

Branch Name:	Signal Processing and Communication
Program Code:	ET214
Course Name:	Adhoc and Wireless Sensor Networks
Course Code:	2ET2140206T
Pre-requisite Course:	Fundamentals of Communication (Analog/Digital), basics of Wireless communication, concept of Data Communication & Networking, Basic Knowledge of existing Cellular Networks (2G, 2.5G, 3G, etc.)

Course Objectives:

1. The course focuses on the Ad - Hoc networks fundamentals.
2. The main purpose of this course is to implementation challenges, routing, security and applications.
3. The course is also including Sensor networks fundamentals, major areas of thrust, energy efficiency, routing, security and applications.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40		-	-	-	100

Subject Contents

Sr. No	Topic	Total Hours	Weight (%)
1	Introduction: Fundamentals of Wireless Communication Technology, The Electromagnetic Spectrum, Radio Propagation Mechanisms, Characteristics of the Wireless Channel, IEEE 802.11Standard, Origin of Ad hoc Packet Radio Networks – Technical Challenges, Architecture of PRNETs, Components of Packet Radios, Comparison of Cellular and Ad-hoc Wireless Networks, Applications of Ad-hoc Wireless Networks, Challenges and Issues of Ad hoc Wireless Networks.	7	12
2	Adhoc Network Protocols: Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols. Issues in Designing a Multicast Routing Protocol, Operation of Multicast Routing Protocols , An Architecture Reference Model for Multicast Routing Protocols, Classifications of Multicast Routing Protocols, Issues in Designing a Transport Layer Protocol for Ad hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad hoc Wireless Networks, Classification of Transport Layer Solutions, TCP over Ad hoc Wireless Networks, Security in Ad Hoc Wireless Networks	8	22

3	QoS and Energy Management in Adhoc Wireless Networks: Issues and Challenges in Providing QoS in Ad hoc Wireless Networks, Classifications of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad hoc Wireless Networks. Need for Energy Management in Ad hoc Wireless Networks, Classification of Energy Management Schemes, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Scheme.	7	22
4	Introduction and Overview of Wireless Sensor Networks: Background of Sensor Network Technology, Applications of Wireless Sensor Networks, Basic Wireless Sensor Technology Introduction, Sensor Node Technology, Sensor Taxonomy, WN Operating Environment, WN Trends	4	14
5	Wireless Sensor Network Protocols: MAC Protocols for WSNs: Fundamentals of MAC Protocols, MAC Protocols for WSNs, Sensor-MAC case study, Routing Protocols for WSNs: Background, Data Dissemination and Gathering, Routing Challenges and design Issue, Flooding, SPIN and LEACH protocols for WSNs. Transport Protocol Design Issues in WSNs.	6	20
6	Operating Systems for Wireless Sensor Networks: Introduction, Examples of Operating Systems: TinyOS, Mate, MagnetOS	4	10
	Total	36	100

List of Text Book:

1. “Ad Hoc Wireless Networks Architectures and Protocols”, C. Siva Ram Murthy and B. S. Manoj, Prentice Hall, PTR, 2004.
2. “Wireless Sensor Networks”, Kazem Sohraby, Daniel Minoli, Taieb Znati, John Wiley & Sons Inc. Publication, 2007

List of Reference Books:

1. “Ad Hoc and Sensor Networks: Theory and Applications”, Carlos de Moraes Cordeiro and Dharma Prakash Agrawal, Second Edition, World Scientific Publishers, 2011
2. “Ad Hoc Mobile Wireless Networks Protocols and Systems”, C. K. Toh, Prentice Hall, PTR, 2001
3. “Wireless Sensor Networks Signal Processing and Communications”, Ananthram Swami, Qing Zhao, Yao-Win Hong, Lang Tong Pub: John Wiley & Sons.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the needs of Wireless Adhoc and Sensor Network in current scenario of technology.	1 Remembering 2 Understanding
CLO2	Describe current technology trends for the implementation and deployment of wireless adhoc/sensor networks.	2 Understanding 5. Evaluate 3 Applying
CLO3	Discuss the challenges in designing MAC, routing and transport protocols for wireless adhoc/sensor networks.	4 Analyze
CLO4	Understand the principles and characteristics of wireless sensor networks.	2 Understanding 4 Analyze

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4

CLO1					L	M						H	H	M	L	
CLO2	H		M	M	L					L		H		M	L	
CLO3		M	H		L									H		L
CLO4	H	M			L			L					L		M	H

H: High, M: Medium, L: Low