RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF TECHNOLOGY (B.TECH.) DEGREE COURSE
SEMESTER: FOURTH(C.B.C.S.)
BRANCH: COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)
Subject Name: Discrete Mathematics and Graph Theory
Subject Code: BTECH_CSEDS-401T

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
3Hrs (Theory)	3	1	4	30	70	100

Course Objective:

1	A primary objective is to provide a bridge for the student from lower-division mathematics courses to upper-division mathematics.
2	Obtain skills and logical perspectives in introductory (core) courses that prepare them for subsequent courses
3	Develop proficiency with the techniques of mathematics and/or computer science, the ability to evaluate logical arguments, and the ability to apply mathematical methodologies to solving real world problems.

Course Outcome:

At the end of this course students are able to:

CO1	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction.
CO2	Gain an introduction into how mathematical models for engineering are designed, analyzed and implemented in industry and organizations.
CO3	Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones.
CO4	Analyze real world scenarios to recognize when Logic, sets, functions are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches.
CO5	Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems.
CO6	Apply their knowledge in life-long learning.

UNIT-I	**Set Theory, Relations and Functions** Sets: Review of propositions and logical operations, Principle of mathematical induction, Review of sets, Types and operations on sets. Relations: Ordered pairs and n-tuples, Types of relations, Composite relation, Transitive closure of a relation, Partially ordered set, Hasse diagrams. Functions: Definition, Composition of functions, Types of functions, Characteristics function and its properties

UNIT-II	**Fuzzy Set and Fuzzy Logic** Fuzzy sets and systems, Crisp set, Operations and combinations on Fuzzy sets, Relation between Crisp set and Fuzzy set, Fuzzy relations, Overview of Fuzzy logic and classical logic. .
UNIT-III	**Group Theory and Ring Theory** Binary operation, Algebraic structure, Groupoid, Semigroup, Monoid,Group, Subgroup, Normal subgroup (Only definitions and examples), Ring, Commutative ring, Ring with unity, Zero divisor, Integral domain, Field (Only definitions and simple examples).
UNIT-IV	**Graph Theory** Basic concepts of graph theory, Digraphs, Basic definitions, Matrix representation of graphs, Subgraphs and quotient graphs, Isomorphic graphs, Paths and circuits, Reachability and connectedness, Node base, Euler's path & Hamilton's path, Tree, Binary tree, Undirected tree, Spanning tree, Weighted graphs (Only definitions and examples), Minimal spanning tree by Prim's algorithm & Kruskal's algorithm, Representation of algebraic expressions by Venn diagram and binary tree.
UNIT-V	**Combinatorics** Permutations and combinations, Pigeonhole principle with simple applications, Recurrence relations (Concept and definition only), Generating functions, Solution of recurrence relations using generating functions.

Text/ Reference Books

(1) Discrete Mathematical Structures (PHI), B. Kolman, R. Busby, S. Ross.

(2) Discrete Mathematical Structures with Applications to Computer Science (TMH), Tremblay and Manohar.

(3) Fuzzy Sets Uncertainty and Information, George, J. Klir, Tina A. Folger.

(4) Discrete Mathematics for Computer Scientists & Mathematicians, J. Mott, A. Kandel, T. Baker.

(5) Discrete Mathematics, S. Lipschutz.

(6) Neural network and Fuzzy systems (PHI), Bart Kosko.

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FOUR YEAR BACHELOR OF TECHNOLOGY (B.TECH.) DEGREE COURSE
SEMESTER: FOURTH(C.B.C.S.)
BRANCH: COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

Subject Name: Data Structure & Program Design **Subject Code:** BTECH_CSEDS-402T

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
3Hrs (Theory)	3	-	3	30	70	100

Course Objective:

1	This course introduces basic idea of data structure while making aware of methods and structure used to organize large amount of data.
2	It's also aimed at developing skill to implement methods to solve specific problems using basic data structures.
3	The course also provides career opportunities in design of data, implementation of data, technique to sort and searching the data.

