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| **logo University of Management & Technology**  School of Science & Technology  Department of Electrical Engineering | | | |
| EE480 WIRELESS COMMUNICATIONS | | | |
| **Lecture Schedule** | Sec A: Mon, Wed 13:20-14:40 | **Semester** | Fall 2012 |
| **Pre-requisite** | EE-315 Signals & Systems | **Credit Hours** | 3 |
| **Instructor(s)** | Section A: Dr. Sajjad Shami | **Contact** | [sajjad.shami@umt.edu.pk](mailto:sajjad.shami@umt.edu.pk) |
| **Office** | 2nd Floor, South Block,  SST Campus. | **Office Hours** | See office window |
| **Teaching Assistant** | TBA | **Contact** | N/A |
| **Office** | Ground Floor | **Office Hours** | N/A |
| **Course Description** | This course deals with the fundamental and practical aspects in the analysis and design of wireless systems. Topics that will be covered are: the wireless communication channel, cellular communication principles, techniques used to enhance channel efficiency, overview of multiple access techniques and example wireless communication systems. Starting from the transmission fundamentals to case study of systems like GSM and CDMA, there will be discussions on cellular planning, propagation, fading, channel assignments strategies, handoffs etc. The course will also give an overview of Wi-Fi systems and Bluetooth technology. The course directly contributes to the objectives of the HEC Electrical Engineering Curriculum. | | |
| **Expected Outcomes** | Upon completion of this course, students will:   * Have good understanding of wireless communication systems at the physical layer * Have familiarity with state of the art technologies like GSM and CDMA systems. * Understand concepts of network planning including cell setup, frequency reuse, handover etc. * Become familiar with protocols like Mobile IP and WAP. * Understand concepts involved in WiFi and Bluetooth technologies. * The course strongly supports the expected outcomes of the HEC Electrical Engineering Curriculum. | | |
| **Textbook(s)** | **Recommended Text:** Wireless communications and networks second edition by William Stallings, 2005.  **Reference:** Introduction to Wireless Systems by P. Mohana Shankar. John Wiley & Sons, 2002 | | |
| **Grading Policy** | * Assignments & Quizzes: 20% * Midterm: 30% * Final Exam: 50% | | |

**Course Schedule**

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| **Lecture** | **Topics** | **Textbook (TB) /**  **Reference (Ref) Readings** |
| 1-2 | Overview of Wireless Systems; Evolution of wireless communication; Trends in wireless communication; Examples of wireless communication systems; Technical challenges of wireless communication | TB: 1.1- 1.5 |
| 3-4 | Transmission Fundamentals***:*** Analog and Digital Data Transmission, Channel Capacity, Transmission Media  Multiplexing | TB: 2.1- 2.4 |
| 5-6 | Communication Networks, TCP/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: 5.1  Ref: 4.1-4.7 |
| 11-15 | Cellular Communication: Cellular Network Principles Study and overview of different Cellular technologies like AMPS, GSM and CDMA. Discussions on 2G, 3G and 4G systems. | TB: 5.2-5.5 |
| **Mid Term Exam (8th Week)** | | |
| 17-20 | Modulation Techniques: Signal Encoding, Spread Spectrum Modulation, Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum | TB: 7.1 – 7.8 |
| 21-22 | Wireless Channel: Propagation Characteristics, Large Scale Fading, Small Scale Fading, Path Loss Models, Channel Modeling | TB: 6.2, 6.4 |
| 23-26 | Multiple Access Techniques: Time Division Multiple Access, Frequency Division Multiple Access, Code Division Multiple Access. | TB: 9.1 – 9.7 |
| 27-28 | Wireless Standards and Mobile IP: WAP, Cordless systems, WLL, WiMAX. | TB: 11.1 – 11.3  TB: 12.1-12.2 |
| 29-30 | Wireless LANS, Wi Fi & Bluetooth: | TB: 13.1-13.4; 15.1-15.3 |
| **Final Term Exam (Comprehensive)** | | |