming for Database Management
Able to write SQL Queries on DDL, DML, DCL commands, Constraints
Able to write PL/SQL Programs

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C306.1	Understand about Databases and Programming for Database Management
C306.2	Able to write SQL Queries on DDL, DML, DCL commands, Constraints
C306.3	Able to write PL/SQL Programs

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
LC-CS306: DATABASE MANAGEMENT SYSTEMS LAB

Lab: 3Hrs/week **Credits: 1.5**
Int Marks :50 **Ext Marks: 50**

SQL

Simple queries to understand DDL, DML and DCL commands. Apply different constraints with Create and Alter commands. Exercise on delete cascade and on update cascade clauses.
Perform Insert, delete and update operations based on conditions. Different ways of performing Join. Set operations and sub queries.
Exercise Aggregate Functions using Group By, Having and Order By clauses Creation and dropping of Views.
Demonstration of operators in SQL.
Queries to demonstrate Conversion Functions, String Functions, Date Functions and Numeric Functions.
Creation of Synonyms, Sequences and Indexes. Granting and Revoking of privileges.

PL/SQL

Simple programs to understand PL/SQL
Write a PL/SQL program to demonstrate exception–handling
Demonstrate the working of Commit, Rollback and Savepoint in PL/SQL block. Develop a program that includes the features Nested If and Case expression.
Program development using While loops, For loops Programs using Cursors
Programs development using creation of procedures and functions. Working of Triggers.

REFERENCES:

1. Oracle: The Complete Reference by Oracle Press
2. Rick F Vander Lans, “Introduction to SQL”, Fourth Edition, Pearson Education,2007.
3. Fundamentals of Database System, Elmasri, Navathe, Pearson Education.
4. Oracle PL/SQL for Dummies, Michael Rosenblum, Paul Dorsey, Wiley Publications.
5. Microsoft Virtual Academy-mva.microsoft.com

Course Code &Title: LC-CS307 DATA STRUCTURES LAB
Semester & Year of study: III & 2020-2021
Course Index: C307

Course Objectives:
The learning objectives of this course are:

Course Objectives
Implementation linear data structure programs using C
Implementation Non-linear data structure programs using C
Implementation on searching techniques using C
Implementation on sorting techniques using C

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C307.1	Implementation linear data structure programs using C
C307.2	Implementation Non-linear data structure programs using C
C307.3	Implementation on searching techniques using C
C307.4	Implementation on sorting techniques using C

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
LC-CS307: DATA STRUCTURES LAB

Lab:3Hrs/week **Credits:1.5**
Int Marks :50 **Ext Marks:50**

List of Programs:

1. Program to create a SLL and perform all insertion and deletion cases
2. Program to create a CLL and perform insertion and deletion at beginning and end
3. Program to create a DLL and perform all insertion and deletion cases
4. Program to reverse the LL
5. Program to store polynomial in a linked list and apply add and subtract operations on2 polynomials
6. Program to sort the numbers given in a LL
7. Program to create LL which stores details of students and print the name of the students who got first class.
8. Program to perform push, pop and peek operations on a stack using arrays
9. Program to check nesting of parenthesis
10. Program to convert infix to postfix and prefix
11. Program to evaluate a postfix and prefix expressions
12. Program to create BST and perform insertion deletion and 4 traversal operations
13. Program to count number of nodes of a BST
14. Program to find nth node in the InOrder traversal of a BST
15. Program to find largest and smallest elements of a BST
16. Program to find all the elements of Nth level
17. Program to find nodes which are at max distance from the root in aBST
18. Program to create maxheap
19. Program to create minheap
20. Program to search for an element in a hashtable

TEXT BOOK:

1. Data Structures and Algorithms, 2008,G.A.V.Pai, TMH

REFERENCE BOOKS:

1. Reema Thareja, “Data Structures using C” Oxford Publications, Second Edition,2014.
2. Cormen, Leiserson, Rivest, and Stein, “Introduction to Algorithms”, Second Edition,2002.
3. Fundamentals of Data Structure in C, 2/e, Horowitz,Sahni, AndersonFreed,University

Course Code &Title: LC-CS308 OPERATING SYSTEMS LAB
Semester & Year of study: III & 2020-2021
Course Index: C308

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about UNIX Operating System and basic commands in UNIX
Learn how to implement CPU Scheduling Algorithms
Learn how to implement Different file allocation strategies
Learn how to implement Deadlock Avoidance and Detection Algorithms
Learn how to implement Page Replacement Algorithms

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C308.1	Understand about UNIX Operating System and basic commands in UNIX
C308.2	Able to implement CPU Scheduling Algorithms
C308.3	Able to implement Different file allocation strategies
C308.4	Able to implement Deadlock Avoidance and Detection Algorithms
C308.5	Able to implement Page Replacement Algorithms

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
LC-CS308: OPERATING SYSTEMS LAB

Lab:3Hrs/week **Credits:1.5**
Int Marks :50 **Ext Marks:50**

List of Programs:

All algorithms must be implemented in UNIX/LINUX environment

1. Basic UNIX commands
2. Implement the following CPU scheduling algorithms
   a) FCFS b) SJF c) Round Robin d) Priority
3. Implement producer-consumer problem using Semaphores
4. Implement the concept of Dining-philosophers problem
5. Implement the following contiguous memory allocation techniques
   a) Worst fit b) Best fit c) First fit
6. Implement the following page replacement algorithms
   a) FIFO b) LRU c) OPTIMAL
7. Implement the following file allocation strategies
   a) Sequential b) Indexed c) Linked
8. Implement Bankers Algorithm for Dead Lock Avoidance algorithm
9. Implement Bankers Algorithm for Dead Lock Detection algorithm
10. Implement the following disk scheduling algorithms.
    a) FCFS b) SCAN c) C-SCAN

REFERENCES :

1. Operating System Concepts. Silberschatz, Galvin and Gagne. Wiley
2. Understanding the Linux Kernel, Daniel P Bovet and Marco Cesati, 3rd Edition, Reilly, 2005. Unix programming, Stevens, Pearson Education.
3. Shell programming YashwanthKanetkar.

Course Code &Title: MC-CS309 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE
Semester & Year of study: III & 2020-2021
Course Index: C309

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Introduction to traditional knowledge, Indigenous Knowledge
Learn about Protection of traditional knowledge, The Biological Diversity Act 2002 and Rules 2004, the protection of TK bill, 2016. Geographical indicators act 2003
Learn about Traditional knowledge and intellectual property, global legal FORA
Learn about Traditional knowledge in different sectors

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C309.1	Understand about Introduction to traditional knowledge, Indigenous Knowledge
C309.2	Understand about Protection of traditional knowledge, The Biological Diversity Act 2002 and Rules 2004, the protection of TK bill, 2016. Geographical indicators act 2003
C309.3	Understand about Traditional knowledge and intellectual property, global legal FOR A
C309.4	Understand about Traditional knowledge in different sectors

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20 AB)
MC-CS309: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Theory : 3 Hrs/week **Credits : 0**
Int Marks : 25 **Ext Marks : 75**

UNIT I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge.

UNIT II

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.
The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT III

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT IV

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Text Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.

Reference Books:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
2. "Knowledge Traditions and Practices of India" Kapil Kapoor1, Michel Danino2

Branch/Course: Computer Science and Engineering
Semester IV (Second year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
ESC-CS401	Computer Organization and Architecture	75	25	100	3	0	0	3
PCC-CS402	Computer Networks	75	25	100	3	0	0	3
PCC-CS403	Object Oriented Programming through JAVA	75	25	100	3	0	0	3
BSC-CS404	Discrete Mathematical Structures	75	25	100	3	0	0	3
HSMC-CS405	Management Science	75	25	100	3	0	0	3
LC-CS 406	Computer Organization and Architecture Lab	50	50	100	0	0	3	1.5
LC-CS407	Computer Network Lab	50	50	100	0	0	3	1.5
LC-CS408	Object Oriented Programming through JAVA Lab	50	50	100	0	0	3	1.5
MC-CS409	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week or 2 Theory Hrs/ Week for SKILL DEVELOPMENT COURSE

Course Code &Title: ESC-CS401COMPUTER ORGANIZATION AND ARCHITECTURE
Semester & Year of study: IV & 2020-2021
Course Index: CS401

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
CS401.1	To identify Basic Computer Organization and its applications.
CS401.2	To learn Input and Output Organizations.
CS401.3	To understand Memory Organizations.
CS401.4	To understand how an 8085CPU works.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
CS401.1	Able to understand the concept of Basic Computer Organization.
CS401.2	Able to describe Input and Output Organizations.
CS401.3	Able to explain Memory Organizations.
CS401.4	Able to know the design of 8085 CPU.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20 AB)
ESC-CS401: COMPUTER ORGANIZATION AND ARCHITECTURE

Theory: 3Hrs/week **Credits: 3**
Int Marks: 25 **Ext Marks: 75**

UNIT-I

Basic Computer Organization: Basic Computer Organization: Instruction Codes-Stored ProgramOrganization,IndirectAddress,ComputerRegisters,ComputerInstructions,Timingand Control, Instruction Cycle, Memory Reference Instructions, Design of Accumulator Logic, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes.

UNIT-II

Input-Output Organizations: Input-Output Organization: Input-Output Interface, Asynchronous Data Transfer—strobe control, hand shaking, asynchronous communication interface, Modes of Transfer, Direct Memory Access(DMA)- DMA Controller, DMA Transfer, Input-Output Processor(IOP).

UNIT-III

Memory Organizations: Memory Hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, Associative Memory, Cache Memory, Miss and Hit Ratio, Access Time, Associative, Set Associative Mapping, Introduction to Virtual Memory.

UNIT-IV

8085 CPU: Introduction to Intel 8085 microprocessor Architecture-ALU, Timing and Control Unit, Register, Data & Address Bus, 8085 pin configuration, Instruction set of Intel 8085-Data Transfer Group, Arithmetic Group, Logical Group, Branch &Control Group, Addressing Modes of 8085, Assembly Language programs involving evaluation of Arithmetic Expressions.

TEXT BOOKS:

1. Computer System Architecture: MorrisMano.
2. Fundamentals of Microprocessor and Microcomputers: B.Ram-DhanpatRai Publications.

REFERENCE BOOKS:

1. ComputerOrganizationandArchitecture–WilliamStallingsSixthEdition, Pearson/PHI.
2. Structured Computer Organization and Design - Andrew S. Tanenbaum, 4thEdition PHI/Pearson.
3. Fundamentals or Computer Organization and Design –Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, Jhon L. Hennessy and David A. Patterson, Fourth Edition Elsevier.

Course Code &Title: PCC-CS402 COMPUTER NETWORKS
Semester & Year of study: IV & 2020-2021
Course Index: CS402

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
CS402.1	To identify Computer Networks and layers of network.
CS402.2	To learn Internetworking.
CS402.3	To understand Transport Layer and its Applications.
CS402.4	To understand Application Layer and its structure.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
CS402.1	Able to understand the concept of Computer Networks.
CS402.2	Able to describe Internetworking.
CS402.3	Able to explain Transport Layer and elements of Transport protocol.
CS402.4	Able to know in detail about Application Layer.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20 AB)

PCC-CS402: COMPUTER NETWORKS

Theory: 3Hrs/ Week **Credits: 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction to Computer Networks: use of computer networks, Network Hardware, Network software, Reference Models. Brief review of Physical Layer and Data Link Layer (only for the purpose of continuity from the previous semester subject Data Communications. Questions need not be asked from this topic for both internal and external examinations.)

Medium Access Control Sub layer: Channel allocation Problem, Multiple Access protocols- ALOHA, CSMA, Ethernet.

Network Layer: Network Layer Design issues, Routing algorithms-optimality principle, Shortest path, Flooding, Distance Vector Routing, Count To Infinity Problem, Link State Routing, Hierarchical Routing, Congestion Control algorithms, Quality Of Service – Requirements, Leaky Bucket algorithm, Token Bucket algorithm, Resource Reservations.

UNIT II

Internetworking: Tunnelling, Internetwork Routing, Packet fragmentation, The Network layer in the Internet- IPv4, IPv6 Protocol, IP addresses, Classes Inter Domain Routing (CIDR), Internet Control Message Protocol (ICMP), Address Resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Dynamic Host Configuration Protocol (DHCP), Open Shortest Path First (OSPF), Border Gateway Protocol (BGP).

UNIT III

Transport Layer: Services Provide to the Upper Layers, Elements of Transport protocol, The Internet Transport protocols- UDP, RPC, Real Time Transport Protocols, Introduction to TCP, TCP Service Model, TCP Segment Header, Connection Establishment, TCP Connection Release, TCP Connection Management Modelling, TCP Sliding Window, TCP Congestion Control, TCP Timer Management.

UNIT IV

Application Layer: DNS (Domain Name System), Electronic Mail, MIME (Multipurpose Internet Mail Extensions), SMTP (Simple Mail Transfer Protocol), WWW (World Wide Web)-Architectural overview, HTTP (Hyper Text Transfer Protocol), FTP (File Transfer Protocol), Multimedia.

Text Books:

1. Computer Networks, Andrews S Tanenbaum, Edition 4,PHI.
2. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw-HillCo Ltd, Second Edition.

Course Code &Title: PCC-CS403OBJECT ORIENTED PROGRAMMING THROUGH JAVA
Semester & Year of study: IV & 2020-2021
Course Index: CS403

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
CS403.1	To identify Java language components and how they work together in applications
CS403.2	To learn the fundamentals of Object-Oriented Programming in Java, including defining Classes, invoking methods, using Class Libraries.
CS403.3	To learn how to extend Java classes with Inheritance and Dynamic Binding and how to use Exception Handling in Java applications
CS403.4	To understand how to design applications with Threads in Java

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
CS403.1	Able to realize the concept of Object-Oriented Programming & Java Programming Constructs
CS403.2	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
CS403.3	Apply the concept of exception handling and Input/ Output operations
CS403.4	Able to design the applications of Java & Java applet

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20 AB)
PCC-CS403: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT-I

Fundamentals of object oriented programming: Introduction, Object oriented paradigm, Basic concepts of oop: Objects and classes, Data Abstraction and encapsulation, Inheritance, Polymorphism, Dynamic binding, Message communication.

Java evolution: Java History, Java Features, How java differs from C and C++, Java and Internet, Java and world wide web, web browsers, Hardware and Software requirements, java support systems, java Environment.

Overview of java language: Introduction, Simple java program, More of java, An Application with two classes, java Program structure, java tokens, java statements, Implementing a java program, java virtual machines, command line arguments, programming style.

Constants variables and data types: Introduction, Constants, Variables, Data Types, Declaration of variables, Giving values to variables, Scope of variables, Symbolic constants, Type casting.

UNIT-II

Operators and expressions : Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation Of Expressions , Precedence of Arithmetic Operators, Type conversions in Expressions, Operator Precedence And Associativity , Mathematical Functions.

Decision making and branching: Introduction, Decision Making With IF Statement, Simple IF Statement, The IF…ELSE Statement, Nesting Of IF…ELSE Statements, The ELSE…IF Ladder, The Switch Statement, The?: Statement.

Decision making and looping: Introduction, The While Statement, The DO Statement, The For Statement, Jumps In Loops, Labeled Loops.

Classesobjectsandmethods: Introduction,DefiningaClass,AddingVariables,AddingMethods,CreatingObjects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting Of Methods, Inheritance: Extending A Class, Overriding Methods, Final Variables And Methods, Final Classes, Finalizer methods, Abstract Methods and Classes, Visibility Control.

UNIT-III

Arrays, Strings and Vectors: Arrays, One Dimensional Array, Creating an Array, Two Dimensional Arrays, Strings, Vectors, Wrapper classes.

Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementinginterfaces, Accessing Interface Variables.

Packages: Putting classes together: Introduction, Java API packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a class to a Package, Hiding Classes.

Multithreaded Programming: Introduction, creating Threads, Extending the Thread classes, Stopping and Blocking a thread, Life cycle of a thread, Using Thread methods, Thread Exceptions, Thread priority, Synchronization, Implementing the Runnable Interface.

UNIT-IV

Managing errors and Exceptions: Introduction, Types Of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing our Exceptions, Using exceptions For Debugging.

Applet Programming: Introduction, How Applets Differ from Applications, Preparing To write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Life Cycle, Designing A Web Page, Applet Tag, Adding Applet to HTML Files, Running The Applet, More About The Applet Tag, Passing Parameters to Applets, Aligning The display, More About The HTML Tags, Displaying Numerical values, Getting Input From The User.

Managing input/output files in java: Introduction, Concept of Streams, Stream classes, Bye Stream Classes, Character Stream Classes, Using Streams , Other Useful I/O Classes, Using The File Class, Input/output Exceptions, Creation of Files, Reading/Writing Characters, Reading/Writing Bytes, Handling Primitive Data Types , Concatenating And buffering Files , Random Access Files , Interactive Input/output , Other Stream Classes

TEXT BOOK:

1.Programming with java –E Bala Guruswamy, Tata Mc Graw hill publications

REFERENCE:

1.Java Complete Reference, Tata Mc Graw Hill Publications.

Course Code &Title: BSC-CS404DISCRETE MATHEMATICAL STRUCTURES
Semester & Year of study: IV & 2020-2021
Course Index: CS404

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
CS404.1	To learn Foundations and its applications in practical scenario.
CS404.2	To learn Elementary Combinatorics and its applications
CS404.3	To understand Recurrence Relations.
CS404.4	To understand Graph Theory and Trees.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
CS404.1	Able to understand the concept of Foundations.
CS404.2	Able to describe Elementary Combinatorics and its applications.
CS404.3	Able to explain Recurrence Relations.
CS404.4	Able to know the concept of Graph Theory and Trees.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20 AB)
BSC-CS404: DISCRETE MATHEMATICAL STRUCTURES

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT – I

Foundations: Sets, Relations and Functions, Mathematical Logic –Statements and Notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof, Predicate Calculus- Predicates, statements functions, variables and quantifiers, predicate formulas, free and bounded variables, universe of discourse, inference theory of predicate calculus, Mathematical Induction**.**

UNIT–II

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 and Multinomial coefficients, Binomial Theorems, The Principles of Inclusion-Exclusion, Pigeonhole Principle and its Applications.

UNIT-III

Recurrence Relations: Generating Functions, Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, Method of Characteristic Roots, Solving Inhomogeneous Recurrence Relations.

UNIT – IV

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees-BFS, DFS and Minimal Spanning Trees-Kruskal's, Prim's (Problems Only and Theorems without Proofs).

TEXT BOOKS:

1. Toe L.Mott, Abraham Kandel & Theodore P.Baker, Discrete Mathematics forComputer Scientists & Mathematicians, PHI 2ndedition,2016.
2. J.P. Trembly and R. Manohar - Discrete Mathematics for Computer Scientists& Mathematicians, PHI Ltd., New Delhi, 2nd Edition,2008.

REFERENCE BOOKS:

1. Kenneth H Rosen-Discrete Mathematics & its Applications , TMH, 6ht Edition,2009
2. S.K. Chakraborthy and B.K.Sarkar - Discrete Mathematics, Oxford, 2011

Course Code &Title: HSMC-CS405MANAGEMENT SCIENCE
Semester & Year of study: IV & 2020-2021
Course Index: CS405

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
CS405.1	To understand Management concepts and application of different management theories.
CS405.2	To learn Human Resource Management, Marketing Management, Strategic Management.
CS405.3	To learn Operations Management and Project Management.
CS405.4	To understand Individual Behaviour and Group Dynamics.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
CS401.1	Able to understand the concept of Management and different types of management theories.
CS401.2	Able to describe HRM, Marketing Management and Strategic Management.
CS401.3	Able to explain about Operations Management and Project Management.
CS401.4	Able to know about Individual Behaviour and Group Dynamics.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20 AB)
HSMC-CS405: MANAGEMENT SCIENCE

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction to Management and organizational concepts of management and organization- Nature and Importance of Management, Functions of Management, System approach to Management - Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Leadership Styles, Social responsibilities of Management. Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization.

UNIT II

Human Resource Management (HRM): Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating–Capability Maturity Mode(CMM) Levels – Performance Management System.

Marketing management: Functions of Marketing, Marketing Mix, and marketing Strategies based on Product Life Cycle, Channels of Distribution, Supply Chain Management.

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programs, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and implementation, Generic Strategy alternatives.

UNIT III

Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Business Process Reengineering (BPR) – Objectives of inventory control, EOQ, ABC Analysis, VED Analysis, FSN Analysis, and JIT System. **Project Management:** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time,

UNIT IV

Individual Behavior: Perception: Perceptual process, Impression management, Personality development, Socialization, Attitude, Process- Formation- Positive attitude.

Group Dynamics: Types of Groups, Stages of Group Development, Group Behaviour and Group Performance Factors, Organizational conflicts: Reasons for Conflicts, Consequences of Conflicts in Organization, Types of Conflicts, Strategies for Managing Conflicts, Organizational Climate and Culture, Stress, Causes and effects, coping strategies of stress.

Text Books:

1. Dr. P.G. Ramanujam *at.al Management Science,HPH.*
2. Koontz & Weihrich: *Essentials of Management*, 6/e, TMH,2007
3. Robbins: Organizational Behaviour, Pearson publications,2011

Reference Books:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI,2007
2. Thomas N.Duening & John M.I Vancevich *Management—Principles andGuidelines* Biztantra, 2007.
3. Kanishka Bedi, *Production and Operations Management*, Oxford University Press,2007.
4. Memoria & S.V.Ganker, *Personnel Management*, Himalaya, 25/e,2007

Course Code &Title: LC-CS406COMPUTER ORGANIZATION AND ARCHITECTURE LAB **Semester & Year of study: IV & 2020-2021** **Course Index: CS406**
Course Objectives: The learning objectives of this course are:
Course Objectives
To apply TTL Characteristics and TTL IC Gates and to learn Multiplexers and Decoders applications.
To learn application of Flip-Flops, Counters, Binary Adders & Subtractors.
To understand the application on operations of Bit Numbers.
To understand the application of Array operations and Conversions from BCD←→HEX.
Course Outcomes: By the end of the course, the student will be
Course Outcomes
Able to understand the application of TTL Characteristics and IC Gates, Multiplexers and Decoders
Able to know the application of Flip-Flops, Counters, Binary Adders and Subtractors.
Able to code a program on operations of Bit Numbers.
Able to know the application of Array operations and Conversions from BCD←→HEX.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20 AB)
LC-CS406: COMPUTER ORGANIZATION AND ARCHITECTURE LAB

Lab	**: 3 Hrs/week**	**Credits**	**: 1.5**
Int Marks	**: 50**	**Ext Marks**	**: 50**

Digital Logic Design Experiments:

1. TTL Characteristics and TTL IC Gates
2. Multiplexers & Decoders
3. Flip-Flops
4. Counters
5. Binary Adders & Subtractors

8085/86AssemblyLanguageProgramming:

1. Addition of two 8 bit numbers.
2. Addition of two 16 bit numbers.
3. Sum of series of 8 bit numbers.
4. Sum of series of 16 bit numbers.
5. Subtraction of two 8 bit numbers.
6. Multiplication of two 8 bit numbers.
7. Largest number in an array.
8. Smallest number in an array.
9. Array elements in ascending order.
10. Array elements in descending order.
11. BCD to HEX conversion
12. HEX to BCD conversion.

