	References: 1 Basic Electronics- Solid State–BL Theraja-SChand And Company Ltd. 2 Electronic Devices And Circuit Theory –Robert L Boylestad AndLouis Nashelsky(PHI)	

SEMESTER IV

Year	2	**Course Code:** 21BSC4C2ELE2L	**Credits**	**04**
Sem.	3	**Course Title: ELECTRONICS COMMUNICATION-I**	**Hours**	**60**
Course Pre-requisites, if any		NA		
Formative Assessment Marks: 40		Summative Assessment Marks: 60	Duration of ESA: 2 hrs.	
Course Objectives		To understand the communication system, Principle and working communication system, means and medium of communication.		

	To understand the Principle and working of different modulation techniques Will be able to differentiate between analog and digital communication. To understand the Principle and working of Satellite and optical fibre communication.
Course Outcomes	**Course Outcomes (COs)**: After the successful completion of the course, the student will be able to: CO1. Know the basic concept of Analog Communication, means and medium of communication. CO2. Understand the principle of Analog and digital modulation. CO3. Familiar with "AM" and "FM "techniques. CO4. Understand the basic concept of Pulse Modulation, Carrier Modulation for digital transmission and able to construct simple pulse modulation. CO5. Understand the basic concept of Satellite Communication CO6. Understand the basic concept of Optical Fibre Communication.
Unit No.	**Course Content**
Unit- I	**Electronic communication:** Introduction to communication – means and modes. Need for modulation. Block diagram of an electronic communication system. Brief idea of frequency allocation for radio communication system in India (TRAI). Electromagnetic communication spectrum, band designations and usage. Channels and base-band signals. Concept of Noise, signal-to-noise (S/N) ratio. **Propagation of "EM" Wave**: Introduction, Loss of "EM" Energy due to noise, Ground Wave, Sky-wave and Space-wave propagation. Ionosphere and its effects. **Communication medium**: Transmission lines, coaxial cables, wave guides and optical fibres. **Antenna**: Introduction, Antenna parameters, Ferrite rod antenna, yagi-Uda antenna, Dish-antenna, principle, Working and applications only. **(15 HOURS)**
Unit- II	**Analog Modulation:** Amplitude Modulation, modulation index and frequency spectrum. Generation of AM (Emitter Modulation), Amplitude Demodulation (diode detector), Concept of Single side band generation and detection. Frequency Modulation (FM) and Phase Modulation (PM), modulation index and frequency spectrum, equivalence between FM and PM, Generation of FM using VCO, FM detector (slope detector), Qualitative idea of Super heterodyne receiver. **Analog Pulse Modulation**: Channel capacity, sampling theorem, Basic Principles- PAM, PWM, PPM, modulation and detection technique for PAM only, Multiplexing. **(15 HOURS)**
Unit -III	**Digital Pulse Modulation**: Need for digital transmission, Pulse Code Modulation, Digital Carrier Modulation Techniques. **Introduction to Communication and Navigation systems**: Satellite Communication Introduction, need, geosynchronous satellite orbits, geostationary satellite advantages of geostationary satellites. Satellite visibility, transponders (C - Band), path loss, ground station, simplified block diagram of earth station. Uplink and downlink. **(15 HOURS)**
Unit -IV	**Optical Fiber Communication**: Optical Fibers: Structure and wave guides, fundamentals, Nature of light, basic optical laws and definitions, optical fiber types, Rays and modes, ray optics. Signal degradation in optical fibers, attenuation, scattering losses, radiative losses, absorption losses, core and cladding losses, signal distortion in optical wave guides, group delay, dispersion, pulse broadening in graded index wave guide. **Optical sources**: LEDs, structure, source materials, Laser diodes: Structures, threshold conditions, modal properties and radiation patterns **Optical Receiver Operations**: Fundamental receiver operations, digital signal transmission, receiver noise, analog receivers. **(15 HOURS)**
Recommended Leaning Resources	

Reference Books	1 Electronic Communications, D. Roddy and J. Coolen, Pearson Education India. 2 Advanced Electronics Communication Systems- Tomasi, 6th edition, Prentice Hall. 3 Modern Digital and Analog Communication Systems, B.P. Lathi, 4th Edition, 2011, Oxford University Press. 4 K.D Prasad, "Antenna and Wave Propagation", Satyaprakashan, New Delhi. 5 Sanjeev Gupta, "Electronic Communication Systems", Khanna Publishers, New Delhi. 6 Electronic Communication systems, G. Kennedy, 3rd Edn., 1999, Tata McGraw Hill. 7 Principles of Electronic communication systems – Frenzel, 3rd edition, McGraw Hill 8 Communication Systems, S. Haykin, 2006, Wiley India Electronic Communication system, Blake, Cengage, 5th edition. 9 Wireless communications, Andrea Goldsmith, 2015, Cambridge University Press 10 Gerd Keiser, "Optical Fibre Communication ", McGraw Hill, 3rd Edn.

