MA301C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSA) – CBCS Regulations-2020
(With effect from the academic year 2022-23)

MATHEMATICS III

(effective from the batch of students admitted from the academic year 2020-21)

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

- This course aims at providing the student to acquire the knowledge on the calculus of functions of complex variables.
- To understand power series and expansion of analytic function.
- To understand Laurent Series, poles, singular points, Residue theorem and its applications.
- The aim is to analyze the solutions of partial differential equations.
- To discuss the boundary value problems, one dimensional wave equation, heat equation and Laplace Equation.

UNIT I

Complex analysis - I: Analytical functions - Cauchy- Reimann equations – Construction of Analytic functions- Complex integration - Cauchy's theorem - Integral formula - Evaluation of integrals.

UNIT II

Complex analysis - II**:** Taylor's and Laurents' series - Transformations - Conformal mapping - Bilinear transformations - Transformation of 1/z, z^2, sin z and cos z.

UNIT III

Complex analysis - III: Singularities - Poles - Residues - Residue theorem – Contour integration- Evaluation of real integrals.

UNIT IV

Partial differential equations - I : Formation of differential equations - Classification - First order linear partial differential equations – Legranges' linear equation - Method of multipliers - first order non-linear partial differential equations - Charpits method.

UNIT V

Partial differential equations - II: Method of separation of variables - One dimensional wave equation - Heat equation – Laplace's equation.

Course Outcomes:

Upon successful completion of this course, the student should be able to

- Understand the analyticity of complex functions and conformal mappings.
- Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
- Describe basic properties of complex integration and having the ability to compute such integrals.
- Describe conformal mappings between various plane regions.

- Apply the concepts of Complex Analysis in many branches of Engineering, including the branches of hydrodynamics, thermodynamics, and particularly quantum mechanics.
- Compute the residue of a function and use the Residue Theory to evaluate a contour integral or an integral over the real line.
- Formulate/solve/classify the solutions of Partial differential equations.
- Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method.
- Apply Variables separable methods to solve boundary value problems.
- Find the solution of one dimensional wave equation, heat equation and Laplace equation.

Text/Reference Books:

1. Grewal B S, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.
2. Venkataraman M K, Engineering Mathematics, Vol. I & II, National Publishing Company, 1993.
3. Venkataraman M K, Engineering Mathematics, National Publishing Company, 1995.
4. Grewal B S, Engineering Mathematics, 13th Edition, Khanna Publications.
5. Kreyszig E, Advanced Engineering Mathematics, 8th edition, Wiley, 1998.

CA301C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSA) – CBCS Regulations-2020(With effect from the academic year 2022-23)

FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS

No.of Credits: 4 Instruction Hours/Week: 3L+1T

Course Objectives:

- To learn data models, conceptualize and depict a database system using ER diagram
- To understand the internal storage structures in a physical DB design
- To demonstrate the fundamental concepts, operation and function of different components of database systems.
- To describe the roles of transaction processing and concurrency control in a modern DBMS.
- To demonstrate key issues in the operation of a DBMS including query processing, security and integrity.
- To design and implement a database application.

UNIT-I

Introduction: Managing Data, File Systems versus a DBMS, Advantages of a DBMS, Storing data in a DBMS, Queries in a DBMS, Transactions, Structure of a DBMS. Introduction to Data base design: ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model. Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, querying relational data, Logical data base Design, Introduction to Views Destroying/ altering Tables and Views.

UNIT-II

Relational Algebra and Calculus: Relational Algebra , Relational calculus, Expressive Power of Algebra and calculus. SQL: Form of Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, NULL values , Complex Integrity Constraints in SQL, Triggers and Active Databases, Designing Active Databases

UNIT-III

Schema Refinement and Normal Forms: Introduction, Functional Dependencies, Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms, BCNF, Properties of Decompositions, Normalization, Schema Refinement in Data base Design, Multi valued Dependencies, FOURTH Normal Form, Join Dependencies, FIFTH Normal form,

UNIT-IV

Overview of Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-based Concurrency Control, Performance Locking, Transaction Support in SQL, Introduction to Crash Recovery. Concurrency Control: 2PL, Serializability and Recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks, Specialized Locking Techniques, Concurrency Control without Locking Crash Checkpointing, Recovering from a System Crash, Media Recovery, Interaction with Concurrency Control.

UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index data Structures, Comparison of File Organizations, Indexes and Performance Tuning. Indexing and Hashing: Intuitions for tree indexes, Indexed Sequential Access Method, B+

Trees: A Dynamic Index Structure, Search, Insert, Delete, Duplicates, B+ Trees in Practice, Static Hashing, Extendable Hashing, Linear Hashing, Extendible vs. Linear Hashing. Parallel and Distributed Databases.

Course Outcomes:

Upon successful completion of this course, the student should be able to

- Use relational algebra and relational calculus, to express database queries.
- Use SQL to interact with database management systems.
- Design appropriate database tables, using functional dependencies and normal forms.
- Implement a disk-oriented database storage manager with heap table and indexes.
- Understand, compare, and implement the major concurrency control algorithms.
- Implement database recovery algorithms and verify their correctness.
- Identify trade-offs among database systems techniques and contrast distributed/parallel alternatives for both on-line transaction processing and on-line analytical workloads.

Text Books:

1. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill, 2014.
2. C. J. Date, A. Kannan and S. Swamynathan, An Introduction to Database Systems, 8th edition, Pearson Education, 2006.

