

Gujarat University
Ahmedabad

B. Sc. Semester – III
Electronics Theory & Practical
(Academic Year 2012 – 13)

Unit	Electronics Theory ELE – 201 4 Credit Total 100 Marks Internal : 30 Marks External : 70 Marks	Electronics Theory ELE – 202 4 Credit Total 100 Marks Internal : 30 Marks External : 70 Marks	Electronics Practical ELE – 203 2.5 Credit Total 100 Marks Internal : 30 Marks External : 70 Marks
Unit – I	HF-LF ANALYSIS	IMPEDANCE TRANSFORMATION	A, B & C three groups : Each group consists of 06 experiments. Total 18 experiments. External Examination: 70 Marks Group A : 23 Marks Group B : 23 Marks Group C : 24 Marks Practical batch size: Maximum 15 students.
Unit - II	NEGATIVE FEED BACK AMPLIFIERS	PASSIVE FILTERS LINEAR WAVE SHAPING CIRCUIT	
Unit - III	FET AND MOSFET	DIGITAL	
Unit - IV	FILTERS AND REGULATORS	MICROPROCESSOR	

In order to give exposure of industry, research institute and higher learning in the field of physics, industrial / institutional visit may be arrange. It is expected that students of S. Y. B. Sc. with Physics / Electronics as one of the subject must visit the industry / research institute / institute of higher learning during either III or IV semester.

GUJARAT UNIVERSITY
B. Sc. (Electronics) Semester – III
ELECTRONICS : ELE – 201
(4 Credit)

Unit - I:

Low frequency response of the transistor amplifier:

Effect of an emitter bypass capacitor on low frequency response, effect of a coupling capacitor on low frequency response, cascading of CE stages, mid-frequency gains, low frequency response of cascaded stages, amplifier low frequency response of a square wave, Transformer coupled transistor amplifier, low frequency responses of a transformer coupled transistor amplifier, low frequency responses of a transformer coupled amplifier, step response of a transformer coupled amplifier.

High frequency response of the transistor amplifier:

High frequency model with resistive load, CE short circuit current gain, high frequency current gain with resistive load, high frequency response of cascaded CE stages, amplifier high frequency responses to a square wave, High frequency response of a transformer coupled amplifier.

Reference Book :

Electronic Devices and circuits by Allen Mottershead 15.1 to 15.8 and 16.1 to 16.7
Electronic Devices and Circuits S Salivahanan and others TMH Ed.
Electronic Devices and Circuits Sanjeev Gupta

Unit - II:

Negative feedback in transistor amplifiers : General theory of feedback, reasons for negative feedback, loop gain, Types of negative feedback in transistor circuits with complete analysis. The Darlington connections, biasing the Darlington amplifier with complete analysis.

Reference Book:

Electronic Devices and circuits by Allen Mottershead
Article No. 17.1 to 17.6

Unit - III:

Field effect transistor Amplifier: Advantages and disadvantages and of the FET, Basic construction of the JFET, characteristic curves of the JFET, Principle of operation of the JFET, Effect of V_{ds} on channel conductivity, channel ohmic region and pinch off region, characteristic parameters of the FET, Effect of temperature FET parameters, common source AC amplifier with complete analysis, fixed bias with self-bias, the common drain or source follower with complete analysis, frequency response of FET amplifier with complete analysis, frequency response of FET amplifier with complete analysis, other amplifier configurations.

MOSFET: The depletion MOSFET, The enhance MOSFET, difference between JFETS and MOSFETS, handling precautions for MOSFETS, Dual gate MOSFETS, Integral gate protection, Testing field effect transistor, applications of FETS in its channel ohmic region, application of FET as a VVR in voltage control attenuator, The field effect diode.

Reference Book :

Electronic Devices and circuits by Allen Mottershead
Article No.: 21.1 to 21.14, 22.1 to 22.10

Unit - IV:

Filters: Inductor Filter, C- Filter (Ripple factor, approximate method), choke input LC filter, Ripple factor in LC filter, value of critical inductance, C-L-C filter.

Text book:

Electronic Devices and circuits by Allen Mottershead

3.1 to 3.4, 3.9 to 3.11 and 3.13.

Voltage Regulators: Voltage regulation, zener diode shunt regulator, working of zener diode shunt regulator, optimum value of current limiting resistor, disadvantage of zener diode shunt regulator, transistor shunt regulator, transistor series regulator, controlled transistor series regulator, short circuit protection against overload, transistor current regulator.

Text book:

A Text Book of Electronic Circuits by R S Sedha, S. Chand & Co.