REFERENCES:

1. Computer System Architecture: Morris Mano.
2. Advanced Micro Processor and Peripherals - Hall/ A K Ray.
3. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
4. Structured Computer Organization and Design - Andrew S. Tanenbaum, 4th Edition PHI/Pearson.

Course Code &Title: LC-CS407COMPUTER NETWORKS LAB
Semester & Year of study: IV & 2020-2021
Course Index: CS407

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
CS407.1	To implement the data link layer framing methods, Dijkstra‘s algorithm.
CS407.2	To implement distance vector routing algorithm.
CS407.3	To implement broadcast tree and encrypting DES algorithm.
CS407.4	To decrypt DES algorithm and encrypt & decrypt of RSA algorithm.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
CS407.1	Able to implement the data link layer framing methods, Dijkstra‘s algorithm.
CS407.2	Able to obtain Routing table for each node using distance vector routing algorithm.
CS407.3	Able to implement encryption and decryption using DES algorithm.
CS407.4	Able to implement encryption and decryption using RSA algorithm.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20 AB)
LC-CS407: COMPUTER NETWORKS LAB

Lab: 3 Hrs /Week **Credits: 1.5**
Int Marks: 50 **Ext Marks: 50**

1. Implement the data link layer framing methods such as character, character stuffing, and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP 15.
3. Implement Dijkstra‘s algorithm to compute the Shortest Path through a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table for each node using distance vector routing algorithm
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Take a 64 bit playing text and encrypt the same using DES algorithm.
7. Write a program to break the above DES coding.
8. Using RSA algorithm encrypts a text data and Decrypt the same.

Text Books:

1. Computer Networks, Andrews S Tanenbaum, Edition 4, PHI.
2. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw-Hill CoLtd, Second Edition.

Course Code &Title: LC-CS408 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
Semester & Year of study: IV & 2020-2021
Course Index: CS408

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
CS408.1	To implement Object Oriented Programming Encapsulation, Polymorphism, methods of Exception class.
CS408.2	To implement Array list, Thread using Runnable Interface.
CS408.3	To implement simple Appletand simple Servlet application.
CS408.4	To connect MySQL Database using JDBC API, remote server and to read and download a web page in HTML file.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
CS408.1	Able to code Java program to implement Object Oriented Programming Encapsulation, Polymorphism, methods of Exception class.
CS408.2	Able to code Java program using Array list, Thread using Runnable Interface.
CS408.3	Able to code Java program to run a simple Applet and to create simple Hello world Servlet application.
CS408.4	Able to code Java Program to connect MySQL Database using JDBC API, to read and download a web page in HTML file and to connect to a remote server.

LC-CS408: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Lab: 3 Hrs/Week **Credits: 1.5**
Int Marks: 50 **Ext Marks: 50**

1. Program to demonstrate how to implement Object Oriented Programming Encapsulation feature in Java Programming language
2. How to demonstrate Polymorphism through a simple Java Program?
3. A Simple Java Program demonstrating methods of Exception class
4. How to use Array list in Java with Examples?
5. How to create and run a Thread using Runnable Interface?
6. How to run a simple Applet in Java?
7. How to create simple Hello world Servlet application in Java?
8. How to connect MySQL Database using JDBC API in Java?
9. A Simple Java Program to read and download a web page in HTML file?
10. How to connect to a remote server through a Java program?

Text Books:

1. Java Complete reference, 10th Edition by Herbert Schildt, publisher :Oracle press
2. Programming with java –E Bala Guruswamy, Tata Mc Graw hill publications

Branch/Course: Computer Science and Engineering

Semester V (Third year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
ESC-CS501	Micro Processors and Micro Controllers	75	25	100	3	0	0	3
PCC-CS502	Formal Languages and Automata Theory	75	25	100	3	0	0	3
PCC-CS503	Design and Analysis of Algorithms	75	25	100	3	0	0	3
PCC-CS504	Object Oriented Analysis & Design with UML	75	25	100	3	0	0	3
PEC-CS505	Elective-I 1.Artifitial Intelligence & Neural Networks 2.Distributed Operating Systems 3.Internet of Things	75	25	100	3	0	0	3
LC-CS506	Micro Processor and Micro Controller Lab	50	50	100	0	0	3	1.5
LC-CS507	Object Oriented Analysis & Design with UML Lab	50	50	100	0	0	3	1.5
MC-CS508	Constitution of India	75	25	100	2	0	0	0
MC-CS509	Skill Development Course	--	50	50	1	0	2	2
MC-CS510	SUMMER INTERNSHIP							1.5
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week or 2 Theory Hrs/ Week for SKILL DEVELOPMENT COURSE

Summer Internship 2 Months (Mandatory) after second year to be evaluated during V semester

ESC-CS501: MICRO PROCESSORS AND MICRO CONTROLLERS
Semester & Year of study: V & 2021-2022
Course Index: C501
OBJECTIVE:
This subject deals about the basic 16-bit (8086) processor and an 8-bit (8051) controllers, their architecture, internal organization and their functions, interfacing an external device with the processors/ controllers.
COURSE OUTCOMES:
Students are able to

C501.1: recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.
C501.2: identify a detailed s/w & h/w structure of the Microprocessor.
C501.3: illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.
C501.4: distinguish and analyze the properties of Microprocessors & Microcontrollers.
C501.5: analyze the data transfer information through serial & parallel ports.
C501.6: train their practical knowledge through laboratory experiments.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20 AB)
ESC-CS501: MICRO PROCESSORS AND MICRO CONTROLLERS

Theory:3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT-I

8086/8088 MICROPROCESSORS

Register organization of 8086, Architecture, signal description of 8086,physical memory organization, general bus operation, I/O addressing capability, special purpose activities, Minimum mode, maximum mode of 8086 system and timings, the processor 8088, machine language instruction formats, addressing mode of 8086, instruction set off 8086,assemblerdirectives and operators.

UNIT-II

PROGRAMMING WITH 8086 MICROPROCESSOR

Machine level programs, programming with an assembler, Assembly language programs, introduction to stack, stack structure of 8086/8088,interrupts and interrupt service routines, interrupt cycle of 8086, non-maskable interrupt and mask able interrupts, interrupt programming.

UNIT-III

BASIC AND SPECIAL PURPOSE PROGRAMMABLEPERIPHERALS AND THEIR INTERFACING WITH 8086/88

Semiconductor memory interfacing, dynamic RAM interfacing, interfacing i/o ports, PIO 8255 modes of operation of 8255,interfacing to D/A and A/D converters, stepper motor interfacing, control of high power devices using8255.Programmable interrupt controller 8259A, the keyboard/display controller 8279, programmable communication interface 8251 USART, DMA Controller 8257.

UNIT-IV

8051 MICROCONTROLLER

Introduction to microcontrollers, 8051 Microcontrollers, 8051 pin description, connections, I/O ports and memory organization, MCS51 addressing modes and instructions, assembly language programming tools.

Overview and features, PIC16Cx/7X instructions, interrupts in PIC16C61/71, PIC16F8XX Flash controllers, I/O ports and timers.

Introduction to 16/32 Bit processors, ARM architecture and organization, ARM / Thumb programming model, ARM / Thumb instruction set.

TEXT BOOKS:

1. A.K.Ray,K.M.Bhurchandi,"AdvancedMicroprocessorsandPeripherals",TataMcGrawHill Publications,2000.
2. N.Sentil Kumar, M.Saravanan, S.Jeevananthan, "Microprocessors and Microcontrollers", Oxford University Press,2010.

REFERENCES:

1. Ajay V Deshmukh, "Microcontrollers", TATA McGraw Hillpublications,2012.
2. Krishna Kant, "Microprocessors and Microcontrollers", PHIPublications,2010.

PCC-CS502: FORMAL LANGUAGES AND AUTOMATA THEORY
Semester & Year of study: V & 2021-2022
Course Index: C502
Course Objectives:
The primary objective of this course is to introduce students to the foundations of computability theory.
Other objectives include the application of mathematical techniques and logical reasoning to important problems, and to develop a strong background in reasoning about finite state automata and formal languages.
Prerequisites:
Discrete Math is a prerequisite, and students are also expected to be familiar with basic notions of computer programming, data structures, and design of algorithms.
Learning Outcomes:
After completion of this course, the student should be able to:
C502.1: Knowledge and understanding
Explain and manipulate the different concepts in automata theory and formal languages such as formal proofs, (non-)deterministic automata, regular expressions, regular languages, context-free grammars, context-free languages, Turing machines;
Explain the power and the limitations of regular languages and context-free languages.
C502.2: Skills and abilities
Prove properties of languages, grammars and automata with rigorously formal mathematical methods;
Design automata, regular expressions and context-free grammars accepting or generating a certain language;
Describe the language accepted by an automata or generated by a regular expression or a context-free grammar;
Transform between equivalent deterministic and non-deterministic finite automata, and regular expressions;
Simplify automata and context-free grammars;
Determine if a certain word belongs to a language;
Define Turing machines performing simple tasks.
C502.3: Judgment and approach
Differentiate and manipulate formal descriptions of languages, automata and grammars with focus on regular and context-free languages, finite automata and regular expressions.

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III BTech (CSE) V Semester (2019-20 AB)
PCC-CS502: FORMAL LANGUAGES AND AUTOMATA THEORY

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT-I

Finite Automata: Basic Concepts of Finite State Systems, Chomsky Hierarchy of Languages, Deterministic and Non-Deterministic Finite Automata, Finite Automata with ϵ-moves, Minimization of Finite Automata, Mealy and Moore Machines, Two-Way Finite Automata.

UNIT-II

Regular Expressions, Regular sets &Regular Grammars: Basic Definitions of Formal Languages and Grammars, Regular Expressions, Regular Sets and Regular Grammars, Closure Properties of Regular Sets, Pumping Lemma for Regular Sets, Decision Algorithm for Regular Sets.

UNIT-III

Context Free Languages & Push down Automata: Context Free Grammars and Languages, Derivation Trees, simplification of Context Free Grammars, Normal Forms, Pumping Lemma for CFL, Closure properties of CFL's. The Definition of PDA, Push-Down Automata and Context free Languages, Parsing and Push-Down Automata.

UNIT-IV

Turing Machines, Universal Turing Machines and Undecidability: The Definition of Turing Machine, Design and Techniques for Construction of Turing Machines. Universal Turing Machines. The Halting Problem, Decidable & Undecidable Problems - Post Correspondence Problem.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages and Computations – J.E. Hopcroft, &J.D. Ullman, Pearson Education Asia.
2. Elements of The Theory of Computation: Harry R Lewis,Cristos h. Papadimitriou, Pearson Education / Prentice-Hall of India Private Limited.

REFERENCE BOOKS:

1. Introduction to languages and theory of computation – John C. Martin(MGH)
2. Theory of Computation, KLP Mishra and N. Chandra Sekhar, IV th Edition,PHI
3. Introduction to Theory of Computation – Michael Sipser (ThomsonNrools/Cole

PCC-CS503: DESIGN AND ANALYSIS OF ALGORITHMS
Semester & Year of study: V & 2021-2022
Course Index: C503
OBJECTIVES:
To teach paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.
To make students understand how the worst-case time complexity of an algorithm is defined, how asymptotic notation is used to provide a rough classification of algorithms.
To explain different computational models (e.g., divide-and-conquer), order notation and various complexity measures (e.g., running time, disk space) to analyze the complexity/performance of different algorithms.
To teach various advanced design and analysis techniques such as greedy algorithms, dynamic programming & Know the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.
COURSE OUTCOMES:
C503.1: After successful completion of this course, student will be able to
C503.2: Analyze the asymptotic performance of algorithms
C503.3: Write rigorous correctness proofs for algorithms.
C503.4: Demonstrate a familiarity with major algorithms and data structures.
C503.5: Apply important algorithmic design paradigms and methods of analysis.
C503.6: Synthesize efficient algorithms in common engineering design situations.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20 AB)

PCC-CS503: DESIGN AND ANALYSIS OF ALGORITHMS

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction: What is an Algorithm, Algorithm Specification: Pseudocode Conventions Recursive Algorithm, Performance Analysis: Space Complexity, Time Complexity, Amortized Complexity, Amortized Complexity, Asymptotic Notation, Practical Complexities, Performance Measurement.

UNIT-II

Brute Force: Selection sort, Bubble sort, Exhaustive search

Divide and Conquer: General Method, Defective Chessboard, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort: Performance Measurement, Randomized Sorting Algorithms, Strassen's Matrix Multiplication.

The Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees: Prim's Algorithm, Kruskal's Algorithms, An Optimal Randomized Algorithm, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT-III

Dynamic Programming: All - Pairs Shortest Paths, Single – Source Shortest paths: General Weights, String Edition, 0/1 Knapsack, Reliability Design, The Travelling Sales Person Problem.

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring Hamiltonian Cycles.

UNIT-IV

BranchandBound: TheMethod:Leastcost(LC)Search,The15-Puzzle:AnExample,Control Abstraction for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch and Bound. 0/1 Knapsack Problem: LC Branch-and Bound Solution, FIFO Branch-and-Bound Solution, Traveling Salesperson. Basic Concepts of NP-Hard and NP-Complete Problems.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms E. Horowitz S. Sahni, Sanguthevar Rajasekaran, UniversityPress2rdEdition.
2. Introduction to the design and analysis of algorithms, Analysis of Algorithms: AnanyLevitin 3rdEdition.

REFERENCE BOOKS:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E.Hopcroft, JeffreyD. Ullman
2. Algorithm Design, JonKleinberg, Pearson.
3. Introduction to Algorithms Thomas H. Cormen, PHI Learning

PCC-CS504: OBJECT ORIENTED ANALYSES AND DESIGN WITH UML
Semester & Year of study: V & 2021-2022
Course Index: C504
Objectives:
To understand the Object-based view of Systems
To develop robust object-based models for Systems
To inculcate necessary skills to handle complexity in software design
Learning Outcomes
C504.1: Ability to analyze and model software specifications.
C504.2: Ability to abstract object-based views for generic software systems.
C504.3: Ability to deliver robust software components.

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III BTech (CSE) V Semester (2019-20 AB)
PCC-CS504: OBJECT ORIENTED ANALYSES AND DESIGN WITH UML

Theory:3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT– I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modelling, Conceptual model of the UML, Architecture, and Software Development Life Cycle.

Structural Modeling: Classes, Relationships, common Mechanisms, and Diagrams (Structural and Behavioural), Common Modeling Techniques.

UNIT-II

Advanced Structural Modelling: Advanced classes, advanced relationships, class diagrams, object diagrams

Basic Behavioural Modelling: Interactions, Interaction diagrams. Use cases, Use case Diagrams, and Activity Diagrams.

UNIT– III

Advanced Behavioural Modelling-1: Events and signals, State machines, Processes and Threads, Time and space, State Diagrams

Architectural Modelling: Components, Deployment, Component diagrams, Deployment diagrams.

UNIT-IV

Design Patterns: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

TEXT BOOKS:

1. "Object- Oriented Analysis And Design with Applications", Grady BOOCH, Robert A. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia Houston, 3rd edition, 2013,PEARSON.
2. "The Unified Modelling Language User Guide", Grady Booch, James Rumbaugh,Ivar Jacobson, 12th Impression, 2012,PEARSON.
3. Design Patterns By Erich Gamma, Richard Helmm Ralph Johnson, John Vlissides,Pearson Education.

REFERENCE BOOKS:

1. "Object-oriented analysis and design using UML", Mahesh P. Matha,PHI
2. "Head first object-oriented analysis and design", Brett D. McLaughlin, Gary Pollice, DaveWest, O"Reilly
3. "Object-oriented analysis and design with the Unified process", John W. Satzinger, RobertB. Jackson, Stephen D. Burd, CengageLearning
4. "The Unified modeling language Reference manual", James Rumbaugh, Ivar Jacobson,Grady Booch,Addison-Wesley

PEC-CS505: ARTIFITIAL INTELLIGENCE & NEURAL NETWORKS (ELECTIVE-I)
Semester & Year of study: V & 2021-2022
Course Index: C505
Course Description and Objectives:
This course provides an introduction to the fundamentals of artificial intelligence.
It contains a theory component about the concepts and principles that underlie modern AI algorithms, and a practice component to relate theoretical principles with practical implementation.
COURSE OUTCOMES (CO)
Students will try to learn:
To create appreciation and understanding of both the achievements of AI Students will able to:
C505.1: Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents. DEPARTMENT OF INFORMATION TECHNOLOGY and the theory underlying those achievements.
C505.2: To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
C505.3: To review the different stages of development of the AI field from human like behavior to Rational Agents.
C505.4: To impart basic proficiency in representing difficult real-life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
C505.5: To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.
C505.6: To introduce advanced topics of AI such as planning, Bayes networks,
C505.7: Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game-based techniques to solve them.
C505.8: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
C505.9: Attain the capability to represent various real-life problem domains using logic based techniques and use this to perform inference or planning.
Formulate and solve problems with uncertain information using Bayesian approaches.
C505.10: Apply concept Natural Language processing to problems leading to understanding of cognitive computing.
C505.11: Know the main provisions neuro mathematics;
C505.12: Know the main types of neural networks;
C505.13: Know and apply the methods of training neural networks;
C505.14: Know the application of artificial neural networks;
C505.15: To be able to formalize the problem, to solve it by using a neural network.

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III BTech (CSE) V Semester (2019-20 AB)

PEC-CS505: ARTIFITIAL INTELLIGENCE & NEURAL NETWORKS (ELECTIVE-I)

Theory:3Hrs/ Week **Credits 3**
Int Marks:25 **Ext Marks :75**

UNIT – I

Introduction: AI problems, history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents.

Searching: uniformed search strategies, Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT – II

Knowledge Representation: Knowledge Representation & Reasons logical Agents, Knowledge-Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward & Backward Chaining.

First order logic: Inference in first order logic, propositional Vs. first order inference, unification & lifting forward chaining, Backward chaining, Resolution.

UNIT – III

Neural Networks: Characteristics of Neural Networks, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units. Competitive Learning Neural Networks & Complex pattern Recognition Introduction.

UNIT – IV

Feedforward Neural Networks: Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks, Analysis of pattern storage Networks. Analysis of Pattern Mapping Networks.

Feedback Neural Networks: Introduction, Analysis of Linear Auto associative FF Networks, Analysis of Pattern Storage Networks.

TEXT BOOKS:

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.
2. Artificial Neural Networks B. Yagna Narayana,PHI

REFERENCES:

1. Artificial Intelligence , 2nd Edition, E. Rich and K. Knight(TMH).
2. Artificial Intelligence and Expert Systems – Patterson PHI.

PEC-CS505: DISTRIBUTED OPERATING SYSTEMS (ELECTIVE-I)
Semester & Year of study: V & 2021-2022
Course Index: C505
Course Objectives
•To provide hardware and software issues in modern distributed systems.
• To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
• To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.
Course Outcomes (COs)
C505.1: To provide hardware and software issues in modern distributed systems**.**
C505.2: To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
C505.3: To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.
C505.4: To know about Shared Memory Techniques**.**
C505.5: Have Sufficient knowledge about file access.
C505.6: Have knowledge of Synchronization and Deadlock.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20 AB)

PEC-CS505: DISTRIBUTED OPERATING SYSTEMS (ELECTIVE-I)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Processes:
THREADS: Introduction to Threads, Threads in Distributed Systems; CLIENTS: User Interfaces, Client-Side Software for Distribution Transparency SERVERS: General Design Issues, Object Servers; CODE MIGRATION: Approaches to Code Migration, Migration and Local Resources, Migration in Heterogeneous Systems, Example: D'Agents.
SOFTWARE AGENTS: Software Agents in Distributed Systems, Agent Technology.

UNIT II

Naming Systems:
NAMING ENTITIES: Names, Identifiers, and Addresses, Name Resolution, The Implementation of a Name Space, Example: DNS, X.500
LOCATING MOBILE ENTITIES: Naming versus Locating Entities, Simple Solutions, Home- Based Approaches, Hierarchical Approaches
REMOVING UNREFERENCED ENTITIES: The Problem of Unreferenced Objects, Reference Counting, Reference Listing, Identifying Unreachable Entities.

UNIT III

Synchronization
Clock synchronization, logical clocks, global state, election algorithms, mutual exclusion, distributed transactions.
Consistency and Replication: Introduction, Client-Centric Consistency Models, Distribution Protocols, Consistency Protocols, Examples: Orca and Causally-Consistent Lazy Replication.

UNIT IV

Fault Tolerance:
Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, Recovery.
Distributed Object-Based Systems: CORBA, Distributed Com, Globe and Comparison of CORBA, DCOM, and Globe.
Distributed File Systems: Sun Network File System, Coda File System, Plan9, XFS and SFS, Scalable Security, Comparison of Distributed File Systems.

TEXT BOOKS:
1. Distributed Systems, Principles and Paradigms, 2/e, Tanenbaum, Maarten Van Steen, PHI.
2. Advanced concepts in Operating Systems, Mukesh Singhal, Niranjan G. Shivaratri, TMH, 2005.

REFERENCE BOOKS:
1. Distributed Operating Systems and Algorithm Analysis, Chow, Johnson, PEA
2. Distributed Systems Concepts and Design, 4/e, George Coulouris, Dollimore, Kindberg, PEA.
3. Distributed Operating Systems, Pradeep K. Sinha,PHI,2009.
4. Operating Systems, Internals & Design Principles, 6/e, William Stallings, PEA

PEC-CS505: INTERNET OF THINGS (ELECTIVE-I)
Semester & Year of study: V & 2021-2022
Course Index: C505
Course description and objectives:
Students will be explored to the interconnection and integration of the physical world and the cyber space.
They are also able to design & develop IOT Devices.
Course Outcomes:
C505.1: Able to understand the application areas of IOT
C505.2: Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
C505.3: Able to understand building blocks of Internet of Things and characteristics.