Reference Books:

1. Silberschatz A, Korth H F, and Sudarshan S, Database System Concepts, 6th edition, McGraw-Hill, Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems,Fourth Edition, Pearson/Addision wesley, 2007.
2. J D Ullman, H. Garcia-Molina and J. Widom, Database Systems: The Complete Book, Prentice-Hall, 2009.
3. Jeffrey A. Hoffer, Ramesh Venkataraman, Heikki Topi, Modern Database Management, 12th edition, Pearson, 2015.

CS303C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSA) – CBCS Regulations-
2020(With effect from the academic year 2022-23)

DISCRETE MATHEMATICAL STRUCTURES

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

This course is designed to

- Use mathematical reasoning in order to read, comprehend, and construct mathematical arguments and theorem proving techniques.
- Familiarize students with the basic concept of functions, basic set theory, countability and counting arguments.
- Present basic concepts of number theory and teach students how to apply the same to cryptography.
- Reinforce the method of recursion and use of structural induction.
- Introduce fundamental concepts of graph theory and present different graph models.
- Familiarize students with minimum spanning trees and shortest-path problems.

UNIT I

Logic, Prepositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Methods of Proof and Strategy.

UNIT II

Sets, Set Operations, Functions, Sequences and Summations, Introduction to Semigroups, Groups, Subgroups, Normal subgroups.
Relations and their properties, n-ary relations and their applications, Representing relations, Closures of relations, Equivalence relations, Partial orderings, Lattices.

UNIT III

Counting: Basics of Counting, Pigeonhole principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations.
Advanced Counting Techniques: Recurrence Relations, Solving Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-and-Exclusion and its Applications.
Number Theory and its Applications.

UNIT IV

Introduction to graphs, Graph terminology, Applications of some special graphs, Representation of graphs, Graph isomorphism.
Connectivity: Connectedness in undirected and directed graphs, Paths and Isomorphism, Construction of reliable communication networks, Euler path, Hamilton path, Chinese postman problem, Shortest path problems, Traveling salesman problem.

UNIT V

Planar graphs, Kuratowski's theorem, Graph coloring and applications.

Introduction to trees, Application of trees, Spanning trees, Applications of backtracking, Minimum spanning trees, Flows, Cuts, Max-flow Min-cut problem.

Course Outcomes

On successful completion of this course the students will be able to:

- Verify the correctness of an argument using propositional and predicate logic
- Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
- Solve problems involving recurrence relations and generating functions.
- Construct and analyze graph models for problems in different areas.
- Design and develop real time application using graph theory

Text Books:

1. Kenneth H Rosen, Discrete Mathematics and its Applications, 6th edition, McGraw-Hill Companies.
2. Mott J L, Kandel A, and Baker T P, Discrete Mathematics for Computer Scientists and Mathematicians, 2nd edition, PHI, 2004.

Reference Books:

1. Malik D S, Sen M K, Discrete Mathematical Structures: Theory and Applications, Thomson Course Technology, 2004.
2. Mott J L, Kandel A, and Baker T P, Discrete Mathematics for Computer Scientists and Mathematicians, 2nd edition, PHI, 2004.
3. Kolman B, Busby R C, Ross S C, and Rehman N, Discrete Mathematical Structures, 5th edition, Pearson Education, 2006.
4. Lipschutz S, Lipson M, Discrete Mathematics, 2nd edition, TMH, 2006.

CA302C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSA) – CBCS Regulations-
2020(With effect from the academic year 2022-23)

INTRODUCTION TO ARTIFICIAL INTELLIGENCE

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

This course is designed to

- To learn Foundations of Artificial Intelligence
- To understand the Search in Complex Environments and Adversarial Search and Games.
- To represent knowledge using different logics.
- To describe Uncertainty using different probability models.
- To demonstrate different models on Probabilistic Reasoning over Time.

UNIT-1

The Foundations of Artificial Intelligence, History of Artificial Intelligence, State of the Art, Risks and Benefits of AI
Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality. The Nature of Environments, The Structure of Agents,
Solving Problems by Searching: Problem Solving Agents, Example Problems, Search Algorithms, Uninformed Search Strategies, Informed (Heuristic) Search Strategies, Heuristic Functions.

UNIT 2

Search in Complex Environments**:** Local Search and Optimization Problems, Local Search in Continuous Spaces, Search with Nondeterministic Actions, Search in Partially Observable Environments, Online Search Agents and Unknown Environments
Constraint Satisfaction Problems**:** Defining Constraint Satisfaction Problems, Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.
Adversarial Search and Games**:** Game Theory, Optimal Decisions in Games, Heuristic Alpha–Beta Tree Search, Monte Carlo Tree Search, Stochastic Games, Partially Observable Games, Limitations of Game Search Algorithms

UNIT 3

Knowledge Representation**:**Semantic Nets, Frames, Propositional Logic, First-Order Logic: Representation Revisited, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic,Inference in First-Order Logic**:** Propositional vs. First-Order Inference, Unification and First-Order Inference, Forward Chaining, Backward Chaining, Resolution

UNIT 4

Quantifying Uncertainty**:** Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use, Naive Bayes Models

Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Exact Inference in Bayesian Networks, Approximate Inference for Bayesian Networks, Causal Networks.

UNIT-5

Probabilistic Reasoning over Time**:** Inference in Temporal Models, Hidden Markov Models, Kalman Filters, Dynamic Bayesian Networks, Simple Decisions: Combining Beliefs and Desires under Uncertainty, The Basis of Utility Theory, Utility Functions, Multi attribute Utility Functions, Decision Networks, The Value of Information, Unknown Preferences

Course Outcomes

Upon successful completion of this course, the student shall be able to:

1) Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
2) Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
3) Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents.
4) Demonstrate proficiency in applying scientifc method to models of machine learning.

