

GODAVARI INSTITUTE OF ENGINEERING & TECHNOLOGY(A)

Department of Computer Science & Engineering

COURSE STRUCTURE

B. Tech. Computer Science & Engineering

III Year

I Semester

S. No	Subject Title	Periods per week			C	Scheme of Examination Maximum Marks		
		T	P	D		Int.	Ext.	Total
14150501	Compiler Design	4	-	-	3	30	70	100
14150502	Data Communication	4	-	-	3	30	70	100
14150503	Principles of Programming Languages	4	-	-	3	30	70	100
14150504	Database Management Systems	4	-	-	3	30	70	100
14150505	Operating Systems	4	-	-	3	30	70	100
14150511	Compiler Design Lab	-	3	-	2	50	50	100
14150512	Operating Systems Lab	-	3	-	2	50	50	100
14150513	Database Management Systems Lab	-	3	-	2	50	50	100
14159596	Soft Skills-II [#]	3	1	-	-	-	-	-
14150521	Mini project/Study Project	-	-	-	2	100	-	100
Total		23	10	0	23	400	500	900

III Year**II Semester**

S. No.	Subject Title	Periods per week			C	Scheme of Examination		
		T	P	D		Int.	Ext.	Total
14150601	Computer Networks	4	-	-	3	30	70	100
14150602	Data Warehousing and Mining	4	-	-	3	30	70	100
14150603	Design and Analysis of Algorithms	4	-	-	3	30	70	100
14150604	Software Engineering	4	-	-	3	30	70	100
14150605	Web Technologies	4	-	-	3	30	70	100
14150606	Multimedia Computing	4	-	-	3	30	70	100
14150611	Computer Networks & Network Programming lab	-	3	-	2	50	50	100
14150612	Web Technologies Lab	-	3	-	2	50	50	100
14150613	Linux Programming Lab	-	3	-	2	50	50	100
Total		24	12	0	24	330	570	900

Compiler Design

Course Objectives: *To make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler, understand what is syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the syntax analysis and, intermediate code generation, type checking, the role of symbol table and its organization, Code generation, machine independent code optimization and instruction scheduling.*

Course Outcomes:

- 1. To introduce the major concept areas of language translation and compiler design*
- 2. To develop an awareness of the function and complexity of compilers.*
- 3. To provide practical, hands on experience in compiler design*
- 4. Identify the similarities and differences among various parsing techniques and grammar transformation techniques*

Unit–I

Overview of language processing – pre-processors – compiler – assembler – interpreters, linkers & loaders - structure of a compiler – phases of a compiler.

Lexical Analysis – Role of Lexical Analysis– Lexical Analysis vs. Parsing – Token, patterns and Lexemes – Lexical Errors – Regular Expressions – Regular definitions for the language constructs – Strings, Sequences, Comments – Transition diagram for recognition of tokens, reserved words and identifiers, Examples.

Unit–II

Syntax Analysis – discussion on CFG, LMD,RMD, parse trees, Role of a parser – classification of parsing techniques – Brute force approach, left recursion, left factoring, Top down parsing – First and Follow- LL(1) Grammars, Non- Recursive predictive parsing.

Unit–III

What is bottom up parsing approach, Types of Bottom up approaches; Introduction to simple LR – Why LR Parsers –Model of an LR Parsers – Operator Precedence- Shift Reduce Parsing – Difference between LR and LL Parsers, Construction of SLR Tables.

More powerful LR parses, construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity, Comparison of all bottoms up approaches with all top down approaches

Unit–IV

Semantic analysis, SDT Schemes, evaluation of semantic rules. Intermediate code, three address code, quadruples, triples, abstract syntax trees. Types and declarations, type Checking.

Unit–V

Symbol tables: use and need of symbol tables. Runtime Environment: storage organization, stack allocation, access to non-local data, heap management, parameter passing mechanisms.

Code generation: Issues, target language, Basic blocks & flow graphs, Simple code generator, Peephole optimization, Register allocation and assignment.

