

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Wireless Communications

(Open Elective - IV)

SYLLABUS FOR B.E. VI - SEMESTER (CSE, CSE (AI&ML) & IT)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U21OE620EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To understand the technology trends changing from generation to generation.	1. Identify key concepts related to frequency reuse, handoff strategies, and channel assignment in cellular networks.
2. To have an insight into the various propagation models and the effects of fading.	2. Explain the architecture, services, and features of 2G wireless systems, specifically the Global System for Mobile (GSM)
3. To understand the multiple access techniques and Mobile communication system specifications.	3. Analyze the benefits of MIMO and OFDM in enhancing data rates and spectral efficiency in 4G and beyond.
	4. Compare and contrast the evolution of 3G, 4G, and 5G technologies, highlighting their advancements and implications.
	5. comprehend the architecture of 5G networks, including the New Radio (NR) standard, standalone and non-standalone modes, massive MIMO

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	1								3	
CO2	3	2	2	2		1								3	
CO3	3	2				1								3	
CO4	3	2	2	2	1	1								3	
CO5	3	2		2	1	1								3	

UNIT - I:

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communications, Examples of Wireless Communications Systems, Trends in Cellular Radio and Personal Communication Systems.

The Cellular Concept – System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems.

UNIT - II:

2G Wireless Systems and Standards: Global System for Mobile (GSM) – Services and features, System architecture, GSM Radio subsystem, channel types, Frame structure for GSM.

UNIT - III:

Evolution from 3G to 4G: 3G UMTS, W-CDMA, HSPA, HSPA+, 3G services and data rates; IMT advanced: 4G, LTE, VoLTE, OFDM, MIMO, LTE Advanced Pro (3GPP release 12+); IMT2020: 5G enhancements in comparison to IMT advanced.

UNIT -IV:

Basics of 5G: 5G potential and applications; Usage scenarios: enhanced mobile broadband (eMBB), ultra reliable low latency communications (URLLC), massive machine type communications (MMTC), D2D communications, V2X communications; Spectrum for 5G, spectrum access/sharing; millimeter Wave communication, channels and signals/waveforms in 5G, carrier aggregation, small cells, dual connectivity.

UNIT -V:

5G Network: New Radio (NR), Standalone and non-standalone mode; non-orthogonal multiple access (NOMA); massive MIMO, beam formation, FAPI: PHY API specification, flexible frame structure, Service Data Adaptation Protocol (SDAP); centralized RAN, open RAN; multi-access edge computing (MEC); software defined networking (SDN), network function virtualization (NFV); network slicing; restful API for service-based interface; private networks.

Learning Resources:

- Theodore S. Rappaport, Wireless Communications Principles and Practices, 2nd edition, Pearson Education.
- 4G, LTE-Advanced Pro and The Road to 5G by Erik Dahlman.
- Fundamentals of 5G Mobile Networks Hardcover, by Jonathan Rodriguez, Wiley.
- 5G NR: Architecture, Technology, Implementation, and Operation of 3GPP New Radio.
- Introduction to Wireless and Cellular Communications
Course url: https://swayam.gov.in/nd1_noc19_ee48/preview

The break-up of CIE : Internal Tests + Assignments + Quizzes

- No. of Internal Tests : Max. Marks for each Internal Test :
- No. of Assignments : Max. Marks for each Assignment :
- No. of Quizzes : Max. Marks for each Quiz Test :

Duration of Internal Tests: 90 Minutes