Daffodil Polytechnic Institute, Institute Code: 50238
Lesson Plan – Academic session: August/September 23 - March 24

Subject Teacher : MD.Badeuzzamal Sarker (Instructor)
Subject Name : Digital Electronics
Subject Code : 26845
Technology : Electrical Technology
Semester : 4th
Reference Book : Digital Electronics
(Reference Book : R.S Publication)

Mark Distribution (for 150 Marks)			
Theory Marks		**Practical Marks**	
Midterm	10	PC	25
Class test	10	PF	25
Quiz and presentation	10	-	-
Final	120	-	-
Total	**150**	**Total**	**50**

Objective

- To develop knowledge & skill on number systems, codes & binary arithmetic operation.
- To provide knowledge & skill on logic gates, logic circuits, Boolean algebra & logic families.
- To assist to acquire the knowledge & skill on combinational logic circuit.

Learning Segment	Activities	Time
Introduction	Greetings & Attendance	10min
Discussion & Demonstration	Discussion about previous class	15min
Discussion & Demonstration	Discussion & Demonstration	30min
Practice	Practical Sessions	15min
Review	Answering & questioning	10min
Next Class	Discussion & Assignment	10min

Marks	Grade Point	Letter Grade	*Marks*	Grade Point	Letter Grade
80>	4.00	A+	55-59	2.75	B-
75-79	3.75	A	50-54	2.50	C+
70-74	3.50	A-	45-49	2.25	C
65-69	3.25	B+	40-44	2.00	D
60-64	3.00	B	0-39	0.00	F

SHORT DESCRIPTION

Basic concept of digital electronics; Number system & codes; Logic gates, Boolean Algebra and logic simplification & combinational logic circuits.

Lecture Plan :

Lecture	Chapter	Topics	Outcomes	Supporting Equipment
01	Understand basic concept of digital electronics.	1.1 Define digital electronics & Digital Signal. 1.2 Mention the characteristics of digital signal. 1.3 Describe the advantages of working in digital mode. 1.4 Define logic level of digital signal. 1.5 Identify DC voltage level of digital signal. 1.6 Describe parameters of a digital pulse waveform such as rise time, fall time, pulsewidth and duty cycle.	To know about digital electronics & digital signal.	
02-03	Understand the number system and binary arithmetic operation.	2.1 Define & Describe decimal, binary, octal and hexadecimal number system. 2.2 Convert one number system to another. 2.3 Compute binary arithmetic & . Complement subtraction Technique. 2.4 State the applications of different number system.	To know about numbering system in electronics.	
04	**Quiz - 01**	**Chapter 1-2**		
05	Understand the arithmetic codes and code conversion.	3.1 Define 8421, Excess—3code, Gray code, BCD code, Hamming code, Unicode, and ASCII code. 3.2 Describe 8421, Excess—3code, Gray code, BCD code,	To know about any type of code conversion.	

		Hamming code, Unicode, and ASCII code. 3.3 Practice the conversion of one code to another. 3.4 Describe the addition and subtraction of 8421, Excess-3 and BCD coded number. 3.5 State parity checked code and Hamming code. 3.6 Describe the error detection and correction with Hamming code. And parity checked code.		
06	**Class Test – 01**	**Chapter 1-3**		
Assignment-01	Assignment on lecture 01,02,03,05,06		To build up their confidence level & increase creativity on chapter-01,02 & 03	Must be submitted within the next two lecture.
Lab Report-01		1. VERIFY THE TRUTH TABLES OF LOGIC GATES (OR, AND, NOT, NAND & NOR)	Verify the truth tables of logic gates (OR, AND, NOT, NAND & NOR).	Must be submitted within the next two Lab classes.
07	Understand the concept of Logic gates.	4.1 Define logic gate. 4.2 Classify logic gate. 4.3 Explain logical statement, truth table, Boolean equation and symbol of AND, OR, NOT, NOR, NAND, EX-OR and EX-NOR gates.	To know about logic different kinds of logic gates.	

		Show. 4.5 NAND & NOR gates used as Universal logic gates. 4.6 State the applications of logic gates.		
08	**Quiz-02**	**Chapter 3-4**		
Lab Report-02		1. VERIFY THE TRUTH TABLE OF X-OR & X-NOR GATE USING BASIC GATES.	Verify the truth table of X-OR & X-NOR gate using basic gates.	Must be submitted within the next two Lab classes.
09	Understand the features of the logic families and digital IC's.	5.1 Classify logic families. 5.2 Define SSI, MSI, LST and VLSI. 5.3 Describe Transistor logic families (DTL & TTL). 5.4 Describe MOS logic families (P-MOS, N-MOS & C-MOS) 5.5 State the meaning of the terms propagation delay time, speed, noise immunity, power dissipation, fan-in, fan-out, operating temperature and power rating of logic circuits. 5.6 State the characteristics of digital IC's.	To know about logic family.	
10	Understand the concepts of electronic circuit of logic gates.	6.1 Describe the operation of standard TTL NAND gate. 6.2 Describe the operation of CMOS NAND & NOR gates. 6.3 State special logic gates such as buffer, tri-state and expandable gates. 6.4 Mention the basic principle of ORing and ANDing.		To know about logic gates operation.
Lab Report-03		1. PERFORM THE OPERATION OF NAND & NOR GATE AS UNIVERSAL GATES.	Show the operation of NAND & NOR gate as universal gates.	Must be submitted within the next two Lab classes.
11	**Class Test - 02**	**Chapter 4-6**		
12	**Review Class**	**Chapter 1-3**		