Articles: 34.1 to 34.13

GUJARAT UNIVERSITY
B. Sc. (ELECTRONICS) Semester – III
ELECTRONICS : ELE – 202
(4 Credit)

Unit – I:

Impedance Transformation and Coupled Circuits : Transformation impedance with tapped resonant circuits, Reactance L sections for impedance transformation, Image impedance, reactance matching, Reactance T networks for impedance transformation, coupled circuits, mutual inductance, coefficient of coupling equivalent T network for magnetically coupled circuit, Iron-core transformer, the Ideal transformer, singly tuned air-core transformer, doubly tuned air core transformer, effects of over coupling, selectivity curves design over coupled circuits.

Reference Books:

Networks, Lines and Fields by J. D. Ryder (3.1 to 3.14)

Network Analysis G K Mithal

Unit – II:

Wave Shaping Circuit : High pass R C circuit (for sinusoidal and square wave i/p) High pass RC circuit as differentiator, low pass R C circuit (for sinusoidal and square wave i/p), low pass RC circuit as a integrator,

Text Book :

Hand book of Electronics, Kumar and Gupta, Pragati Prakashan 35th ed. (14.1 to 14.4)

Filters : The neper, the decibel, characteristics impedance of symmetrical network, current and voltage ratio as exponentials, the propagation constant, properties of symmetrical networks, filter fundamentals, pass and stop bands, Behaviour of the characteristic impedance, the constant K low pass filter, the constant K highpass filter.

Text book:

Networks, Lines and Fields by J. D. Ryder (4.1 to 4.3, 4.5 to 4.9)

Unit – III:

Arithmetic building blocks: adder, subtractor, arithmetic logic unit.

Text book:

Digital principles and applications by Malvino & Leach 6th Edition

Articles: 6.7,6.8, 6.10

Clock and 555 Timer:

Description of functional diagram, monostable operation, linear ramp generator, frequency divider, astable operation.

Text Book: Linear Integrated Circuits 4th Edition by Chaudhary and Jain, New Age International Publishers.

Articles: 8.1 to 8.4.

Ref: OPAMPs and Linear Integrated Circuits by Ramakant Gayakwad

Clock waveforms, TTL clock, Schmitt Trigger, Monostables with input logic, Pulse Forming Circuit.

Text Book: Digital principles and applications by Malvino & Leach 6th Edition

Articles: No. 7.1. to 7.3, 7.6, 7.7

Unit – IV:

Microprocessor, Microprocessor Instruction set and computer language, From large computer to single chip microcontroller.

The 8085 programming model, instruction classification, instruction data format and storage, how to write assemble and execute a simple program, overview of 8085 instruction set.

Text Book: Microprocessor Architecture, programming and application with 8085 5th Ed, Ramesh Gaonkar Penram Int. pub Pvt. Ltd.

Articles: 1.1 to 1.3, 2.1 to 2.5

GUJARAT UNIVERSITY
B. Sc. (ELECTRONICS) Semester – III
ELECTRONICS : ELE – 203
(2.5 Credit)

Group – A:

- 1) FET Characteristics
- 2) JFET Common Source Amplifier
- 3) Transformer Coupled Amplifier
- 4) Voltage series negative feedback amplifier
- 5) Common-Collector Amplifier (Bandwidth, I/P and O/P resistance)
- 6) To study band pass band rejection RC filter

Group - B:

- 1) To design and test transistor series voltage regulator. (load and line regulation)
- 2) To design and test electronics voltage regulator with error amplifier. (load regulation and line regulation)
- 3) Measurement of ripple factor of C filter using CRO at different load
- 4) Study of Lissajous figures and Measurement of frequency and phase difference using C.R.O. (for RC network)
- 5) To design and test transistor constant current regulator.
- 6) Load regulation characteristics of shunt voltage regulator.

Group - C:

- 1) Arithmetic circuit : Half adder, Full adder, (Using EX-OR and NAND gates)
- 2) Half subtractor, Full subtractor (Using EX-OR and NAND gates)
- 3) 4-bit adder subtractor using IC 7483, 7486
- 4) Study of 8:1 multiplexer (74151) and Study of 1:4 and 1:8 demultiplexer using IC 74155
- 5) Monostable Multivibrator using IC 555
- 6) To find the frequency of Astable multivibrator using IC 555

A, B & C three groups: (Total 100 Marks : Internal 30 marks , External 70 Marks)

Each group consists of 06 experiments.

Total 18 experiments.

External Examination: 70 Marks

Group A : 23 Marks

Group B : 23 Marks

Group C : 24 Marks

Practical batch size: Maximum 15 students.