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III BTech (CSE) V Semester (2019-20 AB)

PEC-CS505: INTERNET OF THINGS (ELECTIVE-I)

Theory:3Hrs/ Week **Credits 3**
IntMarks:25 **Ext Marks :75**

UNIT -- I

Introduction to Internet of Things: Definition & Characteristics of IoT, Physical Design ofIoT LogicalDesignofIoT,IoTEnablingTechnologies,IoTLevels&DeploymentTemplatesDomain Specific IoTs: Home, Cities, Environment, Energy systems, Logistics, Agriculture, Health & Lifestyle

UNIT – II

IOT & M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, 1 NeedforIoTSystemsManagement,SimpleNetworkManagementProtocol(SNMP),Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IoT Systems Managementwith NETCONF-YANG,NETOPEER

UNIT – III

IoT Platforms Design Methodology: IoT Design Methodology, Case Study on IoT System for Weather Monitoring , Motivation for Using Python , IoT Systems - Logical Design using Python ,Installing Python , Python Data Types & Data Structures ,Control Flow , Functions, Modules, Packages , File Handling l, Date/Time Operations , Classes ,Python Packages of Interest for IoT

UNIT – IV

IoT Physical Devices & Endpoints: Raspberry Pi , About the Board , Linux on Raspberry Pi , Raspberry Pi Interfaces , Programming Raspberry Pi with Python , Other IoT Devices, IoT Physical Servers & Cloud Offerings , Introduction to Cloud Storage Models & Communication APIs,WAMP–AutoBahnforIoT,XivelyCloudforIoT,PythonWebApplicationFramework
- Django , Designing a RESTful Web API , Amazon Web Services for ,SkyNetIoT Messaging Platform

TEXT BOOK:

1. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERENCE BOOK:

1. Fundamentals of Python, K.A.Lambert and B.L.Juneja, Cengage Learning, 2012

LC-CS506: MICROPROCESSOR AND MICROCONTROLLER LAB
Semester & Year of study: V & 2021-2022
Course Index: C506
Course Description &objectives:
The students are required to develop the necessary Algorithm, Flowchart and Assembly Language Program Source Code for executing the following functions using MASM/TASM software and to verify the results with necessary Hardware Kits.
This course introduces the assembly language programming of 8086 and 8051 microcontroller. it gives a practical training of interfacing the peripheral devices with the 8086 microprocessor.
The course objective is to introduce the basic concepts of microprocessor and to develop in students the assembly language programming skills and real time applications of Microprocessor as well as microcontroller.
• Study the Architecture of 8085 & 8086 microprocessor.
• Learn the design aspects of I/O and Memory Interfacing circuits.
• Study the Architecture of 8051 microcontroller
Prerequisites:
Digital Electronics Lab, Microprocessor and Microcontroller
Course Outcomes (COs)
C506.1 Design and implement programs on 8085 microprocessor.
C506.2 Design and implement programs on 8086 microprocessor.
C506.3 Design interfacing circuits with 8085
C506.4 Design interfacing circuits with 8086.
C506.5 Design and implement 8051 microcontroller based systems
C506.6 To Understand the concepts related to I/O and memory interfacing

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III BTech (CSE) V Semester (2019-20 AB)
LC-CS506: MICROPROCESSOR AND MICROCONTROLLER LAB

Lab: 3Hrs/ Week **Credits 1.5**
Int Marks: 50 **Ext Marks :50**

Objective: The students are required to develop the necessary Algorithm, Flowchart and Assembly Language Program Source Code for executing the following functions using MASM/TASM software and to verify the results with necessary Hardware Kits.

PART-I: MICROPROCESSOR 8086

1. Introduction to MASM/TASM.
2. Arithmetic operation- Multi byte Addition and Subtraction, Multiplication and Division- Signed and unsigned Arithmetic operation, ASCII- Arithmetic operation.
3. Logic operations-Shift and rotate- Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) -Display characters, Strings.

PART-II: INTERFACING WITH MICROPROCESSOR

1. 8259 – Interrupt Controller-Generate an interrupt using 8259timer.
2. 8279 – Keyboard Display- Write a program to display a string of characters.
3. 8255 – PPI-Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART-Write a program in ALP to establish Communication between two processors.

PART-III: MICROCONTROLLER 8051

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

PART-IV: INTERFACING WITH MICROCONTROLLER

1. Write C programs to interface 8051 chip to Interfacing modules to Develop single chip solutions.
2. Simple Calculator using 6 digit seven segment display and Hex Keyboard interface to8051.
3. Alphanumeric LCD panel and Hex keypad input interface to8051.
4. External ADC and Temperature control interface to8051.
5. Generate different waveforms Sine, Square, Triangular, and Ramp etc. Using DAC interface to 8051; change the frequency and Amplitude.

LC-CS507: OBJECT ORIENTED ANALYSIS & DESIGN WITH UML LAB
Semester & Year of study: V & 2021-2022
Course Index: C507
Course Description & Objective:

• Construct UML diagrams for static view and dynamic view of the system.
• Generate creational patterns by applicable patterns for given context.
• Create refined model for given Scenario using structural patterns.
• Construct behavioral patterns for given applications.

The analysis, design, coding, documentation, database design of mini project which will be carried out in 4thyear can be done in object-oriented approach using UML and by using appropriate software which supports UML.
Course Outcomes:
After completing this course, the student must demonstrate the knowledge and ability to:
C507.1: Show the importance of systems analysis and design in solving complex problems.
C507.2: Show how the object-oriented approach differs from the traditional approach to systems analysis and design.
C507.2: Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, statechart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation.
C507.4: Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships. · Show the role and function of each UML model in developing object-oriented software

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III BTech (CSE) V Semester (2019-20 AB)

LC-CS507: OBJECT ORIENTED ANALYSIS & DESIGN WITH UML LAB

Lab: 3Hrs/ Week **Credits 1.5**
Int Marks: 50 **Ext Marks :50**

OBJECTIVES:

- Construct UML diagrams for static view and dynamic view of the system.
- Generate creational patterns by applicable patterns for given context.
- Create refined model for given Scenario using structural patterns.
- Construct behavioural patterns for given applications.

Document the Software Project Management and Software Engineering activities for any SIX of the following projects. Any other project of interest also can be chosen.

1. Student Management System
2. Library Management System
3. Employee Management System
4. Railway Reservation System
5. Automatic Teller Machine
6. Hostel Management System
7. Hospital Management System
8. Online Shopping System
9. Blood Bank Management System
10. Restaurant Management System
11. Journal Publication System

Software Project Management and Software Engineering activities specified below can be customized according to the features of the project.

- Problem Statement
- Feasibility Study
- Software Requirements Specification Document
- Estimation of Project Metrics
- Entity Relationship Diagram
- Use Case Diagrams
- Class Diagram
- Sequence Diagrams
- Activity Diagrams
- State Chart Diagrams
- Test coverage

References:

1. The Unified Modeling Language User Guide. Grady Booch,James Rumbaugh andIvar Jacobson. Addison-Wesley.
2. Object Oriented Software Engineering: Practical Software Development using UML and Java. Timothy C Lethbridge & Robert, Langaneire, Mc GrawHill.

COURSE CODE &TITLE: MC-CS508 CONSTITUTION OF INDIA
SEMESTER & YEAR OF STUDY: V & 2021-22
COURSE INDEX: C508

Course Objectives:
The learning objectives of this course are:

Course Index	Course Objectives
C508.1	To Enable the student to understand the importance of constitution
C508.2	To understand the structure of executive, legislature and judiciary
C508.3	To understand philosophy of fundamental rights and duties
C508.4	To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India.
C508.5	To understand the central and state relation financial and administrative

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C508.1	Understand the concept of Indian constitution
C508.2	Understand the structure of Indian government
C508.3	Understand the structure of state government
C508.4	Understand the local Administration
C508.5	Know the role of Election Commission apply knowledge

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20 AB)
MC-CS508: CONSTITUTION OF INDIA

Lab: 2 Hrs/Week **Credits: 0**
Int Marks: 25 **Ext Marks: 75**

UNIT-I

Introduction to Indian Constitution: Constitution meaning of the term, Indian Constitution Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre-State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, LokSabha, RajyaSabha, The Supreme Court and High Court: Powers and Functions;

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-III

A.**Local Administration** - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation Pachayati Raj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-IV

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

Text Book:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H. M. Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)

References:

1. J.C. Johari, Indian Government and Politics Hans
2. J. Raj Indian Government and Politics
3. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd.. New Delhi

Branch/Course: Computer Science and Engineering
Semester VI (Third year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PCC-CS601	Network Security and Cryptography	75	25	100	3	0	0	3
PCC-CS602	Data Warehouse and Data Mining	75	25	100	3	0	0	3
PCC-CS603	Web Technologies	75	25	100	3	0	0	3
PEC-CS604	Elective-II 1.Cloud Computing 2.Grid Computing 3.Mobile Computing	75	25	100	3	0	0	3
OEC-CS605	Open Elective-I 1. Compiler Design 2. Embedded Systems 3. Robotics	75	25	100	3	0	0	3
LC-CS606	Network Security and Cryptography Lab	50	50	100	0	0	3	1.5
LC-CS607	Data Mining with R Lab	50	50	100	0	0	3	1.5
LC-CS608	Web Technologies Lab	50	50	100	0	0	3	1.5
MC-CS609	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week or 2 Theory Hrs/ Week for SKILL DEVELOPMENT COURSE

Course Code &Title: PCC-CS601 NETWORK SECURITY AND CRYPTOGRAPHY
Semester & Year of study: VI & 2021-2022
Course Index: C601

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about introduction to security and cryptography, Number Theory
Learn about Symmetric Key Cryptographic Algorithm, Asymmetric Key Algorithm
Learn about User Authentication Mechanisms, System Security
Learn about Internet Security Protocol and Network Security

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C601.1	Understand about introduction to security and cryptography, Number Theory
C601.2	Understand about Symmetric Key Cryptographic Algorithm, Asymmetric Key Algorithm
C601.3	Understand about User Authentication Mechanisms, System Security
C601.4	Understand about Internet Security Protocol and Network Security

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)

PCC-CS601: NETWORK SECURITY AND CRYPTOGRAPHY

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction & Classical encryption techniques: OSI security architecture– Security attacks, services and mechanisms- A model for network security-Symmetric cipher model- Substitution techniques-Transposition techniques- Steganography.

Number theory: Prime number – Modular arithmetic – Fermet's theorem- Eulers totient function-Euler's theorem- Euclid's algorithm - Extended Euclid's algorithm-Multiplicative & additive inverse.

UNIT II

Classical encryption techniques: Block cipher principles-Block cipher design principles-Bloch cipher modes of operation-DES-IDEA-RC4-AES -Differential and linear cryptanalysis.

Public key encryption: Principles of Public key cryptosystems- RSA – Key distribution – Diffie Hellman key exchange – Elliptic curve encryption and decryption.

UNIT III

Message Authentication & Hash functions: Authentication requirement – Authentication function – Message Authentication Code (MAC) – Hash function– SHA512– Digital signature and Digital Signature Standard (DSS).

E-mail security & IP security –Pretty Good Privacy- S/MIME- IP Security Architecture- Authentication header- Encapsulating Security Payload

UNIT IV

Web security: Web security considerations- Secure Socket Layer- Transport layer Security- Secure Electronic Transaction.

System Security: Intruders-Intruder Detection-Virus and related threads-virus counter measures-Firewall- Firewall design principles-Introduction to trusted systems

TEXT BOOK:

3. Cryptography & Network Security principles & practices, William Stallings, Fourth Edition, Pearson Education.

REFERENCES:

1. Cryptography & Network Security, Atul Kahate, Tata Mc Graw-Hill pub company Ltd, New Delhi
2. Network Security, Private communication in public world, Charlie Kaufman, Radia Perlman, Mike Speicher, , PHI Second Edition,2002.
3. Practical Cryptography, Bruce Schneier, Neils Ferguson,Wiley Dreamtech India Pvt Ltd, First Edition,2003.

Course Code &Title: PCC-CS602 DATA WAREHOUSE AND DATA MINING
Semester & Year of study: VI & 2021-2022
Course Index: C602

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Data Warehouse and OLAP Technology, Data Preprocessing
Learn about Introduction to Data Mining, Getting to know his data
Learn about Concept Description, Mining Frequent Pattern, Association and Correlations
Learn about Classification Basic Concepts, Cluster Analysis

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C602.1	Understand about Data Warehouse and OLAP Technology, Data Preprocessing
C602.2	Understand about Introduction to Data Mining, Getting to know his data
C602.3	Understand about Concept Description, Mining Frequent Pattern, Association and Correlations
C602.4	Understand about Classification Basic Concepts, Cluster Analysis

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)
PCC-CS602: DATA WAREHOUSE AND DATA MINING

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Data Warehouse and OLAP Technology: An overview Data Warehouse Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation Data Preprocessing: An Overview, Data Cleaning, Data Integartion, Data Reduction, Data Transformation and Data Discretization, From Data Warehousing to Data Mining

UNIT II

Introduction to Data Mining: Motivation and importance, What is Data Mining, Data Mining on what kind of data, What kinds of patterns can be mined, Which technologies are used, Which kinds of applications are targeted, Major issues in Data Mining. Getting to know your Data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring data Similarity and Dissimilarity.

UNIT III

Concept Description: Characterization and comparison What is Concept Description, Data Generalization by Attribute-Oriented Induction(AOI), AOI for Data Characterization, Efficient Implementation of AOI, AOI for Class comparisons. Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Frequent Itemset Mining Methods: Apriori method, generating Association Rules, Improving the Efficiency of Apriori, Pattern-Growth Approach for mining Frequent Item sets, Mining Frequent Itemsets using vertical data format, Mining Closed and Max Patterns.

UNIT IV

Classification Basic Concepts: Basic Concepts, Decision Tree Induction: Decision Tree Induction, Attribute Selection Measures, Tree Pruning, Bayes Classification Methods, Classification by Back Propagation, Suport Vector Machines. Cluster Analysis: Cluster Analysis, Partitioning Methods, Hierarchical methods, Density based methods-DBSCAN and OPTICS.

TEXT BOOK:

1. Data Mining Concepts and Techniques—Jiawei Han, Micheline Kamber and Jian Pei Morgan Kaufman Publications 3rd edition.

REFERENCE BOOKS:

1. Introduction to Data Mining –Pang-Ning Tan, Michael Steinbach, Vipin Kumar
2. Introduction to Data Mining, Adriaan, Addison Wesley Publication
3. Data Mining Techniques, A.K. Pujari, University Press

Course Code &Title: PCC-CS603 WEB TECHNOLOGIES
Semester & Year of study: VI & 2021-2022
Course Index: C603

Course Objectives:
The learning objectives of this course are:

Course Objectives
Understand about Internetworking Concepts, Devices, Basics, History and Architecture, WWW, HTTP, TELNET, Introduction to Web Technology
Learn about Introduction to HTML/XHTML, Introduction to Java Script, XML
Learn about Dynamic Web Pages, Active Web Pages
Learn about Electronic Data Interchange, Wireless Application Protocol

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C603.1	Understand about Internetworking Concepts, Devices, Basics, History and Architecture, WWW, HTTP, TELNET, Introduction to Web Technology
C603.2	Understand about Introduction to HTML/XHTML, Introduction to Java Script, XML
C603.3	Understand about Dynamic Web Pages, Active Web Pages
C603.4	Understand about Electronic Data Interchange, Wireless Application Protocol

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III BTech (CSE) VI Semester (2019-20 AB)

PCC-CS603 WEB TECHNOLOGIES

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT- I

Internetworking Concepts, Devices, Basics, History and Architecture: Internetworking, Problems in Internetworking, Dealing with Incompatibility Issues, A Virtual Network, Internetworking Devices, Repeaters, Bridges, Routers, Gateways, A Brief History of the Internet, Growth of the Internet, Internet topology, Internal Architecture of an ISP.

WWW, HTTP, TELNET: A Brief History of WWW, Basics of WWW and Browsing, Locating Information on the Internet, Web Browser Architecture, Web Pages and Multimedia, Remote Login (TELNET).

Introduction to Web Technology: Features Required for Enabling e-commerce, Web pages-Types and Issues, Tiers, The Concept of a Tier, A Concept of Microsoft and Java Technologies, Web Pages, Static Web Pages, Plug-ins, Introduction to Frames and Forms

UNIT- II

Introduction to HTML/XHTML: Origins and Evolution of HTML and XHTML, Basic Syntax of HTML, Standard HTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, HTML5, Syntactic Differences between HTML and XHTML.

Introduction to Java Script: Objects in Java Script. Dynamic HTML, Java Script – declaring variables, scope of variables, functions, even handlers (onclick, onsubmit, etc), form validations

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java. XML AJAX A New Approach: Introduction to AJAX. Consuming WEB services in AJAX**:** (SOAP, WSDL).

UNIT- III

Dynamic Web Pages: Need for Dynamic Web Pages, Magic of Dynamic Web Pages, Overview of Dynamic Web Page Technologies, Overview of Dynamic HTML (DHTML), Common Gateway Interface (CGI), Microsoft's Active Server Pages (ASP), Basics of ASP Technology, ASP Example, Modern Trends in ASP, Java and the Concept a Virtual Machine, Java Servlets and Java Sever pages(JSP), Java Servlets, Java Sever pages (JSP).

Active Web pages: Active Web pages is a Better Solution, Java Applets, Why are Active Web Pages Powerful? When not to use Active Web Pages, Lifecycle of Java Applets, Java Beans, Active X Controls.

UNIT- IV

Electronic Data Interchange (EDI): An Overview of EDI, the Origins of EDI, Understanding EDI, Data Exchange Standards, EDI Architecture, The Significance of EDI in International Trade, Financial EDI, EDI and the Internet.

Wireless Application Protocol (WAP): Limitations of Mobile Devices, The emergence of WAP, WAP Architecture, The WAP Stack, Concerns about WAP and its Future, Alternatives to WAP.

TEXT BOOKS:

1. DeitelH.M.andDeitelP.J.,"InternetandWorld WideWebHowtoprogram",Pearson International, 2012, 4th Edition.(Ch-1,4,5,6,12,14,26,27)
2. Programming the World Wide Web, Robet W Sebesta, 7ed,Pearson.
3. Web Technologies: TCP/IP to Internet Application Architectures-TATA McGraw Hill Publications – Achyut S Godbole, Atul Kahate

Course Code &Title: PEC-CS604 CLOUD COMPUTING
Semester & Year of study: VI & 2021-2022
Course Index: C604

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about introduction to Cloud Computing, Cloud Infrastructure, Cloud Computing Applications and Paradigms
Learn about Cloud Resource Virtualization, Cloud Resource Management and Scheduling
Learn about Storage System, Cloud Security
Learn about Cloud Application Development and Case Study

Course Outcomes:
By the end of the course, the student will be

Course Index	**Course Outcomes**
C604.1	Understand about introduction to Cloud Computing, Cloud Infrastructure, Cloud Computing Applications and Paradigms
C604.2	Understand about Cloud Resource Virtualization, Cloud Resource Management and Scheduling
C604.3	Understand about Storage System, Cloud Security
C604.4	Understand about Cloud Application Development and Case Study

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)

PEC-CS604 CLOUD COMPUTING
(Elective-II)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT - I

Introduction: Overview, Peer-to-Peer Systems, Cloud Computing-Delivery Models, services, Ethical Issues and Vulnerabilities, Overview of Parallel and Distributed Systems.

Cloud Infrastructure: Cloud Computing (At Amazon, At Google, Microsoft Windows Azure), Private Clouds, Cloud Storage, Cloud Computing Interoperability (The Intercloud), Responsibility Sharing Between User and Cloud Service Provider.

Cloud Computing (Applications and Paradigms): Challenges, Architectural Styles, Workflows, The Zoo Keeper, The MapReduce Programming Model, High Performance Computing on Cloud.

UNIT - II

Cloud Resource Virtualization: Layering and Virtualization, Virtual Machines, Full Virtualization and Para virtualization, Hardware Support for Virtualization.

Cloud Resource Management and Scheduling: Policies and Mechanisms for Resource Management, Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two- Level Resource Allocation Architecture, Resource Bundling(Combinatorial Auctions for Cloud Resources), Scheduling Algorithms for Computing Clouds, Fair Queuing, Start-Time Fair Queuing, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

UNIT - III

Storage System: The Evolution, Storage Models, File Systems, and Databases, Distributed File Systems, General Parallel File Systems, Google File Systems, Apache Hadoop, Locks and Chubby, BigTable, Megastore.

Cloud Security: Security Risks, Security (The Top Concern for Cloud Users), Privacy and Privacy Impact Assessment, Trust, OS Security, VM Security, Security of Virtualization, Xoar: Breaking the Monolithic Design of the TCB.

UNIT -IV

Cloud Application Development: Amazon Web Services: EC2 Cloud Application, How to install Hadoop in Eclipse on a Windows System, Cloud-Based Simulation of a Distributed Trust Algorithm.

Case Study: The Grep, Web Application, Xen, a VMM Based on Paravirtualization, Migrating an enterprise IT System to IaaS.

TEXT BOOKS:

1. Cloud Computing: Theory and Practice, Dan C. Marinescu, Morgan Kaufmann, Elsevier.

REFERENCE BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffrey C.Fox, Jack J.Dongarra, Morgan Kaufmann, 1st Edition,2011.
2. Cloud Computing-A Practical Approach, Anthony T. Velte, Toby J. Velte, RobertElsenpeter. McGrawHill.

Course Code &Title: PEC-CS604 GRID COMPUTING
Semester & Year of study: VI & 2021-2022
Course Index: C604

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Introduction about Grid Computing, Overview of Grid Architecture
Learn about Grid Services and Virtualization, Categories of Cloud Computing
Learn about Programming Model, Introduction to Hadoop Framework
Learn about Models for Grid Security, Cloud infrastructure security, SaaS, PaaS, IaaS, Key privacy issues in the cloud

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C604.1	Understand about Introduction about Grid Computing, Overview of Grid Architecture
C604.2	Understand about Grid Services and Virtualization, Categories of Cloud Computing
C604.3	Understand about Programming Model, Introduction to Hadoop Framework
C604.4	Understand about Models for Grid Security, Cloud infrastructure security, SaaS, PaaS, IaaS, Key privacy issues in the cloud

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)

PEC-CS604 GRID COMPUTING
(Elective-II)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction : Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network based systems – clusters of cooperative computers – Grid computing Infrastructures – cloud computing – service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture.

UNIT II

Grid Services and virtualization: Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA/OGSI – Data intensive grid service models–OGSA services. Cloud deployment models: public, private, hybrid, community
Categories of Cloud Computing: Everything as a service: Infrastructure, platform, software–Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data centre automation.

UNIT III

Programming Model : Open source grid middleware packages – Globus Toolkit (GT4) Architecture , Configuration – Usage of Globus – Main components and Programming model – Introduction to Hadoop Framework – Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

UNIT IV

Security: Trust models for Grid security environment – Authentication and Authorization methods– Grid security infrastructure – Cloud Infrastructure security: network, host and application level– aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

TEXT BOOKS:

1. KaiHwang, Geoffery C.FoxandJackJ.Dongarra, “Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet”, First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier,2012.

REFERENCE BOOKS:

1. Jason Venner, “Pro Hadoop- Build Scalable, Distributed Applications in the Cloud”, APress, 2009
2. Tom White, “Hadoop The Definitive Guide”, First Edition. O‟Reilly,2009.
3. Bart Jacob (Editor), “Introduction to Grid Computing”, IBM Red Books, Vervante,2005
4. Ian Foster, Carl Kesselman, “The Grid: Blueprint for a New Computing AA 5.Frederic Magoules and Jie Pan, “Introduction to Grid Computing” CRC Press,2009.

