

# GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Computer Science and Engineering

Academic Year: **2016-17**

Semester: **EVEN**

## COURSE PLAN

Semester: VI

Subject Code& Name: **10EC662& Satellite communication**

Name of Subject Teacher: **N.Raja Thejaswini**

Name of Subject Expert (Reviewer):

For the Period: From: 1-08-16 to 19-11-16

### Details of Book to be referred:

Text Books	<b>Satellite Communications</b> , Dennis Roddy, 4th Edition, McGraw- Hill International Edition,2006.
Reference Books	<b>Satellite Communications</b> , Timothy Pratt, Charles Bostian and Jeremy Allnutt, 2nd Edition, John Wiley Pvt. Ltd & Sons, 2008. <b>Satellite Communication Systems Engineering</b> , W. L. Pitchand, H. L. Suyderhoud, R. A. Nelson, 2nd Ed., Pearson Education., 2007.

Lecture NO	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remarks by HOD
	Introduction to syllabus			6-2-17				
	<b>UNIT I OVER VIEW OF SATELLITE SYSTEMS</b>	<b>Applications:</b>						

1.	Introduction	<p>Important application for communication satellites is in international telephony.</p> <p><b>Objectives:</b> understanding of specialist bodies of knowledge</p> <p><b>Outcome:</b> Develop the student background and basic knowledge in the field of satellite communication.</p>	T1 1	7-2-17				
2.	Over view of satellite systems		T1 2	8-2-17				
3.	Introduction to satellite communication		T1 2	9-2-17				
4.	Frequency allocation		T1 3	10-2-17				
5.	Frequency allocation		T1 4	13-2-17				
6.	Intel Sat		T1 5	14-2-17				
	<b>UNIT II ORBITS</b>	<p><b>Applications:</b> Fixed-point telephones relay calls to an earth station, where they are then transmitted to a geostationary satellite</p> <p><b>Objectives:</b> determine the azimuth and elevation angles and visibility of a geostationary satellite from an earth station. create link budgets for an uplink and a downlink, and determine carrier to noise ratio (C/N) at an earth terminal</p>						
7.	<b>Orbits:</b> Introduction		T1 29	15-2-17				
8.	Kepler laws, Orbital elements,		T1 30	16-2-17				
9.	Apogee and perigee heights		T1 37	17-2-17				
10.	Orbit perturbation, inclined orbits		T1 39	20-2-17				
11.	Calendars, Universal time, sidereal time,		T1 44	21-2-17				
12.	orbital plane		T1 46	22-2-17				
13.	Local mean time		T1 70	23-2-17				
14.	a sun synchronous orbit,		T1 72	27-2-17				
15.	Geo stationary orbits: Introduction, angles		T1 77	28-2-17				

16.	Antenna look angles	receiver <b>Outcomes:</b> Ability to calculate the orbital determination and launching	T1 78	1-3-17				
17.	Polar mix antenna		T1 85	2-3-17				
18.	Limits of visibility, earth eclipse of satellite, Sun transit outage,		T1 92	3-3-17				
19.	Test			6-3-17				
	<b>UNIT III PROPAGATION IMPAIRMENTS AND SPACE LINK</b>	<b>Applications:</b> Navigation satellite is an artificial satellite stationed in space for the purposes of navigation. Satellite navigation is a space-based radio positioning system  <b>Objectives:</b> calculate the baseband signal-to-noise ratio or bit error rate for a satellite link  <b>Outcomes:</b> design satellite communication systems using GEO or LEO satellites to carry voice, video, or data signals using						
20.	Propagation impairment's		T1 103	7-3-17				
21.	Atmospheric loss, ionospheric effects		T1 104	8-3-17				
22.	Rain attenuation, other impairments		T1 106	13-3-17				
23.	Space link: introduction		T1 351	14-3-17				
24.	EIRP, Transmission losses		T1 352	15-3-17				
25.	Link power budget		T1 356	16-3-17				
26.	System noise, CNR		T1 357	17-3-17				
27.	Uplink, downlink		T1 367	20-3-17				
28.	Effect of rain,	T1 375	21-3-17					