Unit–VI

Machine independent code optimization – semantic preserving transformations, global common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling, inter procedural optimization.

Text Books:

1. Compilers, Principles Techniques and Tools- Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D. Ullman, 2nd ed, Pearson, 2007.
2. Compiler Design, K. Muneeswaran, Oxford.

Reference Books:

1. Engineering a compiler, 2nd edition, Keith D.Cooper & Linda Torczon, Morgan Kaufman.
2. <http://www.nptel.iitm.ac.in/downloads/106108052/>
3. Principles of compiler design, V. Raghavan, 2nd ed, TMH, 2011.
4. Compiler construction, Principles and Practice, Kenneth C Loudon, CENGAGE
5. Implementations of Compiler, A new approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

III Year B.TECH (CSE) – I SEMESTER

Data Communication

Course Objectives:

1. *To have a detailed study of various analog and digital modulation and demodulation techniques*
2. *To have a thorough knowledge of various multiplexing schemes and Data communication protocols*
3. *To know about the standards and mechanisms of telephone and cellular mobiles.*

Unit-I

Introduction: Data Communications Circuits, Serial and parallel Data Transmission, Data communications Networks, Alternate Protocol Suites.

Signals, Noise, Modulation, And Demodulation: Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and *M*-ary Encoding, Digital Modulation.

Unit-II

Metallic Cable Transmission Media: Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves

Optical Fiber Transmission Media: Advantages of Optical Fiber cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block

Diagram, Optical Fiber construction, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

Unit-III

Digital Transmission: Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to- Quantization Noise Voltage Ratio, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed, Delta Modulation PCM and Differential PCM.

Multiplexing and T-Carriers: Time- Division Multiplexing, Digital Line Encoding, Frequency-Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network

Unit-IV

Wireless Communications Systems: Electromagnetic Polarization, Electromagnetic Radiation, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Microwave Communications Systems, Satellite Communications Systems.

Unit-V

Telephone Instruments And Signals: The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

Cellular Telephone Systems: First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, Interim Standard, Global system for Mobile Communications.

Unit-VI

Data Communications Codes, Error Control and Data Formats: Data Communications Character Codes, Bar Codes, Error Control, Error Detection and Correction, Character Synchronization.

Data Communications Equipment: Digital Service Unit and Channel Service Unit, Voice-Band Data Communication Modems, Bell Systems-Compatible Voice- Band Modems, Voice-Band Modem Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, 56K Modems, Modem Control: The AT Command Set, Cable Modems.

Text Books:

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

Reference Books:

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition.TMH.
2. Data and Computer communications, 8/e, William Stallings, PHI.
3. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson
4. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education

III Year B.Tech. (CSE). – I Semester

Principles of Programming Languages

Course Objectives:

1. *To understand and describe syntax and semantics of programming languages*
2. *To understand data, data types, and basic statements*
3. *To understand call-return architecture and ways of implementing them*
4. *To understand object-orientation, concurrency, and event handling in programming languages*
5. *To develop programs in non-procedural programming paradigms*

Course Outcomes:

1. *Describe syntax and semantics of programming languages*
2. *Explain data, data types, and basic statements of programming languages*
3. *Design and implement subprogram constructs, Apply object - oriented, concurrency, and event handling programming constructs*
4. *Develop programs in Scheme, ML, and Prolog*
5. *Understand and adopt new programming languages*

Unit- I

Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming, Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments.

Syntax and Semantics: Evolution of programming languages, describing syntax, context, free grammars, attribute grammars, describing semantics, lexical analysis, parsing, recursive - decent bottom - up parsing

Unit -II

Data, Data Types, and Basic Statements: Names, variables, binding, type checking, scope, scope rules, lifetime and garbage collection, primitive data types, strings, array types, associative arrays, record types, union types, pointers and references, Arithmetic expressions, overloaded operators, type conversions, relational and boolean expressions, assignment statements , mixed mode assignments, control structures – selection, iterations, branching, guarded Statements

Unit-III

Subprograms and Implementations: Subprograms, design issues, local referencing, parameter passing, overloaded methods, generic methods, design issues for functions, semantics of call and return, implementing simple subprograms, stack and dynamic local variables, nested subprograms, blocks, dynamic scoping

