Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2019-20

Course Handout (Part-I)

Date: 28/11/2019

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

Course Description:

History of mobile radio; the mobile radio signal environment; review of statistical techniques; pathover 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" by Theodore S. Rappaport, Second Edition, Pearson, 2010

2. Reference Books:

[R1] "Mobile Communications Engineering - Theory and Applications" William C.Y. Lee, Mc-Graw-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	Modern Wireless CommunicationSystems	2G, 2.5G , 3G and 4G Technologies, Wireless Local Loop (WLL), Local Multipoint Distribution Service (LMDS)	Ch-2 (T1)
3-8	Cellular Engineering Fundamentals	Frequency Reuse, Channel Assignment and Handoff Strategies,Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems	Ch-3 (T1)
9-14	Free Space Radio Wave Propagation	Free Space Propagation Model, Basic Methods of Propagation, Link Budget Design, Outdoor Propagation Models, Indoor Propagation Models	Ch-4 (T1)
15-18	Multipath Propagation and Fading	Small-Scale Multipath Propagation and Measurements, Multipath Channel Parameters, Types of Small-Scale Fading, Statistical Models for Multipath Propagation	Ch-5 (T1)
19-20	Modulation Techniques	AM, FM, Digital Modulation,Linear Modulation Techniques, Constant Envelope Modulation, Spread Spectrum Modulation Techniques, Modulation Performance in Fading and Multipath Channels	Ch-6 (T1)
21-22	Equalization, Diversity and Channel Coding	Equalization in Communication Receivers, Types of Equalizers, Diversity Techniques, Channel Coding	Ch-7 (T1)
23-24	Speech Coding	Speech Signals, Quantization Techniques, Pulse Code Modulation, Vocoders	Ch-8 (T1)
25-26	Multiple Access Techniques	FDMA, TDMA, CDMA, OFDM, SDMA, Packet Radio	Ch-9 (T1)
27-30	Wireless Networking	Development of Wireless Networks, Fixed Network Transmission Hierarchy, Circuit Switching, Packet Switching, Wireless Data Services, ISDN, SS7, PCS/PCNs, Protocols for Network Access, UMTS	Ch-10 (T1)
31-34	Wireless Systems and	GSM, CDMA Digital Cellular Standard (IS-	Ch-11 (T1),

	Standards	95), WiMAX and IEEE 802.16 Broadband Wireless Access Standards	Ch-11 (R3)
35-38	Wireless Network Technology and Standards	Wireless LAN Technology, WiFi and IEEE 802.11 Wireless LAN Standard, Bluetooth and IEEE 802.15	Ch-13 to 15 (R3)
39-41	Ad-hoc Wireless Network	Multihop Ad-hoc Wireless Network Scenario, BER Performance, Spectral Efficiency (MIMO, OFDM)	Class Notes

4. Evaluation Scheme:

Component	Duration	Weight	Marks	Date & Time	Evaluation Type
Mid Semester Exam	90 min	20%	60	6/3,9:00 – 10:30 AM	Closed Book
Surprise Quizzes	–	10%	30	–	Closed Book
Lab Component	–	20%	60	–	Open Book
Term Project	–	20%	60	–	Open Book
Comprehensive Exam	3 hours	30%	90	12/05 FN	Closed Book
Total	–	–	300	–	–

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

6. Notices: EEE Notice Board and CMS

7. Make-Up Examination:

No make-up will be given for Surprise 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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