29.	combined CNR	analog or digital modulation	T1 380	22-3-17				
	<b>UNIT IV SPACE SEGMENT</b>	<b>Applications:</b> A communications satellite is an artificial satellite stationed in space for the purposes of telecommunications. Modern communications satellites use geosynchronous orbits, Molniya orbits or low Earth orbits.  <b>Objectives:</b> Study of components of space segment components  <b>Outcomes:</b> Able to design satellite for real time applications.						
30.	Introduction		T1 199	23-3-17				
31.	Power supply units, altitude control		T1 202	24-3-17				
32.	Station keeping,		T1 206	27-3-17				
33.	thermal control,		T1 209	28-3-17				
34.	TT&C		T1 211	30-3-17				
35.	Transponders,		T1 213	31-3-17				
36.	Antenna system		T1 215	3-4-17				
37.	Test			4-4-17				
	<b>UNIT V EARTH SEGEMENT</b>		<b>Applications:</b>  Agriculture is one of the most important application fields using Earth Observation data from all missions, where other data sources are often too expensive, or too					
38.	Earth Segment: Introduction	T1 239		5-4-17				
39.	Receive only home TV system	T1 240		6-4-17				
40.	Out door unit, indoor unit	T1 241		7-4-17				
41.	MATV	T1 243		10-4-17				

42.	CATV	restricted in scope. <b>Objectives:</b> Study of components of earth segment components	T1 244	11-4-17				
43.	Tx-Rx earth station	<b>Outcomes:</b> Able to design antennas to provide uplink and down link Frequency.	T1 246	12-4-17				
	<b>UNIT VI INTERFERENCE AND SATELLITE ACCESS</b>	<b>Applications:</b> The most basic form of satellite imagery provides pictures of the current cloud conditions.						
44.	Interface and Satellite Access: Introduction		T1 399	13-4-17				
45.	Interface between satellite circuits,	<b>Objectives:</b> Study of satellite access by various users.	T1 401	20-4-17				
46.	Satellite access, single access		T1 423	21-4-17				
47.	Pre assigned FDMA, SCPC	<b>Outcomes:</b> Design a communications satellite system to meet specified objectives for signal to noise ratio (S/N) in an analog baseband or BER in a digital link using appropriate multiple access techniques.	T1 425	24-4-17				
48.	TDMA,		T1 436	25-4-17				
49.	pre-assigned TDMA,		T1 438	26-4-17				
50.	Demand assigned TDMA, Downlink analysis		T1 455	27-4-17				
51.	Comparison for uplink power requirement for TDMA,FDMA ,Switched		T1 459	28-4-17				

	TDMA							
52.	TEST			2-5-17				
	<b>UNIT VII DIRECT BROADCAST SATELLITE</b>	<b>Applications:</b> Geology and related oil, mineral and gas exploration activities make up an application segment that takes full advantage of satellite capabilities  <b>Objectives:</b> Study of DTH and compression standards.  <b>Outcomes:</b> Ability to design different kinds of transmitter and receiver antennas.						
53.	DBS – Direct Broadcast Satellite		T1 531	3-5-17				
54.	Introduction, Orbital spacing		T1 532	4-5-17				
55.	power ratio , Frequency and polarization,		T1 533	5-5-17				
56.	Transponder capacity		T1 534	<b>9-5-17</b>				
57.	Bit rates for digital TV	T1 536	10-5-17					
	<b>UNIT VIII SATELLITE MOBILE AND SPECIALIZED SERVICES</b>	<b>Objective:</b> This discusses logical or IP Addressing, addressing system and about IPV4 and IPV6  <b>Application:</b> Internet protocols  <b>Outcome</b> Modern communications						
58.	Satellite mobile and specialized services		T1 561	11-5-17				
59.	Satellite mobile services, VSAT		T1 562	12-5-17				
60.	Radar sat, GPS		T1 564	18-5-17				
61.	Indian satellite systems		T1 565	19-5-17				

		satellites use geosynchronous orbits, Molniya orbits or low Earth orbits.						
62.	GPS receivers and codes		T1 569	22-5-17				
63.	Orb communication ,		T1 572	23-5-17				
64.	Revision			24-5-17				
65.	Revision			25-5-17				
66.	Revision			26-5-17				
67.	Revision			29-5-17				
68.	Revision			30-5-17				
69.	Revision			31-5-17				
70.	Revision			1-6-17				
71.	Revision			2-6-17				

Prepared By: \_\_\_\_\_  
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