

Subject Code: 1ET2030204	Subject Title: WIRELESS NETWORK AND MOBILE COMPUTING
Pre-requisite	Fundamentals of Computer Networks

Course Objective:

The objectives of this course is to introduce the concepts of wireless and mobile communication and to make the students learn various wireless techniques, methods, architecture and protocols used in the mobile communication. Students will be exposed to various wireless network systems and standards. The course shall assist the students in identifying future research directions in the domain of mobile/wireless computing.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture	Tutorial	Practical	Credit	Theory		Practical		Total
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	-	2	4	60	40	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Wireless Communications: History and applications of wireless communications, Characteristics of wireless channel: Pathloss, Fading, Interface, Overview of Multiplexing: Frequency Division, Code Division and Time Division	1	5
2	Wireless LAN: Bluetooth :Architecture and Protocols, Radio frequency identification (RFID), IEEE 802.11, Wireless LAN security: WEP, WPA2	3	13
3	Wireless Adhoc Networks: Delay Tolerant Networks (DTN), Peer-To-Peer Wireless (AdHoc) Wireless Network: Introduction to adhoc network, Types of Adhoc networks: VNET, WSN, MANET etc., issues and challenges, application of adhoc network, routing in adhoc network, TCP over adhoc networks, security in adhoc networks	10	38
4	Mobile Communication: Global system for mobile communication (GSM): GSM architecture, call routing in GSM, PLMN interface, authentication and security, Protocols, Mobile computing over SMS, CDMA, 3G and 4G Networks	2	10
5	General packet radio service (GPRS): Main Features, GPRS Architecture: Roles of GGSN, SGSN, HLR, VLR, GPRS Mobile Station (MS). GPRS Protocols	2	5
6	Mobile IP: Introduction, Mobile IP: Goals, assumptions and requirements. Entities and terminology. IP packet delivery. Agent Discovery. Registration. Tunnelling and encapsulation. Optimizations. Reverse Tunnelling. IP micro-mobility support	3	12
7	Mobile TCP: Overview of Traditional TCP and implications of mobility control. Improvement of TCP: Indirect TCP, Snoop TCP, Mobile TCP, Fast retransmit/fast recovery, Time-out freezing, Selective retransmission, Transaction-oriented TCP.	3	12
8	Wireless Application Protocol: WAP Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Development, Wireless Telephony Application, push architecture, Push/pull services	1	05

Review Presentation: The student is expected to spend minimum 2 hours per week (as mentioned in the teaching and evaluation scheme) to refer at least two peer reviewed journal papers related to this domain/subject. The student is expected to identify issues/challenges and emerging trends in the domain/subject. Student is supposed to explore various video lectures (E.g. NPTEL) available in the domain/subject. Student is required to make a review-presentation on the work carried out for the same.

Recommended sites for journal papers are (1) dl.acm.org (2) springer.com (3) sciencedirect.com (4) elsevier.com (5) ieeexplore.ieee.org (6) scholar.google.co.in (7) scopus.com or others of similar repute.

Course Outcome:

At the end of this course, the student would be able to

- have fundamental knowledge on Wireless Networks
- have fundamental knowledge on Wireless Internet
- understand the basic terminology used in Mobile Communication
- Study, analyze and understand wireless LAN and security
- simulate the routing protocols using simulator
- design and simulate the wireless network using simulator
- use various simulation tools like NS2, NS3 etc.

List of References:

1. Mobile Communication by Jochen Schiller (Pearson Education)
2. Mobile Computing, Asoke K Telukder, RooApa R Yavagal, TMH
3. Adhoc Wireless Networks by C. Siva Ram Murthy, Pearson Education
4. Handbook of Wireless Networks and Mobile Computing (WILEY-INDIA edition)

E-Resources / Web Links:

- [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1530-8677](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1530-8677)
- <http://unina.stidue.net/Reti%20Wireless/Materiale/Handbook%20of%20Wireless%20Networks%20and%20Mobile%20Computing.pdf>

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may change/formulate it as per his/her methodology and requirement.

1. Discover and install the wireless simulator.
2. Implement AODV protocol.
3. Implement DSDV protocol.
4. Implement DSR protocol.
5. Compare performance of AODV and DSR with graphs.
6. Compare performance of DSDV and DSR with graphs.
7. Identifies the devices in the wireless range (Neighbour Discovering).
8. Simulate a transmission of ping message over a network topology consisting of N nodes and find the number of packets dropped.
9. Calculation of NRL, PDR, E2ED, Energy etc. using trace file.
10. Generating the network traffic with fixed, variable length of packets,
11. Generate the different mobility pattern models for network.
12. Open Experiment (Student have to identify the simple problem and try to implement it-if possible)
[Research papers from reputed Journals & Conferences.]