Course Code &Title: PEC-CS604 MOBILE COMPUTING
Semester & Year of study: VI & 2021-2022
Course Index: C604

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Introduction to Mobile Communications and Computing
Learn about Wireless LANs, Wireless Networking
Learn about Database Issues, Data Dissemination
Learn about Mobile IP and Wireless Application Protocol

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C604.1	Understand about Introduction to Mobile Communications and Computing
C604.2	Understand about Wireless LANs, Wireless Networking
C604.3	Understand about Database Issues, Data Dissemination
C604.4	Understand about Mobile IP and Wireless Application Protocol

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)
PEC-CS604: MOBILE COMPUTING
(ELECTIVE-II)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT-I

Introduction to Mobile Communications and Computing: Introduction to cellular concept, Frequency Reuse, Handoff, GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services, Introduction to mobile computing, novel applications, limitations, and architecture.

UNIT II

Wireless LANs: Introduction, Advantages and Disadvantages of WLANs, WLAN Topologies, Introduction to Wireless Local Area Network standard IEEE 802.11, Comparison of IEEE 802.11a, b, g and n standards, Wireless PANs, Hiper LAN, Wireless Local Loop

Wireless Networking: Introduction, Various generations of wireless networks, Fixed network transmission hierarchy, Differences in wireless and fixed telephone networks, Traffic routing in wirelessnetworks,WANlinkconnectiontechnologies,X.25protocol,FrameRelay,ATM,Virtual private networks, Wireless data services, Common channel signaling, Various networks for connecting to the internet.

UNIT III

Database Issues: Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, file system, disconnected operations.

Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT IV

Mobile IP and Wireless Application Protocol: Introduction to Mobile IP, Introduction to Wireless Application Protocol, Application layer.

Text Books:

1. Gottapu Sasibhushana Rao, “Mobile Cellular Communication”, PearsonEducation, First Edition,2013.
2. Stojmenovic and Cacute, “Handbook of Wireless Networks and MobileComputing”,

Course Code &Title: OEC-CS605 COMPILER DESIGN
Semester & Year of study: VI & 2021-2022
Course Index: C605

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Introduction of Compilers, Lexical Analysis
Learn about Syntax Analysis, Semantic Analysis and Intermediate Code Generation
Learn about Code Optimization and Code Generation
Learn about Symbol Table Management and Error Handling

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C605.1	Understand about Introduction of Compilers, Lexical Analysis
C605.2	Understand about Syntax Analysis, Semantic Analysis and Intermediate Code Generation
C605.3	Understand about Code Optimization and Code Generation
C605.4	Understand about Symbol Table Management and Error Handling

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)

OEC-CS605: COMPILER DESIGN

(Open Elective-I)

Theory: 3Hrs/ Week **Credits 3**
Int Marks:25 **Ext Marks :75**

UNIT I

Introduction: Introduction to Compilers, Compilers & Translators, Why do we need Translators, The structure of a Compiler, Lexical Analysis, Syntax Analysis, Intermediate Code Generation, Optimization, Code Generation, Error Handling, Compiler Writing Tools, Bootstrapping.

Lexical Analysis: Introduction to Lexical Analysis, The role of Lexical Analyzers, Approaches to the design Lexical Analyzers, Language for specifying lexical analyzers, Implementation of lexical analyzers, Lexical Analyzer Generator LEX.

UNIT II

Syntax Analysis: Syntactic Specification of Programming Languages, Context Free Grammars & Languages, Introduction to Parsers. Top-down parsing techniques: Brute force parsing, Recursive Descent Parsing, Predictive Parsing, Bottom – up Parsing: Shift reduce parsing, Operator precedence parsing, Simple LR Parser, Canonical LR and LALR Parsing Techniques.

Semantic Analysis and Intermediate Code Generation: Semantic Actions, Syntax Directed Translations, Translation on the parse Tree, Implementation of Syntax Directed Translator, Intermediate Codes, Syntax Directed translation to Postfix code.

UNIT III

Code Optimization: Principal sources of Code Optimization, Loop Optimization, DAG Representation of Basic Blocks, Applications of DAG's, Global Data Flow Analysis, Data Flow Equations & Computations. Machine Dependent Optimizations, Overview of Informal Compiler Algorithm Notation (ICAN), If Simplification, Loop Simplification, Loop Inversion, Branch Optimization and Prediction.

Code Generation: Object programs, problems in Code Generation, A Simple Code Generator, Register allocation & Assignments, Code Generation from DAG's. Peephole Optimization.

UNIT IV

Symbol Table Management: Contents of a Symbol Table, Data Structures for Symbol Tables; Run time Environments, Implementation of a simple Stack allocation, Heap Management, Block Structured Languages;

Error Handling: Errors, Lexical Phase Errors, Syntactic Phase Errors, Semantic Errors, Error Handling Routines.

Text Book:

1. Principles of Compiler Design by Aho,D. Ullman, Lam and Ravi Sethi, PearsonEducation SecondEdition
2. Advanced Compiler Design and Implementation, Steven Muchnic, ElsevierPublications

Reference Books:

1. Compiler Construction by Kenneth. C. Louden, VikasPub.House.
2. Compiler Design, A.A. Pentambekar,TechnicalPublications.

Course Code &Title: OEC-CS605 EMBEDDED SYSTEMS
Semester & Year of study: VI & 2021-2022
Course Index: C605

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Introduction to Embedded systems, Core of embedded system
Learn about 8—bit microcontrollers architecture
Learn about Programming the 8051 Micro controller
Learn about Interrupt, timers and serial ports of 8051

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C605.1	Understand about Introduction to Embedded systems, Core of embedded system
C605.2	Understand about 8—bit microcontrollers architecture
C605.3	Understand about Programming the 8051 Micro controller
C605.4	Understand about Interrupt, timers and serial ports of 8051

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)
OEC-CS605: EMBEDDED SYSTEMS
(Open Elective-I)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, purpose of embedded systems.

Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT II

8—bit microcontrollers architecture: Characteristics, quality attributes, application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT III

Programming the 8051Micro controller: Addressing modes, Instruction set, Data transfer instructions, Arithmetic Instructions, Logical Instructions, Arithmetic Instructions, logical instructions, Boolean, Program control transfer instructions.

UNIT IV

Interrupt, timers and serial ports of 8051: 8051 interrupts, interfacing ADC 0801, Timers, serial port, Reset circuit, power saving modes.

Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOKS:

1. Introduction to Embedded Systems, Shibu K V,TMH,2009.
2. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi,Pearson,.

REFERENCE BOOKS :

1. Embedded Systems, Rajkamal,TMH,2009.
2. Embedded Software Primer, David Simon,Pearson.

Course Code &Title: OEC-CS605 ROBOTICS
Semester & Year of study: VI & 2021-2022
Course Index: C605

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Introduction to Robotics
Learn about Robot Kinematics
Learn about Fundamentals of actuating systems
Learn about Sensors

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C605.1	Understand about Introduction to Robotics
C605.2	Understand about Robot Kinematics
C605.3	Understand about Fundamentals of actuating systems
C605.4	Understand about Sensors

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)

OEC-CS605: ROBOTICS
(Open Elective-I)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction to Robotics: Classification components, Characteristics, Applications, Robots as Mechanisms, Matrix Representation, Homogeneous Transformation matrices Representation of pure translation, Representation of pure rotation about an axis.

UNIT II

Robot Kinematics: Representation of combined Transformations, Transformations relative to the rotating inverse of Transformation matrices, forward and actuating Systems

UNIT III

Fundamentals of actuating systems: Characteristics of actuating systems, comparison of actuating systems, Hydraulic devices, Pneumatic Devices, Magneto strictive actuating Systems, Introduction to electronic actuators electronic motors, control of electric motors.

UNIT IV

Sensors: Characteristics, position sensors, velocity and acceleration sensors, force and pressure, Torque and micro switches, light and Infrared sensors, Touch and Tactile sensors, Proximity and range Finders, sniff sensors, vision systems, voice recognizes, voice Synthesizer, remote centre compliance Device.

Text Books:

1. Saeed b.Niku, Introduction to Robotics analysis, application, Person Education Asia 2001

References:

1. R.K Mitttal and I J Nagrath, robotics and control TMH2003
2. Computational Intelligence, Davis Poole, Alan mackwath randy coehel, OxfordUniversity

Course Code &Title: LC-CS606 NETWORK SECURITY AND CRYPTOGRAPHY LAB
Semester & Year of study: VI & 2021-2022
Course Index: C606

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn about Cryptography, and can implement programs for encryption and decryption substitution techniques using Caesar-Cipher
Able to implement programs for different Encryption Algorithms
Know about the implementation of digital signatures, NMAP/ZENMAP
Know about the implementation of Sniff network traffic, creating passwords with length

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C606.1	Able to implement programs for encryption and decryption substitution techniques using Caesar-Cipher
C606.2	Able to implement programs for different Encryption Algorithms
C606.3	Able to the implementation of digital signatures, NMAP/ZENMAP
C606.4	Able to implement the implementation of Sniff network traffic, creating passwords with length

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)
LC-CS606 NETWORK SECURITY AND CRYPTOGRAPHY LAB

Lab: 3Hrs/ Week **Credits 1.5**
Int Marks: 50 **Ext Marks :50**

List of Experiments: Cyber Security

1. Implement encryption and decryption substitution technique using Modified Caesar-Cipher
2. Implement One Time Pad Cipher algorithm
3. Implement Rail Fence transposition technique.
4. Implement RSA algorithm.
5. Calculate the message digest of a text using the MD5/SHA-1 algorithm
6. Generate digital signature using RSA & MD5/SHA-1
7. Experiment using NMAP/ZENMAP
8. Sniff network traffic using tool: Cain and Abel / Wireshark / tcpdump
9. Generate minimum 10 passwords of length 12 characters using openssl command
10. Study and use Snort IDS.

References:

1. Cryptography and Network security, Atul Kahate, Tata McGraw-Hill Pub company Ltd., New Delhi
2. NASSCOM, Handbook of Security Analyst, SSC/Q0901, 2015

Course Code &Title: LC-CS607 DATA MINING WITH R LAB
Semester & Year of study: VI & 2021-2022
Course Index: C607

Course Objectives:
The learning objectives of this course are:

Course Objectives
Student should be aware of usage of few packages, functions and libraries of R
Learn about basic R commands, Interact data, Clean Data, Visualize statistical measures, data frame
Learn about group of functions, rbind,cbind
Learn about K-medoids and density based clustering, decision trees

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C607.1	Able to aware of usage of few packages, functions and libraries of R
C607.2	Able to implement basic R commands, Interact data, Clean Data, Visualize statistical measures, data frame
C607.3	Able to implement Apply group of functions, rbind,cbind
C607.4	Able to implement K-medoids and density based clustering, decision trees

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)
LC-CS607 DATA MINING WITH R LAB

Lab: 3Hrs/ Week **Credits 1.5**
Int Marks: 50 **Ext Marks :50**

Students should be aware of usage of few packages and libraries of R. They should also be familiar with few functions used in R for visualization.

1. Implement all basic R commands
2. Interact data through .csv files(Import from and export to .csv files).
3. Get and Clean data using swirl exercises.(Use 'swirl' package, library and install that topic from swirl).
4. Visualize all Statistical measures(Mean ,Mode, Median, Range, Inter Quartile Range etc., using Histograms, Boxplots and ScatterPlots).
5. Create a data frame with the following structure.
   a) Extract two column names using column name.
   b) Extract the first two rows and then all columns.
   c) Extract 3rd and 5th row with 2nd and 4thcolumn.
6. Write R Program using 'apply' group of functions to create and apply normalization function on each of the numeric variables/columns of iris dataset to transform the minto
   a. 0 to 1 range with min-max normalization.
   b. a value around 0 with z-score normalization.
7. Create a data frame with 10 observations and 3 variables and add new rows and columns to it using 'rbind' and 'cbind' function.
8. Create a function to discretize a numeric variable into 3 quantiles and label them as low, medium, and high. Apply it on each attribute of any dataset to create a new data frame. 'discrete' with Categorical variables and the class label.
9. Createasimplescatterplotusinganydatasetusing'dplyr'library.Usethesamedatatoindicate distribution densities using box whiskers.
10. Write R Programs to implement k-means clustering, k-medoids clustering and density based clustering on any dataset.
11. Write a R Program to implement decision trees using 'reading Skills' dataset.
12. Implement decision trees using any dataset using package party and 'rpart'.

REFERENCES:

1. www.tutorialspoint.com/r
2. www.r-tutor.com
3. R and Data Mining: Examples and Case Studies YanchangZhao.

Course Code &Title: LC-CS608 WEB TECHNOLOGIES LAB
Semester & Year of study: VI & 2021-2022
Course Index: C608

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn how to create web page for application with HTML, DHTML
Learn to implement Java Script Programs
Learn to develop Web Applications with Java Script, Servlets, ASP, JSP, database connectivity
Learn to implement Scripting in PERL, PHP, Python

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C608.1	Able to create web page for application with HTML, DHTML
C608.2	Able to implement Java Script Programs
C608.3	Able to develop Web Applications with Java Script, Servlets, ASP, JSP, database connectivity
C608.4	Able to implement Scripting in PERL, PHP, Python

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20 AB)
LC-CS608 WEB TECHNOLOGIES LAB

Lab: 3Hrs/ Week **Credits 1.5**
Int Marks:50 **Ext Marks :50**

List of Experiments:

1. Create web pages for an application demonstrating the working of different features of HTML and DHTML.
2. Demonstrate the use of CSS in organizing the layout of web pages

Implement at least two Java Script programs to demonstrate the working of

3. Conditional statements
4. Looping statements.
5. Arrays
6. Functions.
7. Event handling
8. Validation controls.

Develop simple applications for the following

9. Exercise client server programming using Java Script, Servlets, ASP,JSP
10. Create a web application with database connectivity and work on different queries for data manipulation.
11. Develop small application using Perl
12. Develop small application using PHP
13. Develop small application using Python.

REFERENCES:

1. Web Technologies, Godbole, Kahate, 2nd Ed.,TMH
2. Internet & World Wide Web How to program, Dietel & Deitel Fourth Edition,PHI
3. Web Programming, building internet applications, 2nd Ed., Chris Bates, Wiley Dreamtech
4. The complete Reference HTML and DHTML, Thomas A. Powey Core Servlets andJava Server Pages, Marty Hall Larry Brown,Sec

Branch/Course: Computer Science and Engineering
Semester VII (Fourth year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PEC-CS701	Elective-III 1.Software Testing and Quality Assurance 2.Software Architectures and Design Patterns 3.Agile Software Development	75	25	100	3	0	0	3
PEC-CS702	Elective-IV 1.Python Programming 2.AJAX/JSON 3.PHP Programming	75	25	100	3	0	0	3
PEC-CS703	Elective-V 1.Computer Vision and Pattern Recognition 2 Machine Learning 3.Big Data Analytics	75	25	100	3	0	0	3
OEC-CS704	Open Elective-II 1.Business Intelligence and Visualization 2.Natural Language Processing 3.Advanced Databases	75	25	100	3	0	0	3
OEC-CS705	Open Elective-III 1.Foundations of Data Science 2.Block Chain Technology 3.Computer Forensics	75	25	100	3	0	0	3
HSMC-CS706	Managerial Economics and Financial Accounting	75	25	100	3	0	0	3
MC-CS707	Skill Development Course		50	50	1	0	2	2
MC-CS708	SUMMER INTERNSHIP							1.5
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week
Summer Internship 2 Months (Mandatory) after third year(to be evaluated during VII semester

Course Code &Title: PEC-CS701 SOFTWARE TESTING AND QUALITY ASSURANCE
Semester & Year of study: IV & 2022-2023
Course Index: C701

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the basic concepts of quality and testing, unit testing ,control flow testing
To learn about Data flow testing ,Domain testing, Integration testing
To learn about Software Quality Assurance, Software Quality Factors and Software Quality System
To learn about CASE tools for software quality, Software quality metrics and Quality management standards

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C701.1	Able to understand the basic concepts of quality and testing, unit testing ,control flow testing
C701.2	Able to data flow testing ,domain testing, integration testing
C701.3	Able to understand Software Quality Assurance, Software Quality Factors and Software Quality System
C701.4	Able to CASE tools for software quality, Software quality metrics and Quality management standards

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
PEC-CS701 SOFTWARE TESTING AND QUALITY ASSURANCE
(Elective-III)

Theory:3Hrs/ Week **Credits 3**
IntMarks:25 **Ext Marks :75**

UNIT I

Basic concepts of quality and testing: Quality revolution, Software Quality, Role of testing, Verification and validation, Failure, Error, Fault and Defect, Objectives of testing, What is a Test case, Expected Outcome, Testing activities, Test Levels, Sources of information for Test Case selection.
Unit testing: Unit testing basics, Static Unit testing, Defect prevention, Dynamic unit testing, Mutation Testing, Debugging, Unit testing in extreme programming, Tools for unit testing.
Control flow testing: Outline of Control flow testing, Control flow graph and Paths, Path Selection Criteria: All-path coverage criterion, Statement coverage criterion, Branch coverage criterion, Predicate coverage criterion, Generating test input, test data selection.

UNIT II

Data flow testing: General idea, Data flow anomaly, Data flow graph, Data flow terms, Data flow testing criteria.
Domain testing: Domain error, Testing for domain errors, Sources of domains, Types of domain errors, ON and OFF points, Test selection criterion.
Integration testing: Concept of integration testing, Different types of interfaces and interface errors, System integration techniques: Incremental, Top down, Bottom up, Sandwich and Big Bang, Test plan for system integration, Off-the-shelf component integration.

UNIT III

Software Quality Assurance(SQA): The uniqueness of SQA, The environments for which SQA methods are developed, what is software, Software errors, faults and failures, classification of the causes of software errors, software quality-definition, SQA -definition and objectives.
Software quality factors: Classification of software requirements into software quality factors: Product operation, product revision, Product transition.
Software quality assurance system: The SQA system-an SQA architecture: Pre-project components, Software project life cycle components, Infrastructure components, Management SQA components.

UNIT IV

CASE tools for software quality: What is a CASE tool? The contribution of CASE tools software product quality, The contribution of CASE tools to improved project management.
Software quality metrics: Objectives of measurement, Classification of quality metrics, Process metrics, Product metrics, Implementation of quality metrics, Limitations of metrics.
Quality management standards:
The scope of quality management standards, ISO 9001 and ISO 9000-3, Capability maturity models-CMM and CMMI assessment methodology, The Bootstrap methodology, The SPICE project and the ISO/IEC 15504 software process assessments standard.

TEXT BOOKS:

1. Software Testing and Quality Assurance. Kshirasagar Nail, PriyadarshiTripathy.John Wiley Publication.
2. Software Quality Assurance: From theory to implementation. Daniel Galin.Pearson Adison Wesley Publication.

Course Code &Title: PEC-CS701: SOFTWARE ARCHITECTURES AND DESIGN PATTERNS
Semester & Year of study: VII & 2022-2023
Course Index: C701

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Envisioning Architecture, Creating an Architecture
To learn about the Analyzing Architectures**,** Architecture design decision making, Building systems from off the shelf components
To learn about the Patterns, Organizing catalogs, Creational and Structural patterns
To learn about the Behavioural Patterns, Chain of responsibility

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C701.1	Able to understand about the Envisioning Architecture, Creating an Architecture
C701.2	Able to understand about the Analyzing Architectures**,** Architecture design decision making, Building systems from off the shelf components
C701.3	Able to understand about the Patterns, Organizing catalogs, Creational and Structural patterns
C701.4	Able to understand about the Behavioural Patterns, Chain of responsibility

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)

PEC-CS701: SOFTWARE ARCHITECTURES AND DESIGN PATTERNS

(Elective-III)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT-I

Envisioning Architecture: The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture: Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT II

Analyzing Architectures: Architecture Evaluation, Architecture design, decision making, ATAM, CBAM, Moving from one system to many, Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT III

Patterns: Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage, Creational and Structural patterns, Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight.

UNIT IV

Behavioural Patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

TEXT BOOKS:

1. Software Architecture in Practice, second edition, LenBass, PaulClements & RickKazman, Pearson Education,2003.
2. Design Patterns, Erich Gamma, Pearson Education,1995.

REFERENCE BOOKS:

1. Beyond Software architecture, Luke Hohmann, Addison wesley,2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice HallPTR, 2001
3. Software Design, David Budgen, second edition, Pearson education,2003.
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY,2007.
5. Design Patterns in Java, Steven John Metsker & William C. Wake, Pearson education,2006.
6. J2EE Patterns, Deepak Alur, John Crupi & Dan Malks, Pearson education,2003.
7. Design Patterns in C#, Steven John metsker, Pearson education,2004.
8. Pattern Oriented Software Architecture, F.Buschmann & others, John Wiley &Sons.

Course Code &Title: PEC-CS701: AGILE SOFTWARE DEVELOPMENT
Semester & Year of study: VII & 2022-2023
Course Index: C701

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about Introducing the Agile In Practice, Method and Practice of Agile, Agile Organisational Methods Spaces
To learn about the Extreme Programming, Planned Process Life Cycles And Agile, Agile Practices
To learn about the Agile Project Challenges, Project Management and Agile, CAMS
To learn about the Enterprise Architecture Process Map , Six Sigma in Composite Agile; Agile Software Development Life Cycle.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C701.1	Able to understand about Introducing the Agile In Practice, Method and Practice of Agile, Agile Organisational Methods Spaces
C701.2	Able to understand about the Extreme Programming, Planned Process Life Cycles And Agile, Agile Practices
C701.3	Able to understand the Agile Project Challenges, Project Management and Agile, CAMS
C701.4	Able to understand Emergent Information Technologies – Agile Enablers, Six Sigma in Composite Agile; Agile Software Development Life Cycle.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)

PEC-CS701: AGILE SOFTWARE DEVELOPMENT
(Elective-III)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT-I

Introducing Agile In Practice: Agile In Practice- A Business Issue; Understanding Enterprise Agility; Strategy, Method and Practice of Agile; Defining Agile; Agility – Art, Craft And Engineering; Correlating Agility To Planned Processes; Agile Organisational Methods Spaces; Agile Manifesto, Values, Principles And Practices; Agile Methods.

UNIT-II

Extreme Programming; Scrum; Crystal; Lean; Kaizen; Agile Project Management; Feature Driven Development; Test Driven Design; Planned Process Life Cycles And Agile – The Waterfall Based SDLC, The Fountain Based SDLC, The IIP - Iterative, Incremental, Parallel Development Process; A Practical Agile Manifesto; Agile Practices - Analytical Practices, Requirements Practices, Development Practices, Design Practices, Project Management Practices, Quality Assurance Practices, Testing Practices.

