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Mobile and Wireless Communication — Complete Syllabus (Elective — Specialisation, Option 1)

BTEUP Diploma in Electronics Engineering • 6th Semester • Session 2026-27

Subject 6.3.1 — Elective (Specialisation), Option 1 (Practicum) • Total 100 Marks • 3

Credits • L 2 - P 3 • Choose this OR VLSI Using VHDL OR Power Electronic Devices

Note: No marks-distribution table and no reference-books list are given for this subject in the PDF, so unit weightages and books are not shown.

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
6.3.1	Elective (Specialisation): Mobile and Wireless Communication	Practicum	2 - 3	3	Practical 60	Practical 40	100
Mobile and Wireless Communication Total				3	60	40	100

What This Subject Aims To Do

To equip students with fundamental knowledge and practical understanding of wireless and mobile communication systems — their functioning, architecture and operational principles — so they stay updated with current and emerging communication technologies, as mobile communication has largely replaced traditional landline systems.

Unit-Wise Complete Topic List

Note: no marks-distribution table is given for this subject in the official syllabus, so unit weightages are not shown.

Unit 1 — Wireless Communication and Propagation (6 Periods)

Topics: Basics, Advantages of wireless communication, Electromagnetic waves, Frequency Spectrum used, Cellular Network Systems, Link budget, Free-space path loss, Noise figure of receiver, Multipath fading, Shadowing, fading margin, Shadowing margin

In simple words: Wireless basics: the spectrum used, cellular systems, link budgets, path loss, and the fading and shadowing that weaken signals.

Unit 2 — Overview of Cellular Systems (8 Periods)

Topics: Evolution 1G/2G/3G/4G/5G. Cellular Concepts – Cell area, Cell site structure, Capacity of cell, Frequency reuse, Co-channel and Adjacent Channel Interference, Power Control for reducing Interference, Fundamentals of cellular network planning: Coverage planning, Capacity planning, Cell splitting and sectoring. Antenna diversity, wireless channel capacity and MIMO

In simple words: Cellular systems from 1G to 5G: cells, frequency reuse, interference, network planning (coverage, capacity, cell splitting and sectoring), antenna diversity and MIMO.

Unit 3 — Multiple Access Techniques for Wireless Communication (6 Periods)

Topics: Introduction to Multiple Access. Frequency Division Multiple Access (FDMA). Time Division Multiple Access (TDMA), Distinction between TDMA FDD and TDMA TDD, Code Division Multiple Access (CDMA), WCDMA

In simple words: How many users share the airwaves: FDMA, TDMA (FDD and TDD) and CDMA/WCDMA.

Unit 4 — Mobile Communication Systems (8 Periods)

Topics: Introduction of Global Systems for Mobile Communication (GSM) and its architecture, Introduction of CDMA System, comparison of CDMA and GSM Systems and frequency bands. Introduction to GPRS and EDGE, Introduction to Architecture and Features of UMTS HSPA (High Speed Packet Access), Features and Architecture of LTE (Long Term Evolution), Vo-LTE (Voice Over Long-Term Evolution)

In simple words: The systems themselves: GSM and CDMA compared, GPRS and EDGE, UMTS/HSPA, LTE and voice over LTE.

Practical Work

- To understand the path loss.
- Understand the path loss with shadowing.
- Understanding the Flat fading.
- Understanding the Frequency selective fading.
- Understanding the Multipath channel for the following objectives: a. No Fading; b. Flat Fading; c. Dispersive Fading.
- Study the features, specification and working of cellular mobile.
- To understand the cellular frequency reuse concept to find the co-channel cells for a particular cell.
- To simulate a dipole antenna (λ , $\lambda/4$, $\lambda/2$, $3\lambda/2$) for a particular frequency using 4NEC2.
- Perform following experiments using CDMA trainer kit: a. PSK modulation and demodulation experiment; b. Bit synchronization extraction experiment; c. Error correction encoding experiment.
- Measurement of signal strength at various points from a transmitting antenna.
- Demonstration of Base Trans Receiver (BTS) with nearby cellular tower.
- Observing call processing of GSM trainer kit.
- Repair of a GSM mobile phone.
- Troubleshooting GSM Mobile Phone: a. Assembling and disassembling of GSM phone; b. Study parts of Mobile Phone; c. Testing of various parts.

Reference Books

Reference books are not listed for this subject in the official syllabus.

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Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.