Paper Code: BCA 304 | **L** | **T** | **C**
Paper ID: 20304 | **3** | **1** | **4**
Paper: Mobile Computing
Pre-requisites: Knowledge of Digital Electronics(BCA 106), Computer Networks and Programming Concepts

Aim

To provide basic knowledge on Wireless Communications, Mobile Internet and Mobile Content Services.

Objectives

- To learn the basics of Wireless voice and data communications technologies.
- To build working knowledge on various telephone and satellite networks.
- To build skills in working with Wireless application Protocols to develop mobile content applications
- To build practical knowledge on WML and WML Script

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

UNIT - I

Introduction to wireless communications: Applications, Short History of Wireless Communications, Market of Mobile Communications. [T1]

Elementary Knowledge on Wireless Transmission: Frequency of Radio Transmission, Signals, Antennas, Signal Propagation: Path Loss of Radio Signals, Additional Signal Propagation Effects, Multipath Propagation, Multiplexing: Space Division Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Modulation: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Advanced Frequency Shift Keying, Advanced Phase Shift Keying, Multicarrier Modulation, Spread Spectrum: Direct Sequence Spread Spectrum, Frequency Hopping Spread Spectrum, Cellular Systems. [T1] **[No. of Hrs: 11]**

UNIT – II

Elementary Knowledge on Medium Access Control: Motivation for a specialized MAC, Hidden and exposed terminals, Near and far terminals, Introduction to SDMA, FDMA, TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access, CDMA, Spread Aloha multiple access, Mobile communications, Comparison of S/T/F/CDMA. [T1]

Elementary Knowledge on Telecommunications Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services, DECT: System architecture, Protocol architecture.[T1]

Elementary Knowledge on Satellite systems: History, Applications, Basics: GEO, LEO, MEO, Routing, Localization, Handover. [T1] **[No. of Hrs: 11]**

UNIT – III

Mobile Internet: Introducing the Mobile Internet, Services for the mobile Internet, Business opportunities.[T2]

Implementing WAP Services: WML: WML Variables and Contexts: Variable Substitution, Setting Variables, Browser Contexts, WML Tasks and Events, WML User Interaction: Problems with Web Interaction, Interaction in WAP, Elements: <input> , <select> ,<option> , <optgroup>, <do> , <anchor> , <a> , The tabindex Attribute, WML Timers, WML Decks, Templates, and Cards: Elements: <wml>, <head>, <access>, <meta> , <card> , <template>, WML Text and Text Formatting, Elements <p>,
, Character Formatting, Tables, WML Images: <img> Element, The WBMP Image Format. [T2, T3] **[No. of Hrs: 11]**

UNIT – IV

WAP: the Mobile Internet Standard, Making the Internet Mobile: Challenges and Pitfalls, Overview of the Wireless Application Protocol [T2]

Implementing WAP Services: WML Script: Datatypes, Variables, and Conversions, Operators and Expressions: Operand Conversions, Assignment Operators, Arithmetic Operators, Bitwise Operators, Shift Operators, Logical Operators, Increment and Decrement Operators, Comparison Operators, Type Operators, The Conditional Operator, The Comma Operator, Precedence and Associativity, WMLScript Statements: Expressions as Statements, Blocks of Statements, Conditions, Loops, Returning from a Function, Other Statements, WMLScript **Functions:** Function Declarations, Function Calls, Calls to Other Script Units, Calling WMLScript from WML, Standard Libraries, WMLScript Pragmas: The access Pragma, The meta Pragma, Elementry Knowledge on Libraries: Lang , Float , String ,URL , WMLBrowser , Dialogs [T2, T3] **[No. of Hrs: 11]**

TEXT BOOKS

[T1] Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003.

[T2] Sandeep Singhal, "The Wireless Application Protocol, Writing Applications for Mobile Internet", Pearson Education, 2000

[T3] Learning WML, and WMLScript, Programming the Wireless Web, Martin Frost, Publisher: O'Reilly 2000

REFERENCE BOOKS

[R1] William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002

[R2] Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Ed, Pearson Education. 2002

[R3] C. Y. Lee and William, "Mobile Cellular Telecommunications", 2nd Ed, McGraw Hill. 2001