Unit- IV

Object- Orientation, Concurrency, and Event Handling: Object – orientation, design issues for OOP languages, implementation of object, oriented constructs, concurrency, semaphores,

Monitors, message passing, threads, statement level concurrency, exception handling, event handling

Unit-V

Functional Programming Languages: Introduction to lambda calculus, fundamentals of functional programming languages, Programming with Scheme, –Programming with ML,

Unit-VI

Logic Programming Languages: Introduction to logic and logic programming, Programming with Prolog, multi - paradigm languages

Text Books:

1. Pratt, Terrence W., Zelkowitz, Marvin V.: Programming Languages Design and Implementation (Fourth Edition), Prentice Hall, N.J., ISBN 0-13-027678-2.
2. Robert W. Sebesta, “Concepts of Programming Languages”, Tenth Edition, Addison Wesley, 2012.

References:

1. R. Kent Dybvig, “The Scheme programming language”, Fourth Edition, MIT Press, 2009.
2. Jeffrey D. Ullman, “Elements of ML programming”, Second Edition, Prentice Hall, 1998.
3. Richard A. O’Keefe, “The craft of Prolog”, MIT Press, 2009.
4. W. F. Clocksin and C. S. Mellish, “Programming in Prolog: Using the ISO Standard”, Fifth Edition, Springer, 2003.

III Year B.Tech. (CSE). – I Semester

Database Management Systems

Course Objectives: *Provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications. The logical design, physical design and implementation of relational databases are covered.*

Course Outcomes:

- *define a Database Management System*
- *give a description of the Database Management structure understand the applications of Databases*
- *know the advantages and disadvantages of the different models*
- *compare relational model with the Structured Query Language (SQL)*
- *know the constraints and controversies associated with relational database model. know the rules guiding transaction ACID*
- *understand the concept of data planning and Database design identify the various functions of Database Administrator*

Unit-I

Introduction: Data base System Applications, data base System VS file System, Advantages of a DBMS View of Data, Data Abstraction, instances and Schemas, data Models, the ER Model, Relational Model, Other Models, Database Languages: DDL, DML, DCL. Database Access for applications Programs, Storage Manager, the Query Processor, Transaction Management, data base System Structure, data base Users and Administrator

Unit-II

History of Data base Systems::Data base design and ER diagrams, Beyond ER Design Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Concept Design with the ER Model, and Conceptual Design for Large enterprises.

Unit- III

Basic SQL Query: Basic SQL querying (select and project) using where clause, arithmetic & logical operations, Set ,Comparison Operators, NULL values , Comparison using Null values, sub queries, grouping, aggregation, ordering, implementation of different types of joins, Simple Database schema, data types, table definitions, different types of DML and DDL operations

Unit-IV

SQL and PL/SQL: Creating tables with relationship, implementation of key and integrity constraints, views. Introduction to PL/SQL, PL/SQL procedures, functions, triggers, cursors, exception handling, packages, arrays, table types. SQL constructs that grant access or revoke access from user or user groups.

Unit-V

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form (BCNF), Lossless join and dependency preserving decomposition, Fourth normal form (4NF).

Unit-VI

Transaction Management: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint.

Storage and Indexing: Database file organization, file organization on disk, heap files and sorted files, hashing, single and multi-level indexes.

Text Books:

1. Database System Concepts 6e By Abraham Silberschatz, Henry Korth and S Sudarshan
2. Database Management Systems, 3/e Raghuram Krishnan, Johannes Gehrke, TMH

Reference Books:

1. Introduction to Database Systems, 8/e C J Date, PEA
2. The Database book principles & practice using Oracle/MySql Narain Gehani, University Press.
3. Oracle Database 11g. The complete reference (oracle press)

Operating Systems

Course Objectives:

To gain knowledge about the Operating Systems concepts such as process, main memory management, secondary memory management, CPU and disk scheduling etc

Course Outcomes:

- *by the end of the course student will be able to*
- *describe the general architecture of computers*
- *describe, contrast and compare differing structures for operating Systems understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files*

Unit-I

Computer System and Operating System Overview: Overview of computer operating system, operating system structure, protection and security, services, systems calls, operating system generation.

