

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
23EC6E03	Smart and Wireless Instrumentation	VI	ECE	5	2025-26	10-12-2025

	SE OUTCOMES:					
At the e	nd of the Smart and	l Wireless	Instrumentation Course student can ab	le to		
CO1.	Analyze Smart an	d Wireles	s Instrumentation with respect to variou	is performa	nce paramete	ers. [K4]
CO2.	Demonstration of	various N	Node Architectures and Applications of	WSN.		[K3]
CO3.			entals of Wireless Digital Communication			[K3]
CO4.	1		, Demonstrate an ability to design strate		needs and	[K4]
525 I VV	180 Sell W			Number	Text	Delivery
Unit	Out Comes/	Topics	Topics/Activity	of	Book/	Method
No.	Bloom's Level	No		periods	Reference	Method
		UNIT-I	: INTRODUCTION			
		1.1	Smart Instrumentation Materials	1		
		1.2	Automation systems	1		
		1.3	Ensign and Sensors	1		
	CO1: Analyze	1.4	Sensor Classifications	1		Chalk &
	Smart and	1.5	Wireless Sensor Networks	1		
	Wireless	1.6	History of Wireless Sensor networks	1		Talk, PPT,
1	Instrumentation	1.7	Communication in a WSN	1	T1,T2	Active
	with respect to various	1.8	Important design constraints of a WSN like Energy	1	11,12	Learning &
	performance	1.9	Self Management	1		Tutorial.
	parameters	1.10	Wireless Networking	1		
		1.11	Decentralized Management	1		
		1.12	Design Constraints and Security etc.	1		
			Class Test	1		
				13		

Swarnandhra College of Engineering and Technology Department of Electronics and Communication Engineering



