3/3 MCA First Semester

CA5T4A **MOBILE COMPUTING** **Credits : 4**

Lecture Hours : 4 periods / week Internal assessment : 30 Marks

Semester and Examination: 70 Marks

Course Description:

To impact the fundamental concepts in the area of mobile computing. Students will learn computer systems perspective on the converging areas of Cellular networking, MANETs and software, and to introduce selected topics of current research interest in the field of Mobile Computing with J2ME

Course Objective:

- To present necessary concepts for Mobile Communication
- Understanding different mobile devices and system
- Understanding the Cellular System design
- Study Co-channel and Non Co-channel Interference
- Understanding channel assignment and hand off
- Understanding the concepts of MANETs

UNIT I:

Introduction to Network Technologies and Cellular Communications:

HIPERLAN: Protocol architecture, physical layer, Channel access control sub-layer, MAC sub-layer, Information bases and networking WLAN: Infrared vs. radio transmission, Infrastructure and ad hoc networks, IEEE 802.11. Bluetooth.: User scenarios, Physical layer, MAC layer, Networking, Security, Link management GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture

UNIT II:

(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT – III:

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).

UNIT – IV:

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 V:

Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT VI:

Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT VII:

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT VIII:

Protocols and Tools: 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) and J2ME.

Learning Resources

Text Books:

1. Mobile Communications, Jochen Schiller, Addison-Wesley, 2/e, 2004.
2. Mobile Computing, Raj Kamal, Oxford University 2/e, 2012.
3. Handbook of Wireless Networks and Mobile Computing, Stojmenovic and Cacute, Wiley, 2002.

Reference Books:

1. Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, Reza Behravanfar, Cambridge University Press, 2004
2. Principles of mobile computing Uwe Hansmann, Lother Mack, Martin S Nicklous and Thomas Stober, Springer, 2/e, 2008