SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous)

Narsapur, West Godavari District, A.P. 534280

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Period/Week	Academic Year	Course Commencement Date
20EC7E08	Global Positioning and Navigation satellite systems	VII	ECE	5	2025-26	09-06-2025

COURSE OUTCOMES:

At the end of the Global Positioning & Navigation Satellite Systems Course, student can be able to

1.	Describe the concept of GNSS-based positioning methods, the core components of satellite navigation system and their purposes. [K2]
2.	Illustrate the basic concepts of GPS signal Receivers [K3]
3	Estimate and represent the GPS coordinate frames and GPS orbits. [K4]
4.	Analyze the impact of various error sources on the precision of positioning. [K4]

Unit No.	Out Comes/ Bloom's Level	Topics No	Topics/Activity	Number Of periods	Text Book/ Reference	Delivery Method
1	**CO1**:Describe the concept of GNSS-based positioning methods, the core components of satellite navigation system and their purposes. [K2]	**UNIT-1:OVERVIEW OF GPS**			T1,R1	Chalk and Talk, PPT and E-Learning
		1.1	Basic concept of GPS and Evaluation of GPS	2		
		1.2	GPS Configuration & Working Principle	1		
		1.3	System Architecture of GPS- Space Segment, Control Segment, User Segment	1		
		1.4	Services of GPS	1		
		1.5	GALILEO Satellite System	2		
		1.6	GLONASS Satellite System	1		
		1.7	Comparison of GPS, GALILEO & GLONASS	2		
		1.8	GAGAN System	1		
		1.9	Applications of GPS	1		
		1.10	Class Test-1	1		
				13		
2	**CO2**: Illustrate the basic concepts of GPS signal Receivers [K3]	**UNIT-2:GPS SIGNALS AND RECEIVERS**			T1,R1	Chalk and Talk, PPT and E-Learning
		2.1	GPS Signal generation& Signal Characteristics	2		
		2.2	GPS Signal Structure	2		
		2.3	GPS Receiver	2		
		2.4	GPS Signal Condition	1		
		2.5	GPS Signal Aquisition	2		
		2.6	Anti-Spoofing	1		
		2.7	Selective Ability	1		
		2.8	Class Test-2	1		
				12		

Unit No.	Out Comes/ Bloom's Level	Topics No	Topics/Activity	Number Of periods	Text Book/ Reference	Delivery Method
3	**CO3**: Estimate and represent the GPS coordinate frames and GPS orbits. [K4]	**UNIT-3: GPS CO-ORDINATE FRAMES, TIME REFERENCES**			T1,R1, R2	Chalk and Talk, PPT and E-Learning
		3.1	ECI Co-ordinate system	2		
		3.2	ECEF Co-ordinate system	2		
		3.3	GeoDetic Co-ordinate system	2		
		3.4	World Geodetic system	2		
		3.5	ECI Co-ordinate system	2		
		3.6	GPS Time and UTC generation	1		
		3.7	Class Test-3	1		
				12		
4	**CO3**: Estimate and represent the GPS coordinate frames and GPS orbits. [K4]	**UNIT-4:GPSORBITS AND SATELLITE POSITION DETERMINATION**			T1,R1	Chalk and Talk, PPT and E-Learning
		4.1	GPS Orbital Parameters	2		
		4.2	Description of receiver independent exchange format	2		
		4.3	RINEX observation Data	2		
		4.4	Navigation Message data parameters for RINEX	2		
		4.5	GPS Position Determination	2		
		4.6	Class Test-4	1		
				11		
5	**CO4:** Analyze the impact of various error sources on the precision of positioning. [K4]	**UNIT-5:GPS ERRORS**			T1, R2	Chalk and Talk, PPT and E-Learning
		5.1	GPS Error Models and Sources	2		
		5.2	Clock Errors	2		
		5.3	Ionospheric Error	2		
		5.4	Tropospheric Errors	2		
		5.5	Multipath Error	1		
		5.6	Atmospheric Delay Errors	1		
		5.7	Receiver Noise	1		
		5.8	Ionospheric Effects on GPS Signals	1		
		5.9	Class Test-5	1		
	Content Beyond Syllabus	5.10	Error Analysis of GPS Positioning	1		
				14		
			TOTAL	62		

Text Books:

S.No	
1	G.S. RAO, Global Navigation Satellite Systems, 2nd Edition, McGraw-Hill publications, New Delhi, 2010.

Reference Books:

1	B. Hoffman – Wellen hof, H. Liehtenegger and J. Collins, 'GPS – Theory and Practice', 4th Edition, Springer – Wien, New York , 2001.
2	Elliott D. Kaplan, Christopher J. Hegarty -Understanding GPS Principles and Applications, Second Edition, ARTECH HOUSE, 2005

Web Details:			
S. No			
1	https://www.unoosa.org/oosa/sk/ourwork/psa/gnss/gnss.html		
2	https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/gps/howitworks/		
3	https://www.euspa.europa.eu/european-space/eu-space-programme/what-gnss		
4	https://www.gps.gov/systems/gnss/		
		Name	**Signature with Date**
i.	Faculty	Mr. D. Rahul Khanna	
ii.	Course Coordinator	Mr. D. Rahul Khanna	
iii.	Module Coordinator	Dr. Sekhar Didde	
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