Government Polytechnic, Balangir

Department of Computer Science Engineering

LESSON PLAN 2026-27(WINTER)

NAME OF THE TEACHER : ABHISEK MISHRA, LECTURER (STAGE-1) ETC

Subject: **MOBILE COMPUTING** (Course Code: CSEPE 303A/TH:4(a))
Program: Diploma in Computer Science and Engineering
Semester: 5th
Total Contact Hours: 45
Total Marks: 100
Assessment: Internal Assessment – 30, End Term – 70

After completion of the course, the students will be able to:
CO1: Explain mobile and wireless network.
CO2: Demonstrate the working principles of infrared, cellular and wireless networks.
CO3: Explain various types of multiplexing schemes.
CO4: Explain voice and data compression.
CO5: Explain Global System for Mobile architecture.
CO6: Explain connectivity technologies like Bluetooth, Wi-Fi.

Lesson	Unit	Topic	Learning Objective	Activity	CO	Learning Methodology	Homework
1	Unit 1: Introduction to Wireless and Mobile Network	Historic background	Understand the evolution of mobile networks.	Timeline mapping of mobile generations.	CO1	Lecture & Interactive Discussion	Read about 1G and 2G histories.
2	Unit 1	Cellular Industry	Identify the key players and structure of the cellular industry.	Group discussion on current telecom providers.	CO1	Lecture & Case Study	Research major cellular companies in your region.
3	Unit 1	Advantages & disadvantages of Mobile systems	Evaluate the pros and cons of mobility in computing.	Brainstorming session (Pros vs. Cons).	CO1	Whiteboard/Chalk & Talk	Write a short essay on mobile system constraints.
4	Unit 1	Cell concepts	Understand the basic concept of a cellular geographic area.	Drawing basic cell structures on paper.	CO1	PPT Presentation	Diagram a basic cell cluster.
5	Unit 1	Wireless Network	Define wireless networks and their basic architecture.	Q&A session on wireless vs wired.	CO1	Lecture & Video	List 5 wireless networks you use daily.
6	Unit 2: Basics of Wireless & Mobile System	Wire based and wireless systems	Differentiate between wire-based and wireless systems.	Comparative chart creation.	CO2	Lecture & Visual Aids	Create a comparison table of wired vs wireless.
7	Unit 2	Infrared systems	Understand the working of IR systems and their limitations.	Remote control demonstration (Line-of-sight).	CO2	PPT & Demonstration	Read about modern IR applications.
8	Unit 2	Cellular radio	Explain the radio frequencies used in cellular communication	Spectrum chart analysis.	CO2	Lecture & Chalk & Talk	Define VHF and UHF bands.
9	Unit 2	Concepts of wireless LANS	Introduce the fundamentals of WLANs.	Identify WLAN components in the classroom.	CO2	PPT Presentation	Sketch a basic home WLAN setup.

10	Unit 2	Voice signals - its characteristics	Analyze analog voice signals and their parameters.	Voice wave analysis (Visualizer tool).	CO2	Interactive Lecture	Define amplitude, frequency, and phase.
11	Unit 2	Frequency spectrum	Understand the allocation of the electromagneti c spectrum.	Frequency allocation mapping.	CO2	Lecture & Whiteboard	Memorize standard spectrum ranges.
12	Unit 2	Digital signal, Broadband and base band signals	Distinguish between baseband and broadband digital signals.	Signal drawing exercise.	CO2	PPT & Chalk & Talk	Compare broadband and baseband signaling.
13	Unit 3: Cellular Systems	Cell layout, path-loss, propagation delay	Compute basic propagation delays and understand layout.	Mathematical problem-solvin g on delay.	CO2	Lecture & Problem Solving	Solve 2 path-loss numerical problems.
14	Unit 3	Fading	Explain multipath fading in mobile systems.	Real-world scenario discussion (e.g., driving through a tunnel).	CO2	Video & Discussion	Describe Rayleigh and Rician fading.
15	Unit 3	Size and shape of cell	Justify the use of hexagonal cell shapes in modeling.	Hexagonal grid drawing exercise.	CO2	PPT & Visual Modeling	Explain why circles are not used for cell modeling.
16	Unit 3	Concepts of frequency reuse, spectrum efficiency	Understand how frequencies are reused to increase capacity.	Frequency reuse cluster modeling ($N=7$).	CO2	Chalk & Talk	Calculate cluster sizes for different patterns.
17	Unit 3	Cell capacity to handle calls, Call demand in a cell	Evaluate call capacity and demand metrics (Erlang).	Erlang capacity calculations.	CO2	Lecture & Problem Solving	Review Erlang B and C formulas.
18	Unit 3	Channel requirement, cell splitting, cell sectoring concept	Understand techniques to increase network capacity.	Sectoring vs splitting diagram activity.	CO2	PPT Presentation	Diagram a 120-degree sectored cell.
19	Unit 4: Channel Utilization Schemes	Concepts of Multiplexing: FDM	Define multiplexing and detail Frequency Division Multiplexing.	Visual mapping of frequency bands.	CO3	Lecture & Visual Aids	Summarize FDM applications.
20	Unit 4	FDMA	Explain Frequency Division Multiple Access.	Group discussion on multiple access.	CO3	Chalk & Talk	Differentiate FDM and FDMA.
21	Unit 4	TDD, TDM	Understand Time Division Duplexing and Multiplexing.	Time-slot allocation exercise.	CO3	PPT Presentation	Explain TDD with a real-world example.

