GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology					Branch/Spec.	Computer Science & Engineering (CBA/CS/BDA)		
Semester	I					Version	1.0.0.0		
Effective from Academic Year			2020-21			Effective for the batch Admitted in			June 2020
Subject code	2CSE103		Subject Name			DIGITAL ELECTRONICS			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

Fundamental knowledge of physics during 11^{th} and 12^{th} science.

Learning Outcome:

At the end of the course, the student will be able to:

- Able to understand the basics of digital circuits.
- Capable to design different types of digital logic circuit.
- Learn microprocessor with the help of basic knowledge of digital electronics.

Theory syllabus

Unit	Content	Hrs
1	**Binary Systems:** Digital Computer & Systems, Binary Numbers, Number Base conversions, Different Number systems & their relations, Complements, Binary codes, Binary storage & registers.	**5**
2	**Digital Integrated Circuits:** RTL, DTL circuits, I^2L Logic, TTL, ECL, MOS & CMOS circuits & their characteristics.	**4**
3	**Boolean Algebra & Logic Gates:** Basic definitions, Axiomatic definition of Boolean Algebra, Basic Theorems & Properties, Boolean functions, Canonical & Standard forms, Logic operations, Digital Logic gates & Logic families.	**5**
4	**Simplification of Boolean Functions:** Map method, Two, Three, Four, Five & Six variable maps, Products of Sum & Sum of Products simplification, NAND, NOR & Other two level Implementations, Don't care conditions, Tabulation method.	**6**
5	**Combinational Logic:** Design Procedure, Address, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND & NOR circuits, Exclusive-OR & Equivalence functions.	**5**
6	**Combinational Logic with MSI & LSI:** Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers.	**5**
7	**Sequential Logic:** Latch, Flip Flops, difference between latch and flip flop, Triggering of Flip flops, Analysis of clocked sequential circuits, State reduction & assignment, Flip Flop Excitation tables, Design of Sequential circuits, Design of counters, Design using state equations.	**8**
8	**Registers and Counters:** Registers, Shift registers, Ripple Counters, Synchronous Counters.	**7**

Self Study Topics :

Source current & sink current, ROMs, PLAs, introduction of PLDs, CPLDs and FPGA, Memory.

Practical content

Building & testing circuits on bread board for basic logic gates and elementary level circuits using gates. Understanding & testing behavior of circuits using readily available kits for medium and large level circuits.
Suggested list of practicals:

- To study the test basic logic gates.
- To study and test NAND and NOR gates as Universal Gates.
- To verify the De'Morgan's Theorems.
- To design and test Half Adder / Subtractor circuit using basic logic gates.
- To design and test Full Adder / Subtractor circuit using basic logic gates.
- To Design and test decoder circuit.
- To design and test multiplexer / demultiplexer circuit.
- To design and test 4-bit Binary to Gray and Gray to Binary Converter circuits.
- To design and test 4-bit parallel adder / subtractor.
- To study and test Flip-Flop circuits.
- To design and test asynchronous / synchronous up-down counters.
- To study and test shift registers.

Mood Course

Course Name: Basic Electrical Circuits
Link: https://onlinecourses.nptel.ac.in/noc18_ee18

Text Books	
1	Digital Logic and Computer Design by Morris Mano
Reference Books	
1	Digital Fundamentals by Floyd
2	Digital Electronics by R. P. Jain
3	Fundamental of Digital Circuits by A. Anandkumar