Text Books:

1. S.J. Russel and P.Norvig , "Artificial Intelligence-A Modern Approacch", Pearson 4th Edition, 2020, ISBN 978-0134610993.
2. P.H. Winston, "Artificial Intelligence ", Pearson Education, 3rd Edition, 2002/Latest Edition

Reference:

1. E.Rich and K.Knight, "Artificial Intelligence ", Mc GrawHill Education, 3rd Edition 2017, Latest Edition
2. N.J. Nilsson, "Principles of Artificial Intelligence", Narosa Publ. House, 2002/Latest Edition.
3. L.Luger, "Artificial Intelligence: Structures and Strategies for Complex Problem Solving", Pearson Education, 5th edition 2008/Latest Edition.
4. E.Kumar, "Artificial Intelligence", Dreamtecch Press, 2020/Latest Edition

CA303C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSA) – CBCS Regulations-2020(With effect from the academic year 2022-23)

ELEMENTS OF ELECTRONICS AND DIGITAL LOGIC DESIGN

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

This course is designed to

- To learn Basics of Diodes and Transistors
- To understand the Amplifier and feedback concepts.
- To represent numbers using different methods.
- Understand the fundamental concepts and techniques used in digital electronics.
- Explain the working mechanism and design guidelines of different combinational and sequential circuits.

UNIT I

Basic Electronic Devices: Semiconductor fundamentals, Principle of operation and V-I Characteristics of Diodes (PN, Zener, Photo, LED, Laser Diode), Transistors (BJT, JFET, MOSFET).

Basic Electronics Instruments: Block diagram and principle of operation of - Digital Multi-meter, Function generator, Cathode Ray Oscilloscope (CRO).

UNIT II

Transistor Amplifiers: Concept of an amplifier -Gain, Input and Output impedance, Frequency response, Biasing of a transistor, CB, CE and CC Configurations and their characteristics, Multi stage Amplifiers.

Concept of feedback: Negative and Positive feedback, Advantages and limitations, Oscillator Operation, RC phase shift oscillator and Crystal oscillator.

UNIT III

Number Representation, Signed and Unsigned, Code Conversion, Review of Boolean Algebra and DeMorgan's Theorem, Sum-of-Product and Product-of-Sum forms, Canonical forms, Karnaugh maps up to 6 variables.

UNIT IV

MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half andFull Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU

UNIT V

Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, PseudoRandom Binary Sequence generator, Clock generation

Course Outcomes

Upon successful completion of this course, the student shall be able to:

1) Understand non linear behavior of the diodes and transistors.
2) Apply basic principles for amplification and stabilization.
3) Demonstrate minimization of logical functions using K maps

4) Be able to design and analyze combinational logic circuits.
5) Be able to design and analyze sequential logic circuits.

Text Books:

1.Bogart Jr. T F, Beasley J S, and Rico G, Electronic Devices and Circuits, 6th edition,
2. Pearson Education, 2006.Malvino A, and Bates D J, Electronic Principles, 7th edition, Tata McGraw-Hill,2007.
3.P. Jain, "Modern digital Electronics", Tata McGraw Hill, 4th edition, 2010.
4.Douglas Perry, "VHDL: Programming by Example", Tata McGraw Hill, 4th edition.
5.Brown S, and Vranesic Z, Fundamentals of Digital Logic with VHDL Design, 3rd edition, McGraw Hill, 2012.
6.Kinney L L, and Roth Jr. C H, Fundamentals of Logic Design, 7th edition, CengageLearning, 2015

CA304L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS LABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the course, "Database Management Systems".

CA305L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

ELECTRONICS AND DIGITAL SYSTEM DESIGNLABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the courses, "Elements of Electronics and Communication Engineering".

CS309S

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSA) – CBCS Regulations-
2020(With effect from the academic year 2022-23)

BASIC PYTHON PROGRAMMING

No.of Credits: 2 Instruction Hours/Week: 1T+2P

Course Objectives:

The course is designed to:

- Python syntax and semantics and be fluent in the use of Python flow control and functions.
- the concepts of Object-Oriented Programming as used in Python.
- various problems solving approaches of computer science in various Domains.
- various data structures like lists and dictionaries using python.
- introduce Python third- Party Tools for various domains.

UNIT I

Introduction to Python Programming: Features and History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.

Decision Control Statements: Introduction to Decision Control Statements, Selection/ Conditional Branching Statements, Basic Loop Structures/Iterative Statements, Nested Loops, The break, continue and pass Statement, The else Statement used with Loops.

UNIT II

Functions and Modules: Introduction, Function Definition, Function Call, Variable Scope and Lifetime, The return statement, More on Defining Functions, Lambda Functions or Anonymous Functions, Documentation Strings, Good Programming Practices, Recursive Functions, Modules, Packages in Python, Standard Library modules, Globals(), Locals(), and Reload(), Function Redefinition.

Python Strings Revisited: Introduction, Concatenating, Appending, and Multiplying Strings, Strings are Immutable, String Formatting Operator, Built-in String Methods and Functions, Slice Operation, ord() and chr() Functions, in and not in operators, Comparing Strings, Iterating String, The String Module, Regular Expressions, Metacharacters in Regular Expression.

UNIT III

File Handling: Introduction, File Path, Types of Files, Opening and Closing Files, Reading and Writing Files, File Positions, Renaming and Deleting Files, Directory Methods.

