



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc.), 2nd Semester
Branch: Solar & Renewable Energy
Subject Name: Fundamental of Digital Electronics
Subject Code: 1120702

Type of course: Core

Prerequisite:

Rationale: The students need to learn basic concepts of digital circuits and system which leads to design of complex digital system such as microprocessors/microcontroller. The students need to know combinational and sequential circuits using digital logic fundamentals. This is the first course by which students get exposure to digital electronics world.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical		
				ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA-Progressive Assessment

Content:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	Unit-I Binary Systems : Introduction of Digital Systems, Binary numbers, Base Conversion (Binary, Decimal, Octal, Hexadecimal), Complements - R's Complement, (R-1)'s Complement, 2' and 10's Complement, 1's and 9's Complement, Binary Codes-Weighted Codes, Gray Code, Excess-3 Code.	10	20
2	Unit – II Binary Logic And Boolean Algebra: Binary logic, Logic Gates-AND , OR, NOT, NOR, NAND, EX-OR & EX-NOR, Universal Gates - NAND Gate & NOR Gate, Postulates, Laws, Boolean algebra, De-Morgan's Theorems, Boolean functions	8	20
3	Unit-III Boolean Function Implementation: Need for simplification, Simplification by Karnaugh map(K-map) method- 2 – Variable K – map, 3 – Variable K – map, 4 – variable K – map, K – Map using Don't care condition.	8	20
4	Unit- IV Basic Combinational circuits: Introduction to combinational circuit, Arithmetic and Logical Combinational Circuits -Half Adder, Full Adder, Half Subtractor, Full Subtractor, Decoder -3 to 8 Decoder, Encoder 8 to 3 Encoder, Multiplexer – 4 to 1 multiplexer, Demultiplexer -1 to 4 Demultiplexer.	8	20
5	Unit- V Basic Sequential circuits: Introduction to sequential circuits, Flip-flops-SR Flip flop, JK Flip flop, D-Flip flop, T-Flip flop,	8	20
	Total	42	100

Reference Books:

1. "Digital logic and Computer Design", Mano M Morris, Pearson publication Latest Edition



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2. "Fundamentals of Digital Circuits", A. Kumar, Prentice Hall India.
3. "Digital Principles and Applications", Malvino & Leach, McGraw-Hill Education.
4. "Modern Digital Electronics", R. P. Jain, McGraw Hill Education.

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	20	10	0	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Solve the given problem using fundamentals of Number systems.	20
CO-2	Apply Boolean algebra for circuit optimization.	20
CO-3	Optimize given Boolean expression with K-map.	20
CO-4	Elaborate various types of Combinational circuits.	30
CO-5	Recognize Flip-flops as Sequential circuits.	10

List of Open Source Software/learning website:

Students must refer to following sites to enhance their learning ability.

1. www.nptel.ac.in
2. www.asic-world.com/digital/tutorial.html