SCHEME OF COURSE WORK

Course Details:

Course Title	**: TV & SATELLITE COMMUNICATIONS**		
Course Code	**: 13EC1128**	**L T P C**	**: 4 1 0 3**
Program:	**: B.Tech.**		
Specialization:	**: Electronics and Communications Engineering**		
Semester	**: VII**		
Prerequisites	**: Signals and Systems, Analog Communications, Digital Communications, Orbital Mechanics and Geography.**		

Course Outcomes (COs):

At the end of the course the student will be able to

1	Understand the existing Satellite Communication Applications
2	Undertake Projects based on GPS and TV Broadcasting.

Program Outcomes (POs):

A graduate of Electronics and Communication engineering will be able to

1	Apply the knowledge of mathematics, science, engineering fundamentals to solve complex electronics and communication engineering problems.
2	Identify, formulate and analyze problems related to electronics and communication engineering and substantiate the conclusions using the first principles of sciences and engineering.
3	Design solutions for electronics and communication engineering problems and design system components and processes that meet the specified needs with appropriate consideration for public health and safety.
4	Perform analysis and interpretation of data by using research methods such as design of experiments to synthesize the information and to provide valid conclusions
5	Select and apply appropriate techniques from the available resources and modern electronics and communication engineering and software tools, and will be able to predict and model complex engineering activities with an understanding of the practical limitations.
6	Carry out their professional practice in electronics and communication engineering by appropriately considering and weighing the issues related to society and culture and the consequent responsibilities.
7	Understand the impact of the professional engineering solutions on environmental safety and legal issues.
8	Transform into responsible citizens by resorting to professional ethics and norms of the engineering practice.
9	Function effectively in individual capacity as well as a member in diverse teams and in multidisciplinary streams.
10	Communicate effectively on complex engineering activities with the engineering community and society, and will be able to prepare reports and make presentations effectively.

11	Demonstrate knowledge and understanding of the engineering and management principles and apply the same while managing projects in multidisciplinary environments.
12	Engage themselves in independent and life-long learning in the broadest context of technological change while continuing professional practice in their specialized areas of electronics and communication engineering

Course Outcome Vs Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	S	S	S	S	S					S
CO-2	S	S	S	S	S	S	M	M	S			S

S - Strongly correlated, *M* - *Moderately* correlated, *Blank - No correlation*

Assessment Methods:	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Gross Structure, Image Continuity, Scanning, Flicker, Interlaced Scanning, Number Of Scanning Lines, Fine Structure.	**CO2**	1)What is meant by flicker? 2)Explain interlaced scanning.	▫ Lecture	Quiz (Week 2 - 4) Mid-Test 1 (Week 9)
2	Tonal Gradation. Video Signal Dimensions,Horizontal Synchronization Details, Vertical Synchronization Details, Scanning Sequence Details.	**CO2**	1)Draw the composite video signal showing the details of different levels and pulses. 2) Explain the need for equalizer pulses in vertical sync generation	▫ Lecture	Quiz (Week 2 - 4) Mid-Test 1 (Week 9)
3	Functions Of Vertical Pulse Train, Channel Bandwidth. Vestigial Side Band Transmission, Bandwidth Allocations For Colour Transmission.	**CO2**	1)Show the total channel bandwidth using VSB. 2)Describe the function of vertical pulse train.	▫ Lecture	Quiz (Week 2 - 4) Mid-Test 1 (Week 9)
4	Kepler's Laws, Newton's Law, Orbital Parameters, Orbital Perturbations.	**CO1**	1)What do Kepler's laws describe with reference to a satellite moving around the earth? 2) Define apogee, perigee, mean anomaly & true anomaly	▫ Lecture	Mid-Test 1 (Week 9)
5	Station Keeping, Geo Stationary And Non GeoStationary Orbits, Look Angle Determination, Limits Of Visibility	**CO1**	1)What are the advantages and disadvantages of geostationary orbit for satellite communication? 2)What is meant by station keeping?	▫ Lecture	Mid-Test 1 (Week 9)

6	Eclipse, Sub Satellite Point, Sun Transit Outage, Launching Procedures, Launch Vehicles And Propulsion	**CO1**	1)Describe about various launch vehicles and launch procedures. 2)What is sun transit outage?	▫ Lecture	Mid-Test 1 (Week 9)
7	Spacecraft Structure, Primary Power, Attitude and Orbit Control, Thermal Control and Propulsion, Communication Payload and Supporting Subsystems.	**CO1**	1) Describe the functioning of the attitude and orbit control system in a geosynchronous satellite 2)What is meant by payload & transponder?	▫ Lecture	Mid-Test 1 (Week 9)
8	Telemetry,Tracking and Command, Satellite Uplink and Downlink Analysis and Design, Link Budget,Eb/No Calculation.	**CO1**	1)Why is small omni directional antenna used for TT&C rather than directional antenna? 2) What is system noise temperature? The LNA in a receiver has 0.6 dB noise figure and 50 dB gain. The down-converter has noise temperature of 250 K and gain of 3 dB. IF amplifier has noise temperature of 500K. Find the system noise temperature if the antenna has 100K noise temp.	▫ Lecture	Mid-Test 1 (Week 9)
9	**MID TEST – 1**				
10	Performance Impairments, System Noise, Intermodulation And Interference, Propagation Characteristics And Frequency Considerations- System Reliability And Design Lifetime	**CO1**	1)What is system noise temperature? The LNA in a receiver has 0.6 dB noise figure and 50 dB gain. The down-converter has noise temperature of 250 K and gain of 3 dB. IF amplifier has noise temperature of 500K. Find the system noise temperature if the antenna has 100K noise temp. 2) For a geostationary satellite calculate the free space loss in dB for the signal received on ground at frequencies 4GHz and 11 GHz.	▫ Lecture	Quiz (Week 10 - 13) Mid-Test 2 (Week 18)
11	Modulation and Multiplexing: Voice, Data, Video, Analog – Digital Transmission Systems, Digital Video Broadcast. Multiple Access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum Communication, Compression – Encryption	**CO1**	1) A TDMA system operates with 2 ms frame period. Ten earth stations participate in the network each carrying 2.048 Mb/s PCM data. The preamble to be used with each burst has the length of 64 bits. Find the total number of bits in the frame and the TDMA data rate.5 2)What are the major factors that reduce the capacity of FDMA system?	▫ Lecture	Quiz (Week 10 - 13) Mid-Test 2 (Week 18)
12	Earth Station Technology— Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP,	**CO1**	1) Explain the block diagram of Earth Station Technology. 2) What is Cassegrain	▫ Lecture	Assignment (Week 10 - 13) Mid-Test 2

	Antenna Gain.		antenna? What are its advantages?		(Week 18)
13	INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSA, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS) - Direct to home Broadcast (DTH)	**CO1**	1)Explain the GPS receiver with a block diagram. 2) . Why is MPEG compression used in DTH system	▫ Lecture	Mid-Test 2 (Week 18)
14	Digital audio broadcast (DAB)- World space services, Business TV(BTV), GRAMSAT, Specialized services – E – mail, Video conferencing, Internet.	**CO1**	1)Explain Digital Audio Broadcast. 2)Write short notes on (i) E-mail (ii)Video conferencing	▫ Lecture	Assignment (Week 14 - 17) Mid-Test 2 (Week 18)
15	**MID TEST – 2**				
16/17	**END EXAM**				