Data Structures: Sequence, Lists, Functional Programming, Tuple, Sets, Dictionaries.

Classes and Objects: Introduction, Defining Classes, Creating Objects, Data Abstraction, Class Method and self Argument, The _init_() Method, Class Variables and Object Variables, The _del_() Method, Other Special Methods, Public and Private Data Members, Private Methods, Calling a Class Method from Another Class Method, Built-in Functions to Check, Get, Set, and Delete Class Attributes, Built-in Class Attributes, Garbage Collection, Class Methods, Static Methods.

UNIT IV

Inheritance: Introduction, Inheriting Classes in Python, Types of Inheritance, Composition or Containership or Complex Objects, Abstract Classes and Interfaces, Metaclass.

Operator Overloading: Introduction, Implementing Operator Overloading, Reverse Adding, Overriding _getitem_() and _setitem_() Methods, Overriding the in Operator, Overloading Miscellaneous Functions, Overriding the _call_() Method.

Error and Exception Handling: Introduction to Errors and Exceptions, Handling Exceptions, Multiple Except Blocks, Multiple Exceptions in a Single Block, Except Block Without Exception, The else Clause, Raising Exceptions, Instantiating Exceptions, Handling Exceptions in Invoked Functions, Built-in and User-defined Exceptions, The finally Block, Pre-defined Clean–up Action, Re-raising Exception, Assertions in Python, Multi-threading.

UNIT V

Survey of The Most Common 3rd Party Packages: Requests, Numpy/Scipy, Matplotlib/ Pyplot, Pandas, Pillow, Flask/Django/Twisted, Pep8, Scikit-Learn/Nltk, Stanford-Corenlp, Bcrypt, Beautiful Soup, and More.

GUI Design with Tkinter: Button, Canvas, Check Button, Entry, Frame, Label, List Box, Menu, Menu Button, Message, Radio Button, Scale, Scrollbar, Text Graphics with Turtle: Motion Control, Pen, Colour, Fill, Multiple Turtles, Reset and Clear.

Course Outcomes

Having successfully completed this course the students will be able to:

- understand the structure, syntax, and semantics of the Python language.
- interpret the concepts of Object-Oriented Programming as used in Python.
- demonstrate proficiency in handling Strings and File Systems.
- implement desktop/Web-based applications using the Python programming language.

Text Books:

1. Reema Thareja, Python Programming using problem solving approach, First Edition, Oxford University Press, 2017.
2. Mark Lutz, Learning Python, Fifth Edition, O'Rielly, 2016.

Reference Books:

1. Mark Lutz, Programming Python, Fourth Edition, O'Reilly, 2010.
2. John V.Guttag, Introduction to Computation and Programming Using Python with Application to Understanding, PHI.
3. Allen Downey, Think Python: How to think like a Computer Scientist, Green Tea Press.
4. Paul Barry, Head First Python: A Brain-Friendly Guide, Second Edition, O'Reilly.
5. The Python Standard Library, Python 3.6.5 documentation (Web Resource) https://docs.python.org/3/library/.

PA310A

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSA) – CBCS Regulations-
2020(With effect from the academic year 2022-23)

CONSTITUTION OF INDIA

No.of Credits: Nil Instruction Hours/Week: 2

Course Objectives:

The objective of the course is to impart to the students

- understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT I

History and philosophy of the Indian Constitution:
History -Drafting Committee, (Composition & Working) - Preamble - Salient Features

UNIT II

Contours of Constitutional Rights & Duties: Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

UNIT III

Organs of Governance: Parliament – Composition - Qualifications and Disqualifications - Powers and Functions, Executive President – Governor - Council of Ministers - Judiciary, Appointment and Transfer of Judges, Qualifications - Powers and Functions.

UNIT IV

Local Administration:
District's Administration Head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: ZilaPachayat. Elected officials and their roles, CEO ZilaPachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

UNIT V

Election Commission: Election Commission: Role and Functioning - Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning.
Institute and Bodies for the welfare of SC/ST/OBC and women.

Course Outcomes

Having successfully completed this course the students will be able to know:

- the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- the passage of the Hindu Code Bill of 1956.

Text/Reference Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, Lexis Nexis, 7th Edition, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

CS401C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020(With effect from the academic year 2022-23)

SIGNALS AND SYSTEMS

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

The objective of the course is to impart to the students

- To describe various signals and systems mathematically and understand how to perform mathematical operations on them.
- Also familiar with commonly used signals such as the unit step, ramp, and impulse function, sinusoidal signals, complex exponentials and their operations.
- Analysis using Fourier series and Fourier transform for a given signal.

UNIT-I

Signal Analysis : Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Exponential and sinusoidal signals, continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components Periodicity of discrete time using complex exponential signal, Concepts of Impulse function, Unit step function, Signum function. properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.

UNIT-II

Signal Transmission Through Linear Systems : Discrete time signals and sequences, linear shift invariant systems,(LTI) stability and causality, linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems Linear system, impulse response, Response of a linear system, Linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT-III

Convolution and Correlation of Signals : Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT-IV

Laplace Transforms : Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT-V

Z–Transforms : Concept of Z- Transform of a discrete sequence. Distinction between Laplace,

Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.-Transfer function-BIBO stability –System response to standard signals-solution of difference equations with initial conditions.

Course Outcomes

Having successfully completed this course the students will be able to know:

- Understand and analyse the mathematical modelling of various signals and systems.
- Analyse continuous and discrete time linear time invariant systems
- Evaluate and analyse various signals in terms of Fourier and Laplace transform.
- Evaluate and analyse the reconstruction of signals.

