

S.Y.B.Tech (Computer Engineering) Sem –I (2020-21)

Reduced Syllabus

BTCOC303 Data Structures

Unit 1 5 Hrs
Introduction: Data, Data types, Data structure, Abstract Data Type (ADT), representation of Information, characteristics of algorithm, program, analyzing programs.

[Topics for self study mode characteristics of algorithm, program, analyzing programs]

Unit 2 5 Hrs
Arrays and Hash Tables: Concept of sequential organization, linear and non-linear data structure, storage representation, Hash Tables, Direct address tables, Hash tables,

[Topics for self study mode array processing sparse matrices, transpose of sparse matrices. Hash functions, Open addressing, Perfect hashing.]

Unit 3 5 Hrs
Searching and Sorting: Sequential, binary searching, skip lists – dictionaries, linear list representation, skip list representation, operations – insertion, deletion and searching.

[Topics for self study mode Insertion sort, selection sort, radix sort, File handling]

Unit 4 5 Hrs
Linked Lists: Concept of linked organization, singly and doubly linked list and dynamic storage management, dynamic memory management, garbage collection.

[Topics for self study mode circular linked list, operations such as insertion, deletion, concatenation, traversal of linked list]

Unit 5 5 Hrs
Stacks and Queues: Introduction, stack and queue as ADT, representation and implementation of stack and queue using sequential and linked allocation, Circular queue and its implementation,

[Topics for self study mode Application of stack for expression evaluation and expression conversion, recursion, priority queue]

Unit 6 5 Hrs
Trees and Graphs: Basic terminology, binary trees and its representation, insertion and deletion of nodes in binary tree, binary search tree and its traversal, threaded binary tree, Heap, Balanced Trees.

[Topics for self study mode Terminology and representation of graphs using adjacency matrix, Warshall's algorithm].

Reference Books:

1. E. Horowitz, S. Sahani, Fundamentals of Data Structures, Galgotia Publication, 1st Edition, 1983.
2. Thomas Cormen, Introduction to Algorithms, PHI Publication, 2nd Edition, 2002.
3. Venkatesan & Rose, Data Structures, Wiley Publication, 1st Edition, 2015.

4. Goodrich & Tamassia, Data Structure & Algorithm in C++, Wiley Publication, 2nd Edition, 2011.
5. R. G. Dromey, "How to Solve it by Computer", 2nd Impression, Pearson Education.
6. Kyle Loudon, Mastering Algorithms with C: Useful Techniques from Sorting to Encryption, O'Reilly Media, 1st Edition, 1999.

Text Books:

1. Mark Allen Weiss, Data structures and algorithms analysis in C++, Pearson Education, 4th Edition, 2013.
2. S. Lipschutz, Data Structures, McGraw-Hill Publication, Revised 1st Edition, 2014.
3. Y. Langsm, M. Augenstin, A. Tanenbaum, Data Structure using C and C++, Prentice Hall India Learning Private Limited, 2nd Edition, 1998.
4. Trembley and Sorenson, Introduction to Data Structures, PHI Publication, 2 nd Revised Edition, 1983.
5. Vishal Goyal, Lalit Goyal, A Simplified Approach To Data Structure, SPD Publication, 1st Edition, 2014.

