SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.

(An Autonomous Institute Affiliated to RGPV Bhopal)

Department of Electronics Engineering

Syllabus applicable to July 2022 admitted and later batches

Name of the course:	B. Tech in Electronics & Communication Engineering
Semester and Year of study	B. Tech 1st Year 2nd Semester
Subject Category	Engineering Science Course (ESC)
Subject Code: ECA103	Subject Name: Digital Electronics

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			**Total Marks**				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Applied Physics, Basic Electronics

Course Objective:

The objective of this course is to provide the fundamental concepts associated with the digital logic and circuit design. To familiarize students with the different number systems, logic gates, minimization of logic circuits and combinational and sequential circuits utilized in the different digital circuits and systems. The course will help student to design and analyze the digital circuits and systems.

Course Outcomes:

Upon completion of this course, the student will be able to:

- CO1: Convert different number systems and codes used in digital circuits and systems.
- CO2: Simplify and analyze the digital logic circuits using Boolean algebra and other mapping techniques.
- CO3: Analyze and design different combinational and sequential logic circuits using different mapping techniques and mathematical tools.
- CO4: Compare different types of logic families in the domain of performance, efficiency and economy.

UNITs	Descriptions	Hrs.	CO's
I	**Introduction to Digital Electronics**: Review of number system and conversions; Binary Arithmetic, Signed and Unsigned representation, Binary codes, Gray Code, Code Conversions, Error detection and correction codes - parity check codes and Hamming code.	10	CO1
II	**Boolean Algebra and Switching Functions -** Study of basic logic gates, Basic postulates and fundamental theorems of Boolean algebra; Standard representation of logic functions - SOP and POS forms; Simplification of switching functions - K-map and Quine-McCluskey tabular methods.	8	CO2
III	**Combinational Logic Modules and their applications**: Adders, Subtractors, Code Converters, parity generators and comparators, Encoders & Decoders, BCD to seven-segment decoder, Multiplexers & Demultiplexers and their applications.	9	CO3
IV	**Sequential Circuits and Systems:** Set-Reset latches and flip flops, D-flipflop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge triggered flip-flop, T flip-flops, Shift registers, classification of shift registers, Counters, classification: asynchronous counters, synchronous counters, counters design using flip flops, Introduction to finite state machines.	10	CO3
V	**Logic families:** IC specification terminology, Operational characteristics of BJT in saturation and cut-off regions, Operational characteristics of MOSFET as switch; Introduction to different logic	08	CO4

	families; TTL, CMOS, ECL, IIL etc., Structure and operations of TTL and CMOS gates, comparison of performance characteristics of various logic families.		
Guest Lectures (if any)		May be arranged as required	
Total Hours		45	

Suggestive list of experiments:

1. Study of different digital IC's in term of their technical specification. (Pin diagram application etc.) Testing of IC's by using IC tester. (CO4)
2. Study of different digital logic gates and verifications of their truth table. (CO2)
3. To design the basic logic gates using universal gates and verify their truth table. (CO2)
4. To design 4-bit two input adder using 7483 IC and verify truth table. (CO3)
5. To convert the Binary code to Gray code using 7486 IC. (CO1, CO3)
6. To study and verify the De Morgan's Theorem. (CO2)
7. To design the half adder using Universal gate. (CO3)
8. To Design the full adder using Universal gate. (CO3)
9. Verification of state tables of RS, and JK flip-flops using NAND & NOR gates. (CO3)
10. Verification of state tables of T and D flip-flops using NAND & NOR gates. (CO3)

Text Book-

- M. Mano, "Digital Logic and Computer Design", Pearson Education.
- T. L. Floyd, "Digital Fundamentals", Pearson Education.
- A. Anand Kumar, "Fundamentals of Digital Circuits", PHI.

Reference Books-

- R.J. Tocci, "Digital Systems Principles &: Applications".
- W.H. Gothman, "Digital Electronics" (PHI).

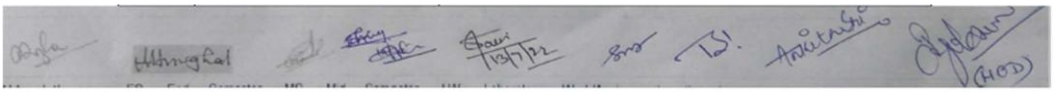
List and Links of e-learning resources:

1. https://nptel.ac.in/courses/108/105/108105132/
2. https://de-iitr.vlabs.ac.in/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, lab work, end-semester examinations, and end-semester practical examinations.