Unit-II

Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

Unit-III

Concurrency: Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors.

Unit-IV

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

Virtual Memory Management: Virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

Unit-V

Principles of Deadlock – System model, deadlock characterization, deadlock prevention, avoidance and detection, recovery form deadlock,

Unit-VI

File System Interface- The concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

Mass-Storage Structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling,

Text Books:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems' – Internal and Design Principles Stallings, Sixth Edition–2005, Pearson education

Reference Books:

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Operating%20Systems/New_index1.html
2. Operating systems- A Concept based Approach-D.M.Dhamdhare, 2nd Edition, TMH
3. Operating System A Design Approach-Crowley, TMH.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.

III Year B.Tech. (CSE). – I Semester

Compiler Design Lab

Course Objectives:

To enlighten the student with knowledge base in compiler design and its applications

Lab Experiments:

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines
2. Simulate First and Follow of a Grammar.
3. Develop an operator precedence parser for a given language.
4. Construct a recursive descent parser for an expression.
5. Construct a LL(1) parser for an expression
6. Design predictive parser for the given language
7. Implementation of shift reduce parsing algorithm.
8. Design a LALR bottom up parser for the given language.
9. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools
10. Write a program to perform loop unrolling.
11. Convert the BNF rules into YACC form and write code to generate abstract syntax tree.
12. Write a program for constant propagation.

Operating Systems Lab

Lab Experiments:

1. Simulate the following CPU scheduling algorithms
 - a) Round Robin
 - b) SJF
 - c) FCFS
 - d) Priority
2. Multiprogramming-Memory management- Implementation of fork(), wait(), exec() and exit(), System calls
3. Simulate the following
 - a) Multiprogramming with a fixed number of tasks (MFT)
 - b) Multiprogramming with a variable number of tasks (MVT)
4. Simulate Bankers Algorithm for Dead Lock Avoidance
5. Simulate Bankers Algorithm for Dead Lock Prevention.
6. Simulate the following page replacement algorithms.
 - a) FIFO
 - b) LRU
 - c) LFU
7. Simulate the following File allocation strategies
 - a) Sequenced
 - b) Indexed
 - c) Linked

Database Management Systems Lab

Course Objectives:

- *To teach the student database design and query and PL/SQL.*

System/Software Requirements:

- *Intel based desktop PC*
- *Mysql /Oracle latest version Recommended*

Lab Experiments:

- 1) Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
- 2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
Example:- Select the roll number and name of the student who secured fourth rank in the class.
- 3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

- 4) Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
- 5) i) Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
ii) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
- 6) Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
- 7) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
- 8) Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
- 9) Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
- 10) Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
- 11) Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
- 12) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

Text Books:

- 1) ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition
- 2) ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc-Graw Hill.
- 3) SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.
- 4) Data Base Management System, Oracle SQL and PL/SQL, Pranab kumar Das Gupta, P Radha Krishna, PHI.

Soft Skills-2

(Title: Professional Communication and Employability skills)

Course Objectives: *To help the students*

1. *Participate in group discussions with confidence and to make effective presentations.*
2. *With- resume packaging, preparing and facing interviews.*
3. *Build an impressive personality through effective time management and goal setting, self-confidence and assertiveness.*
4. *Understand, what constitutes proper grooming and etiquette in a professional environment.*

Course Outcomes: *The students will be able to*

1. *Be effective communicators and participate in group discussions with confidence. Also be able to make presentations in a professional context.*
2. *Write resumes, prepare and face interviews confidently.*
3. *Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.*
4. *Make the transition smoothly from campus to corporate.*

Unit-I

Communicative Competence – The Art of Communication, basic grammar, personal SWOT Analysis, Analyzing audience, role of emotions and body language in communication-Effective listening skills, using English in different situations

