MANGALORE **UNIVERSITY**

DEPARTMENT OF ELECTRONICS
MSc Electronics

ELH 402 - DIGITAL SYSTEM DESIGN

Course Outcomes:
1. To understand number representation and conversion between different representation in digital electronic circuits.
2. To analyze logic processes and implement logical operations using combinational logic circuits.
3. To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines.
4. To understand the concept of Programmable Devices, PLA, PAL, CPLD and FPGA and implement digital system using VHDL.

Unit -I

Introduction to Digital Design: Electronic Aspects of Digital Design, Integrated Circuits, Programmable Logic Devices, ASIC, PCB, Design Levels.
Digital Circuits: Logic Signals and Gates, Logic Families, CMOS Logic, Electrical Behavior of CMOS Circuits – Steady State and Dynamic Behaviors.

16 hours

Unit -II

Combinational Logic Design Principles: Switching Algebra, Combinational Circuit – Analysis and Synthesis, Minimization Methods, Timing Hazards.
Combinational Logic Design Practices: Combinational PLDs, Decoders, Encoders, Three-State Devices, Mux, Parity Circuits, Comparators.

16 hours

Unit - III

Sequential Logic Design Principles: Bistable Elements, Latches and Flip-flops, Synchronous State Machine – Analysis and Design, Designing State Machines Using State Diagrams and Transition List, Counters, Shift Registers, Sequential Logic Design Practices.
Memory, CPLDs and FPGAs: ROM, RAM – Static RAM, Dynamic RAM. Architecture of CPLD and FPGA family.

16 hours

Books:

1. Digital Design – Principles and Practices, John F. Wakerly, Pearson Education Asia, Fourth Edition, 2008
2. "Digital Design with Introduction to Verilog HDL", Mano M M and Michael Ciletti, Pearson Education Asia,5th Edn. 2013
3. "Digital Fundamentals", Floyd T L, Pearson Education Asia,8th Edn.2002.