ADHOC NETWORKS
(ELECTIVE-II)

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Subject Code: 13EC2117

Pre requisites: Data communications, Computer networks, Digital communications.

Course Educational Objectives: Study of ad-hoc/sensor networks

1. Study of End to End Delivery and Security.
2. Study of Media Access Control (MAC) Protocols
3. Study of Routing Protocol
4. Study of Networking Sensors and applications.

Course outcomes:

1. Students will be able to describe the unique issues in ad-hoc/sensor networks. This will be accessed through assignments and seminars.
2. Students will be able to describe current technology trends for the implementation and deployment of wireless ad-hoc/sensor networks. This will be assessed through assignments, and classroom interaction.
3. Students will be able to discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc/sensor networks. This will be assessed through assignments, and classroom interaction.

UNIT-I
INTRODUCTION:

Introduction of ad-hoc/sensor networks, Key definitions of ad-hoc/sensor networks - Advantages of ad-hoc/sensor networks - Unique constraints and challenges Driving Applications.

Electromagnetic spectrum-Radio propagation mechanism-characteristics of the wireless channel Adhoc Wireless Networks – Heterogeneity in Mobile Devices – Wireless Sensor Networks – Traffic Profiles – Types of Adhoc Mobile Communications – Types of Mobile Host Movements – Challenges Facing Adhoc Mobile Networks – Adhoc Wireless Internet. Ad-Hoc wireless networks Introductions to lan, wan, man, pan architectures and applications.

UNIT-II

END TO END DELIVERY AND SECURITY:

Transport layer: Issues in designing- Transport layer classification, adhoc transport

Protocols, Security issues in adhoc networks: issues and challenges, network securityattacks, secure routing protocols Ad-Hoc wireless networks Introductions to local area networks, wide area networks, man, pan architectures and applications.

UNIT-III

MEDIA ACCESS CONTROL (MAC) PROTOCOLS:

Media Access Control (MAC) Protocols Introduction- Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks – Classifications of MAC Protocol. MACAW – FAMA – BTMA – DPRMA – Real-Time MAC protocol – Multichannel Protocols – Power Aware MAC.

UNIT-IV

ROUTING PROTOCOLS:

Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks – Classifications

of Routing Protocols -Table-driven protocols – DSDV – WRP – CGSR – On-Demand protocols – DSR – AODV – TORA – LAR – ABR – Zone Routing Protocol – Power Aware Routing protocols

UNIT-V

NETWORKING SENSORS AND APPLICATIONS:

Unique features, Deployment of ad-hoc/sensor network -Sensor tasking and control Transport layer and security protocols,

SENSOR NETWORK PLATFORMS AND TOOLS:

Berkley Motes - Sensor network programming challenges - Embedded Operating System Simulators,

Applications:

Applications of Ad-Hoc/Sensor Network and Future Directions. Ultra wide band radio communication- Wireless fidelity systems.

TEXT BOOKS:

[1] Holger Karl and Andreas Willig, "*Protocols and Architectures for Wireless Sensor Networks*", WILEY lectures and applications (ISBN: 0-470-09510-5).

[2] C. Siva Ram Murthy and B. S. Manoj, "*Ad Hoc Wireless Networks: Architectures and Protocols*", Prentice Hall, 2004.

REFERENCE BOOKS:

[1] Feng Zhao and Leonidas J. Guibas, "*Wireless Sensor Networks: An Information Processing Approach*" (Morgan Kaufmann, 2004).

[2] Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, "*Mobile ad hoc Networking*", Wiley-IEEE press, 2004.

[3] Mohammad Ilyas, "*The handbook of adhoc wireless networks*", CRC press, 2002.

[4] T. Camp, J. Boleng, and V. Davies "*A Survey of Mobility Models for Ad Hoc Network Research*," Wireless Commun. and Mobile Comp., Special Issue on Mobile Ad Hoc Networking Research, Trends and Applications, vol. 2, no. 5, 2002, pp. 483–502.