

Course Structure and Syllabus

II BTech CSE II Semester

(From the admitted batch of 2016 – 2017 under CBCS Scheme)

Sub Code	Subject	Hrs/Week		Max Marks		Total Marks	Credits
		Theory	Lab	Internal	External		
BTCSE401	COMPUTER ORGANIZATION	4	--	25	75	100	4
BTCSE402	DESIGN AND ANALYSIS OF ALGORITHMS	4	--	25	75	100	4
BTCSE403	DATABASE MANAGEMENT SYSTEMS	4	--	25	75	100	4
BTCSE404	FORMAL LANGUAGES AND AUTOMATA THEORY	4	--	25	75	100	4
BTCSE405	SOFTWARE ENGINEERING	4	--	25	75	100	4
BTCSE406	DISCRETE MATHEMATICAL STRUCTURES	4	--	25	75	100	4
BTCSE407	COMPUTER ORGANIZATION LAB	--	3	50	50	100	2
BTCSE408	DATABASE MANAGEMENT SYSTEMS LAB	--	3	50	50	100	2
TOTAL		24	6	250	550	800	28

BTCSE401: COMPUTER ORGANIZATION

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT-I

Basic Computer Organization: Basic Computer Organization: Instruction Codes-Stored Program Organization, Indirect Address, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Design of Accumulator Logic, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes.

UNIT-II

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

UNIT-III

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

UNIT-IV

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

TEXT BOOKS:

1. Computer System Architecture: Morris Mano.
2. Fundamentals of Microprocessor and Microcomputers: B.Ram-Dhanpat Rai Publications.

REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
2. Structured Computer Organization and Design - Andrew S. Tanenbaum, 4th Edition PHI/Pearson.
3. Fundamentals or Computer Organization and Design –SivaramaDandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, Jhon L. Hennessy and David A. Patterson, Fourth Edition Elsevier.

BTCSE402:DESIGN AND ANALYSIS OF ALGORITHMS

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT-I

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

UNIT-II

Brute Force: Selection sort, Bubble sort, Exhaustive search.

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

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

UNIT-III

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

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

UNIT-IV

Branch and Bound: The Method: Least cost (LC) Search, The 15-Puzzle: An Example, Control Abstraction for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch and Bound. 0/1 Knapsack Problem: LC Branch-and Bound Solution, FIFO Branch-and-Bound Solution, Traveling Salesperson. Basic Concepts of NP-Hard and NP-Complete Problems.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms E. Horowitz S. Sahni, SanguthevarRajasekaran, University Press 2nd Edition.
2. Introduction to the design and analysis of algorithms, Analysis of Algorithms: Anany Levitin 3rd Edition.

REFERENCE BOOKS

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

BTCSE403:DATABASE MANAGEMENT SYSTEMS

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT I

Database System Introduction: Data, DBMS, Database Users, Advantages and Applications of DBMS

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

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

UNIT II

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

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

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

UNIT III

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

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

UNIT IV

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

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

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

TEXT BOOK:

1. Fundamentals of Database System, Elmasri, Navathe, Pearson Education.

REFERENCES BOOKS:

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

BTCSE404: FORMAL LANGUAGES AND AUTOMATA THEORY

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT-I

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

UNIT-II

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

UNIT-III

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

UNIT-IV

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

BTCSE405:SOFTWARE ENGINEERING

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT-I

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

UNIT-II

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

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

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

UNIT-III

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

Coding: Programming Principles and Guidelines, Structured Programming, Information Hiding, Some Programming Practices, Coding Standards, Incrementally Developing Code, An Incremental Coding Process, Test-Driven Development, Pair Programming. Managing Evolving Code: Source Code Control and Build, Refactoring,

UNIT-IV

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

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

TEXT BOOK:

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

REFERENCE BOOKS:

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

BTCSE406:DISCRETE MATHEMATICAL STRUCTURES

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT – I

Foundations: Sets, Relations and Functions, Methods of Proof and Problem Solving Strategies, Fundamentals of Logic, Logical Inferences, Methods of Proof of an implication, First order Logic & Other methods of proof, Rules of Inference for Quantified propositions, Mathematical Induction.

UNIT – II

Elementary Combinatorics, Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutation with Constrained repetitions. Recurrence relations, Generating functions of sequences, Calculating Coefficients of Generating Functions.

UNIT – III

Recurrence relations, Solving recurrence relations by Substitution and generating functions. The methods of characteristic roots, solutions of inhomogeneous recurrence relations. Relations and digraphs, Special properties of binary relations, Equivalence relations. Operations on relation, Ordering Relations, Lattices and Enumerations.

UNIT – IV

Trees: Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees.

Graphs: Basic Concepts, Isomorphisms and Subgraphs, Planar Graphs, Euler's Formula; Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four Color Problem.

TEXT BOOK:

1. Toe L.Mott, Abraham Kandel & Theodore P.Baker, Discrete Mathematics for Computer Scientists & Mathematicians, PHI 2nd edition, 2016.

REFERENCE BOOKS:

1. J.P. Trembly and R. Manohar- Discrete Mathematics for Computer Scientists & Mathematicians, PHI Ltd., New Delhi, 2nd Edition, 2008
2. Kenneth H Rosen-Discrete Mathematics & its Applications, TMH, 6th Edition, 2009

BTCSE407:COMPUTER ORGANIZATION LAB

Lab : 3 Hrs/week

Credits : 2

Int Marks : 50

Ext Marks : 50

DigitalLogicDesignExperiments:

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

8085/86AssemblyLanguageProgramming:

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

REFERENCES:

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

BTCSE408:DATABASE MANAGEMENT SYSTEMS LAB

Lab : 3 Hrs/week

Credits : 2

Int Marks : 50

Ext Marks : 50

SQL

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

PL/SQL

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

REFERENCES:

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