Course Outcome:
At the end of this course students are able to:

CO1	Identify essential data structures and understand when it is appropriate to use..
CO2	Explain use of Abstract data types & ways in which ADTs can be stored, accessed and manipulated
CO3	Apply linear data structures to solve various real world computing problems using programming language.
CO4	Analyze standard algorithms for searching and sorting
CO5	Implementation of linear data structure to find solution for given engineering applications.

UNIT-I	**Introduction** –Common operations on data structures, Types of data structures, Data structures & Programming, Program Design, Complexities, Time Complexity, order of Growth, Asymptotic Notation. **Sorting and Searching** Introduction, Sorting, Insertion Sort, Selection Sort, Merging, Merge- Sort, Shell Sort, Radix Sort, Searching and Data Modification, Hashing
UNIT-II	Arrays :Introduction, Linear Arrays, Arrays as ADT, Representation of Linear array in Memory, Traversing Linear Arrays, Inserting and deleting, Sorting; Bubble Sort, Searching; Linear Search, Binary Search, : Linked List Introduction, Linked Lists, Representation of Linked Lists in Memory, Traversing a Linked List, Searching a Linked List, Memory Allocation; Garbage Collection, Insertion into a Linked List, Deletion from a Linked List, Header Linked List, Circularly Linked Lists, Two-Way Lists (or Doubly Linked Lists).

UNIT-III	Stacks, Queue and Recursion-Introduction, Stacks ,Array Representation of Stacks ,Linked Representation of Stacks, Stack as ADT, Arithmetic Expression; Polish Notation, Application of Stacks, Recursion, Towers of Hanoi, Implementation of Recursive Procedures by Stacks, Queue, Linked Representation of Queues, Queues as ADT, Circular Queues, Deques, Priority Queues, Applications of Queues
UNIT-IV	.Trees and Binary Trees -Binary Trees • Representation, Operations: Insert, Delete, Traversal: Preorder, Inorder, Postorder, Traversal Algorithms Using Stacks, Header Nodes; Threads, Threaded Binary Trees, Binary Search Trees ,Searching and Inserting in Binary Search Trees, Deleting in a Binary Search Tree, Balanced Binary Trees, AVL Search Trees, Insertion in an AVL Search Tree, Deletion in an AVL Search Tree, m-way Search Trees ,Searching, Insertion and Deletion in an m-way Search tree, B-Trees ,Searching, Insertion and Deletion in a B-tree, B+-Trees Graph Algorithms
UNIT-V	**Graphs and their Applications** -) Introduction, Graph Theory Terminology, Sequential Representation of Graphs, Adjacency Matrix; Path Matrix, Linked Representation of a Graph, Operations on Graphs, Traversing a Graph, Posets; Topological Sorting, Spanning Trees

Text Books:-

1. AVAho, J Hopcroft, JD Ullman, Data Structures and Algorithms,Addison- Wesley, 1983.
2. TH Cormen, CF Leiserson, RL Rivest,C Stein, Introduction to Algorithms, 3rd Ed., MIT Press, 2009.
3. Sahni, S., "Data Structures, Algorithms, and Applications in C++",WCB/McGraw-Hill.

Reference Books:

1. Data Structures & Algorithms, 1e, Alfred V.Aho, Jeffery D. Ullman, Person.
2. MT Goodrich, R Tamassia, DM Mount, Data Structures and Algorithmsin Java, 5th Ed., Wiley, 2010. (Equivalent book in C also exists.)
3. Wirth, N., "Algorithms and Data Structures", Prentice-Hall of India.