Unit-II

Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence-Elements of effective presentation – Structure of presentation – Presentation tools

Unit-III

Interview Skills – Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-pre-interview planning, opening strategies, answering strategies, mock interviews

Unit-IV

Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Unit-V

Technical Communication: Report writing: Importance, structure, drafting of reports, Business Writing: Sales letters, claim and adjustment letters, Job Application letter, preparing a personal resume, notices, agenda and minutes of the meeting

Unit-VI

Development of Occupational Competency: Leadership skills - Problem solving skills - Organising and Co-ordination skills - Critical thinking Decision Making

Suggested Reading:

1. Personality Development and Soft Skills-Barun.K.Mithra, Oxford Publications
2. Technical Communication –Principles and Practice-Meenakshi Raman,Sangeeta Sharma,Oxford Publications
3. Effective Technical Communication-Mc Grawhill-Ashraf Rizvi.

III Year B.Tech. (CSE). – II Semester

Computer Networks (for CSE, ECE)

Course Objectives:

At the end of the course, the students will be able to:

1. *Build an understanding of the fundamental concepts of computer networking.*
2. *Familiarize the student with the basic taxonomy and terminology of the computer networking area.*
3. *Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.*

Course Outcomes:

1. *Independently understand basic computer network technology.*
2. *Identify the different types of network topologies and protocols.*
3. *Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.*

Unit – I

Introduction: OSI model overview, TCP/IP and other networks models, Network Topologies, Network technologies (WAN, LAN, MAN), Physical layer: Transmission media (Guided, Wireless)

Unit – II

Data link layer: Design issues, **Framing:** fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait protocol.

Sliding window protocol: One bit, Go back N, Selective repeat-Stop and wait protocol, Data

link layer in HDLC: configuration and transfer modes, frames, control field, point to point protocol (PPP): framing transition phase, multiplexing, multi link PPP.

Unit – III

Random Access: ALOHA, Carrier Sense Multiple Access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: frequency division multiple access (FDMA), time division multiple access (TDMA), code division multiple access (CDMA).

Unit –IV

Network Layer: Design Issues, Internetworking, Routing Algorithms. Shortest path routing, Flooding, Broadcast routing, Congestion control algorithms: general principles of congestion control, congestion prevention policies.

Unit –V

Network Layer Protocols: ARP, ICMP, IPV6 frame format

Transport Layer: The transport service, Elements of transport protocols, the internet transport protocols: UDP, TCP congestion control.

Unit –VI

Application layer (WWW and HTTP): Architecture: Client server model, Domain name system (DNS): E-mail (SMTP) and File transfer (FTP), HTTP and WWW.

Text Books:

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.

Reference Books:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

III Year B.Tech. (CSE). – II Semester

Data Warehousing and Mining

Course Objectives:

Students will be enabled to understand and implement classical models and algorithms in data warehousing and data mining. They will learn how to analyze the data, identify the problems, and choose the relevant models and algorithms to apply. They will further be able to assess the strengths and weaknesses of various methods and algorithms and to analyze their behavior.

Course Outcomes:

- *understand why there is a need for data warehouse in addition to traditional operational database systems;*
- *identify components in typical data warehouse architectures; design a data warehouse and understand the process required to construct one;*
- *understand why there is a need for data mining and in what ways it is different from traditional statistical techniques;*
- *understand the details of different algorithms made available by popular commercial data mining software;*
- *solve real data mining problems by using the right tools to find interesting patterns*

Unit –I

Introduction: What Motivated Data Mining? Why is it Important, Data Mining—On What Kind of Data, Data Mining Functionalities—What Kinds of Patterns Can Be Mined? Are All of the Patterns Interesting? Classification of Data Mining Systems, Data Mining Task Primitives, Major Issues in Data Mining.

Unit –II

Data Pre-processing: Why Pre-process the Data? Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

Unit –III

Data Warehouse and OLAP Technology: An Overview: What Is a Data Warehouse? A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

Unit –IV

Classification: Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction, Characteristics of Decision Tree Induction.

Unit –V

Association Analysis: Basic Concepts and Algorithms: Introduction, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm.

