

Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NCSC503	Advanced Computer Networks	3	1	0	4

Course Objective
At the end of the course, the students will be able to: - To study the evolving wireless technologies and standards - To understand the protocols, architectures and applications of various wireless networks. - To gain expertise in some specific areas of wireless networking.
Learning Outcomes
On successful completion of this unit students will be able to: - Identify the basic concept and understand the state-of-the-art in protocols, architectures and applications of wireless networks. - Compare, contrast and analyse wireless networks; - Classify and also develop new protocols in ad-hoc networks. - Understand how wireless networking research is done.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1.	Computer Networks [Overview of Data Communication and Networking, OSI Reference Model, TCP/IP Protocol Suite, Network Architecture, Understanding Network and Transport Layer, Multicasting]	4	Building foundation for the advanced course on Computer Networks. Some important concepts of Network and Transport layer will be covered.
2.	Introduction to Wireless Networks & Radio wave propagation: [Issues and Challenges, Data and Signals, Analog and Digital Transmission, Antennas, Propagation Modes, Fading in the wireless Environment, Energy consumption and Delay]	5	To understand the working procedure of Physical layer and Radio wave propagation. Help in understanding the radio and microwaves along with their propagation mechanisms.
3.	Multiple Access Techniques for Wireless Communications: [FDMA, TDMA, CDMA, SDMA, Packet Radio]	5	This unit will help students to understand Channelization methods used in wireless networks.
4.	Mobility Management & GSM: [Cellular Architecture, Cell splitting and sectoring concept, Frequency allocation and interference issues, Handoff techniques, Location Management, HLR-VLR Scheme, Hierarchical Scheme, Mobile IP, Mobile TCP]	7	The student will understand the Cellular architecture in much detail and will know about the frequency reuse concepts followed by route optimization and mobility management in wireless network. Understanding GSM architecture and working principle of Cell phones

5.	Wireless LANs & WANs: [Issues and Challenges, Wireless LAN technologies, IEEE 802.11, 802.15 & 802.16 Standards – Wi-Fi, Bluetooth, Zigbee, WiMAX]	6	Understanding about the concepts of wireless LANs and WANs in terms of working principles of Wi-Fi, Bluetooth, Zigbee and WiMAX devices.
6.	Ad-hoc Networks and Sensor Networks: [Introduction, Challenges and Issues, AODV, DSR, DSDV Routing protocols; Architecture and factors influencing the sensor network design; Concept of MANET and VANET]	7	To understand basic properties of Ad-hoc Networks and to get an overview of different routing techniques used in MANET, WSN and VANET.
7.	File System Support for Mobility: [Distributed file sharing for mobility support, Coda and other storage manager for mobility support]	4	Student will learn about the basic concept of file systems and databases in mobile computing.
8.	Publishing & Accessing Data in Air: [Pull and push based Data Delivery Models, Data Dissemination by Broadcast, Broadcast Disks, Directory Service in air, Energy Efficient Indexing Scheme for Push based Data Delivery]	4	Get an overview of the pushing and pulling data to and from air along with its proper indexing and dissemination.
Total		42	

Text Books:

1. T. S. Rappaport, "Wireless Communications – Principles and Practice", PHI, 2nd Edition.
2. Jochen Schiller, "Mobile Communications", Pearson Education, 2nd Edition.

Reference Books:

1. William Stallings, "Data and Computer Communications", Pearson Education, 10th Edition.
2. Andrew S. Tanenbaum, "Computer Networks", Pearson Education, 6th Edition
3. James F. Kurose and Keith W. Ross, "Computer Networking – A top Down Approach" Pearson Education, 10th Edition.
4. Behrouz A. Forouzan, "Data Communications and Networking with TCP/IP Protocol Suite", Tata McGrawHill, 6th Edition.