Programme	**:**	**Diploma in ET**/CE/EE//ME/MT/CM/IT/DDGM
Programme Code	**:**	01/02/**03**/04/05/06/07/08/21/22/**23**/24/26/16/**17**
Name of Course	**:**	**Satellite Communication**
Course Code	**:**	**ET 582**

Teaching Scheme:

	Hours /Week	**Total Hours**
Theory	**04**	**64**
Practical	**02**	**32**

Evaluation Scheme:

	Progressive Assessment	**Semester End Examination**			
		Theory	**Practical**	**Oral**	**Term work**
Duration	**Two class tests, each of 60 minutes**	**3 Hrs.**	**--**	**3 Hrs**	**--**
Marks	**20**	**80**	**--**	**25**	**25**

Course Rationale:

Expose the student to basic ideas of satellite communication via orbiting satellite, important parts of today's technology.

Course Objectives:

After studying this course, the student will be able to

- To understand a general principle of orbiting satellite communication.
- To make student aware of the terminology, model, analysis, methodology and principles of modern satellite links.
- To know the basic line power analysis to idealized and simplified satellite models.

Course Content:

Chapter No.	Name of Topic/Sub topic	Hrs	Marks
	SECTION – I		
1.	**Satellite Systems**		
	Historical development of satellites, orbiting satellite, frequency bands, Satellite Multiple Access formats. Orbital Aspects of satellite communication orbital Mechanics, equation of orbit, locating satellite in orbit, orbital elements, orbital perturbations.	**8**	**10**
2.	**Satellite Channel & Antenna**		
	Satellite channel, Electromagnetic field propagation, power flow, polarization, Antenna gains pattern, and common antenna types: the parabolic (dish), Atmospheric losses, power loss, rainfall effects, receiver noise, temperature noise, noise figure.	**8**	**10**
3.	**Satellite Link**		
	Satellite link analysis, satellite up link, satellite down link, direct broadcasting, up down link analysis and satellite cross-links. Frequency, polarization and depolarization of spot beams, satellite down links, Frequency reuse with spot beams, Multiple beams.	**8**	**10**
4.	**Satellite Transponder**		
	The transponder model ,The satellite front end, front end noise, Front-end filter, front-end wave forms. Filtering of digital carriers, satellite signal processing.	**8**	**10**
	SECTION – II		
5.	**Transponder Limitations**		
	Nonlinear satellite Amplifiers AM/AM conversion, AM/PM conversion on nonlinear amplifier model, Effect of nonlinear amplification of digital carrier.	**8**	**10**
6.	**Optical Satellite Communication**		
	Review of optical beam transmission and reception, lasers, optic filter photo detection Detector efficiency, Gain, Responsivety, Bandwidth, optical Receiver noise, optical background noise power, optical line analysis, Direct detection systems, Heterodyne systems, Atmospheric effects.	**8**	**10**
7.	**Laser Cross Link Analysis**		
	Laser cross link analysis, Digital optical cross links, pulse laser encoding, Beam acquisition tracking, pointing, acquisition.	**8**	**10**
8.	**Transmission System**		
	Introduction to frequency division multiple access, Time division multiple access, TDM formats, Code division multiple access.	**8**	**10**
	TOTAL	**64**	**80**

List of Practical/Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment
1.	To Plot radiation pattern of parabolic antenna.
2.	Measurement of noise.
3.	Calculation of noise figure.
4.	Study of channel specifications.
5.	Study of unlinking & down linking.
6.	Study of transponders.
7.	Setting of optical link.
8.	Study of FDMA, EDMA and CDMA.
9.	Study experiment on DTH system operation.

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1.	Satellite systems	Classroom Teaching & Laboratory work
2.	Satellite channel & Antenna	Classroom Teaching & Laboratory work
3.	Satellite link	Classroom Teaching & Laboratory work
4.	Satellite transponder	Classroom Teaching & Laboratory work
5.	Transponder limiting	Classroom Teaching & Laboratory work
6.	Optical satellite communication.	Classroom Teaching & Laboratory work
7.	Laser cross link analysis	Classroom Teaching & Laboratory work
8.	Transmission system	Classroom Teaching & Laboratory work

Text Books:

Sr. No	Author	Title	Publication
1.	Robert Gagliardi	Satellite Communication	

Reference Books:

Sr. No	Author	Title	Publication
1.	Pratt	Satellite Communication	

Learning Resources: Different Technical Journals

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1.	Satellite systems	4	3	3	10
2.	Satellite channel & Antenna	4	3	3	10
3.	Satellite link	4	3	3	10
4.	Satellite transponder	4	3	3	10
5.	Transponder limiting	4	3	3	10
6.	Optical satellite communication.	4	3	3	10
7.	LASER cross link analysis	4	3	3	10
8.	Transmission system	4	3	3	10
Total		**32**	**24**	**24**	**80**

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