

LESSON PLAN 2025-26(WINTER)**NAME OF THE TEACHER : DEEPAK KUMAR BARDA, LECT.(STAGE-II,CSE)**Subject: **MOBILE COMPUTING(Course Code: TH5)**

Program: Diploma in Computer Science and Engineering

Semester: 5th

Total Contact Hours: 60

Total Marks: 100

Assessment: Internal Assessment – 20, End Term – 80

OBJECTIVE:After completion of thiscourse the student will be able to:

CO1-To learn Mobile Computing Principles and Architecture

CO2-To understand Mobility Management, GSM, and GPRS networks

CO3-To know Short Message Service (SMS) technology, GPRS, WAP, CDMA, 3G

CO4-Understand Wireless LAN, WiFi, and WLL (Wireless Local Loop) Architecture

CO5-Understand the concept of Mobile IP.

CO6- Learn Bluetooth, RFID, and Satellite Communications.

CO7-To Know Next Generation Networks (NGN)

| Lecture No. | Topic | Learning Objective | Activity | Homework | COURSE OBJECTIVE |
|---|----------------------------------|--|--|--|------------------|
| Module 1: Introduction to Wireless Networks & Mobile Computing(06 Periods) | | | | | |
| 1 | Definition and types of Networks | Define a network and classify different types of networks (e.g., LAN, WAN, MAN) | Brainstorm and list various networks students interact with daily (e.g., home Wi-Fi, campus network) | Write a one-page summary on the differences between a Local Area Network (LAN) and a Wide Area Network (WAN) | CO1 |
| 2 | Wireless Networks | Describe what constitutes a wireless network and its basic components | Discuss the advantages and disadvantages of wireless networks compared to wired networks | Research and identify three different wireless network standards other than Wi-Fi | CO1 |
| 3 | Mobile Computing | Define Mobile Computing and explain its core principles | Watch a short video on the history of mobile computing and discuss key milestones | Write a brief essay on how mobile computing has changed the way businesses operate | CO1 |
| 4 | Mobile Computing Characteristics | Identify and explain the key characteristics of mobile computing, such as portability, connectivity, and context-awareness | Group discussion on the characteristics of the latest smartphone model and how they align with mobile computing principles | Find and analyze a mobile computing characteristic not discussed in class | CO1 |
| 5 | Application of Mobile Computing | List and describe diverse applications of mobile computing across various fields | Showcase real-world mobile applications in healthcare, banking, and entertainment | Create a mind map of all the different mobile computing applications you use in a single day | CO1 |
| 6 | Review of Module 1 topics | Consolidate understanding of the foundational concepts of networks and mobile computing | A short quiz or Q&A session to reinforce key definitions and concepts | No new homework | CO1 |
| Module 2: Introduction to Mobile Development Framework(06 Periods) | | | | | |
| 7 | Client/Server (C/S) architecture | Explain the fundamental concept of a Client/Server architecture | Diagram the request-response cycle of a simple web page loading on a mobile device | Research a mobile application that uses a purely C/S and explain its workings | CO1 |

