II Year-I Semester		**T**	**P**	**C**
		4	**0**	**3**
Digital Logic Design (RT21053)				

Course Description and Objectives:

- To introduce the basic tools for design with combinational and sequential digital logic and state machines.
- To learn simple digital circuits in preparation for computer engineering.

Course Outcomes:

Upon completion of the course,the student will be able to achieve the following outcomes.

Cos	Cours eOutcomes	POs
1	Define different number systems, binary addition and subtraction, 2's complement representation and apply operations with this representation.	2
2	Define various logic gates, discuss about Boolean algebra and apply minimization using K-Maps.	1
3	Discuss various combinational logic circuits.	3
4	Discuss various sequential logic circuits.	5
5	Describe about registers and counters.	2
6.	State different programmable logic devices and compare them.	5

Syllabus:

UNIT I:

Number Systems
Binary, Octal, Decimal, Hexadecimal Number Systems.Conversion of Numbers From One Radix To Another Radix,r's Complement and (r-1)'s Complement Subtraction of Unsigned Numbers, Problems, Signed Binary Numbers,Weighted and Non weighted codes

UNIT II:

Logic Gates And Boolean Algebra: Basic Gates NOT, AND, OR, Boolean Theorms,Complement And Dual of Logical Expressions, Universal Gates, Ex-Or and Ex-Nor Gates, SOP,POS, Minimizations of Logic Functions Using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates. **Gate Level Minimization**: Karnaugh Map Method (K-Map):Minimization of Boolean Functions maximum upto Four Variables, POS and SOP, Simplifications With Don't Care Conditions Using K-Map.

UNIT III:

Combinational Logic Circuits
Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, Ripple Adders and Subtractors, Ripple Adder/Subtractor Using Ones and Twos Complement Method.
Design of Decoders, Encoders, Multiplexers, Demultiplexers, Higher Order emultiplexers and Multiplexers, Priority Encoder, Code Converters, Magnitude Comparator.

UNIT IV:

Introduction to Sequential Logic Circuits: Classification of Sequential Circuits, Basic Sequential Logic Circuits: Latch and Flip-Flop, RS- Latch Using NAND and NOR Gates, Truth Tables. RS,JK,T and D Flip Flops , Truth and Excitation Tables, Conversion of Flip Flops. Flip Flops With Asynchronous Inputs (Preset and Clear).

UNIT V:

Registers and Counters: Design of Registers, Buffer Register, Control Buffer Registers,Bidirectional Shift Registers, Universal Shift Register, Design of Ripple Counters, Synchronous Counters and Variable Modulus Counters, Ring Counter, Johnson Counter.

UNIT VI:

Introduction to Programmable Logic Devices (PLDs):PLA, PAL, PROM. Realization of Switching Functions Using PROM, PAL and PLA. Comparison of PLA, PAL and PROM.

TEXT BOOKS:

1. Digital Design ,4/e, M.Morris Mano, Michael D Ciletti,PEA
2. Fundamentals of Logic Design, 5/e, Roth, Cengage

REFERENCE BOOKS:

1. Switching and Finite Automata Theory,3/e,Kohavi, Jha,Cambridge.
2. Digital Logic Design, Leach, Malvino, Saha,TMH
3.Modern Digital Electronics, R.P. Jain, TMH