Text Books :

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

References:

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Network Analysis - M.E. Van Valkenburg, PHI Publications, 3rd Edn., 2000.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004.

CS402C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020(With effect from the academic year 2022-23)

OPERATING SYSTEMS

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

The course is designed to

• provide knowledge about the services rendered by operating systems
• present detail discussion on processes, threads and scheduling algorithms.
• discuss various file-system design and implementation issues
• provide good insight on various memory management techniques
• expose the students with different techniques of handling of deadlocks
• familiarize students the basics of Linux system and perform administrative tasks on Linux servers
• discuss how the protection domains help to achieve security in a system

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, Operating systems operations, protection and security, Computing environments, OpenSource Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, operating system structure, operating
system debugging, System Boot.

UNIT II

Process Concept: Process scheduling, Operations on processes, Interprocess communication,
Communication in client server systems.

Multithreaded Programming: Multitheading models, Thread libraries, Threading issues, Examples.

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Thread scheduling, Examples.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy
waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.

UNIT III

Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Examples.

Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation,
Examples.

4

UNIT IV

Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection and recovery, Deadlock avoidance, Deadlock prevention.

File Systems: Files, Directories, File system implementation, management and optimization.

Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation.

UNIT V

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.
System Security: Introduction, Program threats, System and network threats, Cryptography
for security, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer security classification.
Case Studies: Linux, Microsoft Windows 7.

Course Outcomes

By the end of this course students will be able to:
1. Recognize how the applications interact with the operating system as the later working as intermediary program between the machine and the application.
2. Understand how operating system manages resources such as processors, memory and I/O.
3. Demonstrate knowledge and understanding of how concurrency in OS is handled.
4. Understand the techniques used to implement the process manager
5. Implement various memory management and demand paging techniques.
6. Comprehend virtual memory abstractions in operating systems
7. Design and develop file system interface.
8. Understand various schemes available for achieving system protection and system security

Text Books:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2013.
2. Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (for Interprocess Communication and File systems.)

Reference Books:

1. Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.
2. Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.
3. Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009
4. Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

HS403C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020

(With effect from the academic year 2022-23)

MANAGERIAL ECONOMICS AND ACCOUNTANCY

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

The course is designed to

- To understand the concepts of managerial economics and financial analysis this helps in optimal decision making in business environment.
- To be familiar with demand concepts, types of methods or techniques of demand those are used by the entrepreneur or producer.
- To have a thorough knowledge on the production theories and cost while dealing with the production and factors of production.
- To introduce the concepts of cost and significance, limitation of Break even analysis.
- To provide the optimal decisions acquiring the knowledge on financial accounting and its analysis

UNIT I

Introduction to Engineering Economics, Fundamental concepts, Time value of money, Cash flow and Time Diagrams, choosing between alternative investment proposals, Methods of Economic analysis (pay back, ARR, NPV, IRR and B/C ratio), The effect of borrowing on investment, Equity vs Debt Financing, concept of leverage, Income tax leverage.

UNIT II

Depreciation and methods of calculating depreciation (straight line, sum of the years digit method, Declining balance method, Annuity method, Sinking fund method), National income accounting Methods of estimation, Various concepts of National Income, Significance of National income Estimation and its limitations.

UNIT III

Inflation: Definition, Process and Theories of inflation and Measure of control. New Economic Policy 1991(Industrial Policy, Trade Policy, Fiscal Policy), Impact on Industry.

UNIT IV

Accounting Principles, procedure, Double entry system, Journal, ledger, Trial balance, Cashbook, preparation of Trading and Profit and Loss account, Balance sheet.

UNIT V

Cost Accounting: Introduction, Classification of costs, Methods of costing, Techniques of costing, Cost sheet and preparation of cost sheet, Break-even Analysis, Meaning and its application, Limitation.

Course Outcomes:

On successful completion of this course the students will be able to

- Understand Macro Economic environment of the business and its impact on enterprise.
- Identify various cost elements of the product and its effect on decision making.
- Understand the concepts of financial management and smart investment.
- Prepare the Accounting records and interpret the data for Managerial Decisions.

Text/Reference Books:

1. Henry Malcom Steiner, Engineering Economics Principles, 2nd Edition, McGraw Hill Education, 1996.
2. Dewett. K.K., Modern Economic Theory, Sultan Chand and Co., 2006.
3. A.N. Agarwal, Indian Economy, Wiley Eastern Limited, New Delhi.
4. Jain and Narang, Accounting Part-I, Kalyani Publishers, 2011.
5. Arora, M.N. Cost Accounting: Principles and Practice, 12th Edition, Vikas Publication, 2012.

CS404C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020
(With effect from the academic year 2022-23)

COMPUTER ORIENTED NUMERICAL METHODS

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives

The course is designed to

- Obtain an intuitive and working understanding of numerical methods for the basic problems of numerical analysis.
- Gain experience in the implementation of numerical methods using a computer.
- Find roots using bisection, linear interpolation, Secant and/or Newton's methods
- Demonstrate understanding and ability to write code for Jacobi and Gauss-Seidel iteration method
- Demonstrate understanding and ability to write code for Trapezoid rule, Simpson's rule, and Newton-Cotes

UNIT I

Errors in Numerical Calculations: Truncation and Round-off errors, Effect of errors in data; Closed form solution versus Iterative methods.
Roots of Nonlinear Equations: Bisection, False position and, Newton-Raphson methods.