Recommendation by Board of studies on	15.06.2022
Approval by Academic council on	
Compiled and designed by	



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Syllabus applicable to July 2022 admitted and later batches

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	ECA102	Subject Name:	Problem Solving using Data Structures

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Logical thinking and Computer Fundamentals

Course Objective:

Introduce the fundamentals of data structures and how these concepts are useful in problem solving.

Course Outcomes:

CO-1Understand- Problem solving using of data structure and various searching and sorting methods.

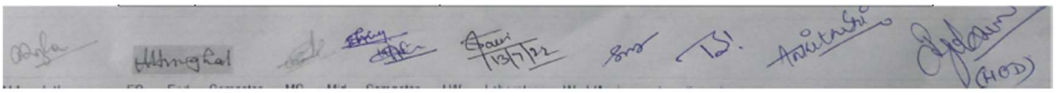
CO-2 Apply- Apply different concepts of data structures to solve different computing problems.

CO-3 Analyse- Analyze the access pattern of various data structure and understand their applicability.

CO-4 Evaluate-Evaluate and Compare the performance of different data structures on real world problems.

CO-5 Discuss- Graph and Tree structure with their operations and applicability

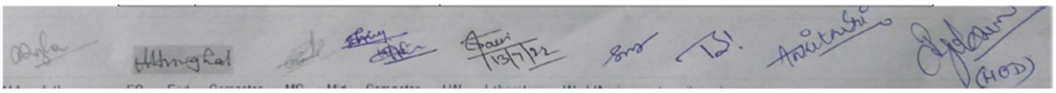
UNITs	Descriptions	Hrs.	CO's
I	Problem solving concepts: top-down, bottom-up design, Concept of datatype, variable, constant and pointers. Dynamic memory allocation. Algorithm: Definition and complexity Analysis. Introduction to data structure: Linear, Nonlinear, Primitive and Nonprimitive. **Arrays-**Concepts of Arrays, Single dimensional array, two-dimensional array- Representation and Address Calculation, Operations on arrays with algorithms (traversing, searching, inserting, deleting) and analysis.	08	
II	**List-**Singly linked lists: Representation in memory, Operations on singly linked list with algorithms (traversing, searching, insertion, deletion)Doubly linked list-Operations with algorithms and analysis. Circular linked lists-Operations with algorithms and analysis.	06	



	Representation & manipulations of polynomials/sets using linked lists.		
III	**Stack-** Introduction to Stack and its operations, Implementation of stack using array and linked list with comparison. Application of stacks (Polish Notations, converting infix to postfix notation, evaluating postfix notation, Parenthesis balancing, Recursion). **Queue-** Introduction to Queue and its operations. Implementation of queue using array and linked list. De-queue, circular queue, priority queue. Applications of queue.	09	
IV	**Tree-** Definition and terminology, concept of binary tree and representation, Traversing binary tree(pre order, post order, in order) Operation with algorithm -insertion and deletion. Binary Search Trees and Concept of balance tree (AVL). **Graph-** Definition and terminology, Types of graphs, Representation of graph. Traversing of graph- Breadth First Traversing and Depth First Traversing.	09	
V	**Searching-** Search methods- Linear search, Binary search and Hashing (collision, chaining and probing) with their algorithms and analysis. **Sorting-**Sorting Methods-Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Radix sort, Shell sort with their algorithms and analysis.	08	
Guest Lectures (if any)		--	
Total Hours		40	

List of Experiments

1. Write program to implement pointers and structure in C to understand the concepts of Dynamic memory allocation.
2. Write a program to implement concept of linear array with following operations:
   i. Traverse an array.
   ii. Find minimum item, maximum item, and average of an array items.
   iii. Insert a new item at beginning, end and middle position within an array.
   iv. Delete an item from an array.
3. Write a program to implement singly linked list with following operations
   i. Insert a new item at beginning, end and middle position within a single linked list.
   ii. Delete an item from single linked list.
   iii. Traverse a single linked list.
4. Modify the singly linked list program to make it for doubly linked list.
5. Write a program to implement Stack with its operations (Push, Pop, Peek, IsEmpty) using:
   i. Using array
   ii. Using linked list
6. Write a program to evaluate postfix notation using stack.
7. Write program to implement queue with its operations (enqueue, dequeue) using:
   i. Using array



ii. Using linked list

8. Modify the queue program to implement circular queue with its operations.
9. Write a program to implement binary search tree with insert and delete operations.
10. Write a program to implement depth first traverse and breadth first traverse on a graph.
11. Write program to implement linear search and binary search on a given array.
12. Write a program to sort a given list of 10000 random integers and compare their execution time using:
    i. Bubble sort
    ii. Insertion sort
    iii. Merge sort
    iv. Quick sort
    v. Radix sort

