

GUJARAT TECHNOLOGICAL UNIVERSITY

Electronics Engineering / Electronics & Communication
Engineering / Electronics & Telecommunication Engineering

B. E. SEMESTER: VII

Subject Name: **Wireless Communication**

Subject Code: **171004**

| Teaching Scheme | | | | Evaluation Scheme | | | |
|-----------------|----------|-----------|-------|---------------------|-----------|---------------------------|----------------------|
| Theory | Tutorial | Practical | Total | University Exam (E) | | Mid Sem Exam (Theory) (M) | Practical (Internal) |
| | | | | Theory | Practical | | |
| 4 | 0 | 2 | 6 | 70 | 30 | 30 | 20 |

| Sr. No | Course Content | Total Hrs. |
|--------|--|------------|
| 1. | <p>Introduction to Wireless Communication System:</p> <p>Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication. Second generation Cellular Networks, Third Generation (3G) Wireless Networks , Wireless Local Loop(WLL), Wireless Local Area network(WLAN), Bluetooth and Personal Area Networks</p> | 3 |
| 2. | <p>The Cellular Concept- System Design Fundamentals:</p> <p>Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Handoff Strategies, Umbrella Cell Concept, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization , Repeaters, Micro cell zone concept, Channel antenna system design considerations.</p> | 14 |
| 3. | <p>Mobile Radio Propagation Model, Small Scale Fading and diversity:</p> <p>Large scale path loss:-Free Space Propagation loss equation, Path-loss of NLOS and LOS systems, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design, Max. Distance Coverage formula, Empirical formula for path loss, Indoor and outdoor propagation models, Small scale multipath propagation, Impulse model for multipath channel, Delay spread, Feher's delay spread, upper bound Small scale,</p> | 12 |

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| | Multipath Measurement parameters of multipath channels, Types of small scale Fading, Rayleigh and rician distribution, Statistical for models multipath fading channels and diversity techniques in brief. | |
| 4. | Multiple Access Techniques: Introduction, Comparisons of multiple Access Strategies TDMA,CDMA, FDMA, OFDM , CSMA Protocols | 8 |
| 5. | Wireless Systems: GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Concept of spread spectrum, Architecture of IS-95 CDMA system, Air interface, CDMA forward channels, CDMA reverse channels, Soft handoff, CDMA features, Power control in CDMA, Performance of CDMA System, RAKE Receiver, CDMA2000 cellular technology, GPRS system architecture. | 14 |
| 6. | Recent trends: Introduction to Wi-Fi, WiMAX, ZigBee Networks, Software Defined Radio, UWB Radio, Wireless Adhoc Network and Mobile Portability, Security issues and challenges in a Wireless network. | 9 |

Text Book:

1. “Wireless Communication”, Theodore S. Rappaport, Prentice hall

Reference Books:

1. “Wireless Communications and Networking “, Vijay Garg, Elsevier
2. 'Wireless digital communication', Kamilo Feher, PHI
3. “Mobile Communications Engineering”, William C. Y. Lee, Mc Graw Hill Publications
4. Mobile and personal Communication system and services by Rajpandya, IEEE press (PHI).
5. Wireless Communications-T.L.Singh-TMH
6. Adhoc Mobile Wireless network, C.K.Toh Pearson