Laboratory Experiments:

Year	2	**Course Code:21BSC2C3ELE3P**	**Credits**	**2**
Sem.	4	**Course Title: ELECTRONIC COMMUNICATION - I**	**Hours**	**4 Hrs/week**
Formative Assessment Marks: 25		Summative Assessment Marks:25	Duration of ESA: 4 hrs.	
		Note: Minimum of 08 Experiments are to be performed using hardware and simulation.		
		LIST OF EXPERIMENTS		
		1. Construct amplitude modulator using transistor / I. C. Determination the modulation index. 2. Construct frequency modulator circuit – determine the modulation index. 3. "AM" Liner Diode detector- trace the input and output waveforms. 4. Frequency mixer circuit – Verify output frequency for different input frequencies. 5. "FM" Detector – Plot the frequency response curve. 6. Study of Balanced demodulator 7. Study of IF amplifier circuit. 8. Pulse amplitude modulation (PAM) – trace the output waveforms. 9. Pulse width modulation (PWM) – trace the output waveforms. 10. Pulse position modulation (PPM) – trace the output waveforms. 11. Characteristics of LED in OFC 12. Study of Numerical aperture 13. Study of OFC losses. 14. Setting up simple OFC Link.		

OPEN ELECTIVE

Year	2	**Course Code:**	**Credits**	03
Sem.	4	**Course Title: Application of Electronics-2**	**Hours**	40

Formative Assessment Marks: 40	Summative Assessment Marks: 60	Duration of ESA:.02 hrs.

Unit No.	Course Content	Hours
Unit I	**Introduction to Advanced Communication** Radio, TV- principles, block diagram & applications, OFC applications and advantages, Embedded system – Smart card, SIM card Mobiles- Bock diagram &applications	(10 hours)
Unit II	**Advance Electronics** CCTV camera, ATM- principles, block diagram & applications Electronic voting Machine (EVM)- CU,BU,VVPAT.,	(10 hours)
Unit III	**Application of Satellite** Types of cameras, antenna and communication system is satellites, EDUSAT, TV & Internet-modem, Wi-Fi.	(10 hours)
Unit IV	**E-waste management**-identification, segregation, disposal. Precious elements. Lithium extraction from Li-Ion batteries. Alternative to Li-Ion batteries, Environmental effect of e-Wastes.	(10 hours)
	References: Basic Electronics-Solid State – B L Theraja - S Chand And Company Ltd	

ASSESSMENT METHODS

Evaluation Scheme for Internal Assessment:

Theory:

Assessment Criteria	40 marks
1st Internal Assessment Test for 30 marks 1 hr after 8 weeks and 2nd Internal Assessment Test for 30 marks 1 hr after 15 weeks. Average of two tests should be considered.	30
Assignment	05
Activity	05
Total	**40**

Assessment Criteria	25 marks
1st Internal Assessment Test for 20 marks 1 hr after 8 weeks and 2nd Internal Assessment Test for 20 marks 1 hr after 15 weeks. Average of two tests should be considered.	20
Assignment/Activity	05
Total	**25**

Practical:

Assessment Criteria	25 marks
Internal test	15
Viva Voce / basic understanding of the concept	05
Journal/Practical Record	05
Total	**25**

Scheme of Evaluation for Practical Examination

Sl.No.	Particulars	Marks Allotted Max. 25
1.	Basic formula with description, nature of graph if any & indication of unit	05
2.	Tracing of schematic ray diagram/Circuit diagram with description and tabulation	05
4.	Experimental skill & connection	05
5.	Record of observation,	05
6.	Calculation including drawing graph	04
7.	Result with unit	01
	Total	**25**

Question Paper Pattern:

RANI CHANNAMMA UNIVERSITY
Department of ELECTRONICS

I /II/III/IV Semester B.Sc.

Sub: **Code:** **Maximum Marks: 60**

Q.No.1.	**Answer any Six Questions** ***(Two question from Each Unit to be asked)*** **a.** **b.** **c.** **d,** **e.** **f.** **g.** **h.**	**6X2=12**
Q.No.2.	**(Questions from Unit-I)** **a.** **b.** **OR** **c.** **d.**	 **08** **04** **08** **04**
Q.No.3.	**(Questions from Entire Unit-II)** **a.** **b.** **OR** **c.** **d.**	 **08** **04** **08** **04**
Q.No.4.	**(Questions from Unit-III)**	

	a. **b.** **OR** **c.** **d.**	**08** **04** **08** **04**
Q.No.5.	**(Questions from Unit-IV)** **a.** **b.** **OR** **c.** **d.**	 **08** **04** **08** **04**

Note:

i. There should be a problem carrying 4 marks from each unit and may be asked in either b or d in questions 2 to 5.

ii. If necessary, sub questions a and c from 2 to 5 may be subdivided in to i. and ii. Without exceeding maximum 08 marks.