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| 8 | n-tier architecture and the WWW | Understand the benefits of n-tier architecture and its relationship to modern web applications | Compare and contrast the C/S model with a 3-tier architecture | Write a short report on how an e-commerce mobile app utilizes a multi-tier architecture | CO1 |
| 9 | Peer-to-Peer architecture | Describe the principles and use cases of Peer-to-Peer (P2P) architecture | Discuss the pros and cons of P2P architecture for mobile devices | Find an example of a P2P mobile application (e.g., file sharing, multiplayer game) and explain its architecture | CO1 |
| 10 | Mobile agent architecture | Define a mobile agent and explain its role in a mobile computing environment | Role-play a scenario where a mobile agent is used to perform a task for a user (e.g., finding the best price for an item) | Research the security challenges associated with mobile agent architecture | CO1 |
| 11 | Comparison of all architectures | Analyze and compare the different mobile development architectures, identifying their strengths and weaknesses | Students, in groups, present a case study for a specific type of architecture | Create a table comparing the four architectures based on criteria like scalability, security, and complexity | CO1 |
| 12 | Review of Module 2 topics | Recap the different mobile development frameworks and architectures | A quick "match the architecture to the application" game | No new homework | CO1 |
| Module 3: Wireless Transmission(06 Periods) | | | | | |
| 13 | Introduction to Wireless Transmission & Signals | Understand the basics of how information is transmitted wirelessly | Use a simple wave model to demonstrate the concepts of a signal | Draw and label a diagram of a sine wave, identifying its amplitude and wavelength | CO2 |
| 14 | Period, Frequency and Bandwidth | Define and differentiate between period, frequency, and bandwidth | Solve simple problems to calculate frequency from period and vice-versa | Find the frequency and bandwidth of a common wireless signal, such as a Wi-Fi or FM radio signal | CO2 |
| 15 | Antennas & Signal Propagation | Describe the function of antennas and the various methods of signal propagation (e.g., line-of-sight, reflection) | Discuss how different antenna designs affect signal strength and range | Explain in your own words why a cell phone signal might be weak inside a concrete building | CO2 |
| 16 | Multiplexing | Understand the concept of multiplexing and its types | Use a simple analogy to explain how multiple conversations can be carried on a single medium | Write a short explanation of the difference between FDM and TDM | CO2 |
| 17 | Modulation & Spread Spectrum | Explain the purpose of modulation and the advantages of spread spectrum technology | A short demonstration of how a simple signal can be modulated to carry data | Research and explain the difference between direct sequence spread spectrum (DSSS) and frequency hopping spread spectrum (FHSS) | CO2 |
| 18 | Cellular System | Describe the basic principles of a cellular system, including cells and handoffs | Draw a simple cellular network with multiple cells and explain how a user's call is maintained as they move between cells | Write a summary of the benefits of using a cellular system for mobile communication | CO2 |

| Module 4: Medium Access Control(06 Periods) | | | | | |
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| 19 | Introduction to Medium Access Control | Explain the necessity of a Medium Access Control (MAC) layer in wireless communication | In-class discussion on what would happen if there was no MAC layer | Define the term "collision" in the context of network communication | CO3 |
| 20 | Hidden/Exposed Terminals | Understand and illustrate the "hidden terminal" and "exposed terminal" problems | Role-playing a scenario with three students to demonstrate the hidden terminal problem | Draw a diagram and explain the exposed terminal problem, proposing a simple solution | CO3 |
| 21 | Near/Far Terminals | Describe the "near/far" problem and its impact on communication | Discuss how power control mechanisms can mitigate the near/far problem | Write a paragraph explaining how a powerful transmitter can interfere with a weaker one | CO3 |
| 22 | SDMA, FDMA | Explain the principles of Space Division Multiple Access (SDMA) and Frequency Division Multiple Access (FDMA) | Use a whiteboard to visually represent how SDMA and FDMA allocate resources | Research and list real-world applications of SDMA and FDMA | CO3 |
| 23 | TDMA, CDMA | Explain the principles of Time Division Multiple Access (TDMA) and Code Division Multiple Access (CDMA) | Use a time-based analogy to explain TDMA and a "code" analogy to explain CDMA | Write a comparative report on the four multiple access methods discussed | CO3 |
| 24 | Review of Module 4 topics | Consolidate the understanding of different MAC protocols and their challenges | Short quiz and a Q&A session on the multiple access methods | No new homework | CO3 |
| Module 5: Wireless LANs(06 Periods) | | | | | |
| 25 | Wireless LAN and Communication | Understand the basic concepts of Wireless Local Area Networks (WLAN) | Discuss the difference between a WLAN and a cellular network | Define the term "access point" and its role in a WLAN | CO4 |
| 26 | Infrared (IR) and Radio Frequency (RF) | Compare and contrast IR and RF technologies for wireless communication | List the advantages and disadvantages of IR and RF | Find a consumer product that still uses IR for communication (e.g., a TV remote) | CO4 |
| 27 | Logical Wireless Network Architecture & WLAN Types | Describe the different types of WLAN architectures (e.g., ad-hoc, infrastructure) | Draw the network topology for an ad-hoc WLAN and an infrastructure WLAN | Explain a scenario where an ad-hoc WLAN would be more suitable than an infrastructure WLAN | CO4 |
| 28 | IEEE 802.11 & MAC Layer | Understand the basics of the IEEE 802.11 standard and its MAC layer | Discuss the role of the Distributed Coordination Function (DCF) in IEEE 802.11 | Research and explain the Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) protocol | CO4 |
| 29 | Security, Synchronization, Power Management & Roaming | Explain how security, synchronization, power management, and roaming are handled in a WLAN | In-class discussion on the importance of WPA3 security | Write a short report on how a mobile device manages power consumption in a WLAN | CO4 |
| 30 | Bluetooth Overview | Understand the fundamentals of Bluetooth technology and its applications | Discuss the differences between Wi-Fi and Bluetooth | List and describe three different Bluetooth profiles (e.g., A2DP, HFP) and their uses | CO4 |