UNIT-III

Agile Project Challenges; Project Type and Agile Challenges; Project Size and Agile Challenges; Business Type and Agile Challenges; Project Management and Agile; Strategic Versus Tactic Agile; Composite Agile Method and Strategy (CAMS); CAMS Architecture; Advantages And Limitations of CAMS.

UNIT-IV

Emergent Information Technologies – Agile Enablers; IT Areas of Work And Agile; Enterprise Architecture Process Map; System Architecture Process Map; Requirements Modelling Process Map; Implementation Process Map; Deployment Process Map; Six Sigma in Composite Agile; Kaizen in Composite Agile; Agile Software Development Life Cycle.

Text Books:

1. The Art of Agile Practice: A Composite Approach for Projects and Organizations. Bhuvan Unhelkar. Taylor and Francis Group.

Reference Books:

1. The Art of Agile Development. James Shore and Shane Warden. O'ReillyMedia.
2. Agile and Iterative Development: A Manager's Guide. Craig Larman. PearsonEducation.

Course Code &Title: PEC-CS702: PYTHON PROGRAMMING
Semester & Year of study: VII & 2022-2023
Course Index: C702

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about Introduction to Python, Syntax and Semantics, Control Flow Statements, Sequences and Dictionaries, Functions and lambda expressions. To learn about Iterations and Comprehensions, Classes and OOP, Exception Handling, Strings and Regular Expressions.
To learn about the Network And Web Programming
To learn about the GUI Programming and Database Connectivity

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C702.1	Able to understand about the Introduction to Python, Syntax and Semantics, Control Flow Statements, Sequences and Dictionaries, Functions and lambda expressions.
C702.2	Able to understand about Iterations and Comprehensions, Classes and OOP, Exception Handling, Strings and Regular Expressions
C702.3	Able to understand the Network And Web Programming
C702.4	Able to understand about the GUI Programming and Database Connectivity

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
PEC-CS702: PYTHON PROGRAMMING
(Elective-IV)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

CORE PYTHON BASICS: Introduction to Python, Python Interpreter and its working, Syntax and Semantics, Data Types, Assignments and Expressions, Control Flow Statements, Sequences and Dictionaries, Functions and lambda expressions.

UNIT II

CORE PYTHON ADVANCED FEATURES: Iterations and Comprehensions, Handling text files, Modules, Classes and OOP, Exception Handling, Strings and Regular Expressions.

UNIT III

NETWORK AND WEB PROGRAMMING: Socket Programming: Handling Multiple Clients, Client side scripting, urlib, Server Side Scripting : CGI Scripts with User Interaction, Passing Parameters.

UNIT IV

GUI PROGRAMMING AND DATABASE CONNECTIVITY: Introduction to tkinter, Top Level Windows, Dialogs, Message and Entry, Event Handling, Menus, List boxes and Scrollbars, Text, SQL Database interfaces with sqlite3: Basic operations and table load scripts.

Text Books:

1. Mark Lutz ,"Learning Python", O Reily, 4thEdition,2009
2. Mark Lutz ,"Programming Python ", O Reily, 4thEdition,2010

References:

1. Tim Hall and J-P Stacey ,"Python 3 for Absolute Beginners" ,2009
2. Magnus Lie Hetland , "Beginning Python: From Novice to Professional", 2nd Edition,2009

Course Code &Title: PEC-CS702: AJAX and JSON
Semester & Year of study: VII & 2022-2023
Course Index: C702

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Introduction to Ajax, Introduction to JSON, Ajax Applications
To learn about The To -Do List Application, Saving Data with Ajax
To learn about the Document Fragments, Introduction to Local Storage, String and String Methods
To learn about the Dates and Date Formatting, Handling Exceptions with Try/Catch

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C702.1	Able to understand about the Introduction to Ajax, Introduction to JSON, Ajax Applications
C702.2	Able to understand about The To –Do List Application, Saving Data with Ajax
C702.3	Able to understand about the Document Fragments, Introduction to Local Storage,String and String Methods
C702.4	Able to understand about the Dates and Date Formatting, Handling Exceptions with Try/Catch

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
PEC-CS702: AJAX and JSON
(Elective-IV)

Theory:3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction to Ajax: What Is Ajax? Without Ajax, With Ajax, The Ajax Request/Response Model, Benefits of Ajax, What You Need in Order to Use Ajax.

Introduction to JSON: Review of Arrays and Objects, JavaScript Object Notation (JSON), Why Use JSON?, How to Use JSON in JavaScript, JSON or XML?

Ajax Application: The HTML & CSS, The JSON data, The JavaScript, The XMLHttpRequest Object, Handling the Response, Testing the Ready State, Testing the Status, Processing the Data, Overview of XMLHttpRequest Request and Response.

UNIT II

The To -Do List Application: Create the Files for the To -Do List Application, Create an array of To -Do Objects, Update the Page with To -Do Items

Saving Data with Ajax: Adding and Saving a To -Do List Item, Add a Form to Your Page and Style It, Style the Form, Process the Form with JavaScript, Create a New To -Do Object, Adding the New To -Do Item to the Page, The Case o f the Disappearing To -Do Item, Saving the Data with Ajax, Creating the PHP Server Script, Adding the JavaScript, Sending the Request.

UNIT III

Document Fragments: Document Fragments to Add Elements to a Page, Document Fragments in the To-Do List Application, Combining Common Code, Improving the Code with a Document Fragment, Enhancing the To -Do List Application.

Introduction to Local Storage: Local Storage, Exploring Local Storage in the Browser, local Storage Object, localStorage Object with JavaScript, Removing Items from Local Storage, Cookies.

Strings and String Methods: String Basics, Basic String Comparison and Searching, Improving the Search, The Substring() and Split() Methods, Regular Expressions.

UNIT IV

Dates and Date Formatting: Date and Time, Dates and Time Zones, Setting a Date and Time, Converting Strings to Dates.

Handling Exceptions with Try/Catch: Causes of Exception, Throwing Exceptions and the Finally Clause, Using Exceptions and Try/Catch.

Textbooks:

1. Ajax: The Definitive Guide, Interactive Applications for the Web, by Anthony Holdener, O'Reilly Publisher.
2. JSON at Work: Practical Data Integration for the Web, By Tom Marrs, O'Reilly Publisher.

Reference link:
http://archive.oreilly.com/oreillyschool/courses/javascript2/Javascript%20JSON%20and%20Ajax%20v2.pdf

Course Code &Title: PEC-CS702: PHP PROGRAMMING
Semester & Year of study: VII & 2022-2023
Course Index: C702

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the PHP Fundamentals
To learn about the PHP OO Language
To learn about the Web pages with PHP
To learn about the working with database

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C702.1	Able to understand about the PHP Fundamentals
C702.2	Able to understand about the PHP OO Language
C702.3	Able to understand about the Web pages with PHP
C702.4	Able to understand about the working with database

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
PEC-CS702: PHP PROGRAMMING
(Elective-IV)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

PHP FUNDAMENTALS: PHP – Exploring the PHP Environment – HTML Embedding, Comments– Variables, Data types – Operators – PHP String functions, Controls Structures, Arrays – Types – Multi dimension array – Array functions, Functions in PHP.

UNIT II

PHP OO LANGUAGE: Introduction – Object, Class, new Keyword, Constructor, Destructor, Accessing Methods and Properties Using the $ this Variable, Class Constants, Cloning Objects, polymorphism, parent: and self:, instanceof Operator, Abstract method and Classes, Interfaces and Inheritance of Interfaces. Final methods, Overloading, Exception handling.

UNIT III

WEB PAGES WITH PHP: Embedding into HTML, User Input, Safe Handling user Input, PHP Form, form processing, Working with Form Data, GET, POST, REQUEST, Reading Data in web Pages, Performing Data validation, required data, number, text, Cookies and Session in PHP.

UNIT IV

WORKING WITH DATABASE: MySQL, Creating Database and Table, CURD, JOIN, Aggregate Queries, connecting to MySQL with PHP, Accessing and Updating Database with PHP, SQL injections, Prepared Statements.

TEXT BOOKS:

1. Steven Holzner, “PHP: The Complete Reference”, Tata McGraw Hill Education, 1st Edition,2007.

REFERENCES:

1. Luke Welling, Laura Thomson, “PHP and MySQL Web Development”, Pearson, 4thEdition.
2. Larry Ullman, “PHP and MySQL for Dynamic Web Sites”, Prentice Hall, 4thEdition.
3. George Schlossnagle,“Advanced PHP Programming”, First Edition, SamsPublishing.

Course Code &Title: PEC-CS703: COMPUTER VISION AND PATTERN RECOGNITION
Semester & Year of study: VII & 2022-2023
Course Index: C703

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Image Formation Models
To learn about the Feature Extraction
To learn about the Basics of pattern recognition
To learn about the Pattern Analysis **,** Dimensionality Reduction

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C703.1	Able to understand about the Image Formation Models
C703.2	Able to understand about the Feature Extraction
C703.3	Able to understand about the Basics of pattern recognition
C703.4	Able to understand about the Pattern Analysis **,** Dimensionality Reduction

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
PEC-CS703: COMPUTER VISION AND PATTERN RECOGNITION
(Elective-V)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Image Formation Models: Monocular imaging system, Orthographic & Perspective Projection, Camera model and Camera calibration, Binocular imaging systems, Perspective, Binocular Stereopsis, Camera and Epipolar Geometry; Homography, Rectification, DLT, RANSAC, 3-D reconstruction framework, Auto-calibration. Apparel, Binocular Stereopsis: Camera andEpipolar Geometry; Homography, Rectification, DLT, RANSAC, 3-D reconstruction framework, Auto- calibration, Apparel, Stereovision.

UNIT II

Feature Extraction: Edges - Canny, LOG, DOG; Line detectors (Hough Transform), Corners - Harris and Hessian Affine, Orientation Histogram, SIFT, SURF, HOG, GLOH, Scale-Space Analysis- Image Pyramids and Gaussian derivative filters, Gabor Filters and DWT.

UNIT III

Basics of pattern recognition: Basics, Design principles of pattern recognition system, Learning and adaptation, Pattern recognition approaches, Mathematical foundations – Linear algebra, Probability Theory, Expectation, mean and covariance, Normal distribution, multivariate normal densities, Chi squared test.

UNIT IV

Pattern Analysis: Clustering: K-Means, K-Medoids, Mixture of Gaussians, Classification: Discriminant Function, Supervised, Un-supervised, Semi-supervised; Classifiers: Bayes, KNN, ANN models; Dimensionality Reduction: PCA, LDA, ICA; Non-parametric methods.

TEXT BOOKS:

1. Szeliski, R., Computer Vision: Algorithms and Applications, Springer-Verlag LondonLimited (2011), 1stEdition.
2. Forsyth, A., D. and Ponce, J., Computer Vision: A Modern Approach, PearsonEducation (2012) 2ndEdition.

REFERENCE BOOKS:

1. Fukunaga, K., Introduction to Statistical Pattern Recognition, Academic Press,Morgan Kaufmann (1990) 2ndEdition.
2. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification”, 2ndEdition, John Wiley,2006.

Course Code &Title: PEC-CS703: MACHINE LEARNING
Semester & Year of study: VII & 2022-2023
Course Index: C703

Course Objectives:
The learning objectives of this course are:

Course Objectives
Familiarity with a set of well-known supervised, unsupervised and semi-supervised learning algorithms.
The ability to implement some basic machine learning algorithms
Understanding of how machine learning algorithms are evaluated

Course Index	Course Outcomes
C703.1	Recognize the characteristics of machine learning that make it useful to real-world Problems.
C703.2	Characterize machine learning algorithms as supervised, semi-supervised, and Unsupervised. Have heard of a few machine learning toolboxes.
C703.3	Be able to use support vector machines.
C703.4	Be able to use regularized regression algorithms. Understand the concept behind neural networks for learning non-linear functions.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)

PEC-CS703: MACHINE LEARNING

(Elective-V)

Theory: 3Hrs/ Week **Credits: 3**
Int Marks: 25 **Ext Marks :75**

UNIT - I

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning.

Binary classification and related tasks: Classification, Scoring and ranking, Class probability estimation.

Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning.

UNIT - II

Concept learning: The hypothesis space, Paths through the hypothesis space, Beyond conjunctive concepts.

Tree models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction.

UNIT - III

Rule models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First-order rule learning.

Linear models: The least-squares method, The perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, obtaining probabilities from linear classifiers, Going beyond linearity with kernel methods.

UNIT - IV

Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data, Discriminative learning by optimising conditional likelihood Probabilistic models with hidden variables.

Features: Kinds of feature, Feature transformations, Feature construction and selection. Model ensembles: Bagging and random forests, Boosting.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai Ben-David, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

Course Code &Title: PEC-CS703: BIG DATA ANALYTICS **Semester & Year of study :VII & 2022-2023** **Course Index: C703**
Course Objectives: The learning objectives of this course are:
Course Objectives
To learn about the introduction to Big Data and Hadoop
To learn about the Real Time Analytics, Map Reduce Programming
To learn about the Streaming in Spark, Machine Learning, Map Reduce Advanced Programming
To learn about the Graph Representation in Map Reduce, Graph Analytics in Spark, Programming with RDDs-Basics, Spark SQL overview
Course Outcomes: By the end of the course, the student will be

Course Index	Course Outcomes
C703.1	Able to understand about introduction to Big Data and Hadoop
C703.2	Able to understand about Real Time Analytics, Map Reduce Programming
C703.3	Able to understand about Streaming in Spark, Machine Learning, Map Reduce Advanced Programming
C703.4	Able to understand about Graph Representation in Map Reduce, Graph Analytics in Spark, Programming with RDDs-Basics, Spark SQL overview

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)

PEC-CS703: BIG DATA ANALYTICS
(Elective-V)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction to Big Data: Big Data-definition, Characteristics of Big Data (Volume, Variety, Velocity, Veracity, Validity), Importance of Big Data , Patterns for Big Data Development, Data in the Warehouse and Data in Hadoop.

Introduction to Hadoop: Hadoop- definition, Understanding distributed systems and Hadoop, Comparing SQL databases and Hadoop, Starting Hadoop - The building blocks of Hadoop, NameNode, DataNode, Secondary NameNode, JobTracker and Task Tracker.

UNIT II

Real Time Analytics- Examles, What is Apache Spark, Why Spark when Hadoop is there, Spark Features, Getting started with Spark, Spark Eco System, Architecture and its working, Data Structures of Spark, Spark components, Using Spark with Hadoop, Usecase.

MapReduce Programming: Writing basic Map Reduce programs - Getting the patent data set, constructing the basic template of a Map Reduce program, Counting things.

UNIT III

Streaming in Spark, Streaming features, Streaming Fundamentals. Usecase on streaming. Machine Learning, Spark MLlib Overview, Tools, Algorithms-Classification, Regression, Clustering, Dimensionality Reduction, FeatureExtraction.

MapReduce Advanced Programming- Chaining Map Reduce jobs, joining data from different sources. Usecase.

UNIT IV

Graph Representation in MapReduce: Modeling data and solving problems with graphs, Shortest Path Algorithm, Friends-of-Friends Algorithm, PageRank Algorithm, Bloom Filters. Graph Analytics in Spark, Spark GraphX, GraphX features, GraphX Examples, Usecase.

Programming with RDDs-Baiscs, Creating RDDs, Operations, Passing Functions to Spark, Common Transformations and Actions, Persistence, Adding Schemas to RDDs, RDDs as Relations, Creating Pairs in RDDs, Transformations and actions on RDDs.

Spark SQL, Overview, Libraries, Features, Querying using Spark SQL.

TEXT BOOKS:

1. Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data by Dirk de Roos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, 1st Edition, TMH,2012.
2. LearningSpark:LearningBigDataAnalysis:Karauetc.,O'reillyPublications.Hadoopin Action by Chuck Lam, MANNING Publishers.
3. Hadoop in Practice by Alex Holmes, MANNING Publishers

REFERENCE BOOKS:

1. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'Reilly
2. Big Java Fourth Edition Cay Horstmann Wiley, John Wiley &Sons
3. Mining of massive datasets, Anand Rajaraman, Jeffrey D Ullman, Wiley Publications.

Course Code &Title :OEC-CS704: BUSINESS INTELLIGENCE AND VISUALIZATION
Semester & Year of study :VII & 2022-2023
Course Index: C704

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Business intelligence, architecture, analysis, ethics
To learn about the Knowledge discovery, Geographic Visualization
To learn about the Efficiency measures, identification of good operating practices, Pattern matching
To learn about the Business intelligence applications, Future of business intelligence

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C704.1	Able to understand about the Business intelligence, architecture, analysis, ethics
C704.2	Able to understand about the Knowledge discovery, Geographic Visualization
C704.3	Able to understand about the Efficiency measures, identification of good operating practices, Pattern matching
C704.4	Able to understand about the Business intelligence applications, Future of business intelligence

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
OEC-CS704: BUSINESS INTELLIGENCE AND VISUALIZATION
(Open Elective II)

Theory:3 Hrs/week **Credits:3**
Int Marks: 25 **Ext Marks :75**

UNIT I

BUSINESS INTELLIGENCE: Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT II

KNOWLEDGE DELIVERY: The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT III

EFFICIENCY: Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis

UNIT IV

BUSINESS INTELLIGENCE APPLICATIONS: Marketing models–Logistic and Production models – Case studies.

FUTURE OF BUSINESS INTELLIGENCE: Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TEXT BOOK:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, “Decision Support and Business Intelligence Systems”, 9th Edition, Pearson 2013.

REFERENCES:

1. Larissa T. Moss, S. Atre, “Business Intelligence Roadmap: The Complete ProjectLifecycle of Decision Making”, Addison Wesley,2003.
2. Carlo Vercellis, “Business Intelligence: Data Mining and Optimization forDecision Making”, Wiley Publications,2009.
3. David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Manager“sGuide”, Second Edition,2012.
4. Cindi Howson, “Successful Business Intelligence: Secrets to Making BI a KillerApp”, McGraw-Hill,2007.
5. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, “TheData Warehouse Lifecycle Toolkit”, Wiley PublicationInc.,2007.

Course Code &Title :OEC-CS704: NATURAL LANGUAGE PROCESSING
Semester & Year of study :VII & 2022-2023
Course Index: C704

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Overview and Language Modeling, Word Level Analysis
To learn about the Syntactic & Semantic Analysis, Discourse Processing
To learn about the Natural Language Generation, Machine Translation Characteristics of Indian Languages
To learn about the Information Retrieval, Introduction to WordNet , FrameNet , Stemmers , POS Tagger Research Corpora

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C704.1	Able to understand about the Overview and Language Modeling, Word Level Analysis
C704.2	Able to understand about the Syntactic & Semantic Analysis, Discourse Processing
C704.3	Able to understand about the Natural Language Generation, Machine Translation Characteristics of Indian Languages
C704.4	Able to understand about the Information Retrieval, Introduction to WordNet , FrameNet , Stemmers , POS Tagger Research Corpora

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
OEC-CS704: NATURAL LANGUAGE PROCESSING
(Open Elective-II)

Theory: 3 Hrs/week **Credits:3**
Int Marks:25 **Ext Marks: 75**

UNIT- I

Overview and Language Modeling: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages-NLP Applications-Information Retrieval. Language Modelling: Introduction-Various Grammar-based Language Models-Statistical Language Model

Word Level Analysis: Introduction- Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes- Part-of Speech Tagging.

UNIT- II

Syntactic & Semantic Analysis: Introduction – Context-free Grammar -Constituency Parsing-Probabilistic Parsing. Introduction – Meaning Representation – Lexical Semantics Ambiguity - Word Sense Disambiguation.

Discourse Processing: Introduction- cohesion-Reference Resolution Discourse Coherence and Structure

UNIT- III

Natural Language Generation: Introduction-Architecture of NLG Systems Generation Tasks and Representations-Application of NLG.

Machine Translation: Introduction-Problems in Machine Translation Characteristics of Indian Languages- Machine Translation Approaches-Translation involving Indian Languages

UNIT- IV

Information Retrieval: Introduction-Design features of Information Retrieval Systems-Classical, Non-classical, Alternative Models of Information Retrieval –Evaluation

Lexical Resources: Introduction – WordNet – FrameNet – Stemmers - POS Tagger Research Corpora

Text Book:

1. Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008.

Reference Books:

1. Daniel Jurafsky and James H Martin,”Speech and Language Processing: An introduction to NaturalLanguageProcessing,ComputationalLinguisticsandSpeechRecognition”,PrenticeHall, 2nd Edition,2008.
2. James Allen, Bejamin/cummings, “Natural Language Understanding”, 2nd edition,1995

Course Code &Title : **OEC-CS704: ADVANCED DATABASES**
Semester & Year of study :VII & 2022-2023
Course Index: C704

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Introduction to Parallel and Distributed Databases, Distributed Transactions
To learn about the Intelligent Databases: Active Databases, Spatial Databases, Temporal Databases
To learn about the XML Databases: XML-Related Technologies, Web Databases, Cloud Based Databases
To learn about the Mobile and Multimedia Databases, Mobile Transaction Models, Image/Vedio/Audio databases

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C704.1	Able to understand about the Introduction to Parallel and Distributed Databases, Distributed Transactions
C704.2	Able to understand about the Intelligent Databases**:** Active Databases, Spatial Databases, Temporal Databases
C704.3	Able to understand about the XML Databases: XML-Related Technologies, Web Databases, Cloud Based Databases
C704.4	Able to understand about the Mobile and Multimedia Databases, Mobile Transaction Models, Image/Vedio/Audio databases

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
OEC-CS704: ADVANCED DATABASES
(Open Elective-II)

Theory: 3 Hrs/week **Credits:3**
Int Marks: 25 **Ext Marks: 75**

UNIT I

Parallel and Distributed Databases: Database System Architectures: Centralized and Client- Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism– DesignofParallelSystemsDistributedDatabaseConcepts-DistributedDataStorage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing.

UNIT II

Intelligent Databases: Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy-Applications- Design Principles for Active Rules- Temporal Databases: Overview of TemporalDatabasesTSQL2-DeductiveDatabases-RecursiveQueriesinSQL-SpatialDatabases- Spatial Data Types - Spatial Relationships- Spatial Data Structures-Spatial Access Methods- Spatial DB Implementation.

UNIT III

XML Databases: XML-Related Technologies-XML Schema- XML Query Languages- Storing XML in Databases-XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems-Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages- Introduction to Big Data-Storage-Analysis.

UNIT IV

Mobile and Multimedia Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols. Multimedia Databases: Multidimensional Data Structures – Image Databases – Text / Document Databases – Video Databases – Audio Databases –Multimedia Database Design.

