Course Type	Course Code	Name of Course	L	T	P	Credit
DC	ECC203	Digital Circuits and System Design	3	0	0	09

Course Objective

To make students learn about the fundamentals of digital electronics and how to engineer the building blocks that go into digital subsystems. To provide sufficient knowledge and information to the students for designing various types' power and space optimized digital circuits and systems.

Learning Outcomes

Upon successful completion of this course, students can able to:
- Gain information about the basic building blocks to design various types of digital circuits and systems.
- Learn how to analyse the performance and working of digital circuits.
- Develop their projects in the field of robotics containing advanced and complex circuit board.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Canonical and Standard forms of Boolean functions, Simplification of Boolean functions Combinational and sequential circuits. NAND and NOR implementation of logic functions. Determination of Boolean functions from Digital Circuits. Combinational Circuits: Adder, Subtractor, Magnitude Comparator, Code converters etc. MSI circuits: Multiplexers, Decoders/Demultiplexers, Encoder etc. Design of digital systems using SSI and MSI circuits.	10	Gain the knowledge about the basic blocks to design digital components. Able to develop upgraded level digital circuits using the basic tools and blocks.
2	Sequential circuits: Latches and Flip-flops, practical clocking aspects concerning flip-flops, timing and triggering considerations, excitation tables, conversions. Shift registers and counters. Analysis of sequential circuits: State tables and state diagrams. Finite State Machine. Design of system for digital bit-pattern detection.	11	Acquire the ability to design and perform analysis of different sequential circuits
3	Bipolar Logic Families: DTL, TTL, ECL and CMOS. Timing circuits. A/D and D/A converters.	09	Develop knowledge about the various techniques for IC designing and know the working of VLSI components
4	Semiconductor memories. Use of ROM, PLA and PAL in logic implementation. Sequential PLDs and their applications, Sequential digital system design using Programmable Logic Devices (PLD) and timing circuits.	12	Understanding of the implementation and improvement in performance of simple digital blocks to design complex circuits and systems

Textbook:

1. Digital Systems: Principles and Applications, Ronald J Tocci, Pearson Publication

Reference Books:

1. Digital Logic and Computer Design by M. Morris Mano, Prentice-Hall (2015).
2. Digital Fundamentals, Thomas L. Floyd, Pearson (2014).
3. Modern Digital Electronics by R P Jain, McGraw-Hill Education, 2003.