Reference Books-

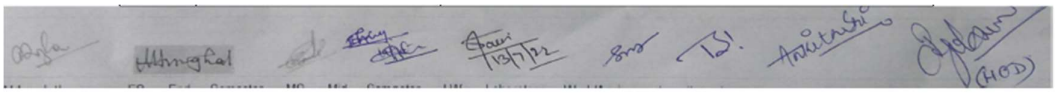
- Data Structure- Schaum's Series- McGraw Hill Publication
- Data Structure- Horwitz and Sartaj Sahni
- Data Structure through C, Yashwant Kanekar, BPB Publication.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

Recommendation by Board of studies on	June-2022
Approval by Academic council on	June-2022
Compiled and designed by	
Subject handled by department	



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Name of the course:	B. Tech in Electronics & Communication Engineering
Semester and Year of study	B. Tech 1st Year 2nd Semester
Subject Category	Engineering Science Course (ESC)
Subject Code: ECL110	Subject Name: Electronics Workshop

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
-	-	-	-	30	10	10	**50**	1	0	2	**2**

Prerequisites:

Applied Physics, Basic Electronics

Course Objective:

The aim of the course content is to develop different types of skills leading to the achievement of the following competency:

(i) Test various electrical and electronics components, and measure circuit parameters.
(ii) Able to identify various Resistors, capacitors, inductors and transformers etc.. Use of instruments such as analog & digital multimeter, CRO and Function generator, etc.
(iii) Interpret data sheet of various electronics components, different ICs and their schematic/ pin diagram.
(iv) Use of Bread board, PCB design software and assembly of electronics components.

Course Outcomes:

After completion of the course the students will be able to:

1. Identify electronics components' schematic symbols and interpret its parameters using data sheets. Perform their testing using lab instruments.
2. Design prototype circuit on a bread board or simulator and use it to assemble and test it.
3. Describe PCB design technique and assemble the electronic circuits.
4. Locate the fault and troubleshoot the circuit board.
5. Design and complete a mini-project.

Suggestive list of experiments:

1. Identification, Study and Testing of various electronic components: (a) Resistances-Various types, Color coding (b) Capacitors-Various types, Color coding, (c) Inductors (d) Diodes (e) Transistors (f) SCRs (g) ICs (h) Photo diode (i) Photo transistor (j) LED (k) LDR (l) Potentiometers (m) PID diagram, etc. (CO1)
2. Study of symbols for various Electrical & Electronic Components, Devices, etc. (CO1)
3. Assembling and Testing of Various Circuits such as diode clipping and clamping circuits on Bread board / Circuit Simulators. (CO2)
4. (a) Study of soldering components, solders, tools, heat sink. (CO3)
   (b) Soldering and de-soldering practice.
5. (a) Design and fabrication of PCB for a given circuit. (CO3)
   (b) Assemble the given circuit on PCB and test it. (CO3)
6. Study of electronic test and measuring equipment: Multimeter, Oscilloscope, Function Generator and Regulated Power Supply. (CO1)
7. Study PCB designing software and generate the routing layout. (CO2, CO3)
8. Perform the troubleshooting of circuit and understand safety aspects. (CO4)
9. Study of component data sheet and its interpretation (CO1)
10. Design and assembly of a mini project. (CO5)

Text Books-

1. Troubleshooting Electronic Equipment by R. S. Khandpur, MHE, India

2. Testing of Electronic Components, Sarkar and Fernandes, Shroff Publishers
3. Basic Electronic Components, V.K. Barbudhe, Notion Press

Reference Books-

1. Beginner's Guide to consumer electronics repair, K. Douglas, iUniverse publishers
2. A guide to Electronic Maintenance and Repair, A. M. Yousufu and Y. Ali S., Author House Publishers.
3. How to Diagnose and Fix Everything Electronic, M. J Geier, MGH

List and Links of e-learning resources:

1. https://www.circuitlab.com/
2. https://www.partsim.com/simulator
3. https://www.tinkercad.com/learn/circuits
4. https://circuitmaker.com/
5. https://www.datasheets.com/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in lab work and end-semester practical examinations.

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