Course code : CSE-2404
Course title : Computer Algorithms sessional
Credit Hours: 1.5   **Contact Hours: 3** per week
[Prerequisite courses: CSE-2304 (Data structures)]

Laboratory works based on CSE-2403
Implementation and Analysis of Insertion sort, Merge sort, Quick sort, Heap sort, Counting sort, Radix sort, Matrix Chain Multiplication, Longest Common Subsequence, Job selection problem, Breadth First Search , Depth First Search, Bellman-Ford's Algorithm, Dijkstra's Algorithm, Floyd-Warshall Algorithm, Random Number Generation, Backtracking Algorithm, N-Queen Problem, Huffman Algorithm, Knapsack Problem, Minimum Spanning Tree.
To perform also other experiments relevant to this course.

Course code : CSE-2405
Course title : Digital Electronics and Pulse Techniques
Credit Hours: 3   **Contact Hours: 3**per week

Objectives: The objective of this course is to provide students the fundamental concepts that underlie the physical operation, analysis and design of digital integrated circuits and systems. The course will cover the mathematical and theoretical foundations of Digital Electronics and Pulse Technique. The course will also provide students with an understanding of how to analyze, build and troubleshoot digital circuits.

Section-A (Mid-term: 30 Marks)

1. Wave shaping: Linear wave shaping, Wave shaping techniques, High pass and low pass RC circuits (sinusoidal, step voltage, pulse, square wave, exponential and ramp inputs).

2. Diode and Op-amp circuit applications: Clipping and Clamping circuits, Design of different Clipping and Clamping circuits according to application, RLC circuit response, Ringing circuits,

3. Operational Amplifiers:Introduction to Operational Amplifiers (OP-AMP), Linear application of Op-amps,Comparator circuits,Zero crossing detector, Positive and Negative voltage level detectors and other applications.

Section-B (Final Exam: 50 Marks)

Group-A (20 Marks)

4. Switching and Time-based circuits: Switching concept of diodes and transistors, Pulse transformers, Pulse transmission, Pulse generation, Equivalent circuit of pulse transformer, Pulse transformer response in different regions, Application of pulse transformers, Timing circuits.

5. Stable state and regenerative switching: Monostable, bistable and astablemultivibrators, use of multivibrators, Schmidt trigger, blocking oscillators.

Group-B (30 Marks)

6. Logic gates: Transistor, MOS gates, propagation delay, product and noise immunity; open collector and high impedance gates, construction of NAND, NOR, NOT and other gates using TTL and CMOS logic, totem poles.

7. Integrated Circuits as Digital System: Digital integrated circuits, SSI, MSI, LSI and VLSI logic gates Flip-flop, registers, counters, coder, decoder, encoder, multiplexer, demultiplexer. Design of user defined applications using logic gates.

8. ADC/DAC and others: ADC and DAC working principles and applications, Sample and Hold (S/H) circuits, LED, LCD, pulse width modulation (PWM), microcontroller, ADC and DAC in microcontrollers.

CSE

Recommended Books:

1. Jacob Millman and Herbert Taub : Pulse, Digital and Switching Electronics.
2. Robert Coughlin :Operational Amplifier and Linear Integrated Circuits
3. Tocci : Digital Systems
4. 5. M.Mouris Mano : Digital and Computer Design
6. S.C.Lee : Digital Circuits and Logic Design
7. Neschalski : Digital Computer
8.V.K.Jain : Switching theory and Digital Electronics
9. Stephen Brown and Zvonko Vranesic : Fundamentals of digital logic with VHDL design

Course code : CSE-2406
Course title : Digital Electronics and Pulse Techniques Sessional
Credit Hours: 1   **Contact Hours: 2** per week

Laboratory works based on CSE-2405
1. To construct and study the low pass/high pass RC circuit.
2. Construct and study the characteristics of Monstable circuit.
3. Construct and study the characteristics of Bistable circuit.
4. To construct and study
5. a blocking oscillator.
6. To perform also other experiments relevant to this course.

Course code : CSE-2407
Course title : **Database Systems**
Credit Hours: 3   **Contact Hours:** 3 per Week

Objectives:
☐ Understand user requirements/views
☐ Analyze existing and future data processing needs
☐ Develop an enterprise data model that reflects the organization's fundamental business rules
☐ Develop and refine the conceptual data model, including all entities, relationships, attributes, and business rules
☐ Integrate and merge database views into conceptual model
☐ Apply normalization techniques
☐ Identify data integrity and security requirements
☐ Derive a physical design from the logical design taking into account application, hardware, operating system, and data communications networks requirements

Section-A (Mid-term: 30 Marks)

1. Introduction: Database, data, database management system, Database system versus file system, Data model, Database language, Database user administration, Database system structure, Storage manager, Overview of Physical storage medium.
2. Entity-Relationship Model: Entity sets, Relationship sets, Mapping Cardinalities, Keys, Attributes, Entity relationship diagram, Weak entity sets, Specialization, Generalization, Structure of Relational databases, Database Schema.
3. The Relational Algebra and SQL: Selection, projection, Union, Set difference, Cartesian-product, Rename, Set-intersection, Natural-join, Division, Assignment, projection, Aggregate functions, Deletion, Insertion, Updating, Views, Nested sub-queries, Set membership, Set comparison.