Govt. of Karnataka, Department of Technical Education
Diploma in Information Science
Sixth Semester

Subject: Mobile Computing

Contact Hrs / week: 4 **Total hrs: 64**

Table of Contents

SN	Topic	Hours	Marks
1	Introduction	6	15
2.	Mobile Computing Architecture	6	15
3.	Mobile computing through telephony	2	5
4.	Emerging Technologies	4	10
5.	Global Systems for Mobile Communications (GSM)	4	10
6.	Short Message Service (SMS)	4	10
7.	General Packet Radio Service (GPRS)	4	10
8.	Wireless Application Protocol	6	15
9.	CDMA & 3G	6	15
10.	Wireless LAN	8	20
11.	Intelligent Networks & Internet Working	2	5
12.	Next Generation Networks	4	10
13.	Seminars, Guest Lectures & other Industry Innovations	5	0
14.	Tests	3	0
	Total	64	140 + 5 Objectives

Detailed Contents

1			**Introduction**
	1.1		Mobility of Bits & Bytes
		1.1.1	The Convergence leading to ICT
	1.2		Wireless- The Beginning
		1.2.1	Evolution of Wireless Networks
		1.2.2	Evolution of Wireless Data
		1.2.3	Evolution of Wireless LAN
		1.2.4	Evolution of Wireless PAN
	1.3		Mobile Computing
		1.3.1	Mobile Computing Functions
		1.3.2	Mobile Computing Devices
	1.4		Dialog Control
	1.5		Networks
		1.5.1	Wireline Network
		1.5.2	Wireless Networks
		1.5.3	Ad hoc Networks
		1.5.4	Bearers
	1.6		Middleware & Gateways
		1.6.1	Communication Middleware
		1.6.2	Transaction processing Middleware
		1.6.3	Behaviour Management Middleware
		1.6.4	Communication Behaviour
	1.7		Applications And Services(Contents)
	1.8		Developing Mobile computing Applications
		1.8.1	New Mobile Applications
		1.8.2	Making Legacy Application Mobile
	1.9		Security Mobile Computing
	1.10		Standards- Why are they necessary?
		1.10.1	Who makes the standards?
	1.11		Standard Bodies
	1.12		Players in the Wireless Space
2			**Mobile Computing Architecture**
	2.1		History Of Computers & Internet
	2.2		Internet- The Ubiquitous Network
	2.3		Architecture for Mobile Computing
	2.4		3-Tier Architecture
		2.4.1	Presentation (Tier-1)
		2.4.2	Application (Tier-2)
		2.4.3	Data (Tier-3)
	2.5		Design Consideration for Mobile Computing(Page 41 only)
		2.5.1	Client Context manager (Page 42-43 only)
		2.5.2	Context Aware Systems
	2.6		Mobile Computing Through Internet
	2.7		Making Existing Applications Mobile Enabled
3			**Mobile Computing Through Telephony**
	3.1		Evolution Of Telephony

	3.2		Multiple Access Procedures
		3.2.1	FDMA
		3.2.2	TDMA variants
		3.2.3	CDMA
		3.2.4	SDMA
	3.3		Satellite Communication Systems
		3.3.1	Communicating Through Satellite
		3.3.2	Low Orbit Satellite
		3.3.3	Medium Orbit satellite
		3.3.4	Geo Stationary Satellite
		3.3.5	Satellite Phones
	3.4		Mobile Computing through Telephone (Page No. 66 to 68 only)
	3.5		Computer Supported Telecommunications Applications
4			**Emerging Technologies**
	4.1		Introduction
	4.2		Blue-Tooth
		4.2.1	Blue-tooth Protocol
		4.2.2	Blue-Tooth Protocol Stack
		4.2.3	Blue-Tooth Security
		4.2.4	Blue-Tooth Application Models
	4.3		Radio-Frequency Identification(RFID)
		4.3.1	Areas of Applications for RFID
	4.4		Wireless Broadband (Page no 91 to 93 only)
		4.4.1	Broadband Applications
	4.5		Mobile IP
		4.5.1	How does Mobile IP work?
5			**Global System For Mobile Communications (GSM)**
	5.1		Introduction
	5.2		GSM Architecture
	5.3		GSM Entities (Page No. 119 & 120—Basics only)
6			**Short Message Service (SMS)**
	6.1		Mobile Computing Over SMS
	6.2		Short Message Service
		6.2.1	Strength of SMS
		6.2.2	SMS Architecture
	6.3		Value Added Services Through SMS
		6.3.1	VAS Examples
7			**General Packet Radio Service (GPRS)**
	7.1		Introduction
	7.2		GPRS Packet Data Network
		7.2.1	Capacity & Other End User Aspects
		7.2.2	Quality of Service (QoS)
		7.2.3	Integral part of the future 3G Systems
	7.3		GPRS Network Architecture

