(CORE) CS 302: Mobile Computing

No of Lectures: 48

Prerequisites

• Concepts of multiplexing and modulation
• Concepts of Networking
• Conversant with OS internals
• Familiar with event handling
• Web browsers
• Create and Compile Java Programs
• Brief History of wireless communication

Objectives

• To familiarize the students with the buzz words and technology of mobile communication
• Understand the GSM architecture
• Understand the issues relating to Wireless applications

Chapter 1 : Introduction to Mobile Computing [2]

- Introduction and need for Mobile computing
- Mobility and portability
- Mobile and Wireless devices
- Applications
- Brief History of wireless communication

Chapter 2 : Wireless Transmission [3]

- General Concepts of multiplexing and modulation
- Spread Spectrum
- Cellular Systems

Chapter 3 : Medium Access Control Layer [4]

- Why specialized MAC?
  a. hidden and exposed terminals
  b. near and far terminals
- ii. General Concepts and comparison of SDMA, FDMA, TDMA , CDMA

Chapter 4 : Mobile IP [8]

- Goals, assumptions and requirements
- Entities and terminologies
- Agent Discovery
- Registration

- Tunneling and encapsulation

- Optimization
- Reverse Tunneling
- IPv6
- IP micro-mobility support – Cellular IP, Hawaii, Hierarchical, mobile IPv6
- Mobile Routing :
  - Destination sequence distance Vector, Dynamic Source Routing,
  - Alternative Metrics, Adhoc Routing Protocols -Flat, Hierarchical,
  - Geographic-position-assisted

Chapter 5 : Mobile TCP [5]

- Traditional TCP
  - Congestion Control, Slow start, Fast retransmit / Fast recovery
  - Implications on mobility
- Classical TCP improvements
  Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit / Fast recovery, Transmission / Timeout freezing, Selective Retransmission, Transaction oriented TCP
- TCP over 2.5/3G wireless networks

Chapter 6 : GSM [8]

- Mobile Services (Bearer, Tele-and-supplementary services)
- System Architecture
  - Radio subsystem
  - Network and switching subsystem
  - Operation subsystem
- Protocols
- Localization and calling
- Handover
- Value Added Services
  - SMS: Architecture, Mobile Originated and Mobile Terminated procedures
  - Cell Broadcast Service: Architecture, Message Transfer Procedure
  - MMS: Architecture, Protocol framework, Message Transfer Procedure
  - Location Services: Logical Reference Model, Control Procedures, Network
  - Architecture, determination of Location Information, Location based services
- GPRS

Chapter 7 : 3G mobile networks [8]

- UMTS
  System architecture, radio interface
- UTRAN
  Architecture, Functions of RNC, Core network
- Handover
  Hard and soft handover

Chapter 8 : Wireless Application Protocol [4]

- Architecture
- Wireless datagram protocol
- Wireless transport layer security
- Wireless transaction protocol
- Wireless session protocol
- Wireless application environment
- WAP Push Architecture, protocols

Chapter 9 : Introduction to Android Operating System& Programming [10]

- Overview and evolution of Android
- Features of Android
- Android architecture
- Components of an Android Application, Manifest file
- Android Activity and Service Lifecycle
- UI Designing (layout desiginig)
- All components (e.g Button , Slider, Image view, Toast)
- Event Handling

Reference Books

1. Mobile Communications Jochen Schiller, Pearson Education, 2nd Edition, ISBN : 9780321123817
2. Beginning Android Application Development by Wei-Meng Lee Wiley India ISBN:9788126531066
3. Mobile Networks GSM and HSCSD- Nishit Narang, Sumit Kasera, TataMcGrawHill
4. Mobile Computing: Technology, Applications, and Service Creation by Asoke K. Talukder,
5. Beginning Android 3 by Mark Murphy APress , ISBN 9788132203568
6. The Android Developers Guide [http://developer.android.com/guide/index.html]

Note: -

- **For internal evaluation Android Application Development / Assignments are compulsory for <u>20 marks</u>.**