Module 6: Ubiquitous Wireless Communication(06 Periods)

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| 31 | Introduction | Understand the concept of ubiquitous wireless communication and its vision | Brainstorm a future where ubiquitous wireless communication is a reality | Write a fictional story about a day in the life of a person in a fully ubiquitous wireless environment | CO4 |
| 32 | Scenario of Mobile Communication | Discuss the current state and future trends of mobile communication | Debate the future of 5G and 6G technologies | Research a new wireless communication technology beyond 5G | CO4 |
| 33 | Mobile Communication Generations 1G to 3G | Trace the evolution of mobile communication from analog (1G) to digital (2G and 3G) | Create a timeline of key features for each generation (1G, 2G, 3G) | Explain the shift from circuit-switched to packet-switched data in mobile networks | CO4 |
| 34 | 3rd Generation Mobile Communication Network | Understand the core features and architecture of a 3G network | Discuss the role of mobile data in the 3G era | Research and list the key services enabled by 3G networks | CO4 |
| 35 | Universal Mobile Telecommunication System (UMTS) | Describe UMTS as a key 3G technology | Compare UMTS with its predecessors and contemporaries | Write a short report on the key components of a UMTS network | CO4 |
| 36 | Review of Module 6 topics | Consolidate understanding of the evolution of mobile communication and 3G technologies | Quiz on the mobile communication generations and their characteristics | No new homework | CO4 |

Module 7: Mobile IP(06 Periods)

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| 37 | Overview | Explain the problem Mobile IP was designed to solve | Discuss why a standard IP address is not suitable for a mobile host | Write a paragraph defining what a "mobile host" is | CO5 |
| 38 | Working with Mobile IP | Describe the basic process of how Mobile IP allows a device to maintain connectivity while changing networks | Draw a diagram illustrating the key steps in Mobile IP | Define the terms "Home Agent" and "Foreign Agent" in the context of Mobile IP | CO5 |
| 39 | Mobile IP Entities & Mobility Agents | Identify the main entities and their roles in a Mobile IP environment | A group exercise where students explain the functions of each mobility agent | Research and explain the purpose of the "care-of address" | CO5 |
| 40 | Components of Mobile IP | List and describe the various components that make up a Mobile IP system | Discuss the role of tunneling in Mobile IP | Write a short report on the registration process in Mobile IP | CO5 |
| 41 | Mobile IPv6 Features, Address Types, & Scope | Understand the key features and addressing schemes of Mobile IPv6 | Discuss the advantages of Mobile IPv6 over Mobile IPv4 | List and describe the different address types in Mobile IPv6 | CO5 |
| 42 | Mobile IP Operation | Explain the complete operational cycle of Mobile IP, from registration to de-registration | A final review of the entire Mobile IP process using a flowchart | No new homework | CO5 |

