SYLLABUS

Course Code	Course Name	Credits
CSC702	Mobile Communication & Computing	4

Course Objectives (CO) :

1. To introduce the basic concepts and principles in mobile computing. This includes major techniques involved, and networks & systems issues for the design and implementation of mobile computing systems and applications.
2. To explore both theoretical and practical issues of mobile computing.
3. To provide an opportunity for students to understand the key components and technologies involved and to gain hands-on experiences in building mobile applications.

Course Outcomes : On successful completion of course learner will be able :

1. To identify basic concepts and principles in mobile communication & computing, cellular architecture.
2. To describe the components and functioning of mobile networking.
3. To classify variety of security techniques in mobile network.
4. To apply the concepts of WLAN for local as well as remote applications.
5. To describe and apply the concepts of mobility management
6. To describe Long Term Evolution (LTE) architecture and its interfaces.

Pre-requisites : Computer Networks

Module No.	Unit No.	Topics	Hrs.
1.0	1.1	Introduction to Mobile Computing, Telecommunication Generations, Cellular systems,	6
	1.2	Electromagnetic Spectrum, Antenna ,Signal Propagation, Signal Characteristics, Multiplexing, Spread Spectrum: DSSS & FHSS	
2.0	2.1	GSM Mobile services, System Architecture, Radio interface, Protocols , Localization and Calling, Handover, security (A3,A5 & A8)	10
	2.2	GPRS system and protocol architecture	
	2.3	UTRAN , UMTS core network ; Improvements on Core Network,	
3.0	3.1	Mobile Networking : Medium Access Protocol, Internet Protocol and Transport layer	12
	3.2	Medium Access Control: Motivation for specialized MAC, , Introduction to multiple Access techniques (MACA)	

(Book Code : MO81A)

Module No.	Unit No.	Topics	Hrs.
	3.3	Mobile IP: IP Packet Delivery, Agent Advertisement and Discovery, Registration, Tunneling and Encapsulation, Reverse Tunneling, Routing (DSDV,DSR)	
	3.4	Mobile TCP : Traditional TCP, Classical TCP Improvements like Indirect TCP, Snooping TCP & Mobile TCP, Fast Retransmit/ Fast Recovery, Transmission/Timeout Freezing, Selective Retransmission	
4.0	4.1	Wireless Local Area Networks : Introduction, Infrastructure and ad-hoc network	08
	4.2	IEEE 802.11:System architecture , Protocol architecture, Physical layer, Medium access control layer, MAC management, 802.11a, 802.11b	
	4.3	Wi-Fi security : WEP ,WPA, Wireless LAN Threats, Securing Wireless Networks	
	4.4	HiperLAN 1 & HiperLAN 2	
	4.5	Bluetooth: Introduction, User Scenario, Architecture, protocol stack	
5.0	5.1	Mobility Management : Introduction, IP Mobility, Optimization, IPv6	06
	5.2	Macro Mobility : MIPv6, FMIPv6,	
	5.3	Micro Mobility: CellularIP, HAWAII, HMIPv6,	
6.0	6.1	Long-Term Evolution (LTE) of 3GPP : LTE System Overview, Evolution from UMTS to LTE	10
	6.2	LTE/SAE Requirements, SAE Architecture	
	6.3	EPS: Evolved Packet System, E-UTRAN, Voice over LTE (VoLTE), Introduction to LTE-Advanced,	
	6.4	System Aspects, LTE Higher Protocol Layers, LTE MAC layer, LTE PHY Layer,	
	6.5	Self Organizing Network (SON-LTE),SON for Heterogeneous Networks (HetNet), Introduction to 5G	
		Total	**52**

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UNIT I

Chapter 1 : Introduction to Mobile Computing 1-1 to 1-33

Syllabus :

Introduction to Mobile Computing, Telecommunication Generations, Cellular systems, Electromagnetic Spectrum, Antenna, Signal Propagation, Signal Characteristics, Multiplexing, Spread Spectrum : DSSS & FHSS

UNIT II

Chapter 2 : GSM 2-1 to 2-40

Syllabus :

GSM Mobile services, System Architecture, Radio interface, Protocols , Localization and Calling, Handover, security (A3,A5 & A8), GPRS system and protocol architecture, UTRAN, UMTS core network; Improvements on Core Network.

UNIT III

Chapter 3 : Event Handling 3-1 to 3-44

Syllabus :

Mobile Networking : Medium Access Protocol, Internet Protocol and Transport layer, Medium Access Control : Motivation for specialized MAC, Introduction to multiple Access techniques (MACA), Mobile IP: IP Packet Delivery, Agent Advertisement and Discovery, Registration, Tunneling and Encapsulation, Reverse Tunneling, Routing (DSDV,DSR), Mobile TCP : Traditional TCP, Classical TCP Improvements like Indirect TCP, Snooping TCP & Mobile TCP, Fast Retransmit/ Fast Recovery, Transmission/ Timeout Freezing, Selective Retransmission.

UNIT IV

Chapter 4 : Networking Basics 4-1 to 4-48

Syllabus :

Wireless Local Area Networks : Introduction, Infrastructure and ad-hoc network, IEEE 802.11:System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management, 802.11a, 802.11b, Wi-Fi security : WEP, WPA, Wireless LAN Threats, Securing Wireless Networks, HIPERLAN 1 and HIPERLAN 2, Bluetooth : Introduction, User Scenario, Architecture, protocol stack

UNIT V

Syllabus :

Mobility Management : Introduction, IP Mobility, Optimization, IPv6; Macro Mobility : MIPv6, FMIPv6; Micro Mobility : CellularIP, HAWAII, HMIPv6

UNIT VI

Syllabus :

Long-Term Evolution (LTE) of 3GPP : LTE System Overview, Evolution from UMTS to LTE; LTE/SAE Requirements, SAE Architecture; EPS: Evolved Packet System, E-UTRAN, Voice over LTE (VoLTE), Introduction to LTE-Advanced; System Aspects, LTE Higher Protocol Layers, LTE MAC layer, LTE PHY Layer; Self Organizing Network (SON-LTE),SON for Heterogeneous Networks (HetNet), Introduction to 5G

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