TEXT BOOKS:

1. C.J.Date, A.Kannan, S.Swamynathan, ―An Introduction to Database Systems¦, Eighth Edition, Pearson Education,2006.
2. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, Richard T.Snodgrass,V.S.Subrahmanian, Roberto Zicari, ―Advanced Database Systems¦, Morgan Kaufmannpublishers,2006.
3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, ―Database System Concepts¦, Sixth Edition, McGraw Hill,2011.

REFERENCES:

1. R. Elmasri, S.B. Navathe, ―Fundamentals of Database Systems¦, Sixth Edition, Pearson Education/Addison Wesley, 2010.
2. Vijay Kumar, ―Mobile Database Systems¦, John Wiley & Sons,2006.

Course Code &Title : **OEC-CS705: FOUNDATIONS OF DATA SCIENCE**
Semester & Year of study :VII & 2022-2023
Course Index: C705

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Introduction to Data Science, NoSQL
To learn about the Modeling methods of Unsupervised Learning
To learn about the Introduction to R Language, Probability Distribution
To learn about the Documentation and deployment, Introduction to graphical analysis

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C705.1	Able to understand about the Introduction to Data Science, NoSQL
C705.2	Able to understand about the Modeling methods of Unsupervised Learning(Clustering)
C705.3	Able to understand about the Introduction to R Language, Probability Distribution
C705.4	Able to understand about the Documentation and deployment, Introduction to graphical analysis

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
OEC-CS705: FOUNDATIONS OF DATA SCIENCE
(Open Elective-III)

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

INTRODUCTION TO DATA SCIENCE : Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing data – cleaning and sampling for modelling and validation – introduction to NoSQL.

UNIT II

MODELING METHODS : Choosing and evaluating models – mapping problems to machine learning, evaluating clustering models, validating models – cluster analysis – Kmeans algorithm, Naïve Bayes – Memorization Methods – Linear and logistic regression – unsupervised methods.

UNIT III

INTRODUCTION TO R Language: Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files.

PROBABILITY DISTRIBUTIONS in R - Binomial, Poisson, Normal distributions. Manipulating objects - data distribution.

UNIT IV

DELIVERING RESULTS: Documentation and deployment–producing effective presentations – Introduction to graphical analysis – plot()function – displaying multivariate data– matrix plots – multiple plots in one window - exporting graph – using graphics parameters in R Language.

Text Books

1. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications,2014.
2. Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, “Mining of MassiveDatasets”, Cambridge University Press,2014.
3. Mark Gardener, “Beginning R - The Statistical Programming Language”, John Wiley &Sons, Inc.,2012.

Reference Books

1. W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”,2013.
2. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, “PracticalData Science Cookbook”, Packt Publishing Ltd.,2014.
3. Nathan Yau, “Visualize This: The FlowingData Guide to Design, Visualization, andStatistics”, Wiley,2011.
4. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”,Wiley, ISBN: 9788126551071,2015.

Course Code &Title : **OEC-CS705: BLOCKCHAIN TECHNOLOGY**
Semester & Year of study :VII & 2022-2023
Course Index: C705

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Introduction to Blockchain, Distributed Ledger, Permissionless and Permissioned Blockchains
To learn about the Cryptography in Blockchain, Symmetric Key Cryptography
To learn about the Bitcoin-Cryptocurrency, Hyperledger Fabric
To learn about the Usecases of Blockchain

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C705.1	Able to understand about the Introduction to Blockchain, Distributed Ledger, Permissionless and Permissioned Blockchains
C705.2	Able to understand about the Cryptography in Blockchain, Symmetric Key Cryptography
C705.3	Able to understand about the Bitcoin-Cryptocurrency, Hyper ledger Fabric
C705.4	Able to understand about the Usecases of Blockchain

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)

OEC-CS705 BLOCKCHAIN TECHNOLOGY

(Open Elective-III)

Theory:3Hrs/ Week **Credits 3**
Int Marks:25 **Ext Marks :75**

UNIT – I

Introduction to Blockchain: The History of Blockchain,, Decentralisation of Blockchain, Block In a Blockchain, Distributed Ledger, Permission less and Permissioned Blockchains, The Longest Chain of Blockchain, Basic Distributed System Concepts, Distributed Consensus, Byzantine Fault Tolerant Consensus Methods.

UNIT – II

Cryptography in Blockchain: Objectives of Cryptography, Properties of a Hash Function, Cryptographic Hash Function, Hash Pointer, Merkle Tree, Symmetric Key Cryptography – DES, AES; Asymmetric Key Cryptography – RSA; Digital Signatures, SHA256, Elliptic Curve Cryptography Algorithm

UNIT – III

Bitcoin-Cryptocurrency : Bitcoin Transaction Life Cycle, Types of Transaction, UTXO, The Genesis Block, Mining, Task of Miners, Proof of Work, Mining Algorithm, Bitcoin Network, Bitcoin Scripts, Bitcoin Payments, Alternative Coins

Hyperledger Fabric: Architecture, Transaction Flow in Fabric, Channels in Fabric, Fabric Network setup.

UNIT – IV

Usecases of Blockchain: Blockchain in Financial Service, Blockchain in Supply chain, Blockchain in Healthcare, Blockchain in Energy Markets, Blockchain In Media, Preventing Cybercrime through Blockchain, Blockchain for e-Governance, Blockchain for Tax payments, Blockchainfor Land Registry Records, Blockchain inIoT

TEXT BOOK:

1. S Shukla, M Dhawan, S Sharma, S Venkatesan, “Blockchain Technology: Cryptocurrency and Applications” Oxford University Press, 2019
2. Aravind Narayanan, Joseph B, Edward F, “BitcoinandCryptocurrencyTechnologies”, Princeton UniversityPress.
3. Imran Bashir, “Mastering Blockchain” Packt Publishing, Birmingham,UK
4. Blockchain Architecture Design and Usecases, NPTEL Course

REFERENCE BOOKS:

1. Josh Thompson, “The Blockchain for Beginnings, Guild to Blockchain Technologyand Blockchain Programming” , Create Space Independent Publishing Platform,2017.
2. Andreas Antonopoulus, “Mastering Bitcoin: Unlocking DigitalCryptocurrencies”
3. Hyperledger Fabric www.hyperledger.org/projects

Course Code &Title : **OEC-CS705: COMPUTER FORENSICS**
Semester & Year of study :VII & 2022-2023
Course Index: C705

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Introduction of Real-World Incidents, Incident Response Methodology
To learn about the Preparing for Incident Response-2, Overview of the Initial Response Phase
To learn about the Live data Collection from Windows systems, Live data Collection from Unix System
To learn about the Forensic duplication, Computer System storage fundamentals, Data Analysis Techniques

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C705.1	Able to understand about the Introduction to Blockchain, Distributed Ledger, Permissionless and Permissioned Blockchains
C705.2	Able to understand about the Preparing for Incident Response-2, Overview of the Initial Response Phase
C705.3	Able to understand about the Live data Collection from Windows systems, Live data Collection from Unix System
C705.4	Able to understand about the Forensic duplication, Computer System storage fundamentals, Data Analysis Techniques

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
OEC-CS705 COMPUTER FORENSICS
(Open Elective-III)

Theory:3Hrs/ Week **Credits 3**
Int Marks:25 **Ext Marks :75**

UNIT I

Introduction: Real-World Incidents-Factors affecting response, International crime, Traditional hacks. Introduction to the Incidence Response Process: What Is a Computer Security Incident?, What Are the Goals of Incident Response?, Who Is Involved in the Incident Response Process?, Incident Response Methodology, Pre-incident preparation, Detection of incidents, Initialresponse, Formulate a response strategy, Investigate the incident, Reporting, Resolution Preparing for Incident Response-1: Identifying risk, Preparing individual hosts, Preparing a network

UNIT II

Preparing for Incident Response-2: Establishing appropriate policies and procedures, Creating a response Toolkit, Establishing an incident response team.

After Detection of an Incident: Overview of the Initial Response Phase, Establishing an Incident Notification Procedure, Recording the Details after Initial Detection, Incident Declaration, Assembling the CSIRT, Performing traditional investigative steps, Conducting interviews, Formulating a response strategy.

UNIT III

Live data Collection from Windows systems: Creating a response Toolkit, Storing information obtained during the initial response, Obtaining volatile data, Performing an In-depth live response, Is forensic duplication necessary?

Live data Collection from Unix systems: Creating a response toolkit, Storing information obtained during the initial response, Obtaining volatile data prior to forensic duplication, Performing an In- depth, live response.

UNIT IV

Forensic duplication: Forensic duplicates as admissible evidence, Forensic duplication tool requirements, creating a forensic duplicate of a hard drive, Creating a qualified forensic duplicate of a hard drive.

Computer System storage fundamentals: Hard drives and Interfaces, Preparation of hard drive media, Introduction to File systems and Storage Layers.

Data Analysis Techniques: Preparation for forensic analysis, Restoring a forensic duplicate, Preparing forensic duplication for analysis in Linux, Reviewing image files with forensic suites.

TEXT BOOKS:

1. Incident Response & Computer Forensics, 2 edition, Chris Prosise & KevinMandia.
2. The Official CHFI Study Guide for Computer Hacking Forensic Investigator byDave Kleiman

REFERENCE BOOKS:

1. Computer Forensics Investigating Network intrusion & Cyber crime,EC-Council|Press.
2. Digital Forensics with Open Source Tools, Cory Altheide, Harlan Carvey, RayDavidson

Course Code &Title : **HSMC-CS607: MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING** **Semester & Year of study :VII & 2022-2023** **Course Index: C706**
Course Objectives: The learning objectives of this course are:
Course Objectives
To learn about the Introduction to Managerial Economics and Financial Analysis
To learn about the Theory of Production and Cost Analysis
To learn about the Market Structures and Pricing Strategies
To learn about the Financial Marketing
Course Outcomes: By the end of the course, the student will be

Course Index	Course Outcomes
C706.1	Able to understand about the Introduction to Managerial Economics and Financial Analysis
C706.2	Able to understand about the Theory of Production and Cost Analysis
C706.3	Able to understand about the Market Structures and Pricing Strategies
C706.4	Able to understand about the Financial Marketing

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20 AB)
HSMC-CS706: MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING

Theory: 3Hrs/ Week **Credits 3**
Int Marks: 25 **Ext Marks :75**

UNIT I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT II

Theory of Production and Cost Analysis: Production Function–Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

UNIT III

Markets structures and Pricing Strategies: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Objectives and Policies of Pricing- Methods of Pricing:

Business and New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT IV

Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts: Trading, Profit and Loss Account and Balance Sheet (problems with simple adjustments). Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios. (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio).

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand,2007.
2. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas publishinghouse.
3. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH,2005.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. Suma Damodaran, Managerial Economics, Oxford University Press.
3. Lipsey & Chrystel, Economics, Oxford University Press.
4. Dwivedi: Managerial Economics, 6th Ed.,Vikas

Branch/Course: Computer Science and Engineering
Semester VIII (Fourth year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PROJ-CS801	Project-I				-	-	-	14
	Total Credits							14

ADIKAVI NANNAYA UNIVERSITY

UNIVERSITY COLLEGE OF ENGINEERING

R A J A M A H E N D R A V A R A M

Department of
Computer Science and Engineering

BTech (CSE)

MODEL QUESTION PAPERS

II, III & IV YEAR
(*For the admitted batch of* 2019-20)

Board of Studies

University College of Engineering

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)

Semester III (Second year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PCC-CS301	Database Management System	75	25	100	3	0	0	3
PCC-CS302	Software Engineering	75	25	100	3	0	0	3
PCC-CS303	Data Structures	75	25	100	3	0	0	3
PCC-CS304	Operating System	75	25	100	3	0	0	3
BSC-CS305	Probability Statistics and Queuing Theory	75	25	100	3	0	0	3
LC-CS306	Database Management System Lab	50	50	100	0	0	3	1.5
LC-CS307	Data Structures Lab	50	50	100	0	0	3	1.5
LC-CS308	Operating System Lab	50	50	100	0	0	3	1.5
MC-CS309	Essence of Indian Traditional Knowledge	75	25	100	2	0	0	0
MC-CS310	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							21.5

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) III Semester (2019-20AB)
PCC-CS301 DATABASE MANAGEMENT SYSTEMS
MODEL QUESTION PAPER

Time:3hrs **Max.Markss:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Write a brief note on advantages and applications of DBMS [8M]

b) Briefly explain about Three-Schema Architecture with neat diagram [7M]

OR

c.) Briefly discuss about Database System Environment with neat diagram [15M]

2. a) Explain in detail about various key constraints used in database system with examples [10M]

b) Explain about Relational Algebra Set Operations with examples [5M]

OR

c) Explain in detail about Tuple and Domain Relational Calculus with examples [15M]

3. a) What is Normalization? Briefly explain the types of normal forms with an example [15M]

OR

b) Explain how a dynamic multi level indexes can be created using B Trees and B+ Trees with example. [15M]

4. a) What is Serializability? Briefly explain the different types of Serializability [15M]

OR

b) Briefly explain the following Concurrency Control Techniques

i) Two Phase Locking Protocol [8M] ii) Validation Concurrency Control [7M]

SECTION – B (5x3=15 Marks)

Answer any FIVE Questions

5. a) Define DBMS, Schema, Instance. What is weak entity? Explain with example
   b) What is Data Independence? Specify the classification
   c) Give a brief note on Insert, Delete, and Update Queries in SQL with examples
   d) What is View in SQL? Create a view and perform DML operations on it
   e) What is Functional Dependency? Classify.
   f) Give a brief note on Buffering Blocks
   g) What is Transaction? Discuss Characteristics of Transaction
   h) Give a brief note on Shadow Paging technique.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) I Semester(2019-20AB)
PCC-CS302: SOFTWARE ENGINEERING
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain software development process models with a suitable example project for each model. **(15M)**

OR

b) Explain project management activities. **(15M)**

2. a) Briefly explain the requirements process. Consider a web application for conducting mid examinations. List major use cases for this system along with goals, preconditions and exception scenarios. **(15M)**

OR

b) What are the different architectural styles? Consider an online shopping website which provides many different features to perform various tasks. Suggest a suitable architectural style for this.**(15M)**

3. a) Explain structured design methodology with an example. **(15M)**

OR

b) Explain programming principles and guidelines. **(15M)**

4. a) Describe how the measure cyclomatic complexity is derived and its usage during testing with an example. **(15M)**

OR

b) Explain any 2 black box test case design methods. **(8M)**
c) Explain any 2 white box test case design methods. **(7M)**

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. a) Define software engineering.
   b) Write short notes on the problem of scale.
   c) Defect injection and removal cycle.
   d) Top Down vs Bottom Up effort estimation approach.
   e) Consider a program containing many modules. If a global variable x must be used to share data between two modules A and B, how would you design the interfaces of these modules to minimize coupling.
   f) Pair programming
   g) Define error, fault and failure
   h) Give relevant test cases for a login form.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) I Semester(2019-20AB)
PCC-CS303 : DATA STRUCTURES
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A
(4 X 15 = 60 M)

Answer ALL Questions

1. a) What is Linked List? Double Linked Lists with example. **(15M)**
(OR)
b) Explain implementation of Circular Linked List with example. **(15M)**

2. a) What is Stack? Explain various operations in Stack. **(7M)**
b) Explain the process of conversion from infix expression to postfix form. **(8M)**
(OR)
c) Explain Queue as an Abstract Data Type with example. **(7M)**
d) How to implement Queue using Arrays. Explain with example. **(8M)**
(OR)

3. a) What is Tree? Explain representation of Tree operations. **(8M)**
b) Explain various Tree Traversal techniques. **(7M)**
(OR)
c) Define Graphs? How to represent Graph. Explain with Example. **(8M)**
d) Explain Minimal Spanning Tree with example. **(7M)**

4. a) Explain Sequential Search method with example. **(7M)**
b) Explain Binary Search technique with example. **(8M)**
(OR)
c) Explain Bubble Sort with example. **(7M)**
d) Explain Quick Sort with example. **(8M)**

SECTION - B
Answer any FIVE questions **5*3=15M**

5. a) Arrays
b) Stack as Abstract Data type
c) Types of Queues
d) Doubly linked list representation
e) Binary Tree Applications
f) Transitive Closure
g) Efficiency of Binary Search Technique
h) Shell Sort

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) I Semester (2019-20AB)
PCC-CS304 OPERATING SYSTEMS
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A
(4 X 15 = 60 M)

Answer ALL Questions

1. a) Explain different types of systems? (8M)
   b) Write a short notes on system calls? (7M)

OR

   c) Briefly explain the classical problems of synchronization? (8M)
   d) Write a short notes on semaphores? (7M)

2. a) Explain in brief various scheduling algorithms? (7M)

   b) Write a short notes on cooperating processes? (8M)

OR

   c) Write short notes on Deadlock Characterization, deadlock prevention and recovery from deadlock? (15M)

3. a) Explain segmentation and paged segmentation? (15M)

OR

   b) Briefly explain page replacement algorithms? (15M)

4. a) Explain file structure and file access methods? (7M)
   b) Explain directory structure? (8M)

OR

   c) Explain briefly the concept of disk scheduling? (15M)

SECTION - B
(5×3=15M)

Answer any FIVE Questions

5. Write short notes on
   a) Storage Hierarchy
   b) Operating system services.
   c) Threads.
   d) Paging and demand paging.
   e) File operations.
   f) DMA.
   g) Critical section problem.
   h) Secondary storage structure

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM

II BTech (CSE) I Semester (2019-20AB)

BSC-CS305 PROBABILITY, STATISTICS AND QUEUING THEORY

MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)

Answer ALL Questions

1. a) State and prove Bayes' theorem **(8M)**

b) Find the moment generating function of a random variable X defined by the density function f(x) = $\{\frac{1}{3} \quad -1 < x < 2 \; 0 \; ealsewhere$ **(7M)**

Or

c) Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys **(8M)**

d) There are 15 boys and 5 girls in a class. If three students are selected one after the other What is the probability that they are (1) All boys (2) 2 boys one girl (3) All girls. **(7M)**

2. a) Let X is the random variable with the following distribution. Find E(X), E(X^2) E $(2X+1)^2$ **(8M)**

X	-3	6	9
P(X=x)	1/6	½	1/3

b) Binomial distribution approaches poisson distribution as n □∞, prove this statement**. (7M)**

Or

c) In a distribution exactly normal 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution? **(8M)**

d) Fit a Poisson distribution for the following data and calculate the expected frequencies, N = 200. **(7M)**

X	0	1	2	3	4
F(x)	109	65	22	3	1

3. a) A lady stenographer claims that the she can take dictation at the rate of 120 words per minute. Can we reject her claim on the basis of 100 trails in which she demonstrates a mean of 116 words with a S.D of 15 words. **(8M)**

b) Two independent samples of 8 and 7 items respectively had the following values.

Sample1	11	11	13	11	15	9	12	14
Sample2	9	11	10	13	9	8	10	-

Is the difference between the means of samples significant? **(7M)**

Or

c) A manufacturer of electric bulbs claims that the percentage of defectives in his product does not exceed 6. A sample of 40 bulbs is found to contain 5 defectives would you consider the claim justified **(8M)**

d) Explain briefly the following: i) Point Estimation ii) Interval Estimation **(7M)**

4. a) Fit a second degree parabola to the following data using method of least squares. **(8M)**

X	0	1	2	3	4
Y	1	1.8	1.3	2.5	6.3

b) The equations of two regression lines obtained in a correlation analysis are 3 + 12 = 19 , 3 + 9 = 46. Find (i) coefficient of correlation, (ii) Mean values of x and y and (iii) The ratio of the coefficient of variability of X to that of Y. **(7M)**

Or

c) Derive expressions for P_o , P_n for the (M/M/1): (∞/FCFS) queuing model. **(8M)**

d) In a railway marshalling yard, good trains arrive at a rate of 30 trains per day. Assuming that the inter arrival time follows an exponential distribution and the service time distribution is also exponential with an average of 36 minutes, Calculate (i) expected queue size (line length) (ii) Probability that the queue size exceeds 10. If the input of trains increases to an average of 33 per day, what will be the change in (i) and ii)? **(7M)**

Section B (5×3=15M)

Answer any FIVE Questions

5. **a)** Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is even if the two cards are drawn one after the other with replacement.

b) State and prove addition theorem

c) Define continuous random variable and discrete random variable

d) Use Poisson recurrence formula to find probabilities x = 0,1,2 with mean 3

e) Explain the types of errors in sampling

f) If we can assert with 95% that the maximum error is 0.05 and P is given as 0.2. Find the size of the sample.

g) Write the normal equations of straight line by using method of least square

h) What is queuing theory? Explain transient and steady state.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II B.Tech (CSE) III SEMESTER (2019-20AB)
MC-CS309 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE
MODEL QUESTION PAPER

Max Time: 3 Hours **Max Marks: 75M**

SECTION-A (4× 15 = 60 M)
Answer ALL questions

1.a. Define Traditional Knowledge? Explain about its nature, scope and characteristics. **(15M)**

(or)

b. Explain about the historical impact of social change on traditional knowledge system.

2.a. Explain the need of protecting the traditional knowledge significance in detail. **(15M)**

(or)

b. What do you mean by biological diversity? Explain about Biological Acts2002.

3.a. Illustrate certain non IPR mechanisms of Traditional knowledge protection. **(15M)**

(or)

b. Why do we need to protect Traditional knowledge? What benefits do traditional knowledge bring to the society.

4.a. Explain about Traditional Knowledge in sectors like Engineering and Agriculture. **(15M)**

(or)

b. Illustrate the importance of conservation and sustainable development of Food security of the country and protection of Tk.

SECTION-A (5×3 = 15 M)

Answer Any FIVE questions

5. a) Define Western knowledge.

b) What are different kinds of traditional knowledge?

c) List out the role of Government to harness in TK.

d) Illustrate different strategies to increase traditional knowledge.

e) Define bio technology

f) Write about indigenous knowledge.

g) Define intellectual property.

h) How TK related to Biodiversity.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)

Semester IV(Second year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
ESC-CS401	Computer Organization and Architecture	75	25	100	3	0	0	3
PCC-CS402	Computer Networks	75	25	100	3	0	0	3
PCC-CS403	Object Oriented Programming through JAVA	75	25	100	3	0	0	3
BSC-CS404	Discrete Mathematical Structures	75	25	100	3	0	0	3
HSMC-CS405	Management Science	75	25	100	3	0	0	3
LC-CS 406	Computer Organization and Architecture Lab	50	50	100	0	0	3	1.5
LC-CS407	Computer Network Lab	50	50	100	0	0	3	1.5
LC-CS408	Object Oriented Programming through JAVA Lab	50	50	100	0	0	3	1.5
MC-CS409	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20AB)
ESC-CS401 COMPUTER ORGANIZATION AND ARCHITECTURE
MODEL QUESTION PAPER

Time: 3hrs. **Max.Marks: 75**

SECTION-A (4 x 15=60)

Answer ALL Questions

1 (a) Explain different addressing modes with examples. **[15M]**

Or

(b) Explain Design of Accumulator logic. **[15M]**

2 (a) Write notes on asynchronous data transfer. **[15M]**

Or

(b) Explain direct memory access. **[15M]**

3 (a) Explain in brief main memory concepts. **[08M]**

(b) Explain in brief cache memory. **[07M]**

Or

(c) Explain the concepts of virtual memory? **[15M]**

4 (a) Explain 8085 Microprocessor Architecture? **[15M]**

Or

(b) Explain Intel 8085 Microprocessor Instructions?

