



SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology



B. Tech. Semester VI

Subject Name: Wireless Mobile Communication **Subject Code: BTEC15604**

Type of course: OE

Prerequisite: Basic electronics

Rationale: Wireless mobile Communication is the most popular and vibrant technological area in the communication field. We live in a World of digital trends. The course discusses working of a mobile communication and the techniques to allow unlimited users for sharing the spectrum along with concepts of intelligent cell conception, various wireless networks etc.

Teaching and Examination Scheme:

| Teaching Scheme | | | | Theory Marks | | | Practical Marks | | Total |
|-----------------|---|---|---|--------------|-----|-----|-----------------|-----|-------|
| L | T | P | C | TEE | CA1 | CA2 | TEP | CA3 | |
| 3 | 0 | 0 | 3 | 60 | 25 | 15 | - | - | 100 |

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

| Sr. no. | Topics | Teaching Hrs. | Module % Weightage |
|---------|---|---------------|--------------------|
| 1. | Trends in wireless mobile communication: Introduction to wireless communication, mobile generations from 1G to 5G – comparison, terms related to wireless systems, trends in cellular radio and personal communication. | 5 | 10 |
| 2. | Introduction to cellular system – hexagonal geometry and frequency reuse –Channel Assignment Strategies -distance to frequency reuse ratio- S/I ratio consideration and calculation for Minimum Cochannel and adjacent interference- Handoff Strategies, Umbrella Cell Concept , Improving Coverage & Capacity in Cellular System, cell splitting, Cell sectorization, Repeaters, Micro cell zone concept. | 10 | 25 |
| 3. | Mobile radio propagation: large scale path loss - Free space propagation model, basic path loss models. | 6 | 15 |
| 4. | Multiple Access Techniques and Network Frequency division multiple access (FDMA), Time division multiple access (TDMA), , Space division multiple access (SDMA), Orthogonal frequency division multiplexing (OFDM),basic GSM Architecture | 9 | 20 |



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| | | | |
|-----------|--|---|----|
| 5. | Intelligent Cell Concept and application: Introduction to intelligent cell, Application of intelligent microcell system, concept of Code division multiple access (CDMA), Spread spectrum, introduction to MIMO | 7 | 15 |
| 6. | Wireless Networks: LAN Technologies: Evolution of Wireless LAN, IEEE802.11, Physical, Layer, MAC Sub-layer, routing algorithms. Adhoc networks: Characteristics – Performance issues. Overview to Wireless ATM, HYPERLAN, Introduction to wireless sensor networks. | 8 | 15 |

Suggested Specification table with Marks (Theory/Practical):

| % Distribution of Marks | | | | | |
|--------------------------------|----------------|----------------|----------------|----------------|----------------|
| R Level | U Level | A Level | N Level | E Level | C Level |
| 25 | 35 | 30 | 10 | 0 | 0 |

Legends: R: Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **E:** Evaluate **C:** Create and above Levels (**Revised Bloom’s Taxonomy**)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Text Books:

| Sr. No. | Title of book /article | Author(s) | Publisher and details like ISBN | Year of publication | Publication Edition |
|----------------|---|----------------------------|--|----------------------------|----------------------------|
| 1. | Wireless Communications Principles and Practice | Theodore Rappaport | Prentice Hall | 2010 | 2 nd |
| 2. | Wireless Communication and Networks | Upena Dalal | Oxford University Press 9780198060666 | 2014 | Latest |
| 3. | Wireless and Mobile Communication | Upena Dalal & Manoj Shukla | Oxford University Press 9780199475001 | 2016 | Latest |
| 4. | Wireless and cellular telecommunication | William C Y Lee | cbspd 9780071252553 | 2006 | 3 rd |

Course Outcome:



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| Sr. No. | CO Statement After learning this subject students will be able to | Marks % weightage |
|---------|---|----------------------|
| CO-1 | Discuss fundamentals of wireless communication and various generations of mobile communications | 15 |
| CO-2 | Apply concepts of a basic cellular network design for capacity enhancement | 20 |
| CO-3 | Apply mobile radio propagation models to find losses in mobile communications | 25 |
| CO-4 | Describe effectively multiple access techniques for wireless and mobile communication | 15 |
| CO-5 | Describe Intelligent Cell Concept and its application | 15 |
| CO-6 | Describe performances of various wireless networks | 10 |

Mapping with POs:

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO-1 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 |
| CO-2 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 3 |
| CO-3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 3 | 3 |
| CO-4 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 |
| CO-5 | 2 | 2 | 3 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 3 | 2 |
| CO-6 | 3 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 3 |

List of Open Source/learning website:

- <http://nptel.ac.in/>