BTCOC304 Computer Architecture and Organization

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| Unit 1 | | [05 Hrs] |
| | Introduction: Concept of computer organization and architecture, Fundamental unit, Computer function and interconnection,
[CPU structure and function - In Self Study Mode]. | |
| Unit 2 | | [05 Hrs] |
| | Instruction Sets: Characteristics, Types of operands, Types of operations, Assembly language, Addressing modes, Instruction format, Types of instruction, Instruction execution,
[Machine state and processor status, Structure of program, Introduction to RISC and CISC architecture -In Self Study Mode]. | |
| Unit 3 | | [05 Hrs] |
| | Computer Arithmetic: The arithmetic and logic Unit, Integer representation, Integer arithmetic, Floating point representation, Floating point arithmetic,
[Introduction of arithmetic co-processor - In Self Study Mode]. | |
| Unit 4 | | [05 Hrs] |
| | Memory Organization: Internal Memory: Semiconductor main memory, Error correction, Advanced DRAM organization, Virtual memory systems and cache memory systems, Magnetic tape,
[External Memory: Organization and characteristics of magnetic disk, Optical memory, RAID, Memory controllers In Self Study Mode] | |
| Unit 5 | | [05 Hrs] |
| | Control Unit: Control unit operation: Micro-operations, Control of the processor, Hardwired implementation, Micro-programmed Control Unit, Basic concepts,
[Micro-instruction sequencing, Microinstruction execution, Applications of micro-programming - In Self Study Mode] | |
| Unit 6 | | [05 Hrs] |
| | Input/ Output Organization: External devices, I/O module, Programmed I/O, Interrupt driven I/ O, Direct memory access, I/O channels and processors, External interface. Instruction pipe-lining: Concepts.
[Parallel processing: Multiple processor organization, Symmetric multiprocessor, Cache coherence and the MESI protocol - In Self Study Mode]. | |

BTBSC301) Engineering Mathematics III

Unit 1: Laplace Transform

Definition – conditions for existence ; Transforms of elementary functions; Properties of Laplace transforms - Linearity property, first shifting property, second shifting property, transforms of functions multiplied by t^n , scale change property, transforms of functions divided by t , transforms of integral of functions, transforms of derivatives ; Evaluation of integrals by using Laplace transform Transforms of some special functions-, Heaviside-unit step function, Dirac delta function. [06 Hours]

[Topics for self study mode periodic function]

Unit 2: Inverse Laplace Transform

Introductory remarks ; Inverse transforms of some elementary functions ; General methods of finding inverse transforms ; Partial fraction method and Convolution Theorem for finding inverse Laplace transforms [06 Hours]

[Topics for self study mode Applications to find the solutions of linear differential equations and simultaneous linear differential equations with constant coefficients]

Unit 3: Fourier Transform

Definitions – integral transforms ; Fourier integral theorem (without proof) ; Fourier sine and cosine integrals ; [05 Hours]

[Topics for self study mode Complex form of Fourier integrals ; Fourier sine and cosine transforms Properties of Fourier transforms, Parseval's identity for Fourier Transform]

Unit 4: Partial Differential Equations and Their Applications

Formation of Partial differential equations by eliminating arbitrary constants and functions; Equations solvable by direct integration; Linear equations of first order (Lagrange's linear equations)

[Topics for self study mode Method of separation of variables – applications to find solutions of one dimensional heat flow equation and two dimensional heat flow equation] [05 Hours]

Unit 5: Functions of Complex Variables (Differential calculus)

Limit and continuity of $f(z)$; Derivative of $f(z)$; Analytic functions; Cauchy- Riemann equations in Cartesian and polar forms; Harmonic functions in Cartesian form; Mapping: Translation, magnification and rotation, inversion and reflection , Conformal mapping.

[Topics for self study mode bilinear transformation] [06 Hours]

Unit 6: Functions of Complex Variables (Integral calculus)

Cauchy's integral theorem; Cauchy's integral formula; Residues

[05 Hours]

[Topics for self study mode; Cauchy's residue theorem (All theorems without proofs).

Text Books

1. Higher Engineering Mathematics by B. S. Grewal, Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley & Sons, New York.
3. A Course in Engineering Mathematics (Vol III) by Dr. B. B. Singh, Synergy Knowledge ware, Mumbai.
4. A Text Book of Applied Mathematics (Vol I & II) by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
5. Higher Engineering Mathematics by H. K. Das and Er. Rajnish Verma, S. Chand & CO. Pvt. Ltd., New Delhi.

Reference Books

1. Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi.
2. A Text Book of Engineering Mathematics by Peter O' Neil, Thomson Asia Pte Ltd., Singapore.
3. Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata McGraw-Hill Publishing Company Ltd., New Delhi.
4. Integral Transforms and Their Engineering Applications by Dr. B. B. Singh, Synergy . Knowledge ware, Mumbai.
5. Integral Transforms by I. N. Sneddon, Tata McGraw-Hill, New York.