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SEMESTER:FOURTH(C.B.C.S.)
BRANCH: COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)
Subject Name: Data Structure and Program DesignLab
Subject Code: BTECH_CSEDS-402P

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs (Practical)	1	25	25	50

Course Objective:

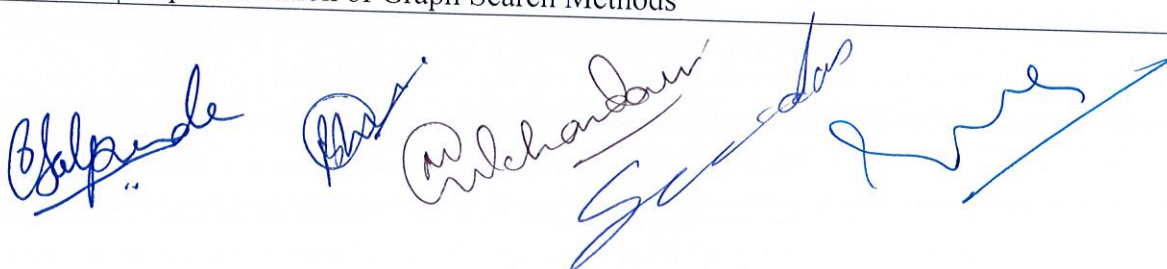| 1	Thiscourseintroducesbasicideaofdatastructurewhilemakingawareofmethodsandstructureused toorganizelargeamount ofdata.
2	It'salsoaimedatdevelopingskilltoimplementmethodstosolvespecific problems using basic datastructures.
3	Thecoursealsoprovidescareeropportunitiesindesignofdata,implementationofdata,techniquetosortandsearching thedata.

Course Outcome:
At the end of this course students are able to:

CO1	Identify essential data structures and understand when it is appropriate to use.
CO2	Explain use of Abstract data types & ways in which ADTs can be stored, accessed and manipulated
CO3	Apply linear data structures to solve various real world computing problems using programming language.
CO4	Analyze standard algorithms for searching and sorting
CO5	Implementation of linear data structure to find solution for given Engineering applications.

List of Practical's:-

1	C++ Programs to implement: Classes, Constructors, Inheritance, Polymorphism, Dynamic Memory Allocation, Class Templates, Exception Handling
2	Implementation of Stacks, Queues (using both arrays and linked lists).
3	Implementation of Singly Linked List, Doubly Linked List and Circular List.
4	Implementation of Infix to postfix conversion and evaluation of postfix expression
5	Implementation of Polynomial arithmetic using linked list
6	Implementation of Linear search and Binary Search
4	Implementation of Binary search tree and its operations
8	Implementation of Insertion Sort, Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Heap Sort
9	Implementation of operations on AVL trees
10	Implementation of Graph Search Methods

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SEMESTER: FOURTH(C.B.C.S.)
BRANCH: COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

Subject Name: Database Management System   **Subject Code:** BTECH_CSEDS-403T

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
3Hrs (Theory)	3	-	3	30	70	100

Course Objective:

1	It is aimed at developing skills to design databases using data modeling and design techniques.
2	It is also aimed to developing skills to implement real life applications which involve database handling.
3	This course also provide carrier opportunities in subject areas of designing, storage techniques and data handling and managing techniques

Course Outcome:

At the end of this course students are able to:

CO1	Analyze an information storage problem and derive an information model expression in the form of Entity relation diagram and design appropriate data model for it.
CO2	Demonstrate SQL queries to perform Create, Retrieve, Update, Delete operations on database and perform inferential analysisof data model
CO3	Identify features of database management systems and Relational database and Understand functional dependencies and various normalization forms
CO4	Perform basic transaction processing and management and ensure database security, integrity and concurrency control
CO5	Analyze the management of structured and unstructured data management with recent tools and technologies

UNIT-I	Introduction to DBMS, DBMS Architecture, Data Models, RelationalDatabase design:
UNIT-II	SQL Concepts : Basics of SQL, DDL, DML, DCL, structure — creation, alteration, defining constraints, Functions - aggregate functions, Built-in functions –numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types.
UNIT-III	Functional Dependency (FD) — Basic concepts, closure of set of FD, closure of attribute set, Decomposition, Normalization — 1NF, 2NF, 3NF, BCNF, 4NF
UNIT-IV	Transaction control commands — Commit, Rollback, Save point. Cursors, Stored Procedures, Stored Function, Database Triggers. Transaction Management: Transaction concepts, properties of transactions, serializability

		of transactions, Two- Phase Commit protocol, Deadlock, two-phase locking protocol
UNIT-V		NoSQL Databases - Introduction, Create, Retrieve, Update, Delete Operations, Data Mining

Text Books:-

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts 4th Edtion McGraw Hill, 2002.