Module 8: Mobile Computing(06 Periods)

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| 43 | WWW architecture for Mobile computing | Understand how the World Wide Web is adapted for mobile devices | Discuss the challenges of displaying a traditional website on a small mobile screen | Research and explain the concept of "responsive web design" | CO5 |
| 44 | Need of WAP & Benefits of WAP | Explain the need for the Wireless Application Protocol (WAP) and its benefits | Discuss the limitations of early mobile devices that necessitated WAP | List three benefits of using WAP for mobile browsing | CO5 |

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| 45 | WAP- Architecture & WAP protocols | Describe the layered architecture of WAP and its key protocols | Draw a diagram of the WAP protocol stack | Write a brief explanation of the Wireless Session Protocol (WSP) | CO5 |
| 46 | WML & WAP Push architecture | Understand the purpose of Wireless Markup Language (WML) and the WAP Push architecture | Discuss a scenario where WAP Push could be used to deliver information to a mobile device | Compare WML with HTML, highlighting their differences | CO5 |
| 47 | Push-Pull based data acquisition | Differentiate between push and pull-based data acquisition models | Give examples of push and pull-based services on a modern smartphone | Research and write about the advantages of a push-based model in certain mobile applications | CO5 |
| 48 | I-mode & WAP 2.x | Understand the I-mode technology and the evolution of WAP to WAP 2.x | Discuss why WAP 2.x became more similar to traditional web browsing | Write a short report on the key differences between WAP 1.x and WAP 2.x | CO5 |
| Module 9: Wireless Telecommunication Networks(06 Periods) | | | | | |
| 49 | GSM & GPRS | Explain the principles of GSM and how GPRS enhances its capabilities | Discuss the role of the SIM card in a GSM network | Define the term "packet-switched" data in the context of GPRS | CO6 |
| 50 | IS-95 & CDMA-2000 | Understand the CDMA standards IS-95 and its evolution to CDMA-2000 | Compare GSM with CDMA, focusing on their multiple access methods | Research and list the countries that primarily use GSM vs. CDMA | CO6 |
| 51 | W-CDMA | Describe Wideband Code Division Multiple Access (W-CDMA) as a 3G technology | Discuss how W-CDMA improves upon previous CDMA standards | N/A | CO6 |
| 54 | Review of Module 9 topics | Recap the various wireless telecommunication standards | A quick "Which standard is this?" quiz for the different networks | No new homework | CO6 |
| Module 10: Messaging Services(06 Periods) | | | | | |
| 55 | Short Message Services (SMS) | Explain the technology behind SMS | Discuss the limitations of SMS (e.g., character limit, no multimedia) | Research and explain the role of a Short Message Service Center (SMSC) | CO7 |
| 56 | Multimedia Message Services (MMS) | Understand how MMS enables the sending of multimedia content | Compare the user experience of SMS vs. MMS | Write a short report on the key components of an MMS message (e.g., headers, body) | CO7 |
| 57 | Multimedia transmission over wireless (Part 1) | Describe the challenges of transmitting multimedia content over wireless networks. | Discuss the bandwidth and latency issues related to streaming video | Research a common video codec used for mobile streaming. | CO7 |
| 58 | Multimedia transmission over wireless (Part 2) | Understand the protocols and techniques used to optimize multimedia transmission | Discuss how mobile apps handle buffering to ensure smooth streaming. | Write a brief explanation of how Adaptive Bitrate (ABR) streaming works. | CO7 |
| 59 | Course Review | Review all key concepts from the entire 60-period course | A comprehensive Q&A session covering all modules | Students should prepare for their final exam | CO7 |
| 60 | Course Summary | Summarize the entire course and its key takeaways | Open discussion about the future of mobile computing | No new homework | CO7 |

Deeplak kumar Barh
11.07.2025
Signature of Teacher

Deeplak kumar Barh
11.07.2025
Signature of HOD