17CS009 Wireless Computer Networks

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Course Description and Objective:
This course covers major aspects of ad hoc networks, from design through performance issue to application requirements. The objective of the course is to enable the student to use MAC protocols and routing protocols in wireless ad hoc networks.

Course Outcomes:
The student will be able to:
- ✓ Understand the principles of mobile ad hoc networks (MANET)
- ✓ Understand the function and applications of routing protocols.
- ✓ Simulate the routing protocols using NS2.

Skills:
- ✓ Design and simulate an ad hoc network for real-time applications.
- ✓ Develop routing algorithms using NS2.
- ✓ Simulate MAC scheduling algorithms using NS2.
- ✓ Simulate applications for specific QoS parameters.

Activities:
- ✓ Design a MANET with different number of nodes.
- ✓ Design and develop a routing algorithm for a specified ad hoc network.
- ✓ Design a scheduling algorithm for energy saving for a specified ad hoc network.
- ✓ Design an adhoc network for the given application

Unit-I
Introduction: Mobile Communications and computing : Mobile Computing (MC)-Introduction to MC, novel applications, limitations, and architecture GSM – Mobile services , System Architecture , Radio interface, Protocols , Localization and calling , Handover, Security, and new data services.

Unit-II
Wireless Medium Access Control: Motivation for a specialized MAC, SDMA, FDMA, TDMA , CDMA. Mobile Network layer – Mobile IP: Goals , assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery , registration, tunneling and encapsulation, optimizations), Dynamic Host configuration Protocol (DHCP) . Mobile transport layer – traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/ fast recovery, Transmission / timeout freezing , Selective retransmission, Transaction oriented TCP.

Unit-III
Mobile Ad Hoc Networks(MANET) : Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, Security in MANET protocols

Unit-IV
Wireless Application Protocol – WAP: Introduction, protocol architecture, and treatment of protocols of all layers, Bluetooth: User scenarios, physical layer, MAC layer, networking, security, link management.

Unit-V

Routing Protocols: Design issues, Goals and classification. Table driven routing protocols, On-demand routing protocols, Hybrid routing protocols, Hierarchical routing protocols and Power aware routing protocols.

Textbooks:
1. Jochen Schiller, Mobile Communications, Addison-Wesley, Second edition, 2008.
2. C.Siva Ram Murthy and B.S.Manoj, "Adhoc Wireless Networks Architectures and Protocols", Pearson Education, 2nd edition, 2007.

Reference Books:
1. William Stallings, "Wireless Communications and Networks", Prentice Hall of India / Pearson Education, 2nd edition, 2007.
2. Uwe Hansmann, Lothar Merk, Martin S Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer International, 2nd edition, 2007.
3. Raj Kamal, "Mobile Computing", Oxford University Press, 2nd edition, 2007.
4. Dharma P Agarwal and Carlos Cordeiro, "Adhoc and Sensor Networks - Theory and Applications", World Scientific Publications, 1st edition, 2007.