MOBILE COMMUNICATIONS
(ELECTIVE- II)
(Common to CSE & IT)

Course Code :13CT1128

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Pre requisites: Computer Networks.

Course Educational Objectives:

To teach students about the fundamentals of mobile communications.

❖ The challenges imposed by wireless transmission, at the physical, Mac, IP, and TCP layers, and possible solutions.

❖ Wireless communications in a LAN environment (IEEE 802.11), and in a (cellular phone) Telecommunications Environment (GSM).

❖ MANETs, Routing in MANETs and technologies like Bluetooth, J2ME, and WAP.

❖ Giving idea about Location-aware and Context-aware computing

❖ Giving idea about Command Listener and Item State Listener interfaces

Course Outcomes:

At the end of the course the student must be able to to

❖ Understand the Basics of Mobile Communications And Computing.

❖ Understand the Global System for Mobile Communications.

❖ Understand the Mobile Network Layer.

❖ Understand the Wireless Application Protocol.

❖ Understand the Database issues.

UNIT-I   (12 Lectures)
INTRODUCTION TO MOBILE COMMUNICATIONS AND COMPUTING:
Introduction to MC, Novel applications, Limitations, and Architecture.

(Wireless) Medium Access Control :

Motivation for a specialized MAC (Hidden and exposed term

inals, Near and far terminals), SDMA, FDMA, TDMA, CDMA. Wireless LAN(IEEE802.11):

System architecture, Protocol architecture, Basic DFW MAC-DCF using CSMA/CA, DFWMAC with RTS/CTS extensions, DFWMAC-PCF with polling.

GSM :

Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover security

UNIT-II   (12 Lectures)

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 /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT-III   (12 Lectures)

MOBILE AD HOC NETWORKS (MANETS):

Overview, Properties of a MANET, Spectrum of MANET applications, Routing and various routing algorithms (DSR, DV/DSDV, AODV, LSR/ OLSR, FSR, CGSR, ZRP), Security issues in MANETs.

UNIT-IV   (12 Lectures)

WIRELESS APPLICATION PROTOCOL-WAP:

Introduction, Protocol Architecture, Treatment of protocols of all layers.

Bluetooth:

User scenarios, Physical layer, MAC layer, Networking, Security,Link Management. J2ME:Configurations, Profiles, Packages, Midlet life cycle, Display and Displayable Classes, Command Listener and ItemState Listener interfaces.

UNIT-V   (12 Lectures)

DATABASE ISSUES :

Hoarding techniques, Caching invalidation mechanisms. Client server computing with adaptation, Location-aware and Context-aware computing. Transactional models in Mobile Communication Systems.

DATA DISSEMINATION:

Communications Asymmetry, Classification of new data delivery mechanisms, Push-based mechanisms, Pull-based mechanisms, Hybrid mechanisms, Selective tuning (indexing) techniques.

TEXT BOOKS :

1. Jochen Schiller, *"Mobile Communications"*, 2nd Edition, Addison-Wesley, 2004. (Chapters 1-4,7-11)

2. Stojmenovic and Cacute, *"Handbook of Wireless Networks and Mobile Computing"*,1st Edition Wiley, 2002. (Chapters 11, 15,17, 26 and 27)

REFERENCES:

1. Reza Behravanfar, *"Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML"*, 1st Edition , Cambridge University Press, October 2004,

2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, *"Fundamentals of Mobile and Pervasive Computing"*, 1st Edition, McGraw-Hill Professional, 2005.

3. Hansmann, Merk, Nicklous, Stober, *"Principles of Mobile Computing"*, 2nd Edition Springer, 2003.

4. Martyn Mallick, *"Mobile and Wireless Design Essentials"*,1st Edition, Wiley DreamTech, 2003.

WEB REFERENCES:

1. IETF RFC's. www.ietf.org/

2. NPTEL Course Material. http://textofvideo.nptel.iitm.ac.in/1036/