RF COMMUNICATION

L	T	P
4	1	5

Subject Code : 095004

RATIONALE

This subject provides knowledge about microwave devices, radar and satellite communication.

This subject provides exposure to microwave engineering, Radar systems and satellite communication. At the end of the course, student will be able to-

1. Know about the microwave frequences and the waveguides used in communication.
2. Understand the operation and working of various microwave devices like klystron, TWT, magnetron, gun diode, IMPATT diode etc.
3. Demonstrate the knowledge of antennas in communication systems and discriminate between antennas on the basis of their electrical ferformance.
4. Analyze different radars; find applications and use of its supporting systems.
5. Explain the basis of Satellite Communication.

DETAILED CONTENTS

(04 Periods)

Unit:- I

INTRODUCTION

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

(30 Periods)

Unit:- II

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

UIDE (10 Periods)

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

Unit:- IV

MICROWAVE COMPONENTS & ANTENNA (16 Periods)

- 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

RADAR (10 Periods)

- 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

SATELLITE COMMUNICATION (10 Period)

- 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

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 and Radar Engg by A.K.Gautam, Katson Publication.
2. Microwave Devices and Components by Samuel Y. Liao, Prentice Hall of India, New Delhi
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.

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**

ELECTRONICS APPLICATIONS IN INDUSTRY

L	T	P
4	1	S

Subject Code : 095003

RATIONALE

This subject provides knowledge about audio TV and Thyristor family.

DETAILED CONTENTS

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 Operation of an SCR.
- Two-Transistor Analogy of SCR.
- DIAC.
- TRIAC.
- Basic Triggering circuits for Thyristors.

(16 Periods)

Unit:- IV

POWER ELECTRONICS CIRCUITS

- SCR Commutation Circuits.
- 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

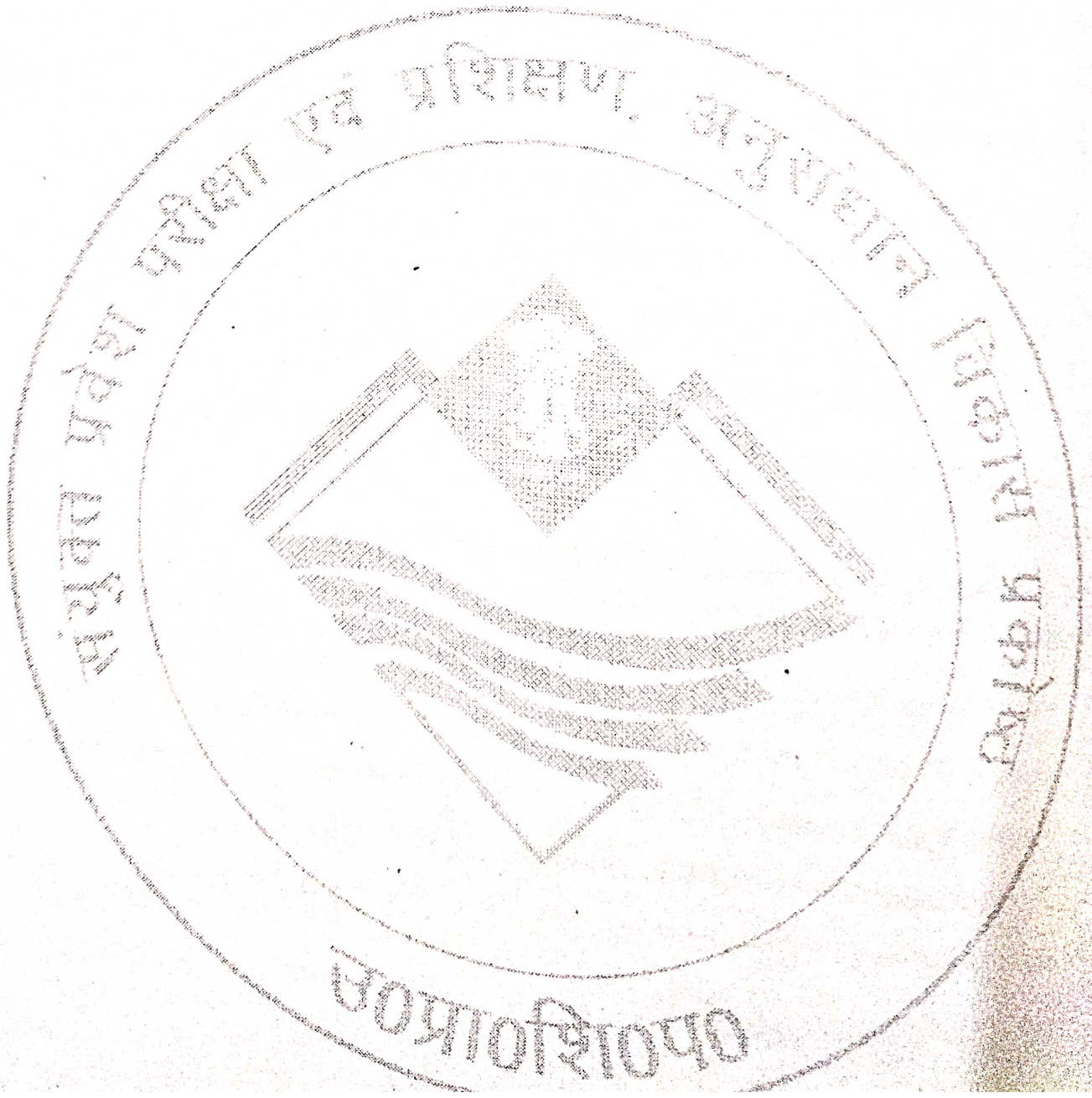
- Familiarization & testing of components- SCR, DIAC, TRIAC .
- To plot the V-I characteristics of SCR.
- To plot V-I characteristics of DIAC.
- To plot and verify Characteristic of TRIAC.
- Assembly and testing of Half-wave Gate-controlled Rectifier using One SCR.
- Assembly and testing of Single-phase 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 troubleshooting 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

