B.Tech (Computer Engineering) Semester III
HF-201 Humanities and Social Sciences (X-X-X) 2
Please refer to Department of Humanities and Social Sciences.
CP-221 Logic System Design (3-0-0) 3
Introduction to Boolean algebra: Binary connectives, Evaluation of truth functions, Truth – function calculus as Boolean Algebra, Duality, Fundamental theorems of Boolean Algebra and simplification of Boolean expressions.
Realisation of Logic Circuits: Standard forms of Boolean Functions, Minterm and Maxterm, designation of functions. Simplification of functions on Karnaugh maps, incompletely specified functions.
Selection of an optimal set of prime implicants, multiple output circuits and map minimization of multiple output circuits. Tabular determination of multiple output prime implicants.
Latches, Flip Flops: JK, SR, D Type and T type Flip Flops and their working principals.
Counters and shift registers: Ripple, decade, up-down counters, Mod-n counters and series, parallel registers. General characteristic of sequential circuits, clock, pulse and level mode sequential circuits.
Analysis and design of sequential circuit. Synthesis of state diagrams, finite memory circuits, equivalence relations, equivalent states and circuits, determination of classes of in distinguishable states and simplification by implicant tables. Mealy and Moore machines, state assignment and memory element input equation, Partitioning and state assignment. General pulse-mode circuits, clock input counters, extended state tables.
Asynchronous Mode Circuits: Analysis of a fundamental mode circuits, Synthesis of flow tables, minimization, transition tables, excitation maps and output maps, Cycles and Races, Race free assignments, Hazards in sequential circuits.
Introduction to A/D and D/A converters.
Text/References:
1. Digital Systems and Hardware and Firmware Algorithms: M.Ercogevac and T. Lang, Pearson.
5. Malvino leech: Digital Electronics
CP-223 Data Structures (3-0-0) 3
Introduction to Data structures.
Arrays: Representation – row-major, column-major, sparse matrix – implementation, addition, multiplication; polynomial – Representation, addition, evaluation and multiplication.
Strings: Representation, operations, string matching - Brute force or naïve, Robin-Karp, Knuth-Morris-Pratt.
Linked List: Static and dynamic implementation, single, double, circular, multiple linked list.
Stack: Static and dynamic implementation, expression evaluation, prefix (polish), infix, postfix (inverse polish) expressions, application, multiple stacks, recursion.
Queues: Static and dynamic implementation, applications, circular queue, multiple queue.
Tree: Binary tree, binary search tree, static and dynamic implementation, tree operations -
deletion and search, tree traversal, Binary heaps. Introduction to AVL trees and B trees.
Sorting: Insertion sort, selection sort, Bubble sort, quick sort, merge sort, heap-sort, radix sort (bucket sort).
Searching: Linear and binary search, hashing.
Graph: Representation of graphs, BFS, DFS, topological sort.

Text/References:
2. Kruse R.L., Data Structure and Program Design, PHI.
3. Horowitz and Sahni: Data Structure in C++, Glagotia
4. Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structures
5. Aaron M. Tenenbaum, Y. Langsam, Moshe J. Augenstein, Data Structures Using C
7. Sartaj Sahni, Data Structures, Algorithms, and Applications in C++

CP-225 Probability and Statistics (3-0-0) 3

Probability Theorem: Properties of probability, Conditional probability, Independence, Bayes theorem

Discrete Distributions: Probability distribution functions and cumulative distribution functions
Mean and variance; moment-generating functions, Marginal and conditional probability distributions,
Some specific discrete distributions

Continuous Distributions: Probability density functions and cumulative distribution functions,
Mean and variance; moment generating functions, Marginal and conditional probability distributions,
Some specific continuous distributions

Functions of Random Variables: Distribution function technique, Transformation technique,
Moment generating function techniques

Text/References:
CP-227 Abstract Algebra (3-0-0) 3

Number sieves.

**Group Theory:** Groups, Semi groups and Monoids, Cyclic semi graphs and sub monoids, Subgroups and cosets, Congruence relations on Semi groups, Factor groups and homomorphisms, Morphisms
Normal sub groups. Structure of cyclic groups, Permutation groups, dihedral groups, Sylow theorems,
abelian groups; solvable groups, Nilpotent groups; groups of small order, elementary applications in coding theory.

**Rings:** Rings, Subrings, Morphism of rings, ideal and quotient rings, Euclidean domains, Commutative rings; integral domains, noncommutative examples, Structure of Noncommutative Rings, Ideal Theory of Commutative Rings

**Field Theory:** Integral domains and Fields, polynomial representation of binary number, Galois fields,
primitive roots, discrete logarithms, split search algorithm.

**Modules:** Sums and products; chain conditions, Composition series; tensor products.

**Text/ References:**
   Student Texts #47, 1999.

CP-251 LSD Lab (0-0-3) 2

The following proposed coverage are broad guiding areas lab. The instructor offering the course in consultation with the theory offered can adopt further variations in tune with CP-221.

1. Truth table verification – NAND gate, NOR gate, OR gate, AND gate, NOT gate.
2. Verifying if NAND gate is a universal gate.
3. Constructing XOR gate using NOR gate only.
4. Realizing given truth table using SOP form.
5. Realizing given truth table using POS form.
7. Design of binary-gray encoder.
8. Design of parity generator and detector.
Text/References:
1. Digital Systems and Hardware and Firmware Algorithms: M.Ercegovac and T. Lang, Pearson.
5. Malvino leech: Digital Electronics

CP-253 Data Structure Lab (0-0-3) 2
The following proposed coverage are broad guiding areas lab. The instructor offering
the course
in consultation with the theory offered can adopt further variations in tune with CP-223.
Programs in C or C++ for following:
2. Searching programs: Linear Search, Binary Search.
3. Array implementation of Stack, Queue, Circular Queue, Linked List.
4. Implementation of Stack, Queue, Circular Queue, dynamic memory allocation.
5. Infix to postfix (prefix) conversion.
6. Program for expression evaluation.
8. Program for graph traversal (BFS, DFS).
9. Program for minimum cost spanning tree, shortest path.

Text/References:
2. Kruse R.L., Data Structure and Program Design, PHI.
3. Horowitz and Sahni: Data Structure in C++ , Glagotia
4. Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structures
5. Aaron M. Tenenbaum, Y. Langsam, Moshe J. Augenstein, Data Structures Using C
Computation)
7. Sartaj Sahni, Data Structures, Algorithms, and Applications in C++

Open Elective I (X-X-X) 3/4
Please refer to concerned Department.