Fourth year of Five Years integrated M.Sc (Physics) **M.Sc. - IV, Semester – VII**	**L**	**T**	**P**	**C**
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MP 405 : Digital Electronics

- **Introduction, Number System** **(04 Hours)**
  Digital & Analog System, Logic Levels and Pulse Waveforms, Elements of Digital Logic, Functions of Digital Logic, Digital Integrated Circuits, The Decimal Number System, The Binary Number System, Representation of Signed Numbers and Binary Arithmetic in Computers, Different Number Systems.
- **BINARY CODES & LOGIC GATES** **(03 Hours)**
  Different Codes, and Gates, , Inhibit circuits, 7400 series ICs, ANSI/IEEE Standard Logic symbols, Pulsed operation of Logic Gates
- **BOOLEAN ALGEBRA** **(03 Hours)**
  Logic Operations, Axioms and Laws of Boolean Algebra, Duality, Reducing Boolean Expressions, Boolean Expression and Logic Diagrams, Converting AND/OR/Invert Logic to NAND/NOR logic, Determination of Output lev0el from the diagram
- **THE KARNAUGH AND QUINE-McCLUSKY METHODS** **(06 Hours)**
  Expansion of a Boolean Expression to SOP & POS form, Computation of total Gate inputs, All variables K-map, Don't care combinations, Hybrid logic, Minimization of Multiple output circuits, Variable mapping, Quine-McClusky Method, Function minimization of multiple output circuits
- **COMBINATION CIRCUITS** **(06 Hours)**
  The Half- Full-adder -Subtractor, Parralel Binary Address, the look-ahead carry adder, IC parrelel adders, Two's complement addition & subtraction using parallel Adders, serial Adders, BCD Adders, Binary multipliers, code converters, Parity generators/checkers, Comparators, IC Comparator, Decoders, BCD to seven segment decoders, Display devices, Encoders, Multiplexers, Demultiplexers and Applications
- **FLIP-FLOPS AND TIMING CIRCUITS** (**04Hours)**
  The S-R latch, Gated latches, Edge-trigged Flip-Flops, Asynchronous inputs, Flip-flop operating characteristics, Master Slave (Pulse-triggered) flip-flop, Conversion of Flip-flops, Applications of Flip-flops, ANSI/IEEE Symbols, Schmitt Trigger, Multivibrators , crystal controlled clock generators.
- **SHIFT REGISTERS , COUNTERS** **(06Hours)**
  Buffer register, Controlled Buffer register, Shift Registers & Data Transmission in shift register, Counters, Pulse Train Generators, Pulse Generators using shift registers, Cascading of Synchronous counters.
- **LOGIC FAMILIES AND ANALOG-TO-DIGITAL AND ANALOG –TO-ANALOG CONVERTERS** **(06Hours)**
  Digital IC Specification Technology, Logic Families, Transistor Transistor Logic (TTL), Open –collector Gates, Digital-to-Analog(D/A) Conversion, The R-2R Ladder Type DAC, The Weighted –resistor Type DAC, The Switched Current-source Type DAC, Analog-to-Digital Conversion, The Counter-type A/D Converter, The Tracking-type A/D Converter, The Flash-type A/D Converter, The Dual-slop Type A/D Converter, The Successive-approximation Type ADC
- **DESIGNING DIGITAL CIRCUITS** **(04 hour)**
  Reactor design, Trafic signal, Stepper mottor

(Total Contact Time (Theory): (42 Hours)

BOOKS RECOMMENDED:

1.	**Floyd T.L, Jain R.P.**	Digital Fundamentals	Dorling Kindersley (india) Pvt Ltd	2008
2.	**Morris Mano M.**	Digital Logic & Computer Design	Dorling Kindersley (India) Pvt. Ltd.	2008
3.	**A.Anand Kumar**	Fundamentals of Digital Circuits	Prentice-hall of India Pvt. Ltd.	2009
4.	**Jain. R.P.**	Modern Digital Electronics	Tata Mcgraw Hill Publishing Company Ltd.	2009
5.	**Malvino A.P., Leach P. D.**	Digital Principals & Applications.	Tata Mcgraw Hill Publishing Company Ltd.	2008