

No	Information of IT-61042	
1	Unit name	Wireless and Mobile Communications Wireless Communications and Networking (4 th edition) by VIJAY GARG
2	Code:	IT 61042
3	Classification	Engineering Subject
4	Credit value:	3
5	Semester/Year Offered:	1/ VI
6	Pre-requisite:	Basic Computer Skill, Basic Network Concept
7	Mode of delivery:	Lecture, Practical
8	Assessment system and breakdown of marks:	
	Test	
	Tutorial/ Assignment	20%
	Practical	20%
	Mid-term/ final Examination	60%
9	Academic staff teaching unit:	Department of Information Technology Engineering
10	<p>Course outcome of unit: In this course, students will be able</p> <p>(a) Identify and discuss the fundamental operational and design problem of wireless communication systems and discuss basic technical standard related to 1G/2G/3G wireless systems.</p> <p>(b) Articulate mathematical and scientific principles to solve engineering problems.</p> <p>(c) classify the cellular radio concept such as frequency reuse, handoff and how interference between mobile and base station affect the capacity of cellular system and develop abilities to setup experiments and analyze system performance using wireless system, hardware and software.</p>	
11	<p>Synopsis of Unit: This course is the study of the development of wireless and mobile communication system, one of the fastest growing industry segments today. Many type of wireless networks are now being used for applications such as personal communication, entertainment, rural and urban healthcare, smart, home building, inventory control and surveillance. This book introduce the basic concept of wireless networks and mobile communication to give engineering students a solid background problems in the telecommunication field of students and advanced-level researcher.</p>	
12	<p>Topics:</p> <p>Chapter 1 topic</p> <ul style="list-style-type: none"> • First- and Second-Generation Cellular Systems • Cellular Communications from 1G to 3G • Road Map for Higher Data Rate Capability in 3G • Wireless 4G Systems • Future Wireless Networks • Standardization Activities for Cellular Systems <p>Chapter 2 topic</p> <ul style="list-style-type: none"> • Tele traffic Engineering • Introduction • Service Level • Traffic Usage • Traffic Measurement Units • Call Capacity 	

- Definitions of Terms
- Data Collection
- Office Engineering Considerations
- Traffic Types
- Blocking Formulas
- Erlang B Formula
- Poisson's Formula
- Erlang C Formula
- Comparison of Erlang B and Poisson's Formulas
- Binomial Formula

Chapter 3 topic

- Radio Propagation and Propagation Path-Loss Models
- Introduction
- Free-Space Attenuation
- Attenuation over Reflecting Surface
- Effect of Earth's Curvature
- Radio Wave Propagation
- Characteristics of Wireless Channel
- Multipath Delay Spread, Coherence Bandwidth, and Coherence Time
- Signal Fading Statistics
- Rician Distribution
- Rayleigh Distribution
- Lognormal Distribution
- Level Crossing Rate and Average Fade Duration
- Propagation Path-Loss Models
- Okumura/Hata Model
- Cost 231 Model
- IMT-2000 Models
- Indoor Path-Loss Models
- Fade Margin
- Link Margin

Chapter 4 topic

- An Overview of Digital Communication and Transmission 85
- Introduction 85
- Baseband Systems 87
- Messages, Characters, and Symbols 87
- Sampling Process 88
- Voice Communication 97
- Pulse Amplitude Modulation (PAM) 98
- Pulse Code Modulation 100
- Shannon Limit 102
- Modulation 103
- Performance Parameters of Coding and Modulation Scheme 105
- Power Limited and Bandwidth-Limited Channel 108
- Nyquist Bandwidth 109
- OSI Model 112

- OSI Upper Layers 112
- Data Communication Services 113
- Multiplexing 115
- Transmission Media 116
- Transmission Impairments

Chapter 5 Topic

- Cellular Systems 123
- Hexagonal Cell Geometry 125
- Cochannel Interference Ratio 131
- Cellular System Design in Worst-Case Scenario with an Omnidirectional Antenna 134
- Cochannel Interference Reduction 136
- Directional Antennas in Seven-Cell Reuse Pattern 137
- Three-Sector Case 137
- Six-Sector Case 138
- Cell Splitting
- Adjacent Channel Interference (ACI) 144
- Segmentation\

Chapter 6 Topic

- Narrowband Channelized Systems
- Frequency Division Duplex (FDD) and Time Division Duplex (TDD) System
- Frequency Division Multiple Access
- Time Division Multiple Access
- Spectral Efficiency
- Spectral Efficiency of Modulation
- Multiple Access Spectral Efficiency
- Overall Spectral Efficiency of FDMA and TDMA Systems
- Wideband Systems
- Comparisons of FDMA, TDMA, and DS-CDMA (Figure 6.7)
- Capacity of DS-CDMA System
- Comparison of DS-CDMA vs. TDMA System Capacity
- Frequency Hopping Spread Spectrum with M-ary
- Frequency Shift Keying
- Orthogonal Frequency Division Multiplexing (OFDM)
- Multicarrier DS-CDMA (MC-DS-CDMA)
- Random Access Methods
- Pure ALOHA
- Slotted ALOHA
- Carrier Sense Multiple Access (CSMA)
- Carrier Sense Multiple Access with Collision Detection
- Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)
- Idle Signal Casting Multiple Access
- Packet Reservation Multiple Access
- Error Control Schemes for Link Layer

Chapter 7 Topic

	<ul style="list-style-type: none"> • WWAN Subsystem Entities 194 • User Equipment 194 • Radio Station Subsystem 196 • Network and Switching Subsystem 197 • Operation and Maintenance Subsystem (OMSS) 198 • Interworking and Interfaces 199 • Logical Channels 199 • Channel and Frame Structure 201 • Basic Signal Characteristics 203 • Speech Processing 203 • Power Levels in Mobile Station 208 • GSM Public Land Mobile Network Services
13	<p>Main Reference: Wireless Communications and Networking (4th edition) by VIJAY GARG</p>
14	<p>Additional Reference:</p>