

Course Title : **Mobile and Wireless Communication**  
 Course Code : COM 613.3  
 Credit : 3  
 Class Load : 3 hours  
 Evaluation :

	Theory	Practical	Total
Sessional	25	25	50
Final	50	-	50
Total	75	25	100

**Course Objective:**

The main objective of this course is to cover basic principle of coding and equalization in mobile and wireless communication

- 1. Introduction (2 Hrs)**  
History and evolution of wireless communication, The cellular concept, evolution of mobile communication, global mobile communication systems
- 2. Speech Coding for Wireless System Applications (4 Hrs)**  
Speech coding techniques for audio and voice, Speech codes
- 3. Radio Propagation and Cellular Engineering Concepts (6 Hrs)**  
Introduction to radio wave propagation and antenna, Free space propagation model, Models of multi-path faded radio signals, fading in the mobile environment, Practical link budget design using path loss models
- 4. Modulation Techniques for Wireless Communication: (6 Hrs)**  
Overview of analog and digital modulation, Pulse shaping techniques, Digital carrier modulation techniques: BPSK, MSK, GMSK, MPSK, MFSK
- 5. Coding and Error Control: (6 Hrs)**  
Error control requirements, Block codes, Convolutional codes, Automatic Repeat Request, Word-error rate, False-alarm rate, probability of bit error
- 6. Equalization and Diversity: (4 Hrs)**  
Introduction and fundamentals of equalization, Diversity techniques, RAKE receivers
- 7. Multiple Access Techniques : (6 Hrs)**  
Overview of FDM and TDM, FDMA, TDMA, The concept of spread spectrum, Frequency hopping spread spectrum, Direct sequence spread spectrum, Code-division multiple access (CDMA), Spread-spectrum application in cellular, mobile and wireless communication
- 8. Wireless communication systems and standards: (6 Hrs)**  
Global system for mobile (GSM): services and features, system architecture, radio subsystem, channel types, frame structure, signal processing, IS-95: frequency and channel specifications, forward CDMA channel, reverse CDMA channel, DECT: features and characteristics, architecture, functional concept, radio link, Recent developments in GSM and CDMA technology
- 9. Wireless Networking: (5 Hrs)**  
Introduction to wireless networks, wireless and fixed telephone networks, Development of wireless networks: first, second and third generation, Cordless systems and wireless local loop, Fixed broadband wireless access standards, Mobile

IP and wireless application protocol, Wireless LAN technology: infrared LAN, spread spectrum LAN, narrow band microwave LAN, standards

**Laboratory:**

Five experiments (including computer simulation and modeling) related to basic principles of wireless communication systems as decided by the course instructor

**Reference:**

1. K. Feher, "Wireless Digital Communications", PHI, 2001
2. W. Stallings, "Wireless Communications and Networks", PEA, 2002
3. J. Schiller, "Mobile Communications", PEA, 2000
4. B.P. Lathi, "Modern Digital and Analog Communication Systems", Third Edition, Oxford University Press, 1999.
5. J. Proakis, M. Salehi, "Communication Systems Engineering", Prentice Hall, New Jersey, 1994.