

B.Sc. Electronics Syllabus under CBCS
w.e.f. 2015-16 (revised in April 2016)

SEMESTER – III

PAPER – 3

Digital Electronics

Unit – I (9hrs)

NUMBER SYSTEM AND CODES: Decimal, Binary, Hexadecimal, Octal, BCD, Conversions, Complements (1's, 2's, 9's and 10's), Addition, Subtraction, Gray, Excess-3 Code conversion from one to another, ASCII code.

Unit- II (12hrs)

BOOLEAN ALGEBRA AND THEOREMS: Boolean Theorems, De-Morgan's laws. Digital logic gates, Multi level NAND & NOR gates. Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh Map Method: 4,5 variables), don't care condition.

Unit-III (15hrs)

COMBINATIONAL DIGITAL CIRCUITS:

Adders-Half & full adder, Subtractor-Half and full subtractors, Parallel binary adder, Magnitude Comparator, Multiplexers (2:1,4:1,8:1) and Demultiplexers (1:2,1:4) Encoders (Octal to Binary, Decimal to BCD)- Decoder (Binary to Octal, BCD to Decimal) IC-LOGIC FAMILIES: TTL logic, DTL logic, RTL Logic, CMOS Logic families (NAND&NOR Gates), Bi-CMOS inverter

UNIT-IV (14hrs)

SEQUENTIAL DIGITAL CIRCUITS:

Flip Flops: S-R FF, J-K FF, T and D type FFs, Master-Slave FFs, Excitation tables for J-K and T FFs, Shift registers (SISO, SIPO, PISO, PIPO), -shift left register, shift right register, Counters - Asynchronous-Mod16, Mod-10, Down counter, Synchronous-4-bit counter & Ring counter.

UNIT-V (10hrs)

MEMORY DEVICES:

General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAROM, PLA (Programmable logic Array), PAL (Programmable Array Logic. Architecture, combinational logic design using PLAs & PALs).

TEXT BOOKS:

1. M.Morris Mano, “ Digital Design “ 3rd Edition, PHI, New Delhi.
2. Ronald J. Tocci. “Digital Systems-Principles and Applications” 6/e. PHI. New Delhi. 1999.(UNITS I to IV)
3. G.K.Kharate-Digital electronics-oxford university press
4. S.Salivahana&S.Arivazhagan-Digital circuits and design
5. Fundamentals of Digital Circuits by Anand Kumar

Reference Books :

1. Herbert Taub and Donald Schilling. “Digital Integrated Electronics” . McGraw Hill. 1985.
2. S.K. Bose. “Digital Systems”. 2/e. New Age International. 1992.
3. D.K. Anvekar and B.S. Sonade. “Electronic Data Converters : Fundamentals & Applications”. TMH. 1994.
4. *Malvino and Leach. “ Digital Principles and Applications”. TMG Hill Edition.*

ELECTRONICS LAB-3**(DIGITAL ELECTRONICS LAB)**

(Minimum six experiments should be done)

LAB LIST:

1. Verification of IC-logic gates
2. Realization of basic gates using discrete components (resistor, diodes & transistor)
3. Realization of basic gates using Universal gates (NAND & NOR gates)
4. Verify Half adder and full adder using gates
5. Verify Half subtractor and full subtractor using gates.
6. Verify the truth table of RS , JK, T-F/F using NAND gates
7. 4-bit binary parallel adder and subtractor using IC 7483
8. Study of 7490 BCD Counter

Lab experiments are to be done on breadboard and simulation software (using multsim) and output values are to be compared and justified for variation.

B.Sc. Electronics Syllabus under CBCS
w.e.f. 2015-16 (revised in April 2016)

SEMESTER – IV

PAPER – 4

Analog and Digital IC applications

Unit – I (10hrs)

OPERATIONAL AMPLIFIERS: Definition, Basic op-amp Ideal op-amp, Block diagram of op-amp, inverting, non-inverting, virtual ground, Adders, subtractors, summing amplifier, voltage follower, op-amp parameters, voltage to current convertor, integrator, differentiator, differential amplifier, Logarithmic amplifier.

Unit- II (15 hrs)

OP-AMP CIRCUITS: voltage regulator, comparator, zerocross detecting circuit, instrumentational amplifier, multivibrators-astable, monostable, Bi-stable, Schmitt trigger. sine wave generator, square wave generator, triangular wave generator, Active filters(Basics)-low pass, high pass, band pass filters

IC-555 –functional block diagram, Astable, Monostable and Schmitt trigger.

Unit-III (15hrs):

COMBINATIONAL & SEQUENTIAL LOGIC CIRCUITS (IC-Applications):

Design of Code convertor: Binary-to-BCD, BCD to Seven Segment, Binary to Grey, Grey to Binary.

Design of Counters: Design of Asynchronous Modulo-N counters, Design of synchronous Modulo-N counters, Presetable Binary Up/Down Counter. Design of Universal Shift Register

UNIT-IV (10hrs)

DATA CONVERTERS:

A/D converter:- Successive Approximation ADC,-Single slope and dual slope converter, Sigma-delta ADC, D/A converter: R-2R Ladder network, Binary Weighted .

UNIT-V (10hrs)

DIGITAL SYSTEM INTERFACING AND APPLICATIONS: interfacing of LEDs and Seven segment LED display Driver.

Applications of Counters: Digital Clock

Applications of Shift Registers: Time delay generator, parallel to serial converter, serial to parallel converter, UART.

TEXT BOOKS:

6. G.K.Kharate-Digital electronics-oxford university press
7. M.Morris Mano, “ Digital Design “ 3rd Edition, PHI, New Delhi.
8. Op Amp and Linear Integrated Circuits By Ramakant Gaykwad
9. Linear Integrated Circuits By Roy Choudary

Reference Books :

5. Jacob Millan ,Micro Electronics,McGraw Hill.
6. Mithal G K, Electronic Devices and Circuits Thana Publishers.
7. Allan Motter shead ,Electronic Devices and Circuits – An Introduction- Prentice Hall

Electronics Lab - 4**(Analog and digital ic-applications)****(Minimum six experiments should be done)****LAB LIST:**

1. Op-Amp as inverting and non-inverting
2. Op-Amp as integrator and differentiator
3. Op-Amp as voltage to current converter
4. Op-Amp as sine wave generator (Wien bridge oscillator)
5. Op-Amp as square wave generator
6. Schmitt trigger using IC-555 timer
7. Binary to Grey and Grey code to binary converter
8. Study of presettable binary up/down counter
9. BCD to Seven segment decoder 7447/7448

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.