2. Jeff Ullman, and Jennifer Widom, A First Course in Database systems, 2nd Edition.

3. RamezElmasri and ShamkantNavathe, Fundamentals of Database Systems 2nd Edition, Benjamin Cummings, 1994.

Reference Books:

1. G. K. Gupta :"Database Management Systems", McGraw – Hill.

2. Regina Obe, Leo Hsu, PostgreSQL: Up and Running, 3rd Edition, O'ReillyMedia 2017.

3. Kristina Chodorow, Shannon Bradshaw, MongoDB: The DefinitiveGuide, 3rd Edition, O'Reilly Media 2018.

Subject Name: Database Management System Lab**Subject Code:** BTECH_CSEDS-403P

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs (Practical)	1	25	25	50

Course Objective:

1	Itisaimedatdevelopingskillstodesigndatabasesusingdatamodeling anddesigntechniques.
2	Itisalsoaimedtodevelopingskillstoimplementreallifeapplications whichinvolvedatabasehandling.
3	Thiscoursealsoprovidecarrieropportunitiesinsubjectareasofdesigning,storagetechniq uesanddatahandlingandmanagingtechniques

Course Outcome:

At the end of this course students are able to:

CO 1	Analyzean informationstorageproblemandderivean information model expression in the form of Entity relation diagram and designappropriatedatamodelforit.
CO 2	DemonstrateSQLqueriestoperformCreate,Retrieve, Update,Delete operationsondatabaseandperforminferentialanalysisofdatamodel
CO 3	Identify features of database management systems and RelationaldatabaseandUnderstand functionaldependencies andvarious normalizationforms
CO 4	Performbasictransactionprocessingandmanagementandensuredatabasesecurity,integrityand concurrency control
CO 5	Analyzethemanagementofstructuredandunstructureddata managementwithrecenttoolsand technologies

List of Practical's:-

1	To create table and specify the questionnaires in SQL
2	To manipulate the operations on the table.(Retrieval, Insertion, Deletion, Modification)
3	To implement the Restriction on the table.
4	To implement Structure of the table. 1. Change the name of the table 2. Change the name of the Column. 3. Drop a Column. 4. Decrease size of table(if table data exist).
5	To implement concept of Joins.
6	To implement concept of Grouping of Data.
4	To implement concept of Subqueries.
8	To implement concept of Index & Views.

9	To implement basics of PL/SQL.
10	To implement concept of Cursor & Trigger.

Subject Name: Computer Network
Subject Code: BTECH_CSEDS-404T

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
3Hrs (Theory)	3	-	3	30	70	100

Course Objective:

1	To understand the computer network architectures.
2	To make aware of design and performance perspective of network architectures.
3	To discuss current trends in communication

Course Outcome:

At the end of this course students are able to:

CO1	Analyze the need for OSI reference model in computer networking
CO2	Studying the various transmission medium used in physical layer
CO3	Analyzing different Elementary protocols for communication and Identify IEEE standards employed in computer networking
CO4	Solve and apply various Routing Algorithm and Protocols
CO5	Use techniques involved in developing transport and application layer of computer networking.

