



Kot Bhalwal, Jammu

Model Institute of Engineering  
& Technology (Autonomous)  
**Course Handout**

## COURSE HANDOUT

WIRELESS AND MOBILE COMMUNICATION (ECE-601)

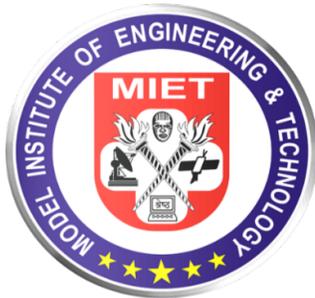
ECE-6th SEMESTER

ACADEMIC YEAR (2024-25)

**Dr. Satyendra Kumar Singh**

Assistant Professor

Department of Electrical Engineering



Department of Electronics & Communication Engineering

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Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

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Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
ECE-601	Wireless and Mobile	Core	4	3	1	0	50	150	150

### COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Discuss the major cellular Communication standards (1G/2G/3G/4G/5G).
CO2	Characterize the tradeoffs among frequency reuse, signal to interference ratio, capacity and spectral Efficiency.
CO3	Illustrate characteristics of different modulation techniques and multiple access techniques.
CO4	Establish the concepts for different models of mobile radio propagations.
CO5	Articulate the wireless communication systems and standards like GSM, IS-95.

### Section-A

**Unit 1:** Introduction to Wireless Communication System: Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless Communication System, Comparison of Common wireless system, Trends in Cellular radio and personal communication. Second generation Cellular Networks, Generations of Mobile (3G, 4G, 5G & 6G) Wireless Networks.

(10 Hrs)

**Unit 2:** Modern Wireless Communication System: The Cellular Concept: Introduction, Hexagonal geometry cell and concept of frequency reuse, Handoff strategies, Co-channel interference and system capacity, Adjacent channel capacity, Improving Coverage and capacity- Cell splitting, Sectoring.

(12 Hrs)

**Unit 3:** Advanced Mobile Communication Standards: IEEE 802.11 WLAN standard and its variants – PHY layer technologies – MAC mechanism – Security, Qos and handover Issues – IEEE 802.15 WPAN standard – Bluetooth Architecture and Protocol stack – IEEE 802.16 Wireless broadband access standards – PHY and MAC layer overviews – WiMAX network architecture – Initialization and Handover procedures.

(08 Hrs)

### Section-B

**Unit 4:** Mobile Network: Transport and Application Layers, Mobile IP – Packet delivery process – Routing optimization – Mobile ad-hoc networks and routing protocols – Mobile TCP – Wireless Application Protocols

(08 Hrs)

**Unit 5:** Wireless System & Standards: GSM-Features, Architecture, Channel types, CDMA Digital Cellular standard (IS-95) - CDMA forward channels, CDMA reverse channels, soft handoff, CDMA features, Introduction to Bluetooth, Wi-Fi, Wi-Mac. WLAN Standard IEEE 802.10, IEEE 802.11

(12 Hrs)

### Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Wireless Communication Principles and Practice	Theodore S. Rappaport	PHI	2nd (2018)
2	Wireless Communication	T L Singal	TMH	1st (2017)



3	Mobile Communication Engineering	W.C.Y Lee	TMH	2nd (2017)
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**Reference Books**

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Wireless Communication	William Stallings	Pearson	2nd (2009)
2	Wireless Communications and Networking	Vijay Garg	Morgan Kaufmann	1st (2008)
3	Personal & Mobile Communication	Raj Pandaya	Wiley Blackwell	2nd (2004)



## COURSE PLAN

Unit-I Introduction to Wireless Communication System		
S.No	Topics	Recommended Books
1	Evolution of mobile communications	Book 1, Ch.1
2	Mobile Radio System around the world	Book 1, Ch.1
3	Types of Wireless communication System	Book 1, Ch.1
4	Comparison of Wireless communication System	Book 1, Ch.1
5	Comparison of Common wireless system	Book 1, Ch.2
6	Trends in Cellular radio and personal communication	Book 1, Ch.2
7	Second generation Cellular Networks	Book 1, Ch.2
Unit-II Modern Wireless Communication System		
8	Introduction	Book 1, Ch.3
9	Hexagonal geometry cell and concept of frequency reuse	Book 1, Ch.3
10	concept of frequency reuse	Book 1, Ch.3
11	Handoff strategies	Book 1, Ch.3
12	Co-channel interference and system capacity	Book 1, Ch.3
13	Adjacent channel capacity	Book 1, Ch.3
14	Improving Coverage and capacity- Cell splitting, Sectoring	Book 2, Ch.7
Unit- III Advanced Mobile Communication Standards		
15	IEEE 802.11 WLAN standard and its variants	Book 2, Ch.14
16	PHY layer technologies	Book 2, Ch.14
17	MAC mechanism – Security	Book 2, Ch.14
18	Qos and handover Issues	Book 2, Ch.14
19	IEEE 802.15 WPAN standard	Book 2, Ch.14
20	Bluetooth Architecture and Protocol stack	Book 2, Ch.14
21	IEEE 802.16 Wireless broadband access standards	Book 2, Ch.14
22	PHY and MAC layer overviews	Book 2, Ch.14
23	WiMAX network architecture	Book 2, Ch.14
24	Initialization and handover procedures	Book 2, Ch.14



Unit-IV Mobile Network		
25	Transport and Application Layers	Book 2, Ch.14
26	Mobile IP – Packet delivery process	Book 2, Ch.14
27	Routing optimization	Book 2, Ch.14
28	Mobile ad-hoc networks	Book 2, Ch.14
29	routing protocols	Book 2, Ch.14
30	Mobile TCP	Book 2, Ch.14
31	Wireless Application Protocols	Book 2, Ch.14
Unit-V Wireless System & Standards		
32	GSM-Features, Architecture,	Book 2, Ch.11
33	Channel types	Book 2, Ch.11
34	CDMA Digital Cellular standard (IS-95)	Book 2, Ch.12
35	CDMA forward channels, CDMA reverse channels	Book 2, Ch.12
36	Soft handoff, CDMA features	Book 2, Ch.8
37	Introduction to Bluetooth	Book 2, Ch.14
38	Wi-Fi	Book 2, Ch.14
39	Wi-Mac	Book 2, Ch.14
40	WLAN Standard	Book 2, Ch.14

#### ADDITIONAL WEB RESOURCES

1.	<b>MOOC:</b> Wireless Communications for Everybody by Coursera <a href="https://www.coursera.org/learn/wireless-communications#:~:text=Wireless%20Communications%20for%20Everybody">https://www.coursera.org/learn/wireless-communications#:~:text=Wireless%20Communications%20for%20Everybody</a>
2.	<b>NPTEL:</b> Video lectures on Introduction to Wireless and Cellular Communications by Prof. R. David Koilpillai, IIT Madras <a href="https://swayam.gov.in/explorer">https://swayam.gov.in/explorer</a>

#### GRADING AND ASSESSMENT

- **Sessional Test:** 20 marks
- **Assignment:** 20 marks
- **Attendance:** 10 marks
- **Final Examination:** 100 marks

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### COURSE POLICIES

- **Attendance:** Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity:** MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions:** Assignments and projects must be submitted by the specified timelines.

### FACULTY INFORMATION

- **Office Hours**  
Tuesday (12:55 PM - 1:45 PM)  
Thursday (12:55 PM - 1:45 PM)
- **Contact Information**  
[satyendra.ece@mietjammu.in](mailto:satyendra.ece@mietjammu.in)