UNIT II

Iterative Solution of Liner Equations - Jacobi iteration, Gauss-Seidel and Relaxation methods; Convergence of iteration methods.

UNIT III

Interpolation - Lagrange polynomials, Newton's difference formula, Cubic splines, and Two dimensional interpolation.

UNIT IV

Numerical Differentiation - Differentiating continuous and tabulated functions, Difference tables and Richardson extrapolation. Numerical integration - Trapezoidal, Simpson's 1/3 and Simpson's 3/8 Rules.

UNIT V

Numerical Solution of Ordinary Differential Equations - Taylor's Series, Euler's, Runge-Kutta methods.

Course Outcomes:

On successful completion of this course the students will be able to

- Obtain an intuitive and working understanding of numerical methods for the basic problems of numerical analysis.
- Gain experience in the implementation of numerical methods using a computer.
- Trace error in these methods and need to analyze and predict it.
- Provide knowledge of various significant and fundamental concepts to inculcate in the students an adequate understanding of the application of Statistical Methods.
- Demonstrate the concepts of numerical methods used for different applications

Text Books:

1. Schilling R J, and Harries S L, Applied Numerical Methods for Engineers Using MATLAB and C, Thomson Brooks/Cole, 2006.

Reference Books:

1. Chapra S C, Applied Numerical Methods with MATLAB for Engineers and Scientists, 2nd edition, Tata McGraw-Hill, 2007.
2. Gerald C F, and Wheatley P O, Applied Numerical Analysis, 6th edition, Pearson Education Asia, 2002.
3. Niyogi P, Numerical Analysis and Algorithms, Tata McGraw Hill, 2003.
4. Heath M T, Scientific Computing: An Introductory Survey, McGraw-Hill, 1997.

CS405C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020
(With effect from the academic year 2022-23)

COMPUTER ORGANIZATION

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives

The course is designed to

- make the students understand the basic structure and operations of various functional units of a digital computer.
- familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- Make the stdents understand how to design processing unit using hardwired control and microprogrammed control approaches.
- familiarize the students with hierarchical memory system.
- expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I

Structure of Computers: Introduction, Performance, Memory addressing and Operations, Instructions and Instruction sequencing, Addressing modes, Basic l/0 operations, Pushdown stacks, Subroutines, Encoding of machine instructions, Brief description and functional classification of IA-32 Pentium instruction set

UNIT II

Basic Processing Unit: Fundamental concepts, Single and Multiple bus organization, Hardwired control, Multiprogrammed control – Microinstructions, Microprogram sequencing, Wide-branch addressing, Microinstructions with next-address field, Prefetching microinstructions.

Arithmetic: Multiplication – Booth algorithm; Integer division, Floating-Point Addition and Subtraction.

UNIT III

The memory System: Basic concepts, RAM and ROM Memories and their internal organization, Cache Memories - Mapping functions, Replacement algorithms; Performance Considerations, Virtual Memories, Secondary Storage.

UNIT IV

Input/ Output Organization: Accessing l/O devices; Interrupts –Enabling and disabling, Handling multiple devices; Direct Memory Access - Bus Arbitration; Buses – Synchronous and Asynchronous; Interface circuits – Parallel port, Serial port

UNIT V

Pipelining: Basic concepts, Data hazards, Instruction hazards, Influence on instruction sets, Data path and control considerations, Superscalar operation.
Processor Families: The ARM family, The Motorola 680x0 and Coldfire families, The IA-32 family.

Course Outcomes:

On successful completion of this course the students will be able to

- Identify the basic structure and functional units of a digital computer.
- Analyze the effect of addressing modes on the execution time of a program.
- Design processing unit using the concepts of hardwired control or microprogrammed control.
- Select appropriate interfacing standards for I/O devices.
- Identify the roles of various functional units of a computer in instruction execution.
- Understand memory hierarchy and its impact on computer cost/performance.
- Understand the advantage of instruction level parallelism and pipelining for high performance processor design.

Text Books

1. Hamacher C, Vranesic Z, and Zaky S, Computer Organization, 5th edition, McGraw-Hill.

Reference Books

1. Heuring V P, and Jordan H F, Computer systems Design and Architecture Addison-Wesley.
2. Carpinelli J D, Computer System Organization and Architecture. Addison-Wesley 2001.
3. Mano M M, Computer system Architecture, 4th edition, Pearson Education Asian 2002.

CS406C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020
(With effect from the academic year 2022-23)

DESIGN AND ANALYSIS OF ALGORITHMS

No.of Credits: 3 Instruction Hours/Week: 3

Course Objectives:

- To understand how to design an algorithm for the given problem.
- To analyze the complexity of an algorithm in terms of time and space.
- To get better insight on different strategies of algorithm design.

UNIT-I

Introduction: What is an Algorithm?, Algorithm Specification, Performance Analysis - Space Complexity, Time Complexity, Amortized Complexity, Asymptotic Notation (O, Ω, Θ), Practical Complexities, Performance Measurement, Randomized Algorithms: An Informal Description, Identifying the Repeated Element, Primality Testing, Advantages and Disadvantages.

Sets and Disjoint Set Union: Introduction, Union and Find Operations.

UNIT-II

Divide-and-Conquer: General Method, Defective Chess Board, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quicksort, Selection, Strassen's Matrix Multiplication, Convex Hull.

UNIT-III

The Greedy Method: The General Method, Container Loading, Knapsack Problem, Tree Vertex Splitting, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single-Source Shortest Paths.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected Components and Spanning Trees, Biconnected Components and DFS.

