Syllabus for: Electronics for F Y B Sc (Electronics)

Semester- 1 (With effect from June 2014)

PAPER I: Basic Electrical Circuits

Unit I: Passive Devices

Resistors, Fixed resistors & variable resistors, Color code, Power ratings, Temperature coefficient, NTC & PTC, Potentiometers and Presets
Capacitors, dielectric and dielectric constant, construction and working, capacity of a capacitor, Non-polar and Polar capacitors
Inductors, construction, types and uses

Transformer Construction and working, Introduction to transformer core materials

Mechanical switches, poles and throws, SPDT, DPDT, push to on, push to off, electromagnetic switch (relay), construction and working, types of electromechanical relay.

Unit II: Basic Laws of Electrical Science

Voltage drop, series and parallel circuit, Kirchhoff's Voltage Law, Kirchhoff's Current Law, applications of KVL, KCL, voltage division rule, current division rule, Super position theorem, concept of ideal voltage source and constant current source, Thevenin's Theorem, Norton's theorem, Maximum power transfer theorem

Network, mesh and node variable analysis,

Unit III: DC and AC Circuits

Alternating current & voltages, frequency & period, Types of waves, reference circle, phase angle and phase difference, average and r.m.s value, reactance and impedance

Reference Books:

1. Fundamentals of Electrical Engg and Electronics by B L Theraja,
2. Basic Electronics by Grob
3. Fundamentals of Electric Ckts by Sammuel Oppenheime
4. Electronic Components and Materials by S M DHIR

Syllabus for: Electronics for F Y B Sc (Electronics)

Semester-1 (With effect from June 2014)

PAPER II: Digital Electronics

Unit I: Number systems and codes

Introduction to number systems, Decimal, Binary, Octal and Hexadecimal number systems, inter conversion and arithmetic (Add and Subtract in Binary and Hexadecimal) in various number systems, Representation of negative numbers (1's and 2's complement; Add and Subtract), Binary codes; 8421, BCD (BCD arithmetic 9' and 10's complement; Add and Subtract), Excess 3, Gray code (encoding and decoding Binary-to-Gray and vice-versa), ASCII code, Concept of error detecting (parity bit, check sum) and error detecting and correcting (Hamming code) method.

Unit II: Logic Gates and Boolean algebra

Binary operations like AND, OR, NOT, truth table, NAND & NOR gates, De-Morgan's Theorem, NAND & NOR as universal logic gates, Laws of Boolean algebra, simplification of Boolean expression using Boolean Laws,

Unit III : Application of Logic Gates

Construction/Realization of Logic diagram/circuit from expression and vice versa using basic and universal logic gates. Need/Importance of simplified/reduced Boolean expression for better digital circuit. Special logic gates (3-inputs or more) XOR and XNOR its logic and truth table and its applications (controlled inverter, parity chequer, parity (odd, even) generator, word comparator) Construction and working concept of multiplexer and demultiplexer (8-to-1 and 1-to-8 lines), Design concept and realization of Half adder, full adder, half subtractor, full subtractor,

Reference Books:

1. Fundamentals of Digital Circuits by A Anand Kumar, PHI
2. Principles of Digital Electronics by K Meena, PHI
3. Digital Systems: Principles and Application, by Tocci and Widmer, PHI
4. Digital Computer Electronics by Malvino and Brown
5. Digital Electronics by Malvino and Leach

List of Experiments / Laboratory work for Semester-1 (Paper –I & II)

1. Charging and discharging of capacitor through RC
2. Study of KVL.
3. Study of KCL.
4. Verification of Norton's theorem.
5. Study of Thevenin's theorem.
6. Study of Superposition theorem.
7. Study of Basic Logic Gates
8. Study of Universal Logic Gates
9. Design , built and test Half and Full adder circuit
10. Design , built and test Half anfd Full Subtractor circuit
11. Study of Multiplexer and Demultiplexer.
12. Design, built and test Code converter
13.

Syllabus for: Electronics for F Y B Sc (Electronics)

Semester- 2 (With effect from June 2014)

PAPER I: Semiconductor Devices

Unit I: Semiconductors and Diodes

Fermi level, extrinsic semiconductor, P-type , N-type, majority & minority carriers, formation of PN Junction, charge depletion region, pn junction in equilibrium, forward bias, reverse bias, diode characteristics, diode equation.

Breakdown in diodes, zener breakdown, avalanche breakdown

Unit II: BJT

Construction of BJT, fundamentals of BJT operation, transistor current components, PNP and NPN devices, CE configuration transistor characteristics, transistor biasing, DC load line for CE configuration, operating point, cutoff region and saturation region, active region, transistor action,. Gain of a transistor common emitter current gain β, common base current gain α, their inter relationship, BJT as a switch.

Unit III: Other Semiconductor devices

Comparison of JFET and BJT, advantage of Unipolar device, Construction Principle of operation and characteristic curve of FET, MOSFET, and UJT and their I-V characteristics..

Introduction to Construction, principle of operation and working of LED, Photo diode, photo transistor

Reference Books:

1. Basic Electronics by B L Theraja
2. Electrical Engg Fundamentals by Del Toro
3. Electronic Devices and Circuits Allen Motterrshead
4. Networks Lines and Fields by J D Ryder
5. Fundamentals of Electric Ckts by Sammuel Oppenheime
6. Electronic Components and Materials by S M DHIR
7.

Syllabus for: Electronics for F Y B Sc (Electronics)

Semester-2 (With effect from June 2014)

PAPER II: Network Analysis and Filters

Unit I: Laplace Transforms and its applications

Laplace transform, Laplace transform of various mathematical functions and unit step function, Laplace transform of integration and differentiation inverse Laplace transform,

Unit II: Sinusoidal function

Sinusoidal functions, average and effective value, average power, phasor representation, sinusoidal steady state response of R, C, L, RL and RLC circuits,.

Fourier theorem, Fourier series, Fourier coefficients

Unit III: Network analysis and Filters

Resonance, Q factor, series resonance and bandwidth, parallel resonance and bandwidth, reactance curve, image impedance,

Filter fundamentals, cutoff frequency, pass band and stop band, high pass filters, low pass filters, band pass filters, band reject filters,

Reference Books:

1. Basic Electronics by B L Theraja
2. Electrical Engg Fundamentals by Del Toro
3. Fundamentals of Electric Ckts by Sammuel Oppenheime

List of Experiments / Laboratory work for Semester-2 (Paper –I & II)

1. Study of series resonance and its bandwidth Q.
2. Study of Parallel resonance and its bandwidth and Q.
3. Study of low pass T filter circuit.
4. Study of low pass π filter circuit.
5. Study of high pass T filter circuit.
6. Study of high pass π filter circuit.
7. Study of characteristics curve of diode
8. Wave shaping circuits using diode
9. Study of characteristics curve of Zener diode
10. Study of characteristics curve of BJT.
11. Study of characteristics curve of FET.
12. Study of characteristics curve of photo diode, photo transistor and