IV Year-II Semester		T	P	C
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WIRELESS SENSOR NETWORKS (RT42044A)

Prerequisite Course:

NIL

Course Description and Objectives:

This course provides the knowledge on applications, architectures and protocols of wireless sensor networks. The course also gives the overview regarding the software platforms and tools required for wireless sensor networks

CourseOutcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

Cos	CourseOutcomes	POs
1	Describe key concepts and wireless sensor node architectures	3
2	Demonstrate knowledge of MAC protocols,Routing Protocols of WSN	3
3	Understand the concept of Topology control in WSN	3
4	Design different sensor networks through its respective tools	3

Syllabus:

UNIT I:

Objective: To Understand about Wireless Sensor Networks and its Architectures

OVERVIEW OF WIRELESS SENSOR NETWORKS: Key definitions of sensor networks, Advantages of sensor Networks, Unique constraints an challenges, Driving Applications, Enabling Technologies for Wireless Sensor Networks.
ARCHITECTURES: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture -Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway

UNIT II:

Objective: To Learn different Networking Technologies

NETWORKING Technologies: Physical Layer and Transceiver Design Considerations, Personal area networks (PANs), hidden node and exposed node problem, Topologies of PANs, MANETs, WANETs.

UNIT III:

Objective: To Understand MAC Protocols for Wireless Sensor Networks

MAC Protocols for Wireless Sensor Networks: Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT IV:

Objective: To Understand the functioning of various Routing Protocols

Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols, Proactive Routing.

UNIT V:

Objective: To Understand the operation of various Transport and Security Protocols

TRANSPORT LAYER AND SECURITY PROTOCOLS: Introduction, 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, Other Transport Layer Protocol for Ad Hoc Wireless Networks.

UNIT VI:

Objective: To Understand about Security, Sensor Network Platforms, Tools and Applications of WSN

SECURITY IN WSNs: Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.
SENSOR NETWORK PLATFORMS AND TOOLS: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Nodelevel software platforms, Node-level Simulators, State-centric programming.
APPLICATIONS of WSN: S Ultra wide band radio communication, Wireless fidelity systems. Future directions, Home automation, smart metering Applications.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control – Jagannathan Sarangapani, CRC Press
3. Holger Karl & Andreas Willig, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

REFERENCE BOOKS:

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks- Technology, Protocols, and Applications", John Wiley, 2007.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing pproach", Elsevier, 2007.
3. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh ,1 ed. Pearson Education.
4. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.
5. Wireless Sensor Networks – S Anandamurugan , Lakshmi Publications