

## 5.1 RF COMMUNICATION

Periods/ Weeks L T P  
4 1 5

### DETAILED CONTENTS

#### Unit:- I

(04 Periods)

##### INTRODUCTION

- Introduction of Electromagnetic waves, their applications.
- Frequency spectrum.
- Types of wave propagation.

#### Unit:- II

(30 Periods)

##### MICROWAVE DEVICES

- Limitation of vacuum tube at microwave frequency
- Inter electrode capacitance & its effect
- Lead Inductance and Transit time.
  - Construction, characteristics, operating principles and typical applications of the following devices (No mathematical treatment)
    - Multi cavity klystron
    - Reflex klystron
    - Multi-cavity magnetron
    - Traveling wave tube
    - Gunn diode
    - Impatt diode
    - Tunnel diode

#### Unit:- III

(10 Periods)

##### WAVE GUIDE

- Wave guides: Rectangular and circular wave guides and their applications.
  - Propagation Mode of wave guide,
  - Propagation constant of a rectangular wave guide,
  - Cut off wavelength,
  - Guide wavelength and their relationship with free space wavelength (no mathematical derivation).

#### Unit:- IV

(16 Periods)

##### MICROWAVE COMPONENTS & ANTENNA

- Brief introduction of S parameter:
- Tees, Bends, matched termination, twists, detector mount, directional coupler, fixed and variable attenuator, isolator, circulator and duplexer.

- Horn , Dish Antenna,Patch antenna

**Unit:- V**

**(10 Periods)**

**RADAR**

- Introduction to radar, radar range equation (no derivation), RADAR applications,.
- Block diagram and operating principles of Basic pulse radar.
- Block diagram and operating principles of CW (Doppler) and FMCW radars.
- Block diagram and operating principles of MTI radar.

**Unit :- VI**

**( 10 Period )**

**SATELLITE COMMUNICATION**

- Satellite Communication
- Basic Idea of passive and active satellite. Meaning of the term orbit, apogee, perigee.  
Geo Stationary satellite. Block diagram and explanation of a satellite communication link. Link losses.
- Transponders, VSAT and its features.

**LIST OF PRACTICALS**

1. To identify the microwave components – Directional Coupler, Tees, Circulator, Isolator, Gunn Diode, Slotted section, Frequency meter, attenuator, Detector mount.
2. To measure electronics and mechanical tuning range of a reflex klystron
3. To measure VSWR of a given load.
4. To measure the Klystron frequency by slotted section method
5. To measure the directivity and coupling of a directional coupler.
6. To verify the properties of tee.

**NOTE:**

**Visit to the appropriate sites of microwave industries, radar installations and communication stations should be made to understand their working. A comprehensive report must be prepared by all the students on these visits, especially indicating the dates and locations of their visits.**

**INSTRUCTIONAL STRATEGY**

Microwave and radar in very important subject and requires both theoretical as well as practical

exposure. The teaching should be supplemented by visits to the microwave stations and using suitable audio visual aids.

### RECOMMENDED BOOKS

1. Microwave Devices and Components by Samuel Y. Liao, Prentice Hall of India, New Delhi
2. Microwave & Radar engg by A.K.Gaurtam, Katson
3. Electronics Communication by Roddy and Coolen
4. Electronics Communication System by KS Jamwal, Dhanpat Rai and Sons, Delhi
5. Microwave Engineering by Das, Tata McGraw Hill Education Pvt Ltd, New Delhi
6. Satellite communications by D. C. Aggarwal, Khanna Publication.
7. Sattelite communications by Pratt & boston.

### SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (L+T)	Marks Allotted (%)
1	4	5
2	30	35
3	10	15
4	16	20
5	10	12
6	10	13
Total	80	100

## 5.2 ELECTRONICS APPLICATIONS IN INDUSTRY

Periods/ Weeks L T P

4 1 5

### **Unit:- I**

**(20 Periods)**

#### **AUDIO SYSTEM**

- Basic working Principle, Construction, Polar pattern, frequency Response & application of Carbon, moving coil, & cordless microphones. Brief idea of velocity, crystal, and condenser microphone.
- Basic working Principle, Construction, Polar pattern, frequency Response & application of direct radiating & horn Loud Speaker.
- Basic idea of woofer, tweeter, baffles and enclosures and crossover networks.

