

GUJARAT UNIVERSITY

Syllabus for First Year B. Sc.: Semester - I

ELECTRONICS : ELE - 101

UNIT I:

Passive Circuit element:

Resistor (5.2 to 5.18), inductor (5.19 to 5.34) Capacitor (5.35 to 5.44), Transformers (7.8 to 7.14)

Book: Basic Electronics (Solid State) by B. L. Theraja S. Chand & Co.

Measuring instruments: DC ammeters, DC voltmeters, Voltmeter sensitivity, series type ohmmeter, shunt type ohmmeter, multimeter, Rectifier type instruments(AC voltmeter) Typical multimeter circuit. (Art. 4.4 to 4.9, 4.11.2, 4.11.3)

Book: Modern Electronics instrumentation and measurement techniques

Helfric and Cooper, PHI 11th Reprint

Ref: . 1. A monograph on Electronics design principle

Goyal and Khetan Khanna Publisher

2. Basic electronics and Linear circuits – Kulshreshtra and Gupta TMH India

3. Electronic Instrumentation by H. S. Kalsi TMH India

UNIT II:

Diode Application: Load line analysis, Diode approximation. Clipper, Clamper, Voltage multiplier,

Special type of diode: Zener diode, Light emitting diode, Laser diode, Varactor

Books: 1. Electronic Devices and Circuit Theory Robert Boylestad Louis Nashelsky
8th Edition PHI

2. Electronics Principles – Malvino and Leach TMH India

UNIT III:

General amplifier characteristics: concept of amplification, amplifier notation, current, voltage and power gain, amplifier input resistance and output resistance, maximum power transfer, conversion efficiency, classes of amplifier, harmonic distortion, three point method of calculating distortion, Measurement of harmonic distortion, other type of amplifier distortion

Decibels, other equation for decibel computation, zero decibel reference level, use of a voltmeter as a decibel indicator, voltmeter range correction factor, frequency response, amplifier band width, phase relationship in amplifier, square wave testing

Books: Electronics devices and circuit – Allen Mottershead PHI

UNIT IV:

Transistors:

Junction transistor structure, the action of transistor, working of transistor, amplifying action, 3-configurations, transistor characteristics (CE, CB, CC), comparison between three configurations, why CE configuration is widely used in amplifier circuit, basic CE amplifier circuit, load line, construction of transistor, transistor data sheet, thermal run away and heat sink

Book: Basic Electronics and Linear Circuit

Bhargav Kulshreshtha and Gupta TMH Edition

Ref: Millman's Integrated Electronics Millman Halkias and Parikh TMH Edition

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ELECTRONICS Practicals : ELE - 102

PRACTICALS:

Group - I

1. Measuring and testing of electronic passive components
2. Study and testing of electronic active component
3. To familiarise with various laboratory instruments
4. Conversion of Galvanometer into multirange DC and AC Voltmeter
5. Dielectric constant
6. Voltage doubler
7. Voltage Multiplier

Group-II

1. Half wave rectifier with and without C filter (Load regulation and ripple)
2. Full wave rectifier with and without C filter (Load regulation and ripple)
3. To study Zener diode as a shunt regulator.
4. Characteristic of different coloured LED
5. To find resonance frequency and Q of a given series resonant circuit by varying frequency of ac source.
6. Wein bridge
7. CE Amplifier (Load Variation)

GUJARAT UNIVERSITY
Syllabus for First Year B. Sc.: Semester - II

ELECTRONICS : ELE - 103

UNIT I:

Four terminal networks and network theorems, concept of voltage source, concept of current source, source equivalence, four terminal network, image parameters, superposition theorem, reciprocity theorem, thevenin's theorem, norton's theorem, maximum power transfer theorem, millman's theorem, star delta conversion theorem (1.1 to 1.5, 1.10 to 1.16)

Book: Handbook of electronics Kumar and Gupta, Pragati Prakashan 35th ed.

UNIT II:

Resonance: Definition of Q, the factor of merit, series resonance, Band width of a series resonance, Parallel resonance, condition for maximum impedance, current in anti resonance, Art. 2.1 to 2.4, 2.6

Book: 1. Network, lines and fields- John D Ryder PHI

Ref: Introductory Circuit Analysis by Roert Boylestad, 10th Edition

Circuits and Networks Sukhija and Nagsarkar Oxford Uni Press

RC filters:

The high pass RC Filter with sine and square wave only, The high pass RC Circuit as a differentiator, Low pass RC circuit with sinusoidal and square wave input, low pass RC circuit as an integrator.

Book: Handbook of Electronics (Art. 14.1 to 14.4) Pragati Prakashan 35th ed.

Ref: Introductory Circuit Analysis by Roert Boylestad, 10th Edition

Circuits and Networks Sukhija and Nagsarkar Oxford Uni Press

UNIT III:

Transistor Biasing and stabilisation: Introduction, why bias a transistor, selection of operating point need for bias stabilisation, requirement of biasing circuit, different biasing circuit (collector to base bias, bias circuit with emitter resistance, voltage divider bias, emitter bias circuit).

Book: Basic Electronics and Linear Circuit Bhargava Kulshreshtha Gupta TMH (Art 7.1. to 7.6)

Hybrid equivalent circuit for a transistor :

Introduction, conversion of an amplifier circuit to a standard form, general 'black box' theory, Hybrid h parameters, obtaining the hybrid h parameters, typical h-parameter values, Amplifier equations, voltage & current gains taking into account R_g of source, Dependence of amplifier characteristics on R_L & R_g comparison of CB, CE & CC characteristics.

Book : Electronics Devices & circuits by A. Mottershead. Art No. 14.0 to 14.10

UNIT IV:

Number systems and codes: Introduction, number system, inter conversion of number, signed binary number, floating point representation of number, binary arithmetic, complement binary arithmetic, arithmetic overflow, codes (BCD, 2-4-2-1 code, 4-bit BCD and 5-bit BCD, Biquinary code, excess 3, gray code, 7-segment code, alpha numeric codes, error detecting, error correcting code, hamming code.

Boolean algebra and logic gates: Boolean algebra, overview of logic circuit, De morgan's theorem (Art 3.2 to 3.4)

Book: 1. Digital electronics G. K. Kharate Oxford University Press

Ref: 2. Digital Design Moriss Mano PHI

3. Digital Principles Malvino and Leach Mcgraw Hill

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Syllabus for First Year B. Sc.: Semester - II

ELECTRONICS Practicals : ELE – 104

Practicals:

Group-I

1. Characteristic of photo diode
2. Common Emitter Characteristic
3. Common Base Characteristic
4. Bridge Rectifier
5. To obtain frequency response of CE amplifier
6. RC High pass filter
7. RC Low pass filter

Group-II

1. Thevenin's theorem
2. To find resonance frequency and Q of a given parallel resonant circuit by varying frequency of ac source.
3. Conversion of a given network into T-network and π network
4. AND OR NOT and Ex-OR gate using IC 7400
5. To verify the De Morgan's Theorem
6. BCD to Binary and Binary to BCD Code Conversion
7. Binary to gray code and gray to binary code