UNIT-I	Introduction The use of computer networks. Network hardware. LAN's, Man's, WAN's, internet works, Network software, protocol hierarchies, design issues for layers, interfaces and services, Connectionless oriented and connectionless services, service primitives, relationship of Services to protocols, the OSI reference model, TCP/IP reference model, comparison of OSI And TCP/IP reference model.
UNIT-II	Physical Layer The theoretical basis for data communication-Fourier analysis, bandwidth-limited signals, Maximum data rate of a channel, transmission media-magnetic media, and twisted pair coaxial Cable, fiber optics. Wireless transmission, microwave transmission. Multiplexing, switching, Narrow and ISDN - services, architecture, interface, perspective on N-ISDN, broadband ISDN & ATM-virtual circuits versus circuit switching, transmission in ATM networks, ATM Switches.
UNIT-III	Data Link Layer Design issues - services provided to the network Layer, framing, error control, flow control, Error correcting & detecting codes, elementary data link protocols, simplex stop and wait Simplex protocols for noisy channel, sliding

	window protocols-one bit protocol, go back Protocol, selective repeat protocol. The medium access sub layer - static and dynamic channel Allocation in LANs and MANs, Multiple access protocols - ALOHA. CSMA, collision free Protocols, limited contention protocols, IEEE 802.11 wireless LAN protocols, IEEE Standards 802 for LAN and MANs-802.3 & Ethernet, token bus. Token ring,
UNIT-IV	The Network Layer Design issues, services provided to the transport layer, internal organization, comparison of Virtual circuit and datagram subnets, routing algorithms. Optimality principle, shortest path Routing, flooding, flow-based routing, distance vector routing, link state routing, hierarchical Routing, broadcast &multicast routing, congestion control algorithms, general principles Prevention policies, traffic shaping. flow specifications, congestion control in virtual circuit Subnets. choke packets, load shedding, jitter control. IP protocol, IP address. Subnets, internet Control protocols, OSPF. BGP
UNIT-V	Transport and Application Layer Transport and Application Layer - services provided to the upper layer, Quality of Service, Transport service primitives, elements of transport protocols, addressing, establishing a Connection, releasing a connection, flow control & buffering, multiplexing, crash recovery,

Text Books:-

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education

2. Data Communication And Networking, Behrouz A. Forouzam, Fourth Edition, McGraw Hill

3. Computer Networks, Andrew S. Tanenbaum, David J. Wetherall, Fifth Edition, Pearson

Reference Books:

1. Norman Abramson, Franklin F. Kuo, Computer-communication networks, Fourth Edition, Prentice-Hall, 1973, Illustrated

2. V. S. Bagad, I. A. Dhotre, Computer Communication Networks, Third Edition, Technical Publications, Illustrated

3. Jean Walrand ,PravinVaraiya, High-Performance Communication Networks (The Morgan Kaufmann Series in Networking), Second Edition, Morgan Kaufmann Publishers

Subject Name: Computer Network Lab   **Subject Code:** BTECH_CSEDS-404P

Load	Credits	College Assessment Marks	University Evaluation	Total Marks
2 Hrs (Practical)	1	25	25	50

Course Objective:

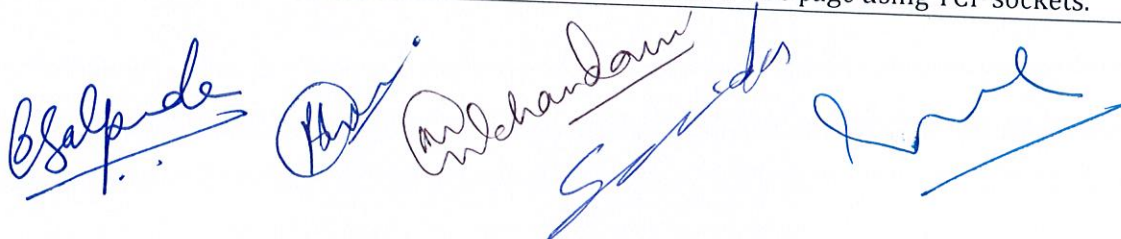| 1	To understand the computer network architectures.
2	To make aware of design and performance perspective of network architectures.
3	To discuss current trends in communication

Course Outcome:

At the end of this course students are able to:

CO1	Analyze the need for OSI reference model in computer networking
CO2	Studying the various transmission medium used in physical layer
CO3	Analyzing different Elementary protocols for communication and Identify IEEE standards employed in computer networking
CO4	Solve and apply various Routing Algorithm and Protocols
CO5	Use techniques involved in developing transport and application layer of computer networking.