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	T					
		UNIT-	II :NODE ARCHITECTURE			
	-	2.1	The sensing subsystem	1		
		2.1	Analog to Digital converter	1		
	1	2.2	The processor subsystem	1		Chalk &
	-	2.3	Architectural overview	1		Talk,
	-			1	T1 T2	PPT,
^	CO2:	2.5	Microcontroller	1	T1, T2	
2	Demonstration of	2.6	Digital signal processor	1	100 D	Active
	various Node	2.7	Application specific integrated circuit	I		Learning
	Architectures	2.8	Field programmable gate array	1		&
	and Applications		(FPGA)			Tutorial.
	of WSN.	2.9	Communication interfaces	1		
	or work.	2.10	Serial peripheral interface	11		
		2.11	Inter integrated circuit	1		
		2.12	The IMote node architecture	1		
		2.13	The XYZ node architecture	1		
		2.14	The Hog throb node architecture	1		
			Class Test	1	4	
		\\		15	Vi	
	1	TIMITT	III: FUNDAMENTALS OF WIRELE	VE-S		
				755		
			CAL COMMUNICATION			
		3.1	Basic components	2	4	
	CO2.	3.2	Source encoding	1		
3	CO2:	3.3	The efficiency of a source encoder	1		
_	Demonstration of	2.4	Pulse code modulation and delta	1		Chalk and
	various Node	3.4	modulation		T1, T2	Talk, PPT
	Architectures	3.5	Channel encoding	1		and
	and Applications	3.6	Types of channels	1		Tutorial
	of WSN.		Information transmission over a	1		Tutoriai
	or work.	3.7	channel	1		
		3.8	Error recognition and correction	1		
		3.9	Modulation and modulation types	1	1	
		3.10	Quadratic amplitude modulation	1		
		3.11	Signal propagation.	1		
		3.11	Class Test	1		
			Ciass rest	13		
			THE PROPERTY OF WINEI FOR	13		
			- IV: FREQUENCY OF WIRELESS			
		COM	MUNICATION		-	
			Development of Wireless Sensor			
		4.1	Network based on Microcontroller	2		Chalk &
	601	3.4.5	and communication device- Zigbee			Talk,
4	CO3:		Communication device			Smart
1880	Demonstration of	4.2	Power sources	1	-	
	- 1 C	4.3	Energy Harvesting Solar and Lead	1	T1, T2,T3	Class,
	Fundamentals of	4 3				PPT
		4.3	acid batteries		_	1 1 1
	Wireless Digital	4.3	acid batteries RF Energy /Harvesting-Energy	1		100 100 1000
			RF Energy /Harvesting-Energy Harvesting from vibration	1 1		Tutorial,
	Wireless Digital	4.4	RF Energy /Harvesting-Energy Harvesting from vibration	1		Tutorial, & Case
	Wireless Digital	4.4 4.5 4.6	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy.	1 1		Tutorial,
	Wireless Digital	4.4 4.5 4.6 4.7	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques	1 1 1		Tutorial, & Case
	Wireless Digital	4.4 4.5 4.6	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection	1 1 1 1	-	Tutorial, & Case
	Wireless Digital	4.4 4.5 4.6 4.7	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques	1 1 1 1 1 1		Tutorial, & Case
	Wireless Digital	4.4 4.5 4.6 4.7 4.8	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test	1 1 1 1		Tutorial, & Case
	Wireless Digital	4.4 4.5 4.6 4.7 4.8	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS	1 1 1 1 1 1 10		Tutorial, & Case
	Wireless Digital	4.4 4.5 4.6 4.7 4.8	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring	1 1 1 1 1 1 10		Tutorial, & Case Study
	Wireless Digital	4.4 4.5 4.6 4.7 4.8	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events	1 1 1 1 1 1 10		Tutorial, & Case Study
	Wireless Digital	4.4 4.5 4.6 4.7 4.8 UNIT 5.1 5.2	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events Single damage detection using	1 1 1 1 1 1 10		Tutorial, & Case Study Chalk & Talk,
	Wireless Digital Communication	4.4 4.5 4.6 4.7 4.8	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events Single damage detection using natural frequencies	1 1 1 1 1 1 10	T2 T2	Tutorial, & Case Study Chalk & Talk,
5	Wireless Digital Communication CO4:	4.4 4.5 4.6 4.7 4.8 UNIT 5.1 5.2 5.3	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events Single damage detection using natural frequencies Multiple damage detection using	1 1 1 1 1 1 10	T2, T3	Chalk & Talk, Smart Class,
5	Wireless Digital Communication CO4: Analyze the	4.4 4.5 4.6 4.7 4.8 UNIT 5.1 5.2	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events Single damage detection using natural frequencies Multiple damage detection using natural frequencies	1 1 1 1 1 10	T2, T3	Chalk & Talk, Smart Class, PPT
5	CO4: Analyze the power sources,	4.4 4.5 4.6 4.7 4.8 UNIT 5.1 5.2 5.3	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events Single damage detection using natural frequencies Multiple damage detection using natural frequencies Multiple damage detection using	1 1 1 1 1 10	T2, T3	Chalk & Talk, Smart Class,
5	CO4: Analyze the power sources, Demonstrate an	4.4 4.5 4.6 4.7 4.8 UNIT 5.1 5.2 5.3 5.4	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events Single damage detection using natural frequencies Multiple damage detection using natural frequencies Multiple damage detection using mode shapes	1 1 1 1 1 10 1 1 1	T2, T3	Chalk & Talk, Smart Class, PPT
5	CO4: Analyze the power sources, Demonstrate an ability to design	4.4 4.5 4.6 4.7 4.8 UNIT 5.1 5.2 5.3	RF Energy /Harvesting-Energy Harvesting from vibration Thermal Energy Harvesting-Energy. Management Techniques Calculation for Battery Selection Class Test - V: APPLICATIONS Structural health monitoring Sensing seismic events Single damage detection using natural frequencies Multiple damage detection using natural frequencies Multiple damage detection using	1 1 1 1 1 10	T2, T3	Chalk & Talk, Smart Class, PPT Tutorial,

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	5.	8 Traffic control	I			
	5.		1			
	5.		I			
	5.	1 Precision agriculture	I			
		2 Active volcano	I			
	5.		1			
		Class Test	I			
			14			
		TOTAL	65			
Text B	ooks:					
S.No						
1	Waltenegus Dargie, Ch	ristian Poellabauer, Fundamentals of wirele	ss sensor networks theory and			
	practice, A John Wiley	and Sons, Ltd., Publication.				
2	Subhas Chandra Mukh	opadhyay, Smart Sensors, Measurement and	Instrumentation, Springer			
	Heidelberg, New York	, Dordrecht London, 2013.				
3	HalitEren: Wireless Sensors and Instruments Networks, Design and Applications, CRC Press, Taylor					
			10-2-5			
	and Francis Group, 200					
Refere	nce Books:	06.				
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	nce Books: Chapman & Hall, Uva Edn, December 2013.	s Qidwai, Smart Instrumentation: A data flo	ow approach to Interfacing", 1st			
	nce Books: Chapman & Hall, Uval Edn, December 2013. Edgar H. Callaway Jr.	o6. s Qidwai, Smart Instrumentation: A data flo and Ed gar H. Callaway. Wireless Sensor N	ow approach to Interfacing", 1st			
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Swarnandhra College of Engineering and Technology Department of Electronics and Communication Engineering Principal (Dr.S.Suresh Kumar)

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