Course Type	Course Code	Name of Course	L	Т	Р	Credit
ESC	NEEE102	Digital Circuits and Processors		0	0	3

Course Objective

To provide an overall understanding of digital electronics, including logic gates, the design of digital circuits, and microprocessors at an introductory level. Furthermore, it aims to offer a basic understanding of the functionalities of microprocessors and microcontrollers.

Learning Outcomes

Upon successful completion of this course, students will:

- have the knowledge of logic gates and circuits, and be able to design simple digital circuits.
- have overall knowledge of microprocessors and introduction to the instruction sets.
- have the knowledge of ports/pins of microprocessors and their applications.

Unit No.	Topics to be covered	Lecture Hours	Learning Outcome
1	Binary numbers, Number base conversions, Basic theorems and properties of Boolean algebra, Digital logic gates	9	Knowledge of binary number system, conversion and functions of basic logic gates.
2	Simplification of Boolean functions, Map method, Variable maps, Product of sums simplification, NAND and NOR implementation, Don't care conditions	8	Knowledge of designing a digital circuit from logic gates for a given function. Use of NAND and NOR gates.
3	Combinational logic, Adders and Subtraction, Multilevel NAND and NOR circuits, Exclusive OR functions, Encoders and Decoders, Multiplexers	9	Trained to design some basic digital circuits, which are also commonly present in all microprocessors.
4	Introduction to sequential logic, Flip-flops (SR, D, JK, and T), Latches, Introduction to Registers and Counters	6	Knowledge of digital memory units, different types of flip-flops, registers and counters.
5	Basic components of Microprocessors, Overall architecture of 8085 microprocessor and ATmega328P microcontroller, Pin configurations of 8085 and ATmega328P, Instruction set and assembly language programming	10	Knowledge about the overall architecture of microprocessors, pin configuration of 8085 and ATmega328P, and its instruction set. Understanding the pin configuration of a commonly used microcontroller.

Text Books:

- 1. M. Morris Mano, 'Digital Design with an introduction to the VHDL', Pearson Education, 2013.
- 2. Ramesh Gaonkar, 'Microprocessor Architecture, Programming, and Applications with the 8085', Penram International Publishing, 2013.

Reference Books:

- 1. Thomas L. Floyd, 'Digital Fundamentals', 11th edition, Pearson Education, 2015.
- 2. Mandal, "Digital Electronics Principles & Application, McGraw Hill Edu, 2013.
- 3. Datasheets of 8085 and ATmega328P.