List of Practical's:-

1	Study of different types of Network cables and Practically implement the cross-wired cable and straight through cable using clamping tool.
2	Study of various LAN topologies and their creation using network devices, cables and computers.
3	To demonstrate and work with computer hardware, PCI slots.
4	Write a program to implement connection oriented and connectionless client for well-known services i.e standard ports
5	Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
6	To give IP Address of different classes in given Network id.
4	Configure a Network topology using packet tracer software.
8	Configure Network using Link State Vector Routing protocol.
9	Implementation of Iterative server using connection oriented socket system calls
10	Write a HTTP web client program to download a web page using TCP sockets.

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SEMESTER: FOURTH(C.B.C.S.)
BRANCH: COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

Subject Name: Theory of Computations   **Subject Code:** BTECH_CSEDS-405T

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
3Hrs (Theory)	3	1	4	30	70	100

Course Objective:
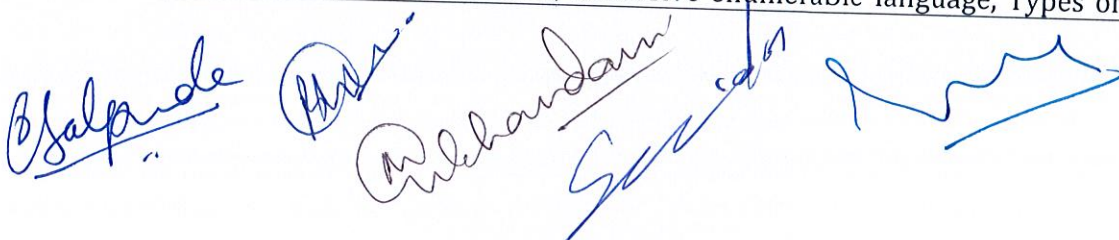
1	To give an overview of the theoretical foundations of computer science from the perspective of formal languages
2	To illustrate finite state machines to solve problems in computing
3	To familiarize Regular grammars, context frees grammar.

Course Outcome:
At the end of this course students are able to:

CO1	Able to understand mathematical preliminaries, FSM, Moore and Mealy Machines
CO2	Understand the concepts of regular: sets, expression, grammar and Chomsky Hierarchy
CO3	Able to understand CFG, CFL and PDA
CO4	Able to design Turing Machine and Types of TM
CO5	Understand the concepts of Decidability, Undecibility recursively enumerable languages, Halting problems, Post correspondence problem and Church Hypothesis

UNIT-I	Strings, Alphabet, Language operations, Finite state machine definitions, Finite automation model, Acceptance of strings and language, Non deterministic finite automation, Deterministic finite automation, Equivalence between NFA and DFA, Conversion of NFA into DFA, Minimization of FSM, Equivalence between two FSM"s Moore and Mealy machines
UNIT-II	Regular sets, Regular expressions, Identity rules, Manipulation rules, Manipulation of regular expressions, Equivalence between RE and FA, Inter conversion, Pumping lemma, Closure properties of regular sets(proofs not required), Chomsky hierarchy of languages, Regular grammars, Right linear and left linear grammars, Equivalence between regular linear programming and FA, Inter conversion between RE and RG.
UNIT-III	Context free grammar, Derivation trees, Chomsky normal form, Greibach normal form, Push down automata, Definition, Model acceptance of CFL, Equivalence of CFL and PDA, Inter conversion, Closure properties of CFL(Proofs omitted),Pumping Lemma of CFL, Introduction of DCFL and DPDA
UNIT-IV	Turing Machine: Definition, Model of TM, Design of TM, Universal Turing Machine, Computable function, Recursive enumerable language, Types of TM"s

	(proofs not required), Linear bounded automata and Context sensitive language, Counter machine
UNIT-V	Decidability and Undecidability of problems, Properties of recursive & recursively enumerable languages, Halting problems, Post correspondence problem, Ackerman function, and Church"s hypothesis. Recursive Function: Basic functions and operations on them, Bounded Minimalization, Primitive recursive function, μ-recursive function, Primitive recursive predicates, Mod and Div functions, Unbounded Minimalization, Equivalence of Turing Computable function and μ-recursive function.

