

Course No.	Course Name	L-T-P	Credits	Year of Introduction
IT231	Digital Circuits Lab	0-0-3	1	2016

### Course Objectives

- To familiarise various types of gates
- To realize adders, subtractors, flip flops
- To Realise shift registers and counters.
- To assemble digital circuits using ICs and study the performance.

### List of Exercises / Experiments (Minimum of 8 mandatory out of 10)

1. Realization of functions using basic and universal gates.
2. Adders and Subtractors (**Any four**)
  - i) Half adder using NAND and NOR only.
  - ii) Full adder using NAND and NOR only.
  - iii) Full adder using two half adders
  - iv) Half subtractor using NAND and NOR only.
  - v) Full subtractor using NAND and NOR only.
3. 2/3 bit binary comparator.
4. BCD to Decimal and BCD to 7 segment decoder & display
5. Multiplexers, De-multiplexers using gates and ICs. (74150, 74154)
6. Realization of combinational circuits using MUX & DEMUX.
7. Realization of flip flops using gates. (**Any four**)
  - i) RS flip-flops
  - ii) T flip-flops
  - iii) D flip-flops
  - iv) JK flip-flops

- v) Master Slave flip-flops
- 8. Random sequence generator.
- 9. Realisation of Shift Registers.
- 10. Counters (using flip flops)
  - i) Synchronous counters
  - ii) Asynchronous counters
  - iii) Ring counter
  - iv) Johnson counter

**Class Project (Minimum one mandatory per group)**

- i) Implementation of digital clock
- ii) Implementation of digital timer
- iii) Implementation of event counter
- iv) Implementation of token display

**Expected Outcome**

From the practical exposure, the students can design digital circuits such as registers, counters, arithmetical circuits, flip flops etc.

**References**

1. Mano M. M., Digital Logic & Computer Design, 4/e, Pearson Education, 2013.
2. Floyd T. L., Digital Fundamentals, 10/e, Pearson Education, 2009.
3. M. Morris Mano, Computer System Architecture, 3/e, Pearson Education, 2007. Harris D. M. and, S. L. Harris, Digital Design and Computer Architecture, 2/e, Morgan Kaufmann Publishers, 2013
4. Tokheim R. L., Digital Electronics Principles and Applications, 7/e, Tata McGraw Hill, 2007.
5. Mano M. M. and M. D Ciletti, Digital Design, 4/e, Pearson Education, 2008.
6. Rajaraman V. and T. Radhakrishnan, An Introduction to Digital Computer Design, 5/e, Prentice Hall India Private Limited, 2012.
7. Leach D, Malvino A P, Saha G, Digital Principles and Applications, 8/e, McGraw Hill Education, 2015.