13	**Review Class**	**Chapter 4-6**		
Midterm Examination				
14-15	Understand digital IC's	7.1 Define Digital IC's 7.2 Describe fixed function Integrated circuit IC's such as AND, OR, NAND etc. 7.3.Mention IC package, code numbers, and important specification of TTL/MOS commercial IC gates. 7.4 Mention the applications of different logic IC's.	To know about digital IC's.	
16-17	Understand logic simplification & design of digital circuit.	8.1 State the theorems of Boolean algebra. 8.2 State DeMorgan's theorems and its applications. 8.3 Determine the terms-Sum of Product (SOP) form and Product of Sum (POS) form. 8.4 Determine the SOP & POS form from truth table. 8.5 Define Kamaugh Map. 8.6 State the structure of Karnaugh map. 8.7 State the simplification process of Boolean expression from a K-map and designlogic circuit (up to 4 variables).	To know about different kinds of theorems.	
18	**Quiz Test**	**Chapter 7-8**		
19-20	Understa nd various combinat ional logic circuits.	9.1 Define combinational logic circuit with example. 9.2 Describe the operation of half adder and half Sub tractor. 9.3 Explain the operation of full adder and full Sub tractor. 9.4 Describe the operation of 4 bit parallel adder. 9.5 Explain the operation of 4 bit subtraction circuit. 9.6 Describe the operation of parity generator and detector circuit.	To know about logic circuit by using logic gates.	

		9.7 Describe the operation of 4 bit BCD adder. 9.8 Explain the operation of multipliers & divisors. 9.9 Mention the application of combinational logic circuit.		
Assignment-02	Assignment on lecture 07,09,10	To build up their confidence level & increase creativity on chapter- 04,05,06,07,08 & 09	Must be submitted within the next two lecture.	Must be submitted within the next two lecture.
Lab Report-04		1. DESIGN & DEVELOP CODE CONVERTER CIRCUITS AND OBSERVE ITS OUTPUT.	Design & develop a code converter circuit and observe its output operation.	Must be submitted within the next two Lab classes.
21	**Class Test - 03**	**Chapter 7-9**		
22-23	Understand the concepts of encoder, decoder and display devices.	10.1 Describe the operation of encoder and decoder circuit. 10.2 State the principle of operation of LCD, LED, seven-segment and dot matrix display. 10.3 Explain the operation of commonly used 4-bit BCD decoder/driver for seven segmentdisplay of common Anode/Cathode type. 10.4 Describe the operation of parity generator & detector circuits	To know about operation of different kinds of circuit.	
24-25	Understand the features of multiplexers and demultiplexer.	11.1 Define multiplexers and demultiplexer. 11.2 Describe the operation of 2:1, 4:1 and 8:1 multiplexer with logic diagram. 11.3 Describe the operation of 1:2, 1:4 and 1:8 demultiplexers with logic diagram. 11.4 State the use of multiplexer &demultiplexer.	To know about different kind of combination al circuit.	

		11.5 Explain the operation of Binary comparator. 11.6 Describe the Pin diagram of commonly used 4-bit comparator ICs. 11.7 Distinguish between Decoder and Demultiplexer.		
26	**Quiz Test**	**Chapter 10-11**		
Lab Report-05		1. OBSERVE THE FUNCTIONS OF HALF ADDER & SUBTRACTOR.	Verify the functions of half adder & half sub tractor.	Must be submitted within the next two Lab classes.
27-28	Understand the features of sequential logic circuits.	12.1 Define sequential logic circuit State the terms clock, timing diagram & latch of digital system. 12.2 Explain the operation of basic SR latch, D flip-flop, clocked flip-flop, J-K flip-flop, 12.3 Toggle operation & J-K master-slave flip-flop. 12.4 State the concept of positive & negative edge triggering and level triggering, 12.5 Describe the pin diagram of commonly used flip-flop IC's.	To know about sequential logic circuit.	
29	**Class test – 04**	**Chapter 10-12**		
Assignment-02	Assignment on lecture 07,09,10	To build up their confidence level & increase creativity on chapter- 04,05,06,07,08 & 09	Must be submitted within the next two lecture.	Must be submitted within the next two lecture.
Lab Report-05		1. VERIFY THE FUNCTIONS OF FULL ADDER & FULL SUBTRACTOR.	Verify the functions of full adder & full sub tractor.	Must be submitted within the next two Lab classes.

30	**Review Class**	**Chapter 1-4**		
31	**Review Class**	**Chapter 5-8**		
32	**Review Class**	**Chapter 9-12**		
Final Term Exam				