Text Books:-

1. Introduction to Automata Theory, Languages and Computation by J. E. Hopcraft,R. Motwani, J. D Ullman, second Edition, Pearson Education, Aisa
2. An Introduction to Formal Languages and Automata by Peter Linz
3. Introduction to Langauges and the theory of Automata by John Martin, Third Edition(TMH)

Reference Books:

1. Theory of Computer Science, Automata, Languages and Computation by K. L. P. Mishra and N. Chandrasekaran, Third Edition, PHI Learning.
2. Elements of Theory of Computation by Lewis H.P and Papadimition C.H.

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FOUR YEAR BACHELOR OF TECHNOLOGY (B.TECH.) DEGREE COURSE
SEMESTER:FOURTH(C.B.C.S.)
BRANCH: COMPUTER SCIENCE & ENGINEERING (DATA SCIENCE)

Subject Name: System Programming　　　　　　**Subject Code:** BTECH_CSEDS-406T

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
3Hrs (Theory)	3	-	3	30	70	100

Course Objective:

1	To Understand Machine Structure
2	To understand language processor programming ,loader , linker and compiler

Course Outcome:
At the end of this course students are able to:

CO1	Demonstrate to understand system software, operating system and IBM 360 Machine in detail.
CO2	Classify & design of assembler, searching and sorting concepts.
CO3	Determine various Macro Language and Macro Processor along with its features and implementation.
CO4	Categorize different loading schemes along with the design and details of linkers.
CO5	Differentiate different phases of compiler and the concepts related to compiler like cross Compiler, bootstrapping, lex and YACC, Databases used in Compilation process.

UNIT-I	Evolution of components of programming system, Overview, Functions and Facilities, Goals of System software, Views of System Software, Virtual machine. General machine structure IBM 360/370, Machine Language Assembly language
UNIT-II	Design of Pass-I and Pass-II Assemblers, Table Processing, Searching and Sorting, Problems based on symbol table, Base table and Literal table generation, Machine code generation and Searching and sorting.
UNIT-III	Macro instruction, Features of Macro facility, Implementation of 1-Pass, 2-Pass Macro processor, Macro calls within macro, macro definition within macros.
UNIT-IV	Different Loading Schemes, Binders, Overlays, Linking loaders, Design of absolute loaders, Design of Direct Linking loaders
UNIT-V	Phases of Compiler, Cross Compiler, Bootstrapping, Erros in each phases, Compiler writing tools, Lex and YACC, Databases used in Compilation process. Introduction to Device drivers, Driver installation with example,.

Text Books:-
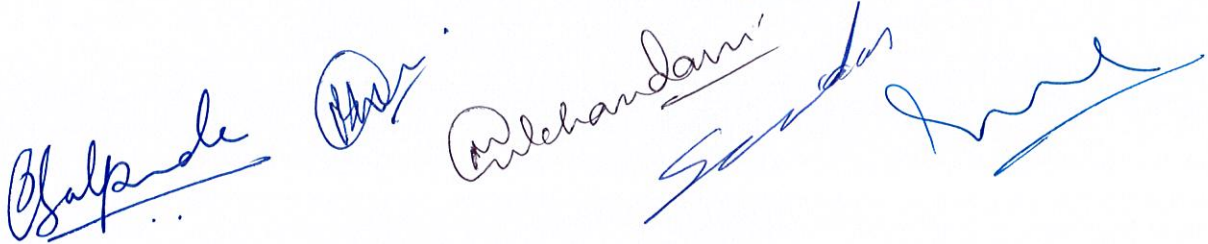1.J. J. Donovan; System Programming; TMH, 2012

2. D.M. Dhamdhere; System Programming; THM; 2011

George Pajari; ErittingUnix Device Drivers; Pearson Education; 2011 4. O.G. Kakade; Principles of Compiler Design; Laxmi Pub. 2008.