Unit –VI

Cluster Analysis: Basic Concepts and Algorithms: What is Cluster Analysis? Different Types of Clustering, Different Types of Clusters, The Basic K-means Algorithm, Strengths and Weaknesses, Basic Agglomerative Hierarchical Clustering Algorithm.

Text Books:

1. Introduction to Data Mining: Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.

Reference Books:

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2. Data Mining: Introductory and Advanced topics : Dunham, Pearson.
3. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
4. Data Mining Techniques, Arun K Pujari, Universities Press

III Year B.Tech. (CSE). – II Semester**Design and Analysis of Algorithms****Course Objectives:**

Upon completion of this course, students will be able to do the following:

1. *Analyze the asymptotic performance of algorithms.*
2. *Write rigorous correctness proofs for algorithms.*
3. *Demonstrate a familiarity with major algorithms and data structures.*
4. *Apply important algorithmic design paradigms and methods of analysis.*
5. *Synthesize efficient algorithms in common engineering design situations.*

Course Outcomes:

- *Students who complete the course will have demonstrated the ability to do the following:*
- *Analyze worst-case running times of algorithms using asymptotic analysis.*
- *Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it.*
- *Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it.*
- *Describe the greedy paradigm and explain when an algorithmic design situation calls for it.*
- *Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.*
- *Explain the different ways to analyze randomized algorithms (expected running time, probability of error). Recite algorithms that employ randomization. Explain the difference between a randomized algorithm and an algorithm with probabilistic inputs.*
- *Analyze randomized algorithms. Employ indicator random variables and linearity of expectation to perform the analyses. Recite analyses of algorithms that employ this method of analysis.*

Unit-I

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis.

Unit-II

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort

Unit-III

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

Unit-IV

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Unit-V

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Unit-VI

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

Text Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. Design and Analysis of Algorithms , S Sridhar, Oxford
3. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu BALachandra Dave, 2ed, Pearson Education.

Reference Books:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein,PHI Pvt.Ltd.
4. Algorithm Design, Foundation, Analysis and internet Examples, Michel T Goodrich, Roberto Tamassia, Wiley.

Software Engineering

Course Objectives:

The students will have a broad understanding of the discipline of software engineering and its application to the development of and management of software systems.

Course Outcomes:

- *knowledge of basic SW engineering methods and practices, and their appropriate application;*
- *general understanding of software process models such as the waterfall and evolutionary models.*
- *understanding of the role of project management including planning, scheduling, risk management, etc.*
- *understanding of software requirements and the SRS document .*
- *understanding of different software architectural styles.*
- *understanding of implementation issues such as modularity and coding standards.*
- *understanding of approaches to verification and validation including static analysis, and reviews.*
- *understanding of software testing approaches such as unit testing and integration testing .*
- *understanding of software evolution and related issues such as version management.*
- *understanding on quality control and how to ensure good quality software.*
- *understanding of some ethical and professional issues that are important for software engineer*
- *development of significant teamwork and project based experience*

Unit-I

Introduction to Software Engineering: Software, Software Crisis, Software Engineering definition, Evolution of Software Engineering Methodologies, Software Engineering Challenges.

Software Processes: Software Process, Software development life cycle, Software Development Process Models.

Unit-II

Requirements Engineering: Software Requirements, Requirements engineering Process-Requirements elicitation, Requirements Analysis, Structured Analysis, Data Oriented Analysis, Object oriented Analysis, Prototyping Analysis, Requirements Specification, Requirements Validation, requirement Management.

Unit- III

Software Design: Software Design Process, Characteristics of Good Software Design, Design Principles, Modular Design, Design Methodologies, Structured Design, Transform Vs Transaction Analysis.

Object-Oriented Design: Object oriented Analysis and Design Principles, Performing user interface design

Unit-IV

Implementation: Coding Principles, Coding Process, Code verification, Code documentation

Software Testing: Testing Fundamentals, Test Planning, Black Box Testing, White Box Testing, Levels of Testing, Usability Testing, Regression testing, Debugging approaches

Unit -V

Project Planning and Estimation: Project Planning activities, Software Metrics and measurements, Project Size Estimation, Effort Estimation Techniques.

