

## SEMESTER SYSTEM ( SYLLABUS )

M.Sc., Physics, M.Sc., Material Science, M.Sc., Space Physics  
and M.Sc., (Tech.) Electronics.

(With Effective from 2000 - 2001 Admitted Batch)

### II SEMESTER

SSP - S205.

### P 205A - ELECTRONICS-I

#### UNIT I

##### 1 Network Theorems and Functions :

(6Hrs)

Network definitions, mesh and node circuit analysis superposition theorem, Reciprocity theorem, Thevenin's theorem, Norton's theorem, Millman theorem, Maximum power transfer theorem, Network functions for one port and two port networks. Poles and zeros of network function pole-zero diagram.

##### 2 Two port networks

(5Hrs)

Two port network parameters, open circuit impedance parameters, (z-parameters) short circuit admittance parameters, (y-parameters) Transmission parameters, (ABCD parameters) Hybrid parameters. (b-parameters) T- section and  $\pi$ -section representation of two- port networks.

##### 3. Special Semi-conductor devices :

(8Hrs)

Tunnel diode, photo diode, solar cell, LED, varactor diode, Silicon controlled rectifier, phototransistor, Uni Junction Transistor, Field Effect Transistor, JFET, static characteristic curves, pinch-off voltage, FET small-signal model, MOSFET, small-signal model of MOSFET, Applications of MOSFET as voltage controlled resistor.

##### 4. Feedback in Amplifiers:

(6 Hrs)

Feedback concept, transfer gain with feedback, general characteristics of negative feedback in amplifiers, voltage series feedback, current series feedback, current shunt feedback, voltage shunt feedback.

#### UNIT - II

##### 1. Tuned amplifiers:

(4Hrs)

Classification of tuned amplifiers, single-tuned capacitor- coupled amplifier, single-tuned inductor-coupled amplifier, double-tuned amplifier.

##### 2. Power amplifiers:

(4Hrs)

Class A large signal amplifier, transformer-coupled amplifier, push-pull amplifier, class B amplifier, class AB amplifier.

##### 3. Oscillators and Multivibrators:

(8 Hrs)

Classification of oscillators, colpitts oscillator, Hartley oscillator, Wien-bridge oscillator, Crystal oscillator, Astable, Bi-stable and Monostable Multivibrators.

##### 4. Modulation and Demodulation:

(9Hrs)

Modulation, need for modulation, Amplitude modulation theory, frequency spectrum of the AM wave, Representation of AM, power relations in the AM wave generation. Theory of frequency and phase modulation, Mathematical representation of FM, frequency spectrum of FM wave, phase modulation, Generation of AM, FM detection, simple diode AM detector, FM detector.

#### Text Books:

1. Network Analysis - Van Valkenberg
2. Electronic Devices and Circuits - G K. Mittal
3. Electronic Communication Systems - G. Kennedy

#### REFERENCE BOOKS:

1. Networks, lines and fields -- J.D RYDER
2. Integrated Electronics -- Millman and Halkies.
3. Transistor circuits...