### **Unit:- II**

**(20 Periods)**

#### **T.V. FUNDAMENTALS**

- Brief idea of V.S.B.(Vestigial sideband) modulation.
- Concept of Scanning and its types.
- Aspect ratio, Resolution.
- Importance of Synchronizing and Blanking pulses.
- Composite video signal (CVS) at the end of even and odd fields.
- Concept of Camera- Vidicon Camera.
- An Introduction to Latest trends of T.V. Technology: LCD, LED & HDTV.

### **Unit:- III**

**(24 Periods)**

#### **THYRISTOR & OTHER POWER ELECTRONICS DEVICES**

- Principle of Operating of an SCR
- Two-Transistor Analogy of SCR
- DIAC
- TRIAC
- Basic Triggering circuits for Thyristors.
- Rectifier Circuits using SCR
- Construction and Working of IGBT.
- Construction and working of UJT and its working as Relaxation Oscillator.

### **Unit:- IV**

**(16 Periods)**

#### **POWER ELECTRONICS CIRCUITS**

- SCR Commutation Circuits (Class A and B only)
- Introduction to Series and Parallel Inverters
- Choppers: Step up, Step down, Morgan's.
- Study of SCR controlled applications viz: Illumination control & Speed control

## LIST OF PRACTICALS

- Familiarization & testing of components- SCR, DIAC, TRIAC .
- To plot the V-I characteristics of SCR.
- To plot V-I characteristics of DIAC.
- To plot and verify Characteristic of TRIAC.
- Assembly and testing of Half-wave Gate-controlled Rectifier using One SCR
- Assembly and testing of Single-phase Half-controlled Full-wave Rectifier using two SCRs and two Diodes
- Assembly and testing of Illumination/ Fan Control circuit using SCR
- Assembly and testing of SCR Controlled Emergency light
- Familiarization with different sections of monochrome TV Receiver.
- Fault finding and trouble shooting of colour T.V Receiver.
- Familiarization with different section of LCD & LED TV
- Installation steps of DTH.

## RECOMMENDED BOOKS

- Industrial Electronics: S.K. Bhattacharya / S Chatterjee, Tata McGraw-Hill Publishing
- Industrial Electronics for Technicians: J.A.Sam Wilson Joseph Rissi, Prompt Publications
- Thyristors and its Application by Ramamurthy, East West New Delhi
- Power Electronics by P.C. Sen, Tata McGraw-Hill Publishing, New Delhi
- Colour Television-Principles & Practice by R.R Gulati , Wiley Eastern Limited, New Delhi

### Suggested Distribution of Marks

Unit	Time Allotted (L+T)	Marks Allocation %
I	20	20
II	20	20
III	24	40
IV	16	20
<b>TOTAL</b>	<b>80</b>	<b>100</b>

