

Branch Name:	Information and Communication Technology
Semester/Year:	Semester II / First Year
Subject Title:	Mobile Computing and Wireless communication
Subject Code:	2ET2080206T
Pre-requisite:	Analog and Digital Communication

Course Objective:

This course provides practical to understand the basic concepts of mobile computing and to learn the basics of mobile telecommunication system. To be familiar with the network layer protocols and Ad-Hoc networks and to know the basis of transport and application layer protocols. Also to gain knowledge about different mobile platforms and application development. This course also helps to understand the functioning of wireless communication system and evolution of different wireless communication systems and standards and to compare recent technologies used for wireless communication with explanation of multiple access techniques for Wireless Communication.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCE		SEE		CCE		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Introduction: Introduction to Mobile Computing, Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing , Spread spectrum -MAC Protocols – SDMA, TDMA, FDMA, CDMA	04	11

2	Mobile Telecommunication System: Introduction to Cellular Systems, GSM Services & Architecture , Protocols, Connection Establishment, Frequency Allocation, Routing, Mobility Management, Security, GPRS/UMTS Architecture, Handover Security	04	11
3	Mobile Network Layer: Mobile IP, DHCP, AdHoc, Proactive protocol-DSDV, Reactive Routing Protocols, DSR, AODV , Hybrid routing, ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (VANET),MANET Vs VANET – Security.	04	11
4	Mobile Transport And Application Layer: Mobile TCP,WAP – Architecture, WDP , WTLS , WTP, WSP , WAE , WTA Architecture – WML	03	08
5	Mobile Platforms And Applications: Mobile Device Operating Systems – Special Constraints & Requirements , Commercial Mobile Operating Systems,Software Development Kit: iOS, Android, BlackBerry, Windows Phone, MCommerce – Structure – Pros & Cons, Mobile Payment System, Security Issues	04	11
6	Introduction to Wireless Communication System: Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal Communication.	04	11
7	Cellular Concept And Wireless System Hexagonal cell and frequency reuse, hard, soft and forced handoffs, umbrella cell concept, distance to frequency reuse distance, channel and co channel interference reduction factor, S/I ratio consideration and calculation of minimum co_ channel and Adjacent interference, Improving coverage and capacity_ cell splitting, cell sectorization, repeaters, microcell zone concept, panel antenna design consideration.	05	14
8	Digital Cellular Systems And Standards: GSM system architecture, Radio interface, Protocols, Localization and calling, Authentication and security in GSM, GSM speech coding, Architecture of IS- 95 CDMA system, RAKE Receiver, GPRS system architecture.	03	08
9	Multiple Access Techniques: Introduction, Comparisons of multiple Access Strategies TDMA, CDMA, FDMA, OFDM, CSMA Protocols.	03	08

10	Advances In Wireless Communication: Basics of MIMO and OFDM, Wi_Fi, Wi_MAX, bluetooth, ZigBee.	02	07
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Review Presentation: The student is expected to spend minimum 2 hours per week (as mentioned in the teaching and evaluation scheme) to refer at least two peer reviewed journal papers related to this domain/subject. The student is expected to identify issues/challenges and emerging trends in the domain/subject. Student is supposed to explore various video lectures (E.g. NPTEL) available in the domain/subject. Student is required to make a review-presentation on the work carried out for the same. Recommended sites for journal papers are (1) dl.acm.org (2) springer.com (3) sciencedirect.com (4) elsevier.com (5) ieeexplore.ieee.org (6) scholar.google.co.in (7) scopus.com or similar of similar repute.

Course Outcome:

Upon successful completion of this course the student would be able to:

- Explain the basics of mobile telecommunication systems
- Illustrate the generations of telecommunication systems in wireless networks
- Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network
- Explain the functionality of Transport and Application layers
- Understand the basic concepts of basic Cellular System and the design requirements.
- Understanding the concept related to radio resource management techniques such as power control, channel allocation and handoffs.
- Learn depth understanding of the design consideration and architecture for different Wireless Systems like GSM, CDMA, and GPRS.
- Get knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc.
- To get knowledge of the emerging trends in Wireless communication like WiFi, WiMAX, OFDM and MIMO

List of References:

1. Jochen Schiller, —Mobile Communications, PHI, Second Edition, 2003
2. Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile Computing, PHI Learning Pvt.Ltd, New Delhi – 2012
3. Wireless Communication, Theodore S. Rappaport, prentice hall

E-Resources:

1. <http://developer.android.com/index.html>
2. <http://developer.blackberry.com>
3. <https://nptel.ac.in/courses/117/102/117102062>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand mobile and wireless network systems such as 2G/3G/4G mobile telephony/data networks,	2 Understanding
CLO2	Understand GSM and GPRS	1 Remembering, 2 Understanding
CLO3	Understand the working of wireless local area network, Bluetooth.	1 Remembering, 2 Understanding
CLO4	Implement practical mobile applications	6 Creating
CLO5	Realize various wireless and mobile cellular communication systems	5 Evaluate 4 Analyze
CLO6	Understand the information theoretical aspects (such as the capacity) of wireless channels	1 Remembering, 2 Understanding
CLO7	Illustrate the generations of telecommunication systems in wireless networks	5 Evaluate 3 Applying 4 Analyze

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes(POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	M		M		M								H			
CLO2	M	L	M	H					M		L					
CLO3	M		L		M								L	M		
CLO4	M	L	M	L				H	L		L					
CLO5	M		M		L									M		
CLO6	H	M									L	M				
CLO7	M	L	M	L				H	L		L			L		

H:High, M:Medium, L:Low