		7.3.1	GPRS Network Enhancements
	7.4		Applications for GPRS
		7.4.1	Generic Applications
		7.4.2	GPRS Specific Application
	7.5		Limitations of GPRS
	7.6		Billing & Charging in GPRS
		7.6.1	Tariffing
		7.6.2	Billing
8			**Wireless Application Protocol (WAP)**
	8.1		Introduction
		8.1.1	Evolution of Wireless Data and WAP
		8.1.2	Networks for WAP
	8.2		WAP
		8.2.1	WAP Application Environment (WAE)
		8.2.2	User Agent
		8.2.3	User Agent Profile
		8.2.4	Wireless Mark-up Language (WML)
		8.2.5	WML Script
		8.2.6	Wireless Telephony Application (WTA, WTAI)
		8.2.7	WAP Push Architecture
		8.2.8	The Push Frame Work
		8.2.9	Wireless Session Protocol (WSP)
		8.2.10	Wireless Transaction Protocol (WTP)
		8.2.11	Wireless Transport Layer Security (WTLS)
		8.2.12	Wireless Data Protocol (WDS)
		8.2.13	WAP gateway
	8.3		MMS
		8.3.1	MMS Architecture
		8.3.2	MMS Transaction Flows
		8.3.3	SMIL (Synchronised Multimedia Integration Language)
		8.3.4	MMS Interconnection, Inter Operability and roaming
		8.3.5	MMS Device Management and Configuration
	8.4		GPRS Applications
		8.4.1	Digital Rights Management
		8.4.2	OMA Digital Rights Management
9			**CDMA and 3G**
	9.1		Introduction
		9.1.1	How it started
	9.2		Spread Spectrum Technology (upto Page 220)
	9.3		CDMA Vs GSM
	9.4		Wireless Data
		9.4.1	Short Message Service (SMS)
	9.5		Third Generation Networks
		9.5.1	International Mobile Telecommunications - 2000
		9.5.2	CDMA – 2000
		9.5.3	UMTS / WCDMA
		9.5.4	Fixed Wireless
	9.6		Applications on 3G

		9.6.1	3G Specific Applications
10			**Wireless LAN**
	10.1		Introduction
	10.2		Wireless LAN Advantages
		10.2.1	Wireless LAN Evolution
		10.2.2	Wireless LAN Applications
	10.3		Mobile Adhoc networks and Sensor Networks
		10.3.1	Wireless Sensor Networks
	10.4		Wireless LAN Security
		10.4.1	Limiting RF Transmission
		10.4.2	Service Set Identifier (SSID)
		10.4.3	MAC Address Access Control
		10.4.4	Authentication Modes
		10.4.5	WEP (Wired Equivalent Privacy)
		10.4.6	Possible Attacks
	10.5		Wireless Local Loop
		10.5.1	WLL Architecture
	10.6		Hiper LAN
	10.7		WiFi Versus 3G
11			**Intelligent Networks and Interworking**
	11.1		Introduction
	11.2		Fundamentals of Call Processing
	11.3		Intelligence in the networks
		11.3.1	Standards for Intelligent Networks
12			**Next Generation Networks**
	12.1		All In One – The Converged Scenario
		12.1.1	Convergence of Voice and Data
		12.1.2	Convergence Wireline and Wireless
		12.1.3	Convergence of Circuit Switching and Packet Switching
		12.1.4	Convergence of IT and CT
		12.1.5	Convergence of OSS and DSS
	12.2		Narrow band to Broadband
		12.2.1	DSL (Digital Subscriber Line) Broadband Networks
		12.2.2	WiMAX Broadband Wireless Networks
		12.2.3	High Speed Broadband Cellular Networks
		12.2.4	WiBro
	12.3		All IP and B3G Network
	12.4		OFDM (Orthogonal Frequency Division Multiplexing)
	12.5		FAMA / DAMA
	12.6		Multi Protocol Label Switching (MPLS)
	12.7		Wireless Asynchronous Mode
	12.8		Multimedia Broadcast Services
		12.8.1	Digital Audio Broadcast (DAB)
		12.8.2	Digital Video Broadcast
		12.8.3	IP TV
		12.8.4	Internet TV
	12.9		Multiple Play

		12.9.1	Triple Play
		12.9.2	Quadruple Play
	12.10		Future trends
		12.10.1	3GPP Long Term Evolution
		12.10.2	iBurst

Text Book:

1. Mobile Computing Technology,Applications & service creation---- Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal - Tata Mc Graw Hill ISBN: 139780070144576, ISBN: 100070144575

Reference Books:

1. Wireless & Mobile Networks Concepts & Protocols --- Dr. Sunilkumar S Manvi & Mahabaleshwar S Kakkasageri ----Wiley Publish ISBN: 9788126520695

2. Mobile Communications 2nd edition --- Jochen Schiller , pearson publish, ISBN: 9788177582635

General Objectives

1. To learn Mobile Computing Principles and Architecture
2. To understand Mobility Management, GSM, and GPRS networks
3. To know Short Message Service (SMS) technology, GPRS, WAP, CDMA, 3G
4. Understand Wireless LAN, WiFi, and WLL (Wireless Local Loop) Architecture
5. Learn Bluetooth, RFID, and Satellite Communications.
6. To Know Next Generation Networks (NGN)

Specific Objectives

1	**Introduction**
	Know the various definitions and significance of terms and technologies
	Understand the concept of How Mobile Computing help business to use information
	Discuss mobile computing functions and devices
	Discuss the various types of networks used in mobile computing
	Learn the Application Services
	Understand the role of different standard bodies
2	**Mobile Computing Architecture**
	Learn the general architecture of mobile computing
	Briefly discuss various types of middle ware, their functions, roles
	Briefly discuss client context manager and context aware systems
3	**Mobile Computing Through Telephony**
	Learn the concepts behind telephony system
	Understand how to access information using telephone as a client device
	Learn how communication is established through satellites
4	**Emerging Technologies**
	Learn the technolgies related to mobile computing : Bluetooh, RFID, WiMAX,

	Study basic concepts of how Mobile IP works
5	**Global System For Mobile Communications (GSM)**
	Learn the basic concepts of Cellular Networks
	Describe in brief GSM Architecture
6	**Short Message Service (SMS)**
	Describe SMS Architecture
	Learn value Added Services through SMS
7	**General Packet Radio Service (GPRS)**
	Understand the GPRS Architecture and various elements of GPRS network
	Discuss the difference between GSM and GPRS
	Discuss the Limitations and Application of GPRS
8	**Wireless Application Protocol (WAP)**
	Discuss the WAP and MMS technology
	Describe WAP stack and WAP application environment
	Know WML , WML script and Wireless Telephony Application Interface
	Study WAP Push Architecture and MMS Architecture
	Know the features of WTP, WTLS, WDP
	Understand the need for SMIL
	Learn GPRS Application
9	**CDMA and 3G**
	Discuss spread spectrum technology
	Compare CDMA Vs GSM
	Learn the organisation of CDMA Protocol Stack
	Comprehend Third generation Networks
	Learn 3G applications
10	**Wireless LAN**
	Learn the advantages and applications of WLAN
	Understand Mobile Ad Hoc Networks and Sensor Networks
	Learn Wireless LAN Security
	Discuss Wireless Local Loop Architecture
	Understand the concept of Hiper LAN
	Compare WiFi Vs 3G
11	**Intelligent Networks and Interworking**
	Understand the concept of Intelligent Networks
	Know the standards of IN
12	**Next Generation Networks**
	Learn how technologies of the past and future converge to NGN

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Max. Marks: 100 Max. Time: 3 Hours

Model Question Paper

Note: 1. Section –I is compulsory.
2. Answer any TWO questions from each remaining Sections.

Section - I

1 a.	Fill in the blanks	5x1=5
i.		
ii.		
iii.		
iv.		
v		
b.	Write a short note on IPTC and WiBro	5

Section – II

2.	a) List the characteristic of a mobile computing environment	5
	b) Discuss Wireless networks and Adhoc Networks	5
	c) How would you broadly classify mobile computing applications	5
3	a) What are the different tiers in the 3 –tier architecture? Describe the functions of these tiers.	10
	b) Discuss mobile computing through internet	5
4	a) List the applications of FDMA, TDMA, CDMA and SDMA	5

	b) What is WiMax? How is it different from WiFi	5
	c) What is active and passive RFID?	5

Section-III

5	a) Explain GSM Architecture	10
	b) List the strengths of SMS	5
6	a) Explain SM MO.	5
	b) What is the difference between GSM and GPRS ? What are the network elements in GPRS that are different from GSM	10
7.	a) Discuss with respect to WAP i) WTP ii) WDP iii) WTLS	10
	b) Describe MMS Architecture	5

Section -IV

8.	a) What is Spread technology?	5
	b) Difference between GSM and 3G	5
	c) List the applications of 3G	5
9.	a) What are the advantages and disadvantages of WLAN?	5
	b) List WLAN applications	5
	c) List types of Wireless LAN Architecture	5
10.	a) Explain WLL Architecture	5
	b) List the requirements of IN service	5
	c) Explain All IP network characteristics	5