SECTION-B (5 x 3=15M)

Answer any FIVE Questions

5. Write a short notes on

a) Stack Organization.
b) Instruction cycle.
c) I/O vs memory bus.
d) Priority interrupts.
e) Associative memory.
f) Memory protection.
g) Write short notes on 8085 pin configuration.
h) Intel 8085 instructions of Arithmetic and logic group.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20AB)
PCC-CS402 COMPUTER NETWORKS
MODEL QUESTION PAPER

Time:3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a. Explain OSI Reference Model. **(15M)**

(OR)

b. Explain any three multiple access protocols in details. **(8M)**
c. What is Channel allocation problem? **(7M)**

2. a. Explain any two Dynamic routing algorithms. **(15M)**

(OR)

b. Explain IPv4 and IPv6. **(15M)**

3. a. Explain ICMP and DHCP in detail. **(15M)**

(OR)

b. Explain OSPF and CIDR. **(7M)**
c. Explain tunnelling and Packet fragmentation. **(8M)**

4. a. Explain Internet Transport Protocols. **(15M)**

(OR)

b. Explain the TCP service model in detail. **(7M)**
c. Differentiate SNMP and Email. **(8M)**

SECTION - B (5×3=15M)
ANSWER ANY FIVE QUESTIONS

5.

a) Explain TCP Sliding window protocols
b) Explain Link state routing
c) Define Internet routing
d) Explain TCP Segment Header
e) Define DNS
f) Give the difference between FTP and HTTP
g) Explain SMTP
h) Explain Flooding

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) IV Semester (2019-20AB)
PCC-CS403 OBJECT ORIENTED PROGRAMMING THROUGH JAVA
MODEL QUESTION PAPER

Time:3hrs **Max.Markss:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Why we need object oriented programming languages instead of structured programming languages? Explain. **7M**
   b) How can we say that Java is a complete object oriented programming language? Justify your answer. **8M**

OR

   c) Explain the role of command line arguments in Java programming. **7M**
   d) Write a Java program to find the individual digits of a given number. **8M**

2. a) With the help of syntax, flow chart and example program explain different conditional statements supported by Java. **15M**

OR

   b) Write and explain bitwise, logical and special operator supported by Java. **15M**

3. a) What is an array? Why we need them? List the different types of arrays supported by java? Write a java program to multiply two matrices. **15M**

OR

   b) Define a package? Write a Java program to illustrate the working of packages. **8M**
   c) How can we assign the priorities to a thread? **7M**

4. a) With the help of a neat sketch, explain the exception handling mechanism. **7M**
   b) Distinguish between applet and application programming. **8M**

OR

   c) With the help of a neat sketch explain the life cycle of an applet. **7M**
   d) Write a Java program to read information from the key board, store it in a file and display the same. **8M**

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) Give brief information on about the history of Java.
   b) Write a java program to find the factorial value of any given number.
   c) Write about the precedence of arithmetic operators.
   d) Write a Java program to illustrate increment and decrement operators.
   e) Describe about the thread synchronization.
   f) Describe about the naming conventions used for packages.
   g) Write short notes on types on types of errors.
   h) Write an applet program to generate circles and ellipses.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II B.Tech (CSE) IV SEMESTER (2019-20AB)
BSC-CS404 DISCRETE MATHEMATICAL STRUCTURES
MODEL QUESTION PAPER

Max Time: 3 Hours **Max Marks: 75**

SECTION-A (4× 15 = 60 M)
Answer ALL questions

1. a) Prove that $\{[p \rightarrow (q \vee r)] \wedge (\sim q)\} \rightarrow (p \rightarrow r)$ is a tautology. **[8M]**

b) Prove the validity of the following argument
Lions are dangerous animals
There are lions
Therefore, there are dangerous animals. **[7M]**

Or

c) Prove that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integer n by using Mathematical induction. **[8M]**

d) Find the disjunctive normal form for the following.
$p \vee (\neg p \rightarrow (q \vee (q \rightarrow \neg r)))$ **[7M]**

2. a) Prove the identity $C(n+1,r) = C(n,r-1) + C(n,r)$ **[8M]**

b) How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$ where each $x_i \geq 2$? **[7M]**

Or

c) Explain Principle of Inclusion and Exclusion. **[8M]**

d) Suppose a department consists of eight men and nine women in how many ways can we select a committee of (i) Four persons that has at most one man? (ii) Four persons that has persons of both sexes? (iii) Four persons so that two specific persons are not included? **[7M]**

3. a) Explain methods of solving recurrence relations with suitable examples. **[8M]**

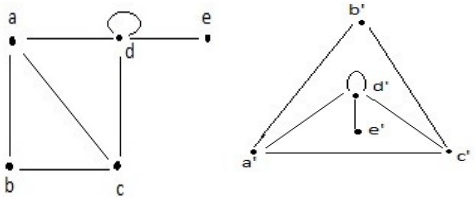
b) Solve the recurrence relation. $a_k - 7a_{k-1} + 10a_{k-2} = 0, a_0 = 1, a_1 = 2, for n \geq 2$ **[7M]**

Or

c) Find a solution to $-a_{n-1} = 3(n-1)$ where $n \geq 1$ and where $a_0 = 2$. **[8M]**

d) Find the generating function of the Fibonacci sequence **[7M]**

4. a) Show that the following graphs are isomorphic. **[8M]**



b) Define the following graphs with one suitable examples for each graph.
Directed, Mixed, Simple, Weighted and Multi graph. **[7M]**

Or

c) Explain Kruskal's Algorithm for finding a Minimal Spanning tree. **[8M]**

d) Draw a graph with six vertices which is Hamiltonian but not Eulerian. **[7M]**

SECTION-B (5×3=15M)
Answer any FIVE Questions

5.

a) Prove that for any two sets, $A-(A-B)=A\cap B$

b) Show that 's' is a valid conclusion from the premises.

$p\to q, p\to r, \neg(q\wedge r)$ and $s\vee p$

c) How many different strings can be made from the letters in ABRACADABRA using the all the letters

d) State Pigeonhole Principle and its applications.

e) Define non-homogeneous linear recurrence relation and give an examples.

f) Solve $a_n - 6a_{n-1} + 12a_{n-2} - 8a_{n-3} = 0$ by generating functions.

g) Define Indegree and Outdegree with example.

h) Explain Graph colouring with example.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II B.Tech (CSE) IV SEMESTER (2019-20AB)
HSMC-CS405 MANAGEMENT SCIENCE
MODEL QUESTION PAPER

Max Time: 3 Hours **Max Marks: 75M**

SECTION-A (4× 15 = 60 M)
Answer ALL questions

1. a) What is management? Explain nature and importance of management. 15M

OR

b) Explain the Henry Fayol's fourteen principles of management. 15M

2. a) Discuss the role and functions of HR manager.

OR

b) What are the elements in the preparation of corporate planning process? 15M

3. a) Explain the principles of plant lay out.

OR

b) Discuss the objectives of inventory control methods of inventory control. 15M

4. a) What is PERT? Illustrate it. 15M

OR

b) Define Product life cycle and explain the marketing strategies should follow in each stage.

SECTION-A (5×3 = 15 M)
Answer Any FIVE questions

5. a) Functions of Management

b) Write about Recruitment

c) SWOT analysis

d) What is CPM?

e) Write about the Balanced score card

f) Explain about JIT system.

g) How to determine performance appraisal

h) Explain about leadership styles.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)

Semester V (Third year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
ESC-CS501	Micro Processors and Micro Controllers	75	25	100	3	0	0	3
PCC-CS502	Formal Languages and Automata Theory	75	25	100	3	0	0	3
PCC-CS503	Design and Analysis of Algorithms	75	25	100	3	0	0	3
PCC-CS504	Object Oriented Analysis & Design with UML	75	25	100	3	0	0	3
PEC-CS505	Elective-I 1.Artifitial Intelligence & Neural Networks 2.Distributed Operating Systems 3.Internet of Things	75	25	100	3	0	0	3
LC-CS506	Micro Processor and Micro Controller Lab	50	50	100	0	0	3	1.5
LC-CS507	Object Oriented Analysis & Design with UML Lab	50	50	100	0	0	3	1.5
MC-CS508	Constitution of India	75	25	100	2	0	0	0
MC-CS509	Skill Development Course	--	50	50	1	0	2	2
MC-CS510	SUMMER INTERNSHIP							1.5
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week
Summer Internship 2 Months (Mandatory) after second year(to be evaluated during V semester

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
ESC-CS501 MICRO PROCESSORS AND MICRO CONTROLLERS
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION – A (4X15=60 Marks)
Answer ALL Questions

1. a) Explain about architecture of 8086. **(15M)**

(Or)

b) Write about the instruction set of 8086. **(15M)**

2. a) Explain about the stack structure of 8086. **(15M)**

(Or)

b) Describe about interrupt service routines and interrupt cycle of 8086. **(15M)**

3. a) Explain about interfacing to D/A and A/D converters. **(15M)**

(Or)

b) What is DMA and explain about DMA Controller. **(15M)**

4. a) Explain about the addressing modes and instructions of MCS51 **(15M)**

(Or)

b) Explain about ARM architecture and organization. **(15M)**

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. a) Define maximum mode 8086

b) What is assembler directive?

c) How to write program with an assembler?

d) Define maskable interrupt.

e) Dynamic RAM interfacing.

f) Memory interfacing.

g) What is Flash Controller?

h) What is 16/32 bit processor?

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
PCC-CS502: FORMAL LANGUAGES AND AUTOMATA THEORY
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION – A (4x15=60 Marks)
Answer ALL Questions

1. **a)** Define DFA and NFA with examples. Differentiate them? **(7M)**
   b) Design a DFA which accepts Odd number of 0's and 1's? **(8M)**
   Or
   c) State and prove equivalence of NFA and DFA? **(15M)**

2. **a)** Closure Properties of Regular Sets? **(10M)**
   b) Decision Algorithm for Regular Sets? **(5M)**
   Or
   c) State and prove pumping lemma for Regular Sets? Give one example? **(15M)**
3. **a)** Design a PDA for the language L={WCW^R/ W in (a,b)*}? **(15M)**
   Or
   b) Design a PDA for the language L={WW^R/ W in (a,b)*}? **(15M)**

4. **a)** Explain Universal Turing machines? **(15M)**
   Or
   b) Discuss the Halting Problem of TM? **(15M)**

SECTION – B (5x3=15 Marks)
Answer any FIVE Questions

5. Write a short note on
   - **a)** Function and relation
   - **b)** Sets
   - **c)** Regular expressions
   - **d)** Context free languages
   - **e)** Pushdown automata
   - **f)** Chomsky hierarchy
   - **g)** Turing machines
   - **h)** Undecidability of PCP

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
PCC-CS503: DESIGN AND ANALYSIS OF ALOGRITHMS
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 x 15=60)
Answer ALL Questions

1. a) Write an algorithm for Matrix multiplication and find the Time complexity of it. **[8M]**
b) Differentiate between Big oh, Omega and Theta Notation **[7M]**

Or

c) What are the features of an efficient algorithm. Explain with an example. **[8M]**
d) Find the time complexity of an algorithm which finds the factorial of a number using recursion. **[7M]**

a) a) What is meant by Divide and Conquer approach. Write the General method of Divide – And – Conquer approach. **[7M]**
b) Write Divide – And – Conquer recursive Merge sort algorithm and derive the time complexity of this algorithm. **[8M]**

Or

c) Write with an example of Prim's algorithm and Kruskal Algorithm. **[10M]**
d) Derive the Best, Worst and Average time complexities of Quick sort technique. **[5M]**

3. a) Solve the following instance of 0/1 Knapsack problem using Dynamic programming n=3; (W1, W2, W3) = (3, 5, 7); (P1, P2, P3) = (3, 7, 12); M = 4. **[8M]**
b) Discuss the 4 – queen's problem. Draw the portion of the state space tree for n = 4 queens using backtracking algorithm. **[7M]**

Or

c) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm. **[7M]**
d) Discuss Sum of subset problem and Travelling Sales Person Problem **[8M]**

4. a) Explain FIFO Branch and Bound solution **[7M]**
b) Explain how the traveling salesperson problem is solved by using LC Branch and Bound. **[8M]**

Or

c) What are the differences between backtracking and branch and bound solutions? **[8M]**
d) Explain the LC branch and bound algorithm **[7M]**

SECTION-B (5 x 3=15M)
Answer any FIVE Questions

5. **a)** What is Amortized analysis? Explain.
b) Describe the Algorithm Analysis of Binary Search.
c) Describe Single source shortest paths
d) State the Job – Sequencing Deadline Problem.
e) Define i) Principles of optimality ii) Feasible solution iii) Optimal solution.
f) Explain about Reliability Design.
g) Write about NP-Hard and NP-Complete Problems.
h) Distinguish between fixed – tuple sized and variable tuple sized state space tree organization.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
PPC-CS504: OBJECT ORIENTED ANALYSIS AND DESIGN WITH UML
MODEL QUESTION PAPER

Time:3hrs **Max.Markss:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain the importance of Modeling. What is Object Oriented Modeling? **(15)**

(Or)

b) Explain the four common mechanisms that apply consistently throughout the language. Describe how to model a comment in UML. **(15)**

2. a) i) With a neat diagram describe the representation of an advanced class. **(8)**

ii) Explain Multiplicity with an example. **(7)**

(Or)

b) i) Describe a Use Case diagram with an example. **(8)**

ii) Explain Activity diagram with a suitable example. **(7)**

3. a) i) Explain State Machine with a suitable example. **(8)**

ii) Difference between a process and a thread. **(7)**

(Or)

b) i) Explain Deployment diagram with a suitable example. **(8)**

ii) Describe the three types of components in UML. **(7)**

4. a) i) Describe Model View Controller (MVC). **(7)**

ii) How to Design patterns solve design problems? **(8)**

(Or)

b) i) How is the catalog of a design pattern organized? **(8)**

ii) Describe different approaches on selecting a design pattern. **(7)**

SECTION- B (5×3=15M)
Answer any FIVE Questions

5.

a) What is Unified Modeling Language?

b) What is dependency relationship?

c) What is a template class?

d) What is a relationship?

e) What is Asynchronous Event?

f) What is a transition?

g) What is reverse engineering?

h) How do we describe a design pattern?

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
PEC-CS505: ARTIFITIAL INTELLIGENCE & NEURAL NETWORKS (Elective-I)
MODEL QUESTION PAPER

Time:3hrs **Max.Markss:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.a) Define Artificial intelligence? Explain types of agents. **(15M)**

OR

b) Explain briefly any two uniformed search strategy.

2.a) Explain the concept of forward & backward chaining? **(15M)**

OR

b) Describe Resolution & Unification.

3.a) Explain the characteristics & principles of Neural Network? **(15M)**

OR

b) Explain the Pattern Recognition Problems in Artificial Neural Networks?

4.a) Describe the Analysis of pattern Association Classification Networks. **(15M)**

OR

b) Explain about Feedback Neural Network?

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. a) Define Rationality.
   b) Write a short note on Minmax Algorithm.
   c) What is the main aim of Wumpus World.
   d) Define First Order Logic.
   e) Write about Alpha-Beta pruning.
   f) Define Topology in Neural Networks.
   g) Functional units of Neural Network.
   h) Note on Analysis of Linear Auto associative FF network.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
PEC-CS505: DISTRIBUTED OPERATING SYSTEMS (Elective-I)
MODEL QUESTION PAPER

Time:3hrs **Max.Markss:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a. What is a Software Agent? Explain different types of software agents in detail?

(or)

b. Define Thread? Explain about different forms of Threads in distributed systems?

2. a. Explain about DNS and x.500 names spaces.

(or)

b. Explain about Hierarchical Deadlock Detection in Distributed System and explain about its algorithms.

3. a. What is the need of clock synchronization in distributed systems? Explain?

(or)

b. What are consistency models? Explain about client -centric consistency model in detail?

4. a. What is Distributed File System? Explain its desirable features of a distributed file system.

(or)

b. Explain about CORBA and its architecture? What is the purpose of CORBA explain in detail.

SECTION- B (5×3=15M)
Answer any FIVE Questions

5.

a) What is Migration in distributed systems?

b) Define Entities, Names, Address in Distributed System.

c) Define Replication and list some consistency protocols.

d) What is fault tolerance

e) Explain about Election algorithm and list its types.

f) Define Deadlock.

g) Define SFS in Distributed operating System.

h) Write a short note on casual -consistency Lazy Replication

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
PEC-CS505: INTERNET OF THINGS (Elective-I)
MODEL QUESTION PAPER

Time:3hrs **Max.Markss:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.a) What is the IoT? Explain Design guidelines for IoT. **(15M)**

OR

b)Explain in detail application of Internet of Things in Smart Cities.

2.a) Explain M2M. Distinguish between IoT and M2M. **(8M)**

b) Explain SDN and NFV for IoT **(7M)**

OR

c) Explain IoT System Management with NETCONF-YANG. **(8M)**

d) Explain limitations of SNMP. **(7M)**

3.a) Explain Design Methodology for IoT. **(15M)**

OR

b) Explain Logical Design of IoT suing Python. Explain various python packages used for IoT.

4.a) What is Raspberry Pi. Explain Raspberry Pi Board and various interfaces in Raspberry Pi.**(15M)**

OR

b) What is Cloud? Explain various Cloud Storage Models using in IoT.

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. a) Explain Wireless Sensor Networks
b) Explain IoT in Environment
c) Explain Need for IoT Systems Management
d) Explain NETOPEER
e) Explain various data types used in Python
f) Explain basic building blocks of IoT Device
g) Explain Amazon Web Services for IoT
h) Explain Django Architecture

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) V Semester (2019-20AB)
MC-CS508 CONSTITUTION OF INDIA
MODEL QUESTION PAPER

Time:3hrs **Max.Markss:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.a) What is a Constitution? Explain the importance of Preamble. **(15M)**

OR

b) Explain in detail the Fundamental Rights and Duties.

2.a) Explain Judiciary and its structure. **(8M)**

b) Explain Federalism and Centre-State relationship structure **(7M)**

OR

c) Explain the role of President and his powers. **(8M)**

d) Elucidate upon the structure of Lok Sabha. **(7M)**

3.a) Explain the Role and Importance of Municipalities **(15M)**

OR

b) Explain the significance of Panchayat Raj.

4.a) What is the role of Election Commission? Explain the powers vested to Election Commissioner. **(15M)**

OR

b) What are some of the functions taken up by the EC for the welfare of SC/ST/OBC and Women?

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. Explain about:

a) History of Indian Constitution
b) Directive Principles of State Policy
c) The Supreme Court
d) Council of Ministers
e) Structure of State Secretariat
f) Grass root Democracy
g) Zila Panchayat
i) Sources of Indian Constitution

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)

Semester VI (Third year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PCC-CS601	Network Security and Cryptography	75	25	100	3	0	0	3
PCC-CS602	Data Warehouse and Data Mining	75	25	100	3	0	0	3
PCC-CS603	Web Technologies	75	25	100	3	0	0	3
PEC-CS604	Elective-II 1.Cloud Computing 2.Grid Computing 3.Mobile Computing	75	25	100	3	0	0	3
OEC-CS605	Open Elective-I 1. Compiler Design 2. Embedded Systems 3. Robotics	75	25	100	3	0	0	3
LC-CS606	Network Security and Cryptography Lab	50	50	100	0	0	3	1.5
LC-CS607	Data Mining with R Lab	50	50	100	0	0	3	1.5
LC-CS608	Web Technologies Lab	50	50	100	0	0	3	1.5
MC-CS609	Skill Development Course	--	50	50	1	0	2	2
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
PCC-CS601 NETWORK SECURITY AND CRYPTOGRAPHY (Open Elective I)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about SI security architecture and Security attacks. (15M)

(OR)

b) Explain Euclid's algorithm and Multiplicative & additive inverse (15M)

2. a) Explain about Differential and linear cryptanalysis. (15M)

(OR)

b) Write Principles of Public key cryptosystems and explain RSA – Key distribution. (15M)

3. a) Explain about Authentication function and Message Authentication Code (MAC). (15M)

(OR)

b) Explain about S/MIME and IP Security Architecture (15M)

4. a) Explain about Transport layer Security and Secure Electronic Transaction. (15M)

(OR)

b) Explain about virus counter measures and Firewall design principles. (15M)

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) Steganography

b) Modular Arithmetic

c) Block cipher

d) Encryption and Decryption

e) Digital Signature

f) Authentication Header

g) Socket Layer

h) Intruder

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
PCC-CS602: DATA WAREHOUSING AND DATA MINING
MODEL QUESTION PAPER

Time:3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain with a neat diagram the three-tier architecture of a Data Warehouse. 7M
b) Explain the OLAP operations in a Multidimensional data. 8M

OR

c) Why do we pre-process data? Explain different techniques in data cleaning, integration and transformation. 15M

2. a) Data Mining should be applicable to any kind of data repositories, including data streams. What are the different kinds of data on which mining can be applied? 10M
b) Mention different issues in Data Mining. 5M

OR

c) Explain in detail how the data is measured differently in statistical descriptions. 8M
d) Where can data mining be applied? Explain different domains of applications. 7M

3. a) Explain FP-Growth Algorithm with an example. 8M
b) Explain AOI Algorithm. 7M

OR

c) Explain Apriori property and explain the algorithm associated with it. 8M
d) How to generate Closed and Max patterns. 7M

4. a) What is the difference between classification and Prediction? How a decision tree is constructed. 10M
b) Explain Support Vector Machines concept. 5M

OR

c) Explain Bayesian Classification Methods. How Classification by back propagation is obtained. 7M
d) Explain k-means Clustering and compare that with k-medoids algorithm. 8M

SECTION-B

5. ANSWER ANY FIVE QUESTIONS. **(5x3=15)**

a) DBSCAN Algorithm
b) Tree Pruning
c) Concept Description.
d) Frequent Item sets using vertical data format
e) Multilevel Association Rules
f) Data Visualization
g) Similarity and Dissimilarity of data
h) Data Cube Technology

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
PCC-CS603: WEB TECHNOLOGIES
MODEL QUESTION PAPER

Time:3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) i) Explain the different layers and their roles in protocols of Computer Communication
ii) What are the types of Bridges? Explain Simple Bridge?
iii) How does the Address Resolution Protocol (ARP) wrote?

(OR)

b) i) Explain the following ICMP Messages
Destination Unreachable, Source Quench, Redirect
ii) Discuss the Hardware and Software issues in Internet Working?
2. a) i) How does the three way Handshake foe creating a TCP connection work?
ii) Explain the concept of FTP (File Transfer Protocol)?