UNIT-IV

Dynamic Programming: The General Method, Multistage Graphs, All Pairs Shortest Paths, Single-Source Shortest Paths: General Weights, Optimal Binary Search Trees, String Editing, 0/1-Knapsack, Reliability Design, The Traveling Salesperson Problem, Flow Shop Scheduling.

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

UNIT-V

Branch-and-Bound: The Method, 0/1 Knapsack Problem, Traveling Salesperson, Efficiency Considerations.

NP-Hard and NP-Complete Problems: Basic Concepts, Cook's Theorem, NP-Hard Graph Problems, NP-Hard Scheduling Problems.

PRAM Algorithms: Introduction, Computational Model, Fundamental Techniques and Algorithms, Selection.

Course Outcomes:

Upon successful completion of this course, the student should be able to

- Develop systematically an algorithm for solving a problem
- Analyze the time and space complexity of the given algorithm
- Identify algorithm design methodology to solve problems.
- Distinguish between P and NP classes of problems

Text Books:

1. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, 2nd edition, Universities Press, 2008.
2. Cormen T H, Leiserson C E, Rivest R L, and Stein C, Introduction to Algorithms, 3rd edition, Prentice-Hall of India, 2009.

Reference Books:

1. Levitin A, Introduction to the Design and Analysis of Algorithms, 3rd edition, Pearson Education, 2012.
2. Goodrich M T, Tamassia R, Algorithm Design, Wiley, 2008.
3. Skiena S S, The Algorithm Design Manual, 2nd edition, Springer, 2012.
4. Heineman G T, Pollice G, Selkow S, Algorithms in a Nutshell, 2nd edition, O'Reilly, 2016.
5. Dave P H, and Dave H B, Design and Analysis of Algorithms, 2nd edition, Pearson Education, 2008.

CS407L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020

(With effect from the academic year 2022-23)

ARTIFICIAL INTELLIGENCE LABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the course "Artificial intelligence."

CS408L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020

(With effect from the academic year 2022-23)

OPERATING SYSTEMS AND ALGORITHMS LABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the courses, "Operating systems and Design of Algorithms".

CS409S

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSA) – CBCS Regulations-2020
(With effect from the academic year 2022-23)

BASIC WEB DESIGNING

No.of Credits: 2 Instruction Hours/Week: 1T+2P

Course Objectives:

The objectives of this course is to acquire knowledge on the

- Web related terminology and how does a website work.
- Web standards and W3C elements
- Responsive Web Designing
- Client-side Scripting Languages (Front End)
- Domains and Hosting

UNIT I

Introduction to Web and Web Design Principles:

Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Web pages, Website, Web browsers and Web servers and Web protocols. Basic principles involved in developing a web site, Planning process, Five Golden rules of web designing, Designing navigation bar, Page design, Home Page Layout, Design concept.

UNIT II

Introduction to HTML:

What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags. Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT III

Introduction to Cascading Style Sheets:

Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model (Introduction, Border properties, Padding Properties, Margin properties), CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Color, Creating page Layout and Site Designs.

UNIT IV

Introduction to Java Script:

What is Java Script? Basics of Java Script: Variables, functions, and Operators, select HTML elements with Java Script, Java Script Events and Event Handlers, Regular expressions and pattern matching in Java Script. Form validation using Java Script.

UNIT V

Introduction to Web Publishing or Hosting:

Creating the Web Site, Saving the site, Working on the web site, Creating web site structure, Creating Titles for web pages, Themes-Publishing web sites. Case study: Web publishing and hosting using Heroku cloud platform (https://www.heroku.com/).

Course Outcomes

Having successfully completed this course the students will be able to:

- describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies.
- create and publish advanced web pages with the help of HTML frames, scripting languages, and CSS.
- design forms for thick clients using JavaScript with interactive responsiveness and validations.
- design, host and publish websites in various domains.

Text Books:

1. Kogent Learning Solutions Inc., HTML 5 in simple steps, Dreamtech Press.
2. A beginner's guide to HTML, NCSA, 14th May 2003.
3. Murray, Tom/Lynchburg, Creating a Web Page and Web Site, College, 2002.

Reference Books:

1. Web Designing and Architecture-Educational Technology Centre, University of Buffalo.
2. Steven M Schafer, HTML, XHTML, CSS and JavaScript, Wiley India.
3. Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design, Wiley India.
4. Kogent Learning, Web Technologies: HTML, JavaScript, Wiley India.

CSHN 01

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

B.Tech (Honors in CSA) – CBCS Regulations-2020

DISTRIBUTED DATABASES

No.of Credits: 4 Instruction Hours/Week: 3L+1T

Course Objectives:

- To expose the need for distributed database technology to confront with the deficiencies of the centralized database systems.
- To introduce basic principles and implementation techniques of distributed database systems.
- To familiarize students with the principles and knowledge of parallel databases.

UNIT I

Introduction: What Is a Distributed Database System?, History of Distributed DBMS, Data Delivery Alternatives, Promises of Distributed DBMSs, Design Issues, Distributed DBMS Architectures.

Distributed and Parallel Database Design: Data Fragmentation, Allocation, Combined Approaches, Adaptive Approaches, Data Directory.

Distributed Data Control: View Management, Access Control, Semantic Integrity Control.

UNIT II

Distributed Query Processing: Overview, Data Localization, Join Ordering in Distributed Queries, Distributed Cost Model, Distributed Query Optimization, Adaptive Query Processing.