22	Unit 4	TDMA	Detail Time Division Multiple Access principles.	Conceptual simulation of time slots.	CO3	Lecture & Animation	Contrast TDMA with FDMA.
23	Unit 4	CDMA	Explain Code Division Multiple Access utilizing orthogonal codes.	Orthogonal code generation example.	CO3	Chalk & Talk	Read up on CDMA usage in 3G networks.
24	Unit 4	Concepts of spread spectrum	Define spread spectrum technology and its benefits.	Bandwidth vs Noise graph analysis.	CO3	PPT & Discussion	List the benefits of spread spectrum.
25	Unit 4	Frequency hopping	Understand the mechanics of frequency hopping.	Frequency hopping sequence mapping.	CO3	Interactive Lecture	Explain how FHSS prevents jamming.
26	Unit 4	Introductory idea on AMPS	Introduce the Advanced Mobile Phone System (1G).	AMPS architecture review.	CO3	Lecture & Video	Write a brief history of the AMPS network.
27	Unit 4	Compression operations voice compression	Understand why and how voice is compressed for mobile.	Audio compression rate comparison.	CO4	PPT & Audio Demo	Research standard voice codecs (e.g., AMR).
28	Unit 4	Data compression, V.42, fax compression-introductory idea	Introduce standard data and fax compression protocols.	Protocol analysis (V.42).	CO4	Lecture & Whiteboard	Write short notes on V.42 standard.
29	Unit 5: Global System for Mobile Communication (GSM)	Historical background	Trace the development of GSM standard across Europe.	Map the evolution of the GSM standard.	CO5	Lecture	Review the timeline of GSM rollouts.
30	Unit 5	SIM and GSM	Detail the function of the Subscriber Identity Module.	Examine physical SIM cards/components.	CO5	Interactive Session	List data stored inside a SIM card.
31	Unit 5	Overview of GSM operations - Registration	Understand how a mobile device registers on a network.	Flowcharting the registration process.	CO5	PPT & Flowcharts	Diagram the GSM registration flow.
32	Unit 5	Call Establishment	Step-by-step analysis of Mobile Originated/Terminated calls.	Roleplay: Network entities routing a call.	CO5	Chalk & Talk	Map MO (Mobile Originated) call steps.
33	Unit 5	Roaming	Explain the concepts and signaling behind network roaming.	VLR/HLR interaction diagramming.	CO5	Lecture & Diagramming	Differentiate HLR and VLR functions.
34	Unit 5	GSM channel	Classify logical and physical channels in GSM.	Channel classification chart creation.	CO5	PPT Presentation	Memorize Broadcast and Control channels.

35	Unit 5	GSM operations	Review Handover and location updating procedures.	Handover scenario analysis.	CO5	Lecture & Case Study	Differentiate Hard vs Soft Handover.
36	Unit 5	GSM operations (Review & Practical Context)	Consolidate understanding of the complete GSM architecture.	Open Q&A and system architecture drawing.	CO5	Peer Review / Q&A	Draw the full GSM architecture diagram.
37	Unit 6: Blue tooth and Wireless LANS	Need of compatibility, Bluetooth concepts	Understand the origins and primary function of Bluetooth.	Piconet and Scatternet drawing.	CO6	Lecture & Visuals	Define a Piconet.
38	Unit 6	Comparison with IR system, Architecture	Compare BT with IR and analyze BT architecture.	Side-by-side comparison chart.	CO6	PPT Presentation	Contrast Bluetooth and Infrared.
39	Unit 6	Potential applications	Identify real-world implementations of Bluetooth technology.	Brainstorming IoT and BT use-cases.	CO6	Group Discussion	List 5 modern Bluetooth applications.
40	Unit 6	IEEE802.11x Wireless LAN standard-basic configuration	Understand the 802.11 family of standards (a/b/g/n/ac).	Standard comparison matrix.	CO6	Lecture & Chalk & Talk	Compare speeds of 802.11n vs 802.11ac.
41	Unit 6	Architecture, concepts of wireless home networking	Map out a secure home Wi-Fi networking setup.	Design a home network topology.	CO6	Interactive Design	Draw your own home network topology.
42	Unit 7: Security and Privacy	Introduction, frequency hopping spread spectrum	Introduce security concerns in mobile systems and FHSS security.	Identify vulnerabilities in wireless tech.	CO1	PPT & Discussion	Read about wireless eavesdropping.
43	Unit 7	Encryption concepts, Public Key Encryption	Understand asymmetric cryptography and general encryption.	RSA simple mathematical example.	CO1	Chalk & Talk	Explain Public vs Private Keys.
44	Unit 7	Authentication Model, Smart Card	Learn how networks verify user identity using smart cards.	Smart card workflow mapping.	CO5	Lecture & Flowcharts	Summarize how a smart card authenticates.
45	Unit 7	Biometric Authentication	Evaluate modern biometric security measures on mobile devices.	Biometric modality discussion (Face, Fingerprint).	CO1	PPT & Open Forum	Write a short note on biometric privacy.

25/06/2026
Signature of Teacher

Deepak Kumar Barala
25.06.2026
Signature of HOD