



Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2021-22

Course Handout (Part-II)

Date: 31/12/2021

Course No. : **EEE G592**
Course Title : **Mobile and Personal Communication**
Instructor-in-Charge : **Dr. Amit Ranjan Azad**

Pre-requisites: Signals and Systems, Communication Systems

Course Description:

History of mobile radio; the mobile radio signal environment; review of statistical techniques; path over flat as well as hilly terrain; effects of RF system design on propagation; received signal envelope and phase characteristics; modulation schemes employed; functional design of mobile radio systems, diversity schemes-space; frequency and polarization diversity; mobile radio system functional design; signal error analysis versus performance criteria; multiple access schemes; classification of the concepts of sensitive topics; new concepts data transmission via cellular; spectrum and technology of WLL

Scope and Objective of the Course:

The course aims at the study of mobile personal communications, one of the fastest growing fields in the engineering worldwide. Design methods and general concepts involved in understanding and implementation of wireless systems and techniques are discussed. In this course an effort will be made to impart an understanding of the basics of the rapidly growing field of mobile and personal communication systems, services and standards.

1. Text Book:

[T1] Wireless Communications - Principles and Practice, Theodore S. Rappaport, Second Edition, Pearson, 2010

2. Reference Books:

- [R1] Mobile Communications Engineering - Theory and Applications, William C.Y. Lee, McGraw-Hill Education, 1998
- [R2] Fundamentals of Wireless Communication, David Tse, Pramod Viswanath, Cambridge University Press, 2005
- [R3] Wireless Communications & Networks, William Stallings, Second Edition, Pearson, 2009

3. Course Plan:

Lec. No.	Learning Objectives	Topics to be Covered	Reference
1	Introduction and General Overview	Introduction to Wireless Communication and Overview of Mobile Networks	Ch-1 (T1, R1)
2-3	Modern Wireless Communication Systems	Wireless Systems, Cellular Networks Evolution, Wireless Local Loop (WLL)	Ch-2 (T1)
4-9	The Cellular Concept	Frequency Reuse, Channel Assignment and Handoff Strategies, Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems	Ch-3 (T1)
10-15	Mobile Radio Propagation: Large-Scale Path Loss	Free Space Propagation Model, Basic Methods of Propagation, Link Budget Design, Outdoor Propagation Models, Indoor Propagation Models	Ch-4 (T1)
16-20	Mobile Radio Propagation: Small-Scale Fading and Multipath	Small-Scale Multipath Propagation and Measurements, Multipath Channel Parameters, Types of Small-Scale Fading, Statistical Models for Multipath Fading Channels	Ch-5 (T1)
21-30	Equalization, Diversity and Channel Coding	Equalization in Communication Receivers, Types of Equalizers, Diversity Techniques, Channel Coding	Ch-7 (T1)
31-32	Speech Coding	Speech Signals, Quantization Techniques, Pulse Code Modulation, Vocoders	Ch-8 (T1)
33	Multiple Access Techniques	FDMA, TDMA, CDMA, SDMA, OFDM, Packet Radio	Ch-9 (T1)
34-35	Wireless Networking	Development of Wireless Networks, Fixed Network Transmission Hierarchy, Circuit Switching, Packet Switching, Wireless Data Services, ISDN, SS7, Protocols for Network Access	Ch-10 (T1)
36-38	Wireless Systems and Standards	GSM, CDMA Digital Cellular Standard (IS-95)	Ch-11 (T1)
39-41	Wireless Network Technology and Standards	Wireless LAN Technology, WiFi and IEEE 802.11 Wireless LAN Standard, Bluetooth and IEEE 802.15, WiMAX and IEEE 802.16 Broadband Wireless Access Standards, Mobile Ad-hoc Networks	Ch-11 (R3), Ch-13 to 15 (R3)

42	Communication System Performance	BER Performance, Spectral Efficiency	Class Notes
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4. Evaluation Scheme:

Component	Duration	Weight	Marks	Date & Time	Evaluation Type
Mid Semester Exam	90 Minutes	25%	50	As per Timetable	Open Book
Quizzes	–	10%	20	–	Closed Book
Lab Component	–	15%	30	–	Open Book
Term Project	–	10%	20	–	Open Book
Comprehensive Exam	2 Hours	40%	80	As per Timetable	Closed Book
Total	–	–	200	–	–

5. **Chamber Consultation Hour:** To be announced in the class

6. **Notices:** Notices related to the course will be announced on CMS

7. Make-Up Examination:

No make-up will be given for quizzes. However, for Lab, Mid Semester and Comprehensive Exam, make-up exam will be conducted only for extremely genuine cases for which prior permission of the instructor-in-charge is required.

8. Academic Honesty and Integrity Policy:

Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-Charge

EEE G592 Mobile and Personal Communication

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