Unit- VI

Software Quality: Software Quality Factors, Verification & Validation, the Capability Maturity Model Integration

Software Maintenance: Software maintenance, Maintenance Process Models, Reengineering activities, Software Reuse.

Text Books:

1. Software Engineering, concepts and practices, Ugrasen Suman, Cengage learning
2. Software Engineering, 8/e, Sommerville, Pearson.
3. Software Engineering, 7/e , Roger S.Pressman , TMH

Reference Books:

1. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH.

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Web Technologies

Course Objectives:

This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web. The course will introduce web-based media-rich programming tools for creating interactive web pages.

Course Outcomes:

- *Analyze a web page and identify its elements and attributes.*
- *Create web pages using XHTML and Cascading Styles sheets.*
- *Build dynamic web pages.*

- *Build web applications using PHP.*
- *Programming through PERL and Ruby*
- *Write simple client-side scripts using AJAX*

Unit-I

History of the Internet and WWW: HTML 4 protocols- HTTP, SMTP, POP3, MIME, IMAP
HTML Common Tags: Lists, Tables, Images, Forms, Frames, Links & Navigation, Image Maps.

Unit-II

Cascading Style Sheets: Introduction, CSS properties, Types of CSS,
Introduction to Java Script, Objects in Java Script. Dynamic HTML with Java Script.

Unit-III

Working with XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX.

Unit-IV

AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX. Consuming WEB services in AJAX: (SOAP, WSDL, UDDI)

Unit-V

PHP Programming: Introducing PHP: Creating PHP script, Running PHP script.

Working with Variables and Constants: Using variables, Using constants, Data types, Operators.

Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases such as mySql, Oracle, SQL Sever.

Unit-VI

Introduction to PERL, Perl language elements, Interface with CGI- A form to mail program, Simple page search.

Text Books

1. Web Technologies, Uttam K Roy, Oxford
2. Programming the World Wide Web, Robert W Sebesta, 7ed, Pearson.
3. The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrelll, Gosselin, Zak, Karparhi, MacIntyre, Morrissey, Cengage

Reference Books

1. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
2. Web Technologies, HTML JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
3. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage.

Multimedia Computing

Course objectives:

To provide the foundation knowledge of multimedia computing, e.g. media characteristics, compression standards, multimedia representation, data formats, multimedia technology development.

Course Outcomes:

- *understand the characteristics of different media; understand the representations of different multimedia data; understand different data formats; be able to take into considerations in multimedia system designs;*
- *understand the characteristics of human's visual system; understand the characteristics of human's audio system; be able to take into considerations in multimedia techniques design and implementation;*
- *understand different compression principles; understand different compression techniques; understand different multimedia compression standards; be able to design and develop multimedia systems according to the requirements of multimedia applications.*
- *program multimedia data and be able to design and implement media applications;*

Unit-I

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

Unit-II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Unit-III

Multimedia data compression I: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression,

Unit-IV

Multimedia data compression II: Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

Unit-V

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

Unit–VI

Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

Text Books:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew Pearson Education.

Reference Books:

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Multimedia Basics by Weixel Thomson
6. Multimedia Technology and Applications, David Hilman , Galgotia

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Computer Networks & Network Programming Lab

Course Objectives:

- To teach students practical orientation of networking concepts
- To teach students various forms of IPC through Unix and socket Programming

PART – A

1. Implement the data link layer framing methods such as character stuffing and bit stuffing.
1. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
2. Implement Dijkstra's algorithm to compute the Shortest path in a graph.
3. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm
4. Take an example subnet of hosts. Obtain broadcast tree for it.

PART – B

1. Implement the following forms of IPC.
 - a) Pipes
 - b) FIFO

2. Implement file transfer using Message Queue form of IPC
3. Write a programme to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions
4. Design TCP iterative Client and server application to reverse the given input sentence
5. Design TCP iterative Client and server application to reverse the given input sentence
6. Design TCP client and server application to transfer file
7. Design UDP Client and server application to reverse the given input sentence
8. Design UDP Client server to transfer a file .