Reference Books:

1   Leland Beck, D. Manjula; System Software; An Introduction to System Programming; Pearson Education; 2013

2   Alfred Aho,J. Ullman; Principles of Compiler Design;Narosa Pub. 2010

Subject Name: Consumer Affairs(Audit)   **Subject Code:** BTECH_CSEDS-407T

Load	Lecture	Tutorial	Credits	College Assessment Marks	University Evaluation	Total Marks
3Hrs (Theory)	2	-	Audit	-	-	-

Course Objective:

1	To familiarize the students with their rights as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights.
2	Provides an understanding of the procedure of redressal of consumer complaints, and the role of different agencies in establishing product and service standards.

Course Outcome:

At the end of this course students are able to:

CO1	The students should be able to comprehend the business firm' interface with consumers and the consumer related regulatory and business environment.
CO2	The students should be able to comprehend the business firm' interface with consumers and the consumer related regulatory and business environment.
CO3	The students are also expected to understand the social, economic and legal consequences of business decisions affecting consumers.

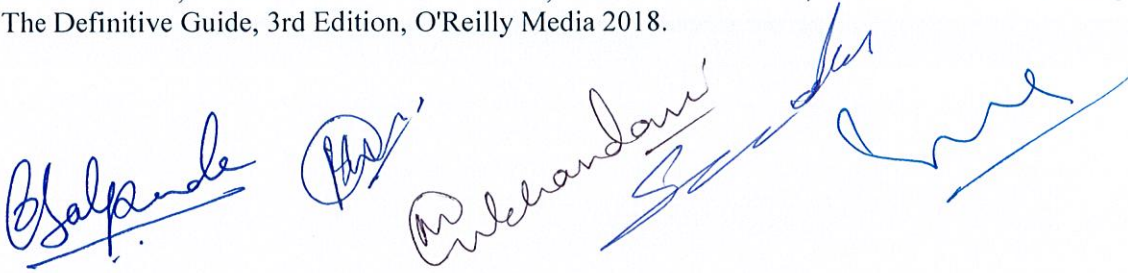| UNIT-I	Conceptual Framework: Consumer and Markets: Concept of consumers; Nature of markets; Concept of price in Retail and Wholesale; Maximum Retail Price (MRP), and local taxes, Fair Price, misleading advertisements and deceptive packaging.
UNIT-II	Objectives and basic concepts: Consumer, goods, services, defect in goods, deficiency in service spurious goods and services, unfair trade practices, restrictive trade practices. Organizational Set- up under the Consumer Protection Act
UNIT-III	Consumer Movement in India: Formation of consumer organization and their role in consumer protection including Advocacy and Campaigning for policy intervention; Evolution of Consumer Movement in India , Recent Development in Consumer Protection in India; National Consumer helpline, citizen charter, Product testing

Text Books:-

1. Khanna, Sri Ram, Hanspal. Savita Kapoor, Sheetal and Awasthi, H. K. "Cosumer Affairs" (2007) Delhi University Publication, Pp. 334
2. Aggarwal, V. K. (2003) Consumer Protection: Law and Practice, 5th ed., Bharat Law House, Delhi or latest edition
3. Girimaji, Pushpa (2002), Consumer Rights for Everyone. Penguin BOOKs.

Reference Books:

1. Nader, Ralph (1973). The Consumer and Corporate Accountability, USA, Harcourt Brace Jovanovich, Inc.
2. Deepa Sharma, Grievance redress and Consumer Protection in ndia, Lambart Academic Publishers Germany 2012
3. N.D. Kapoor, Merchantile Law,
4. Sen & Mitra, Merchantile Law and Practice,3. Kristina Chodorow, Shannon Bradshaw, MongoDB: The Definitive Guide, 3rd Edition, O'Reilly Media 2018.