COURSE NAME : ELECTRONICS ENGINEERING GROUP

COURSE CODE : ET/EN/EX/EJ/ED/EI/DE

SEMESTER : SIXTH FOR ET/EJ/EN/EX/DE AND SEVENTH FOR ED/EI

SUBJECT TITLE : ADVANCE COMMUNICATION SYSTEMS

SUBJECT CODE : 9172

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	--	02	03	80	20	--	25#	25@	150

Rationale:

An improvement and development in the technology have occurred with tremendous rapidity in parallel with its increasingly wide scale deployment Telecommunication n/w based on Radar, Satellite, Microwave and optical fiber technology have become a major information transmission system to improve the transmission & ideality, to increase the data rate so that more information could be sent or to increase the transmission distance between relay stations.

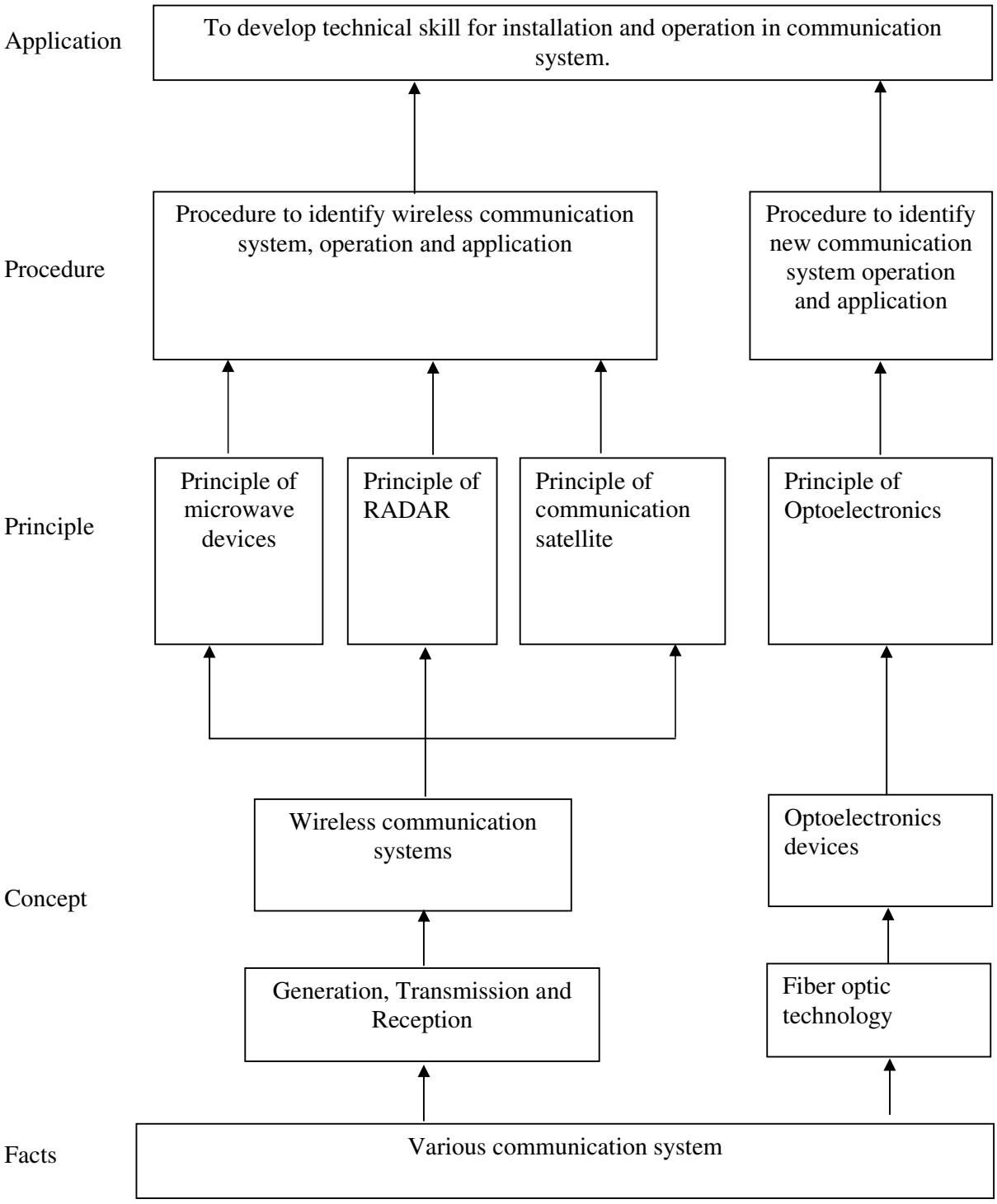
As a result & accelerating rate of growth of communication technology in research and industry students who are preparing themselves for and electronics engineers who are working in these area are faced with the need to understand the theoretical and experimental design and analysis

Objectives:

Students will be able to:

1. Recognize different communication system.
2. Learn the Concept of electromagnetic wave.
3. Identify Microwave spectrum (frequency).
4. Identify different wave guide components.
5. State the Properties of different Tee.
6. State the Concept of duplexer.
7. Know the principle of light transmission through optic fiber.
8. Know Splicing technique.