### 5.3 Digital Data Communication

L T P 4 1 5

- UNIT: 1** (8 Periods)
- Basic Block Diagram of analog communication System and Digital Communication System
  - Advantage and disadvantages of digital Data communication.
- UNIT: 2-** (10 Periods)
- Analog Modulation Technique
  - PAM, PWM, PPM. Need Of Carrier suppression
- UNIT: 3-** (12 Periods)
- Digital Modulation Technique-
  - Sampling Theorem. Concept of Digital Modulation- ASK( Amplitude Shift Keying), FSK(Frequency Shift Keying), PSK (Phase Shift Key) ,QPSK( Quadrature Phase Shift Keying)and PCM (Pulse Code Modulation)
  - Quantization,QAM.
- UNIT: 4-** (10 Periods)
- Transmission of Digital Data
  - Transmission of binary data, concepts of simplex, half duplex and full duplex modes Transmission. Serial and parallel data communication, comparison in terms of speed of data transmission.
  - Synchronous data transfer mode, Asynchronous data transfer mode, advantages and disadvantages of synchronous and asynchronous communication.
- UNIT: 5-** (14 Periods)
- Multiplexing and Multiple Access Technique-
  - Frequency Division Multiplexing/Multiple Access. Time Division Multiplexing/ Multiple Access. Comparison of FDMA and TDMA. Code Division Multiple Access.
- UNIT: 6-** (14 Periods)
- Data Communication Hardware-
  - UART, USART, Their need in communication. Need and function of Modems. Modem data transmission speed, Modes of Modem operation, Modem interfacing
  - ( RS232 interfacing other interface) .
- UNIT : 7.** (12 Periods)
- Coding
  - Introduction to various common codes 5 bit Baudot code. 7 bit ASCII, ARQ, , Code error detection and correction techniques Redundancy, parity, block check character (BCC). Cyclic Redundancy Check (CRC),Vertical Redundancy check (VRC) Hamming code.

#### **LIST OF PRACTICAL**

- 1- Prove the sampling theorem. Reconstruct the analog signal from samples.
- 2- Observe the wave shape of ASK, FSK and PSK, QPSK.
- 3- Observe Frequency division multiple access.
- 4- TDM Access at different sampling frequency.
- 5- Using CDMA Trainer, Study the code division multiple access technique .

6- Observe the wave shape of Pulse code modulation and demodulation. .

**RECOMMENDED BOOKS**

- 1- Mobile and wireless Communication by Stalling, Pearson Publishers
- 2- Electronics Communication system by KS Jamal, Dhanpat Rai & co., New Delhi.
- 3- Principles of digital communication by J. Das- New Age Publishers, New Delhi.
- 4- Computer network by Tenenbaun Andrews, Prentice Hall of India, New Delhi.
- 5- Data Communication and Networking by Foronzan TMH, New Delhi.
- 6- Fundamentals of Error Correcting Codes by W. Cary Huffman

**SUGGESTED DISTRIBUTION OF MARKS**

<b>Topic No.</b>	<b>Time Allotted (Periods)</b>	<b>Marks Allotted(%)</b>
1	8	5
2	10	10
3	12	20
4	10	10
5	14	20
6	14	10
7	12	20
<b>Total</b>	<b>80</b>	<b>100</b>

## 5.4 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

Periods/ Weeks

L T P

4- -

### RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. This subject focuses on imparting the necessary competencies and skills of enterprise set up and its management.

### DETAILED CONTENTS

#### SECTION – A

#### ENTREPRENEURSHIP

##### 1. Introduction

(15 periods)

- Concept /Meaning and its need
- Qualities and functions of entrepreneur and barriers in entrepreneurship
- Sole proprietorship and partnership forms of business organisations
- Schemes of assistance by entrepreneurial support agencies at National, State, District level: NSIC, NRDC, DC:MSME, SIDBI, NABARD, Commercial Banks, SFC's TCO, KVIB, DIC, Technology Business Incubator (TBI) and Science and Technology Entrepreneur Parks (STEP)

##### 2. Market Survey and Opportunity Identification

(15 periods)

- Scanning of business environment
- Salient features of National and State industrial policies and resultant business opportunities
- Assessment of demand and supply in potential areas of growth
- Identifying business opportunity
- Considerations in product selection

##### 3. Project report Preparation

(6 periods)

- Preliminary project report
- Detailed project report including technical, economic and market feasibility
- Common errors in project report preparations

#### SECTION –B

#### MANAGEMENT

##### 4. Introduction to Management

(8 periods)

- Definitions and importance of management
- Functions of management: Importance and Process of planning, organising, staffing, directing and controlling
- Principles of management (F.W. Taylor)
- Concept and structure of an organisation



- Types of industrial organisations

- a) Line organisation
- b) Line and staff organisation
- c) Functional Organisation