(OR)

b) i) Describe the steps involve when a web browser request for and obtains a web page from a Web server?
ii) What are the three approaches for e-Commerce application Developments and Explain main features of a product such as IBM's Net. Commerce?
3. a) i) Describe how static Web pages are made dynamic?
ii) Create a static web page that displays the following fields

Student No	Student Name	Department	Marks	Average	Result

(OR)

b) i) What are the Advantages of Client –side scripting?
ii)Describe ADO and how it can be Used to Interact with Databases?
iii) Why was JSP required?
4. a) i) Describe the typical Operation involving a middleware such as CORBA?
ii) Explain the Concept of EDI?

(OR)

b) i) Describe the Anatomy of an XML Document?
ii) Explain WAP Architecture?

SECTION – B (5X3=15 Marks)

5. Answer any FIVE Questions

a) What is Maximum Transmission Unit?
b) Describe Spooling in brief?
c) What is Resolver?
d) What are Java Beans?
e) What is the need for XSL? Illustrate this with the help of an example?
f) Explain GPRS and UMTS?
g) Life cycle of JAVA applet.
h) JAVA Remote Method Invocation.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
PEC-CS604: CLOUD COMPUTING (Elective-II)
MODEL QUESTION PAPER

Time:3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Briefly explain the business case for going to the cloud, its services and business applications. (15M)

(OR)

b)What are benefits,limitations,security concerns and regulatory issues in cloud computing? (15M)

2. a) Write about the overview of cloud storage and cloud storage providers? (15M)

(OR)

b)What is software plus services and its overview with mobile device integration (15M)

3. a) Explain the developing applications of Intuit QuickBase, cast iron cloud, Bungee connect? (15M)

(OR)

b) Explain virtualization in your organization? (15M)

4. a) How the cloud services aimed at the mid-market? (15M)

(OR)

b)Explain about best practices and the future of cloud computing? (15M)

SECTION-B

5. Answer any five questions **(5*3=15)**

a) Salesforce.com
b) NetApp
c) WebApps
d) Microsoft Online
e) Google developing application
f) MC.Neilus steel
g) Cloud services for individuals
h) Future of cloud computing

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
PEC-CS604: GRID COMPUTING (Elective-II)
MODEL QUESTION PAPER

Time:3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.a) Explain grid monitoring Architecture(GMA),its components and monitoring data. (15M)

Or

b) Discuss in detail the four main stages of grid computing. (15M)

2. a) Compare and contrast between grid monitoring tools. Monitoring and discovering tools (MDS) and Network and weather service (NWS) with respect to features. (15M)

Or

b) Explain the architecture of LSF grid scheduling system, its daemons, job life cycle, job management and resource management. (15M)

3. a) Discuss various resource matching services provided by Portable Batch Systems (15M)

Or

b) Explain how mutual authentication and credential delegation are achieved in GSI. (15M)

4. a) Discuss in detail the three tire architecture of first generation grid portals, services and implementation. (15M)

Or

b) Discuss the challenges associated in data management services in grid environment. (15M)

SECTION- B (5×3=15M)

5. Answer any FIVE Questions

a. What is grid portal
b. Differentiate grid and cluster computing
c. How are private keys secured in GSI
d. How web services benefit the grid environment
e. State advantages of OGSI over WSRF
f. Functionalities of sensor and sensor manager of JAAM systems
g. State the authorisation models of GSI in server systems
h. Responsibilities of Ganglia monitoring daemon

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
PEC-CS604: MOBILE COMPUTING (Elective-II)
MODEL QUESTION PAPER

Time:3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about GSM System architecture?

OR

b) Explain about Mobile Computing with Architecture?

2. a) Explain about Wireless Local Area Network standard IEEE 802.11 and write comparison of IEEE 802.11a, b, g and n standards.

OR

b) Explain about Traffic routing in wireless networks.

3. a) Explain about adaptive clustering for mobile wireless networks.

OR

b) Explain about push-based mechanisms and pull-based mechanisms.

4. a) Explain about Mobile IP.

OR

b) Explain about Wireless Application Protocol.

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. Write short notes on:

a) Frequency Reuse

b) Localization and calling

c) Wireless Local Loop

d) Frame Relay

e) Data Replication

f) Selective tuning

g) Co-located address

h) Caching model

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
OEC-CS605: COMPILER DESIGN (Open Elective I)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) What are the phases of Compiler. **(5)**
b) Explain all the phases in detail with the help of an example statement p=i+r*100. **(10)**

(OR)

c) Define the terms lexeme, token and short note on lexical analyzer generators. **(5)**
d) Explain in detail about lexical Analyzer generator LEX. **(10)**

2. a) Explain brute force parsing and shift reducing parsing with examples. **(15)**

(OR)

b) What is SDT, Define L-attributed grammars; explain various types of three address codes **(15)**

3. a) Explain about Machine Dependent Optimization, ICAN and Loop Optimization techniques.**(15)**

(OR)

b) Explain Register Allocation for identifiers in detail. **(7)**
c) What are the problems in Code Generation? **(8)**

4. a) What are the data structures used in Symbol Table. **(15)**

(OR)

b) Explain in detail about error handling routines. **(15)**

SECTION- B (5×3=15M)
Answer any FIVE Questions

5.

a) Explain Boot Strapping
b) Explain Interpreter?
c) Define Basic Blocks
d) Explain DAG
e) Explain If Simplification methods in detail.
f) Explain Stack Allocation of Symbol Table.
g) What are the contents of Symbol Table.
h) Define Left Linear Grammar.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
OEC-CS605 EMBEDDED SYSTEM (Open Elective I)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about memory, sensors and actuators. (15M)

(OR)

b) Explain about communication interface and embedded firmware (15M)

2. a) Explain about 8051 architecture. (15M)

(OR)

b) Explain about memory organization and registers (15M)

3. a) Explain about Addressing modes. (15M)

(OR)

b) Explain about Program control transfer instructions. (15M)

4. a) Explain about 8051 interrupts and interfacing ADC 0801. (15M)

(OR)

b) Explain about Embedded Product Development life cycle (EDLC). (15M)

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) Core of embedded system

b) Passive components

c) Quality attributes

d) Oscillator unit

e) Arithmetic Instructions

f) Logical Instructions

g) Timers

h) Simulators

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
III BTech (CSE) VI Semester (2019-20AB)
OEC-CS605: ROBOTICS (Open Elective-I)
MODEL QUESTION PAPER

Time:3hrs. **Max. Marks:75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) What is Robot? Explain its components, Characteristics, and Applications Robots as Mechanisms.

(OR)

b) Derive matrix that represents pure rotation about y-axis of reference frame.

2. a) Explain in detail about Representation of combined Transformations.

(OR)

b) Explain Transformations relative to the rotating inverse, with necessary diagrams.

3. a) Explain various stepper motors?

(OR)

b) Compare Hydraulic, electric, pneumatic actuating system?

4. a)What is position sensor? What are various position sensors and explain it?

(OR)

b) Explain Touch and Tactile sensors?

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. Write Short notes on the Following

a. What is actuator?
b. What are the characteristics of actuator system?
c. Write a short note on potentiometers and encoders?
d. Discuss sensor characteristics?
e. What is the principle of stepper motor?
f. Write Basic principle on velocity sensors
g. What are force and pressure sensors?
h. Write about Matrix representation of Robot Mechanism.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTech (CSE) (2019-20 AB)

Semester VII (Fourth year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week			Credits
		Ext	Int		L	T	P	
PEC-CS701	Elective-III 1.Software Testing and Quality Assurance 2.Software Architectures and Design Patterns 3.Agile Software Development	75	25	100	3	0	0	3
PEC-CS702	Elective-IV 1.Python Programming 2.AJAX/JSON 3.PHP Programming	75	25	100	3	0	0	3
PEC-CS703	Elective-V 1.Computer Vision and Pattern Recognition 2 Machine Learning 3.Big Data Analytics	75	25	100	3	0	0	3
OEC-CS704	Open Elective-II 1.Business Intelligence and Visualization 2.Natural Language Processing 3.Advanced Databases	75	25	100	3	0	0	3
OEC-CS705	Open Elective-III .Foundations of Data Science 2.Block Chain Technology 3.Computer Forensics	75	25	100	3	0	0	3
HSMC-CS706	Managerial Economics and Financial Accounting	75	25	100	3	0	0	3
MC-CS707	Skill Development Course		50	50	1	0	2	2
MC-CS708	SUMMER INTERNSHIP							1.5
	Total Credits							**21.5**

Note: 2 lab Hrs/Week and 1 Theory Hrs/Week for SKILL DEVELOPMENT COURSE or 2 Theory Hrs/ Week
Summer Internship 2 Months (Mandatory) after third year(to be evaluated during VII semester

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS701: SOFTWARE TESTING AND QUALITY ASSURANCE (Elective-IV)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a)Explain testing activities.What are the various sources of information for test case selection?

OR

b) What is a CFG? Explain how paths are selected for testing using CFG.

2. a)Explain different types of domain errors. Show how criterion for test selection and the test data so selected reveal domain errors.

OR

b) Explain system integration techniques.

3.a) Explain classification of software requirements into software quality factors.

OR

b) Explain SQA system.

4.a) What is a CASE tool? Explain the contribution of CASE tools to software product quality.

OR

b) Explain different process and product metrics. A requirement specification document of XYZ system is analyzed to obtain the following data. Number of user inputs –28, Number of user outputs –36, Number of user online queries –24, Number of logical files –8, Number of external interfaces -12. The team estimated that 50% of the components are simple, 25% are average and 25% complex. The project's complexity is estimated as RCAF =57. Compute the function points estimate for the project.

SECTION-B

5. Answer any five questions **(5*3=15)**

a) Define verification and validation

b) Dynamic unit testing

c) c-use and p-use of a variable

d) Explain data points near boundaries ON and OFF points.

e) Give IEEE definition for software, software quality and software quality assurance.

f) Distinguish software error, fault and a failure with example.

g) Limitations of quality metrics

h) Write short notes on CMM

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS701: SOFTWARE ARCHITECTURES AND DESIGN PATTERNS (Elective-IV)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain the Architecture patterns, Architecture styles and Reference models. **(15M)**

(OR)

b) Discuss about quality attributes and architectural means for achieving quality.

2. a) Discuss with suitable example how software architecture evaluation will be done.**(15M)**

(OR)

b) What is meant by Software Product Lines? Discuss about software architecture in future.

3. a) What is meant Design Patterns? What are their advantages? Discuss about selection and usage of design patterns. **(15M)**

(OR)

b). Discuss the applicability, structure, participants, consequences and implementation of Abstract Factory pattern.

4. a) Discuss the applicability, structure and implementation of Interpreter, Memento and Observer patterns. **(15M)**

(OR)

b) a) Explain about Chain of responsibility and Template method..

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. a) Define Business Cycle.

b) Define View

c) What is ATAM.

d) What is CBAM.

e) Briefly Write about Singleton Pattern.

f) Briefly Write about Flyweight Pattern.

g) Define Strategy Pattern.

h) Define Visitor Pattern.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS701: AGILE SOFTWARE DEVELOPMENT (Elective-IV)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) What is the working principle of Agile? What value is provided by Agile? Discuss.

(or)

b) Explain Agile Organisational Methods Spaces, Values, Principles and Practices of Agile Methods.

2. a) Explain various roles in Agile process. How are these roles different from traditional roles?

(or)

b) Illustrate the Planned Process Life Cycles and Agile - The Waterfall Based SDLC

3. a) What is Composite Agile Method and Strategy(CAMS).Explain CAMS Architecture.

(or)

b) How measurement helps in monitoring the progress in Agile approach? Discuss.

4.a)How business involvement and team motivation are managed in Agile product management?

(or)

b) What is Enterprise Architecture Process Map? How are they applicable?

SECTION- B (5×3=15M)
Answer any FIVE Questions

5.
a) Explain various Agile tools available.
b) What is Scrum? What is the need of Scrum?
c) Breif note on Quality Assurance Practices.
d) Distinguish Strategic Versus Tactic Agile.
e) What is Kaizen in Composite Agile.
f) What are Agile Challenges.
g) Describe Agile Enablers.
h) Explain The IIP-Iterative in the life cycle of agile.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS702: PYTHON PROGRAMMING (Elective-IV)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about Python Interpreter working and Syntax & Semantics

OR

b) Explain about Sequences and Dictionaries

2. a) Explain about Iterations and Comprehensions

OR

b) Explain about Exception Handling with example Program

3. a) Explain about Handling Multiple Clients in Socket programming

OR

b) Explain about Client side scripting and Server Side Scripting

4. a) Explain about Event handling with examples

OR

b) Explain about SQL Database interfaces with sqlite3.

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. Write short notes on

a) Control flow statements

b) Lambda expressions

c) Any 3 string functions

d) Regular expressions

e) CGI script

f) Parameter passing

g) tkinter

h) urllib

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS702: AJAX AND JSON (Elective-IV)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about The Ajax Request/Response Model and write Benefits of Ajax

OR

b) Write about arrays and objects and explain how to use JSON in java script.

2. a) Explain about To-Do List Application

OR

b) Explain how to save the data with Ajax

3. a) Explain how to improve the Code with a Document Fragment.

OR

b) Write about Exploring Local Storage in the Browser and Removing Items from Local Storage.

4. a) Explain about Dates and Date Formatting

OR

b) Explain about Exception handling with example program.

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. Write short notes on

a) Requirements for Ajax

b) XMLHttpRequest Object

c) To-Do Object

d) PHP Server script

e) substring(), split()

f) String searching methods

g) Converting string to date

h) Finally clause

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS702: PHP PROGRAMMING (Elective-IV)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about Control Structures in PHP

OR

b) Explain about Arrays and Array Functions

2. a) Explain about Interfaces and Inheritance of Interfaces

OR

b) Explain about Exception handling with example program.

3. a) Explain about PHP Form, form processing and Working with Form Data.

OR

b) Explain about Reading Data in web Pages and Performing Data validation.

4. a) Explain how to create database with table and aggregate queries in MySQL.

OR

b) Explain how to connect with database and update the database with PHP.

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. Write short notes on

a) Data types
b) Any 3 String functions
c) Cloning objects
d) Abstract classes
e) GET and POST
f) Cookies
g) SQL injections
h) Prepared Statements

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS703 COMPUTER VISION AND PATTERN RECOGNITION (Elective-V)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain Orthographic & Perspective Projection Image Formation Models.

(or)

b) Explain 3-D reconstruction framework, Auto-calibration

2. a) Determine the following Feature Extraction Techniques:
i) Line detectors ii) orientation histogram iii) SIFT

(or)

b) Explain Scale-Space Analysis- Image Pyramids and Gaussian derivative filters.

3. a) Explain design principles of pattern recognition system.

(or)

b) Define the mathematical foundation approaches which are required for pattern recognition.

4. a) What is Clustering ? Explain the pattren analysis through K-means and k-Mediods with suitable example.

(or)

b) Explain about ANN models with suitable example.

SECTION- B (5×3=15M)
Answer any FIVE Questions

5. a) What is Auto-calibration?
b) Define the term Rectification .
c) Gabor Filters
d) GlOH
e) Mean and covariance
f) Multivariate normal
g) Chi squared test.
h) Unsupervised learning

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS703 MACHINE LEARNING (Elective V)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about Supervised, Unsupervised Learning and Batch and Online Learning(15M)

(OR)

b) Overfitting the Training Data and Underfitting the Training Data. (15M)

2. a) Explain about Measuring Accuracy Using Cross-Validation. (15M)

(OR)

b) Explain the Random Patches and Random Subspaces. (15M)

3. a) Explain about Expressing Linear Perceptrons as Neurons. (15M)

(OR)

b) Explain about Training Feed-Forward Neural Networks. (15M)

4. a) Explain about Logging and Training the Logistic Regression Model. (15M)

(OR)

b) Explain about Building a Multilayer Model for MNIST in TensorFlow. (15M)

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) Types of Machine Learning Systems.

b) Training Data.

c) Confusion Matrix.

d) Voting classifier.

e) Linear neuron.

f) Gradient Descent.

g) TensorFlow.

h) Placeholder Tensor.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
PEC-CS703 BIG DATA ANALYTICS (Elective-V)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain the Characteristics of Big Data. How the data is different in Warehouse and in Hadoop

OR

b) Explain the building blocks of Hadoop with a neat Architecture.

2. a) What is Apache Spark and explain the Eco System of it. What are the main data structures used in Spark

OR

b) What is key-value pair. Write a Mapreduce program to count the number of words in a given text

3. a) Discuss any three machine learning algorithms which will use the features of MLlib in Spark.

OR

b) How do you join data from different sources in Mapreduce programming? Show with Matrix Multiplication example.

4. a) What are Resilient Distributed Dataset. Explain how to create pairs in RDDs and transformations that are carried in them.

OR

b) Explain Page Rank and Bloom Filter Algorithms.

SECTION B

5. ANSWER ANY FIVE **(5*3=15)**

a. What is Big Data and explain is importance and applications

b. Explain Spark components

c. Explain the working of Spark Architecture

d. Explain streaming in Spark

e. Explain the concept of Dimensionality Reduction

f. Explain Friends-of-Friends Algorithm

g. How to add schemas on RDD

h. Explain the features of Spark SQL

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
OEC-CS704 BUSINESS INTELLIGENCE AND VISUALIZATION (Open Elective II)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain the Business Intelligence Architecture. (8M)

   b) Explain the Role of Mathematical Models. (7M)

   (OR)

   c) Explain the development of Business Intelligence System. (9M)

   d) Explain the Ethics and Business Intelligence. (6M)

2. a) Explain the Visualization. (15M)

   (OR)

   b) Explain the interactive analysis and Ad Hoc Querying. (8M)

   c) Explain the Considerations of Knowledge Delivery. (7M)

3. a) Explain the Efficiency Measures. (15M)

   (OR)

   b) Explain the Pattern Matching. (15M)

4. a) Explain the business intelligence application. (15M)

   (OR)

   b) Explain the future of business intelligence. 15M)

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) Explain the effective and timely decisions of business intelligence?

   b) Explain the Dimensional Analysis?

   c) Explain the Cross efficiency analysis?

   d) Explain the Production Models?

   e) Explain the BI Search?

   f) Explain Parameterized Reports?

   g) Explain the Enabling factors in Business Intelligence Projects?

   h) Describe about the Emerging Technologies?

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
OEC-CS704 NATURAL LANGUAGE PROCESSING (Open Elective II)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)

Answer ALL Questions

1. a) what is tagging? Explain Hidden Markov model in detail with necessary diagrams.

(Or)

b)Explain in detail about Maximum Entropy Models with examples.

2. a) Explain about computational Phonology in detail.

(or)

b) What is Speech Synthesis, illustrate Automatic Speech Recognition with suitable examples.

3. a) Explain about Formal Grammars of English?

(or)

b) Explain about Features and Unification - Language and Complexity.

4. a) what is Lexical Semantics - Computational Lexical Semantics

(or)

b) Explain about Computational Discourse.

SECTION- B (5×3=15M)

Answer any FIVE Questions

5.

a) What are Regular Expressions and Automata.
b) What are N-grams explain.
c) Define Speech – Phonetics and - Speech Synthesis.
d) Define - Computational Phonology
e) What is - Statistical Parsing.
f) Define Language and Complexity. for a syntax.
g) What is Computational Lexical Semantics Explain.
h) Define Computational Discourse.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
OEC-CS704 ADVANCED DATABASES (Open Elective II)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about Database System Architectures. (15M)

(OR)

b) Explain about Design of Parallel Systems. (15M)

2. a) Explain about Active Databases. (15M)

(OR)

b) Explain about Spatial Databases. (15M)

3. a) Explain about Native XML Databases. (15M)

(OR)

b) Explain about Cloud Storage Architectures. (15M)

4. a) Explain about Mobile Transaction Models. (15M)

(OR)

b) Explain about Multimedia Databases. (15M)

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) I/O Parallelism

b) Commit Protocol

c) Taxonomy

d) Spatial Data Types

e) XML Schema

f) Geographic Information System

g) Localization

h) Concurrency Control

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
OEC-CS705 FOUNDATIONS OF DATA SCIENCE (Open Elective III)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about cleaning and sampling for modelling and validation. (15M)

(OR)

b) Explain about working with relational databases. (15M)

2. a) Explain about mapping problems to machine learning. (15M)

(OR)

b) Explain about Linear and logistic regression. (15M)

3. a) Explain about ordered and unordered factors. (15M)

(OR)

b) Explain about Binomial, Poisson, and Normal distributions. (15M)

4. a) Explain about documentation and deployment. (15M)

(OR)

b) Explain about exporting graph using graphics parameters in R Language. (15M)

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) Data Science Process

b) Stages in Data Science

c) Clustering

d) Memorization

e) Lists

f) Data distribution

g) Multivariate Data

h) Matrix Plots

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
OEC-CS705 BLOCKCHAIN TECHNOLOGY (Open Elective-III)
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Discuss the differences between centralised and decentralised systems. (15M)

Or

b) Explain Byzantine fault tolerant consensus methods. (15M)

2. a) Explain how Merkle tree helps in ensuring integrity of data over a blockchain. (15M)

Or

b) Explain the significance of digital signatures in a Blockchain (15M)

3. a) Explain bitcoin transaction life cycle. (15M)

Or

b) Explain the architecture of Hyperledger Fabric network (15M)

4. a) Give the applications of blockchain in financial service (15M)

Or

b) Give the applications of blockchain in healthcare.

SECTION- B (5×3=15M)

5. Answer any FIVE Questions

i) Proof of work.

j) Permissionless blockchain

k) Properties of a hash function

l) Genesis block.

m) UTXO.

n) What does a Miner do ?

o) Alternative coins.

p) Blockchain in IoT.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
IV BTech (CSE) VII Semester (2019-20AB)
OEC-CS705 COMPUTER FORENSICS (Open Elective III)
MODEL QUESTION PAPER

Time: 3 Hrs **Max Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. a) Explain about the Incidence Response Process. (15M)

(OR)

b) Explain about Resolution Preparing for Incident Response-1 (15M)

2. a) Explain about Establishing appropriate policies and procedures. (15M)

(OR)

b) Explain about Incident Declaration and Assembling the CSIRT (15M)

3. a) Explain about performing an In-depth live response. (15M)

(OR)

b) Explain about obtaining volatile data prior to forensic duplication. (15M)

4. a) Explain about creating a qualified forensic duplicate of a hard drive. (15M)

(OR)

b) Explain about reviewing image files with forensic suites. (15M)

SECTION- B (5×3=15M)

Answer any FIVE Questions

5. a) Traditional hack

b) Goals of Incident Response

c) Initial response phase

d) Response strategy

e) Volatile Data

f) Live response

g) Admissible evidence

h) Storage Layers