SUGGESTED DISTRIBUTION OF MARKS

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



CONTROL AND INSTRUMENTATION

L	T	P
4	1	5

Subject Code : 095002

RATIONALE

This subject aims to develop appreciation and understanding of the use of variety of physical quantities, their measurement and their control. On completion of this course, student will be able to:

1. Explain the basic principles and importance of process control.
2. Explain the mathematical basis for the design of control systems.
3. Get a complete overview of strategies of process control.
4. Analyze the performance characteristics of each instrument.
5. Apply the complete knowledge of various electronics instruments/transducers to measure the physical quantities in the fields of science, engineering and technology.

DETAILED CONTENTS

Process Instrumentation **(06 Periods)**

Unit:- I

Introduction

- Functional block diagram of instrumentation system.
- Process Characteristics.
- Process Variables.

(10 Periods)

Unit:- II

Pressure Measurement

- Measurement of Pressure by
- Diaphragms
- Bourdon Tube
- Bellows

(08 Periods)

Unit:- III

Temperature Measurement

- Temperature Measuring Devices Like
- Pyrometer
- Thermistor

Unit:- IV

Angular Velocity Measurement (12 Peri

- Measurement of Angular Velocity.
- DC & AC Tachometer Generators .
- Digital Tachometer.

Unit:- V

Flow Measurement (10 Perio

- Types of Flow
- Flow Coefficient
- Reynolds No
- Venturi Meter
- Orifice Plate

Unit:- VI

Humidity and Level Measurement (08 Perio

- Hygrometer method for humidity measurement.
- Electrical contact type liquid level indicators.

(B) Control System

Unit:- VII

Introduction (04 Period

- Block diagram of a general open and closed loop process.

Unit:- VIII

Control System Components (10 Period

- Brief description and working of a potentiometer.
- Differential transformer, servo motors.

Unit:- IX

Types of Control Techniques
Periods)

- **Brief Idea and Introduction of following control techniques**
- ON-OFF Control
- Proportional
- Integral
- Derivative
- PI
- PD

LIST OF PRACTICALS

- Experiment of Pressure Measurement
- Experiment of Temperature Measurement
- Experiment of Flow Measurement
- Experiment of Humidity Measurement
- Measurement of Level
- Measurement of angular velocity
- ON/OFF Controller

RECOMMENDED BOOKS

- Instrumentation Devices & Systems by By S. Ranjan; Tata McGraw-Hill Publishing
- Electrical & Elex Measurement by A. K. Sawhney; Danpat Rai & Co.
- Industrial Instrumentation by Tyson
- Process Instrumentation byy Donald P. Echman
- Process Control by Donald P. Echman
- Instrumentation by Cirk & Rimboi
- Instrumentation Measurement and Analysis by B. C. Nakra and K K Chaudhary; MC Graw Hill Publication 8. Electronics Instrumentation by H.S. Kalsi; McGraw Hill Publication
- Medical Instruments by S. Ananthi; New Age International (P) Limited Publisher

SUGGESTED DISTRIBUTION OF MARKS

Unit	Time Allotted (L+T)	Marks Allocation %
I	06	07
II	10	12
III	08	10
IV	12	16
V	10	12
VI	08	10
VII	04	05
VIII	10	12
IX	12	16
TOTAL	**80**	**100**

ENTREPRENEURSHIP MANAGEMENT

Subject Code : 095001

L	T
4	-

RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurs and management concepts to students so that a significant percentage of them c be directed towards setting up and managing their own small enterprises. Th subject focuses on imparting the necessary competencies and skills of enterpr 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 Manngement **(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
- Introduction, 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)

- Introduction, 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

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

MAJOR PROJECT - 1

L	T	P
-	-	10

Subject Code : 095005

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 an image of PCB layout, pasting of PCB layout image on PCB, Etching, Drilling, Mounting of components.

1. Laboratory Experiences **(14 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 **(26 period)**

- Understanding the use of printed circuit board in electronics.
- Use of software --Work bench and PSPICE.

3. Soldering the PCB **(20 period)**

- Soldering practice for PCB.
- Soldering the PCB design in layout topic.
- De-soldering practice.

4. Testing of PCB **(20 period)**

- After soldering the component on given PCB, testing the continuity and input / output result of given circuit.

5. Fault finding of electronic circuit **(20 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(%)
1	14	10
2	26	18
3	20	9
4	20	9
5	20	10
6	60	44
Total	**160**	**100**