

## **PIT3I101 SWITCHING THEORY AND LOGIC DESIGN**

**Theory L/T (Hours per week): 3/0, Credit: 3**

**Introduction:** Logic design, transistors as switches, CMOS gates, sequential circuits, some examples.

**Digital Systems:** Representation of numbers, binary codes, Gray code, error-detecting and error-correcting codes, registers, binary logic, basic logic gates.

**Boolean Algebra:** Boolean operations, Boolean functions, algebraic manipulations, minterms and maxterms, sum-of-products and product-of-sum representations, two-input logic gates, functional completeness.

**Minimization of Boolean Functions:** Karnaugh map, don't-care conditions, prime implicants, Quine–McCluskey technique, Logic gates, NAND/NOR gates, Universal gates.

**Combinational Circuits:** Adder, subtractor, multiplier, comparator, decoders, encoders, multiplexers, demultiplexers, MUX Realization of switching functions, Parity bit generator, Code-converters, Hazards and hazard free realizations

**Synchronous Sequential Circuits:** Finite-state machines, latches and flip-flops (SR, D, JK, T), synthesis of clocked sequential circuits, Steps in synchronous sequential circuit design. Design of modulo-N Ring & Shift counters, Serial binary adder.

**Registers and Counters:** Registers and shift registers, sequential adders, binary and BCD ripple counters, synchronous counters

**Algorithmic State Machines:** Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

### **Text Book:**

1. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.
2. Digital Electronics by G.K. Kharate, Oxford University Press

### **References:**

1. Switching & Finite Automata theory – Z. Kohavi, TMH, 2nd Edition.
2. An Engineering Approach To Digital Design – Fletcher, PHI.
3. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
4. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006