

# 16CS404 MOBILE COMMUNICATIONS

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	CS	WA/RA	SSH	SA	S	BS
45	-	30	3	5	40	8	5	2



## Course Description and Objectives:

This course offers an insight into the concepts of mobile and wireless data communication technologies. The objective of this course is to enable the student to understand the emerging technologies of wireless and mobile communications and simulate them.

## Course Outcomes:

The student will be able to:

- understand the new trends in mobile/wireless communications networks.
- understand multiple radio access techniques.
- analyze various routing algorithms used in mobile/wireless networks.
- identify the issues in transport and application layers.

## SKILLS:

- ü *Identify and simulate the medium access control mechanisms suitable for given applications.*
- ü *Develop ad-hoc network applications using appropriate algorithms/protocols.*
- ü *Identify the impact of improvements made to TCP in mobile/wireless networks.*
- ü *Identify the need of mobile IP and simulating mobile IP network.*

**ACTIVITIES:**

- Choose medium access control mechanism for a given application.
- Distinguish among various wireless networks.
- Simulate the calling mechanism used in GPRS.
- Design and simulate a simple wireless network.
- Analyze the customization of TCP in wireless network.

**UNIT - 1****L- 09**

**INTRODUCTION:** Wireless Communication Fundamentals Introduction, Wireless transmission-Frequencies for radio transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulations, Spread spectrum, Medium Access Control - SDMA, FDMA, TDMA, CDMA and Cellular Systems.

**UNIT - 2****L- 09**

**MOBILE TELECOMMUNICATIONS SYSTEMS:** Introduction to 1G,2G,3G systems, GSM, Mobile Services, System Architecture, Protocol Architecture, Localization and calling, Handover, Security Services, GPRS Architecture and UMTS Architecture.

**UNIT - 3****L- 09**

**CATEGORIES OF WIRELESS NETWORKS:** Wireless Local Area Networks, Infrared vs Radio LANs, IEEE 802.11 - Standards, Architecture, Physical Layer, MAC Layer; Blue Tooth - Introduction, Networking, Pico net, Scatter net, Protocol Architecture and Layers.

**UNIT - 4****L- 09**

**NETWORK LAYER:** Mobile IP, Dynamic Host Configuration Protocol, Routing, Destination Sequence Distance Vector Routing, Dynamic Source Routing, Ad hoc On Demand Distance Vector Routing and Applications of wireless sensor networks.

**UNIT - 5****L- 09**

**TRANSPORT AND APPLICATION LAYERS:** TCP over Wireless Networks, Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit / Fast Recovery, Transmission/Timeout Freezing, Selective Retransmission, Transaction Oriented TCP, Wireless Application Protocol - WAP Architecture, Wireless Datagram Protocol, Wireless Transport Layer Protocol, Wireless Transaction Protocol, Wireless Security Protocol, Wireless Markup Language, WML Script and Wireless Application Environment.

**LABORATORY EXPERIMENTS****Course Outcomes:**

The student will be able to:

- write Tcl script.
- simulate various network topologies with different routing algorithms.
- analyze how each routing algorithm is performing its job.

**LIST OF EXPERIMENTS:**

Total Hours: 30

1. Write Tcl Script to:
  - a. check Age range
  - b. perform arithmetic operations using switch
  - c. check whether given number is prime or not
  - d. find factorial of a given number
  - e. swap two numbers
  - f. find area of a rectangle
  - g. check whether a number is Armstrong or not

- h. find the sum of digits
- i. print Fibonacci Series
- j. check number is palindrome or not
2. Installation of NS2/NS3
3.
  - a. Create FTP traffic over TCP using NS2
  - b. Create CBR traffic over UDP using NS2
4.
  - a. Write Tcl script for creating nodes, duplex link, orientation, Label and Queue.
  - b. Write Tcl script to create TCP agent, TCP sink and attach the TCO agent with TCP sink.
5. Write Tcl script to set identification color to links.
6. Simulate Link State Routing (LS) protocol in NS2?
7. Simulate Distance Vector Routing (DV) protocol in NS2?
8. Develop Tcl script to make TCP communication between nodes using DSR routing protocol.
9. Write Tcl script to make communication between nodes using AODV routing protocol and CBR traffic.
10. Develop and implement Tcl script to make TCP communication between nodes using DSDV routing protocol.

**TEXT BOOKS:**

1. Jochen Schiller, "Mobile Communications", 2<sup>nd</sup> edition, Pearson Education, 2009.
2. Teerawat Issariyakul and Ekram Hossain, "Introduction to Network Simulator NS2", 2<sup>nd</sup> edition, Springer, 2009.

**REFERENCE BOOKS:**

1. William Stallings, "Wireless Communications and Networks", 2<sup>nd</sup> edition, Prentice Hall of India / Pearson Education, 2007.
2. Uwe Hansmann, Lothar Merk, Martin S Nicklons and Thomas Stober, "Principles of Mobile Computing", 2<sup>nd</sup> edition, Springer International, 2007.
3. Raj Kamal, "Mobile Computing", 2<sup>nd</sup> edition, Oxford University Press, 2007.
4. Dharma P Agarwal and Carlos Cordeiro, "Adhoc and Sensor Networks - Theory and Applications", 1<sup>st</sup> edition, World Scientific Publications, 2007.
5. C Siva Ram Murthy, " Adhoc Wireless Networks Architecture and Protocols", 2<sup>nd</sup> edition, Prentice Hall PTR, 2008.