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Web Technologies Lab

List of Experiments:

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three **frames**.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame: At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link “MCA” the catalogue for MCA Books should be displayed in the Right frame.

Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA BCA	Description of the Web Site			






2) login page

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
MCA MBA BCA	Login:		<input type="text" value="14551AO531"/>	
	Password:		<input type="password" value="*****"/>	
	<input type="button" value="submit"/>		<input type="button" value="Reset"/>	

3) Catalogue Page:

The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

- Snap shot of Cover Page.
- Author Name.
- Publisher.
- Price.
- Add to cart button.

Logo		Web Site Name		
Home	Login	Registration	Catalogue	Cart
MCA		Book : XML Bible Author : Winston Publication : Wiely	\$ 40.5	
MBA		Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	
BCA		Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	
		Book : HTML in 24 hours Author : Sam Peter Publication : Sam	\$ 50	

4) Registration Page:

Create a “*registration form*” with the following fields

- Name (Text field)
- Password (password field)
- E-mail id (text field)
- Phone number (text field)
- Sex (radio button)
- Date of birth (3 select boxes)
- Languages known (check boxes – English, Telugu, Hindi, Tamil)
- Address (text area)

5) Design a web page using CSS (Cascading Style Sheets) which includes the following:

1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.).

Then, in the body of your pages, you refer to these selectors to activate the styles

6) Write an XML file which will display the Book information which includes the following:

- Title of the book
- Author Name
- ISBN number
- Publisher name
- Edition
- Price

Write a Document Type Definition (DTD) to validate the above XML file.

- 7) Write Ruby program reads a number and calculates the factorial value of it and prints the same.
- 8) Write a Ruby program which counts number of lines in a text file using its regular expressions facility.
- 9) Write a Ruby program that uses iterator to find out the length of a string.
- 10) Write simple Ruby programs that uses arrays in Ruby.
- 11) Write programs which uses associative arrays concept of Ruby.
- 12) Write Ruby program which uses Math module to find area of a triangle.
- 13) Write Ruby program which uses tk module to display a window
- 14) Define complex class in Ruby and do write methods to carry operations on complex objects.
- 15) Write a program which illustrates the use of associative arrays in perl.
- 16) Write perl program takes a set names along the command line and prints whether they are regular files or special files
- 17) Write a perl program to implement UNIX 'passwd' program
- 18) An example perl program to connect to a MySQL database table and executing simple commands.
- 19) Example PHP program for contactus page.
- 20) **User Authentication:**

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a PHP for doing the following.

 1. Create a Cookie and add these four user id's and passwords to this Cookie.
 2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display " You are not an authenticated user ".

Use init-parameters to do this.
- 21) Example PHP program for registering users of a website and login.
- 22) Install a database (Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form).

Write a PHP program to connect to that database and extract data from the tables and display them.

Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).
- 23) Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).
- 24) Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.

25) **HTTP** is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method `session.invalidate()`).

Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

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LINUX Programming Lab

List of Experiments:

1.
 - a) Study of Unix/Linux general purpose utility command list man,who,cat, cd, cp, ps, ls, mv, rm, mkdir, rmdir, echo, more, date, time, kill, history, chmod, chown, finger, pwd, cal, logout, shutdown.
 - b) Study of vi editor.
 - c) Study of Bash shell, Bourne shell and C shell in Unix/Linux operating system.
 - d) Study of Unix/Linux file system (tree structure).
 - e) Study of .bashrc, /etc/bashrc and Environment variables.
2. Write a C program that makes a copy of a file using standard I/O, and system calls
3. Write a C program to emulate the UNIX `ls -l` command.
4. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: `- ls -l | sort`
5. Write a C program that illustrates two processes communicating using shared memory
6. Write a C program to simulate producer and consumer problem using semaphores
7. Write C program to create a thread using pthreads library and let it run its function.
8. Write a C program to illustrate concurrent execution of threads using pthreads library.