Learning Structure:



Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	**Wave Guide** 1.1 Microwave Region and Band Designations 1.2 Introduction to TEM/TE/TM/HE wave destination. 1.3 Comparison of wave guide with two wire transmission line. 1.4 Propagation of waves in rectangular wave guide only. (Introduction to wave guide only) 1.5 TE & TM Modes in rectangle wave guide with field pattern. Concept of dominant mode. 1.6 Definition and interpretation of cut off frequency of a waveguide, guide wave length, phase velocity, group velocity(Simple Numerical)	**08**	**10**
02	**Microwave Components** 2.1 Construction , working Principles & Applications of : Multicavity klystron amplifier, Reflex Klystron amplifier, Travelling wave tube, Magnetron, 2.2 Construction working principle & Application, Parametric amplifier, PIN Diode & Gunn Diode 2.3 Construction, Working principle & application of H-plane Tee, E-Plane Tee, E-H Plane TEE, Multihole directional coupler, wave guide, bends, corners, Twists, circular, Isolator.	**10**	**18**
03	**Radar Theory** 3.1 Fundamentals: Basic concept of Radar, Block diagram of an elementary pulsed Radar, Duplexer concept. 3.2 Concept of continuous Wave Radar, Doppler effect & Speed Measurement. 3.3 Block diagram and explain the operation of MTI radar 3.4 Application of Radar 3.5 Block diagram of elements of a satellite Communication system. Brief introduction of communication and geostationary orbit and Satellite. Television and azimuth angles if a Satellite. Uplink and downlink frequencies used frequency bands used in satellite Communication. Definition of foot print, Altitude and	**08**	**12**

	angles, station keeping, look angle. 3.6 Satellite subsystems, Functions of a satellite. i. Power subsystem (only concept), Solar ECLIPSE ii. Telemetry, tracking & Command iii. Attitude & Orbit Control System. iv. Communication Channel subsystem (Block diagram of typical transponder)		
04	**Fiber Optic Communication** 4.1 Light Wave Spectrum 4.2 History of Fiber Optic. 4.3 Advantage & disadvantages of Fiber optic communication. 4.4 Application of FOC in Industrial, Defense, Commercial Field. 4.5 Block Diagram of Fiber Optic Communication.	**08**	**16**
05	**Fiber Optic Communication & Ray Theory** 5.1 Construction of Fiber Optic Cable. 5.2 Fiber Characteristics & Classification. 5.3 Source & It's Limitations, Construction & working Principle of LED, LASER. 5.4 Detector, Limitation, Construction & working principle, Photo Diode. 5.5 Spicing Techniques. 5.6 Definition & Concept of Reflection, dispersion, diffraction, absorption & scattering with the help of light theory 5.7 Definition of Snell's Law, Numerical Aperture\ Acceptance angle, acceptance cone, Critical Angle(Numericals)	**10**	**16**
06	**Losses in Fiber Optic** 6.1 Attenuation, dispersion-intermodel, intramodel, bend loss- micro macro scattering losses- Linear. Non Linear. Absorption (Numericals) 6.2 Link Budget, Power Budget (Numericals) 6.3 Block Diagram & working of OTDR	**04**	**08**
	Topic	**48**	**80**

Practical:
Intellectual Skills:

1. Reading
2. Sourcing of Web sites

Motor Skill:
1. Testing
2. Measurement

List of Practical:

1. Verify the characteristics of Reflex Klystron.
2. Verification of characteristics E Plane Tec.
3. Verification of characteristics r of Isolator.
4. Verification of characteristics of Circulator.
5. Indirect measurement of frequency using cavity resonator.
6. Measure the coupling factor of MHD Coupler.
7. Calculate the N.A for given FOC.
8. Calculate the bend Loss in given FOC.
9. Verify the characteristics of LASER.
10. Verify the characteristics of LED.
11. Verify the characteristics of Photo Diode.
12. Attenuation measurement in given FOC.
13. Dispersion measurement in given FOC.
14. Visit Industry to see
    i) Use of OTDR (Demonstration)
    ii) Use of Splicing Technique (Demonstration)

Learning Resources:

Books:

Sr. No.	Author	Title	Publisher
01	Keiser	Optical Fiber Communication	Tata McGraw-Hill International
02	Samuel liao	Microwave Devices and Circuits	Prentice Hall of India
03	A. Selverajan	Optical Fiber Communication	Tata McGraw-Hill
04	Kennedy Davis	Electronic Communication System	Tata McGraw-Hill
05	John Senior	Optical Fiber Communication	Prentice Hall of India
06	David Pozar	Microwave Engineering	John Wiley and Sons
07	Frenzel	Communication Electronics	Tata McGraw-Hill
08	William Schweber	Electronic Communication	Prentice Hall International UK