**University of Management and Technology**

School of Engineering

Department of Electrical Engineering

**Course Outline**

**Course code:** EE 480 **Course title:** Wireless Communications

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| **Program** | BSEE & BS(H) |
| **Credit Hours** | 3 |
| **Duration** | One semester |
| **Prerequisites** | EE-315 Signals & Systems |
| **Resource Persons** | Dr. Sajjad ShamiAyesha Iqbal |
| **Counseling Timing****(Room# )** | See office window |
| **Contact** | sajjad.shami@umt.edu.pkayesha.iqbal@umt.edu.pk |

**Chairman/Director signature………………………………….**

**Dean’s signature…………………………… Date………………………………………….**

**Learning Objectives:**

Upon completion of this course, students will be able to:-

1. Have good understanding of wireless communication systems at the physical layer.
2. Have familiarity with state of the art technologies like GSM and CDMA systems.
3. Understand concepts of network planning including cell setup, frequency reuse, handover etc.
4. Become familiar with protocols like Mobile IP and WAP.
5. Understand concepts involved in WiFi and Bluetooth technologies.

The course strongly supports expected outcomes a, b, d and i of the HEC Electrical Engineering Curriculum.

**Learning Methodology:**

Lecture, interactive, participative

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Quizzes 20

Assignments

Mid Term 30

Attendance & Class Participation

Term Project

Presentations

Final exam 50

Total 100

**Recommended Text Books:**

“Wireless communications and networks” second edition by William Stallings, 2005.

**Reference Book:**

“Wireless Communications” second edition by Theodore S. Rappaport, 2002.

**Calendar of Course contents to be covered during semester**

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|  **Lecture** |  **Course Contents**  | **Reference Chapter(s)** |
| 1-2 | Overview of Wireless SystemsEvolution of wireless communicationTrends in wireless communicationExamples of wireless communication systemsTechnical challenges of wireless communication | TB: 1.1- 1.5 |
| 3-4 | Transmission Fundamentals***:*** Analog and Digital Data TransmissionChannel CapacityTransmission MediaMultiplexing | TB: 2.2- 2.5 |
| 5-6 | Communication NetworksTCP/IP | TB: 3.1- 3.4, 4.1- 4.4 |
| 7-10 | Cellular Concepts: Cell Shapes, Cell splitting, Interferences, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems | TB: 5.1RB: 3.2 – 3.5, 3.7 |
| 11-14 | Cellular Communication: Cellular Network PrinciplesStudy and overview of different Cellular technologies like AMPS, GSM and CDMADiscussions on 2G, 3G and 4G systems | TB: 10.1 – 10.5 |
| 15-16 | **Mid Term Examination** |  |

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| 17-20 | Modulation Techniques: Signal Encoding, Spread Spectrum Modulation, Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum | TB: 7.1 – 7.3 |
| 21-22 | Wireless Channel: Propagation Characteristics, Large Scale Fading, Small Scale Fading, Path Loss Models, Channel Modeling | RB: 4.2, 4.5-4.8, 5.1 |
| 23-26 | Multiple Access Techniques: Time Division Multiple Access, Frequency Division Multiple Access, Code Division Multiple Access | TB: 10.3, 10.4, 7.4 |
| 27-28 | Wireless Standards and Mobile IP: WAP, Cordless systems, WLL, WiMAX | TB: 11.1 – 11.3, 12.1-12.2 |
| 29-30 | Wireless LANSWi Fi & Bluetooth | TB: 13.1-13.4, 15.1-15.3 |
| 31-32 | **Final Examination** |  |