**5. Leadership and Motivation** (05 periods)

a) Leadership

- Definition and Need
- Qualities and functions of a leader
- Manager Vs leader

b) Motivation

- Definitions
- Factors affecting motivation

**6. Management Scope in Different Areas** (10 periods)

a) Human Resource Management

- Introduction and objective
- Introduction to Man power planning, recruitment and selection

b) Material and Store Management

- Introduction functions, and objectives

c) Marketing and sales

- Introduction, importance, and its functions
- Physical distribution

d) Financial Management

- Introductions, importance and its functions

**7. Miscellaneous Topics** (05 periods)

a) Customer Relation Management (CRM)

- Definition and need
- Types of CRM

b) Intellectual Property Right (IPR)

- Introductions, definition and its importance
- Infringement related to patents, copy right, trade mark

**Note:** In addition, different activities like conduct of entrepreneurship awareness camp extension lecturers by outside experts, interactions sessions with entrepreneurs and industrial visits may also be organised.

**RECOMMENDED BOOKS**

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development published by Tata McGraw Hill Publishing Company Ltd., New Delhi

3. Entrepreneurship Development in India by CB Gupta and P Srinivasan; Sultan Chand and Sons, New Delhi
4. Entrepreneurship Development - Small Business Enterprises by Poornima M Charantimath; Pearson Education, New Delhi
5. Entrepreneurship : New Venture Creation by David H Holt; Prentice Hall of India Pvt. Ltd., New Delhi
6. Handbook of Small Scale Industry by PM Bhandari
7. Principles and Practice of Management by L M Prasad; Sultan Chand & Sons, New Delhi.

**SUGGESTED DISTRIBUTION OF MARKS**

<b>Topic No.</b>	<b>Time Allotted (Pds)</b>	<b>Marks Allotted (%)</b>
1	15	23
2	15	23
3	6	10
4	8	12
5	5	8
6	10	16
7	5	8
<b>Total</b>	<b>64</b>	<b>100</b>

## 5.5 MAJOR PROJECT-I

L T P Periods per week

- - 08

### DETAILED CONTENTS

#### Steps To make a Project

- 1) Study of different Projects.
- 2) Selection of Project.
- 3) Search component data sheet.
- 3) Component Availability of project and market search.
- 4) Identification and Testing of component.
- 5) PCB Design.(PCB Layout, develop a image of PCB layout, pasting of PCB layout image on PCB, Etching, Drilling, Mounting of components.

1. Laboratory Experiences (12 period)
  - Identification of components
  - Understand the use of data book for transistors, Diodes, SCR and triac
  - Understand the use of data book for TTL and CMOS ICs
  - Testing of different components using multi-meter
2. Designing the PCB layout using computer software (24 period)
  - Understanding the use of printed circuit board in electronics.
  - Use of software --Work bench and PSPICE
3. Soldering the PCB (10 period)
  - Soldering practice for PCB
  - Soldering the PCB design in layout topic.
  - De-soldering practice
4. Testing of PCB (10 period)
  - After soldering the component on given PCB testing the continuity and input / output result of given circuit
5. Fault finding of electronic circuit (12 period)
  - Basic idea of fault finding procedure

6. This Major Project-I Work is the part of major project in sixth semester. So the student have to complete one third portion of the major project ( predecessor of Major Project) . Student must present seminar and submit Synopsis related to their work. (60 period)

#### RECOMMENDED BOOKS

1. Data hand books for transistors Diodes & SCR
2. Data hand book for TTL and CMOS ICs
3. PCB designing Books

#### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted(%)
<b>1</b>	<b>12</b>	<b>10</b>
<b>2</b>	<b>24</b>	<b>18</b>
<b>3</b>	<b>10</b>	<b>9</b>
<b>4</b>	<b>10</b>	<b>9</b>
<b>5</b>	<b>12</b>	<b>10</b>
<b>6</b>	<b>60</b>	<b>44</b>
<b>total</b>	<b>128</b>	<b>100</b>