Distributed Transaction Processing: Background and Terminology, Distributed Concurrency Control, Distributed Concurrency Control Using Snapshot Isolation, Distributed DBMS Reliability, Modern Approaches to Scaling Out Transaction Management.

UNIT III

Data Replication: Consistency of Replicated Databases, Update Management Strategies, Replication Protocols, Group Communication, Replication and Failures.

Database Integration - Multidatabase Systems: Database Integration, Multidatabase Query Processing.

Parallel Database Systems: Objectives, Parallel Architectures, Data Placement, Parallel Query Processing, Load Balancing, Fault-Tolerance, Database Clusters.

UNIT IV

Peer-to-Peer Data Management: Infrastructure, Schema Mapping in P2P Systems, Querying Over P2P Systems, Replica Consistency, Blockchain.

Big Data Processing: Distributed Storage Systems, Big Data Processing Frameworks, Stream Data Management, Graph Analytics Platforms, Data Lakes.

UNIT V

NoSQL, NewSQL, and Polystores: Motivations for NoSQL, Key-Value Stores, Document Stores, Wide Column Stores, Graph DBMSs, Hybrid Data Stores, Polystores.

Web Data Management: Web Graph Management, Web Search, Web Querying, Question Answering Systems, Searching and Querying the Hidden Web, Web Data Integration.

Course Outcomes:
After completion of the course the students will be able to

- Design and implement distributed databases.
- Handle query processing in a distributed database system.
- Comprehend transaction management and analyze various approaches to concurrency control in distributed databases.
- Design and implement various algorithms and techniques for deadlock and recovery in distributed databases.

Text Books:

1. M. Tamer Ozsu and Patrick Valduriez, “Principles of Distributed Database Systems”, Fourth Edition, Springer, 2020.

Reference Books:

1. Stefano Ceri and Giuseppe Pelagatti, Distributed Databases: Principles and Systems, McGraw Hill Education, 2017.
2. Saeed K. Rahimi and Frank S. Haug, Distributed Database Management Systems: A Practical Approach, Wiley.
3. Chhanda Ray, Distributed Database Systems, First Edition, Pearson Education India.
4. Sachin Deshpande, Distributed Databases, Dreamtech Press.
5. David Bell and Jane Grimson, Distributed Database Systems, First Edition, Addison-Wesley, 1992.
6. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: Database Systems: The Complete Book, Second Edition, Pearson Education.

CSMN 01

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

B.Tech (Minor in CSA) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

DATA STRUCTURES

No.of Credits: 4 Instruction Hours/Week: 3L+1T

Course Objectives:

- Develop skills to design and analyze linear and nonlinear data structures.
- Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
- Develop recursive algorithms as they apply to trees and graphs.
- Strengthen the ability to identify and apply the suitable data structure for the given real world problem.
- Understand the various techniques of sorting and searching.

UNIT I

Introduction: Data types/Objects/Structures, Abstract definition of Data Structures, Overview of linear and nonlinear data structures, Analysis of algorithms, Algorithm specification, Asymptotic notation, Time-Space trade-off, Searching: Linear, Binary and Fibonacci search and their complexity analysis.

Arrays: Definition, Multidimensional arrays, Pointer arrays, Representation of arrays – Row major and Column major orders, Application of arrays – Polynomials, Sparse matrices representation.

UNIT II

Stacks and Queues: Introduction, ADT, Array Representation, Operations and Applications of Stacks - Evaluation of expressions, Code generation for stack machines, Implementation of recursion, Factorial calculation and Towers of Hanoi; Circular Queue, Priority Queue, Double ended queue, Applications of Queues - Simulation, CPU Scheduling; Multiple stacks and queues.

UNIT III

Linked Lists: Single linked lists and chains, Circular linked list, Doubly linked list, Circular doubly linked list, Complexity analysis of the same, Linked representation of Stacks and Queues, Applications of linked lists - Polynomial representation, Sparse matrix multiplication, Dynamic storage management; Generalized list representation, Recursive algorithms for lists, Recursive lists.

UNIT IV

Trees: Basic tree terminologies, Binary Trees – Definition, Properties, ADT, Representations, Operations and Applications; Binary Search Trees, Heap Trees, Threaded binary trees, Height balanced trees – AVL Trees, Red black tree, Splay tree Their operations and complexity analysis.

UNIT V

Sorting Techniques: Insertion sort, Selection sort, Bubble sort, Quick Sort, Radix sort, Merge sort, External sort – Introduction, K-way Merge sort.

Graphs: Basic terminologies, Representations, ADT, Operations on graphs – DFS, BFS, Spanning Trees, Biconnected components, Minimum cost spanning trees.

Course Outcomes:

After completion of the course the students will be able to

- Choose appropriate data structure for the specified problem definition.
- Implement linear and non-linear data structures viz. stacks, queues, linked list, trees, graphs.
- Apply the concept of trees and graph data structures for the real world problems.
- Comprehend the implementation of sorting and searching algorithms.

Text Books:

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structures", Computer Science Press.
2. Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Fundamentals of Data Structures in C++, Universities Press, Second Edition.
3. Debasis Samanta, Classic Data Structures, Second Edition, Prentice Hall of India.

REFERENCES:

1. Aaron M. Tenenbaum Yedidyah Langsam. Moshe J. Augenstein, "Data Structures using C and C++", PHI Learning Private Limited.
2. Jean Paul Tremblay and Paul G Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill.
3. R. Kruse et.al, "Data Structures and Program Design in C", Pearson Education.