MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	Information and Communication Technology
Course Name & code	:	Digital Systems and Computer Organization & ICT 2171
Semester & branch	:	III & CCE
Name of the faculty	:	Mrs. Divya S.
No of contact hours/week:		L: 3 | T: 1 | P: 0 | C: 4

Course Outcomes (COs)

	At the end of this course, the student should be able to:	No. of Contact Hours	Marks
CO1:	Identify the applications of various elements of digital system abstractions.	5	10
CO2:	Design MSI combinational logic circuits using typical TTL integrated circuit components.	17	36
CO3:	Device applications employing sequential logic circuits.	10	21
CO4:	Distinguish operations of control unit, execution unit and I/O in computer organization.	16	33
CO5:			
	Total	48	100

Assessment Plan

Components	Assignments	Sessional Tests	End Semester/ Make-up Examination
Duration	20 to 30 minutes	60 minutes	180 minutes
Weightage	20 % (4 X 5 marks)	30 % (2 X 15 Marks)	50 % (1 X 50 Marks)
Typology of Questions	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation	Knowledge/ Recall; Understanding/ Comprehension; Application	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation
Pattern	Answer one randomly selected question from the problem sheet (Students can refer their class notes)	MCQ: 10 questions (0.5 marks) Short Answers: 5 questions (2 marks)	Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks
Schedule	4, 7, 10, and 13th week of academic calendar	Calendared activity	Calendared activity
Topics Covered	Quiz 1 (L 1-8 & T 1-2) (CO1,2)	Test 1 (L 1-15 & T 1-5) (CO1,2)	Comprehensive examination covering full syllabus. Students are expected to answer all questions (CO1-4)
	Quiz 2 (L **9-16** & T 3-5) (CO2)		
	Quiz 3 (L 17-24 & T 6-8) (CO2,3)	Test 2 (L 16-30 & T 6-10) (CO2,3,4)	
	Quiz 4 (L 25-32 & T 9-10) (CO3,4)		

Lesson Plan

L. No.	Topics	Course Outcome Addressed
L0	Introduction to the course Introduction to digital systems, Basic theorems and properties, truth table, Boolean functions, canonical and standard forms	CO1
L1	Introduction to digital systems, Basic theorems and properties, truth table, Boolean functions, canonical and standard forms	CO1
L2	The map method: 2 variables, 3 variables, 4 variables.	CO1
L3	Simplification into POS and SOP expressions using K-map, and implementation using NAND and NOR gates(upto 4 variables).	CO1
T1	Simplification into POS and SOP expressions using K-map, and implementation using NAND and NOR gates (upto 4 variables).	CO1
L4	Simplification into POS and SOP expressions using K-map for Don't care conditions, and implementation using NAND and NOR gates(upto 4 variables).	CO1
L5	Design of Half adder, Full adder, Parallel Adder(7483).	CO2
L6	Design of half subtractor, full subtractor, Parallel subtractor (using 7483), Parallel Adder/ Subtractor.	CO2
T2	Design of one digit and two digit BCD adder	CO2
L7	Design of 4 bit Carry Look Ahead Adder	CO2

L8	Design of 4 bit Carry Save Adder	CO2
L9	Design of Code converters and implementation using NAND and NOR gates.	CO2
T3	Design questions on combinational Circuits using IC 7483, IC 74283	CO2
L10	Design of binary multipliers using half adder and full adders, Design of multiplier using 74283 IC.	CO2
L11	Design of magnitude comparators	CO2
L12	Design of Decoders with and without enable i/p. Design of high order decoders using low order decoders.	CO2
T4	Combinational Circuit design using decoder IC74138	CO2
L13	Design of encoders, priority encoders.	CO2
L14	Design of cascading magnitude comparators, IC 7485 applications.	CO2
L15	Design of multiplexers with and without enable i/p. Higher order mux using lower order mux.	CO2
T5	Design of combinational circuits using MUX.	CO2
L16	Design of combinational circuits using 74151 IC and 74153 IC,74157 IC's.	CO2
L17	Combinational shifter design using MUX. Design of De Multiplexers.	CO2
L18	NAND latch, NOR latch, SR flip flop, D FF. Excitation and characteristic equation of every FF.	CO3
T6	SR flip flop, D FF. Excitation and characteristic equation of every FF, JK FF AND T FF	CO3
L19	Flip Flop Conversion, Race around condition and solution.	CO3
L20	Asynchronous counter design	CO3
L21	Asynchronous counter design using IC 7490 and IC 7493	CO3
T7	Synchronous counter design	CO3
L22	Synchronous counter design using 74193 IC	CO3
L23	Synchronous counter design	CO3
L24	Shift registers, sequence generators.	CO3
T8	Applications of sequential circuit ex: Sequence detectors.	CO3
L25	Introduction to computer organization, Von – Neumann architecture.	CO4
L26	Arithmetic and logic unit design.	CO4
L27	Multiplication algorithms.	CO4
T9	Related Problems	CO4
L28	Division algorithms.	CO4

L29	Related Problems.	CO4
L30	Control Unit: Introduction, basic concepts	CO4
T10	Design methods: Hardwired approach.	CO4
L31	Hardwired approach	CO4
L32	Micro- programming	CO4
L33	Micro – programming	CO4
T11	Memory Unit: Types of memory and characteristics, memory hierarchy.	CO4
L34	Cache memory mapping	CO4
L35	Input and Output: I/O subsystem	CO4
L36	Programmed I/O, Interrupt I/O	CO4
T12	Direct memory access, I/O bus standards	CO4

References:

1.	M. Morries Mano: "Digital Design", Prentice Hall India, 3rd edition, 2002.
2.	Ronald J. Tocci, Neal S. Widmer and Greegory L. Moss: "Digital Systems: Principles and Applications", Pearson Education India, 12th Edition, 2017.
3.	Mohamed Rafiquzzaman and Rajan Chandra, Modern Computer Architecture", Galgotia publications Pvt Ltd, 3rd edition, 2015
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Submitted by: MRS. DIVYA S.

(Signature of the faculty)

Date: 26/7/2019

Approved by: DR. BALACHANDRA

(Signature of HOD)

Date: 27/7/19

Dr. Balachandra
Professor & Head
Dept. of Information & Communication Technology
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FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
Mrs. Rashmi N.R.	A	Mrs. Divya S.	B

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