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| **logo University of Management & Technology** School of Science & Technology Department of Electrical Engineering |
| EL-312 SIGNAL AND SYSTEM LAB  |
| **Lab Schedule** | As per timetable | **Semester** | Spring 2011 |
| **Title**  | EL-312 Signals & Systems Lab | **Credit Hours** | 2 |
| **Instructor(s)** |  Saima Shaheen1 (Sec A) Masooma Atiq2  (Sec B1) Muhammad Haris3 (Sec C) Asfa Javed4 (Sec E, E1) | **Contact** | saima.shaheen@umt.edu.pk1masooma.atiq@umt.edu.pk2 muhammad.haris@umt.edu.pk 3asfa.javed@umt.edu.pk 4 |
| **Office** | Lab 5 Cabin1,4, 3S-33 Room# 22,3S-42/A3 | **Office Hours** | See office window |
| **Course Description** | This course includes continuous time and discrete time signals, periodic signals, even and odd signals, exponential and sinusoidal signals, the unit impulse and unit step functions, continues time and discrete time systems, linear time invariant (LTI) systems, difference equation, causality, BIBO stability, convolution and correlation, discrete time Fourier transforms, time and frequency characterization of signals and systems, the discrete time signals, z-transform, analysis and characterization of LTI systems using z-transform, The Lab directly contributes to **objectives** a, d, e and f of the HEC Electrical Engineering Curriculum. |
| **Expected Outcomes** | This is a Lab that is intended to provide the fundamentals of signals, systems and transforms to the electrical engineering students. basic Upon completion of this course, students will: * Have good understanding of signal and systems.
* Analyzing the signals and their operations.
* will acquire hands-on experience with programming in
* will enable you to study and understand the theory behind signals and systems as well as validate the theory with real-world examples.
* The Lab strongly supports expected **outcomes** a, b, d and i of the HEC Electrical Engineering Curriculum.
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| **Textbook(s)** | **Recommended Material.** **TB.1** Fundamentals of Signals and Systems Using the Web and MATLAB, HKamenHEd. and Heck H.B., Prentice Hall, (Latest Edition)**TB.2** Signal and systems by **oppenheim****TB.3** Signals and systems laboratory with MATLAB by [Anastasia Veloni](http://www.worldcat.org/search?q=au%3AVeloni%2C+Anastasia.&qt=hot_author)**Digital Signal Processing Using Matlab V4 Ingle** |
| **Grading Policy** | * Lab Performance 70%
* Final 30%
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**Lab Schedule**

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| **Lab sr.** | **Experiments** | **Textbook (TB) /****Reference (Ref) Readings** |
| 1 | Introduction to the basic sequences and their implementation, Energy and Power Calculation | **TB.2 &TB.3** |
| 2 |  Types of basic sequences generation  | **TB.2 &TB.3** |
| 3 | Signal Operation addition, multiplication, scaling, shifting, folding, sample summation, even and odd synthesis. | **TB.2 &TB.3** |
| 4 | Introduction to the systems, linear time invariant (LTI) system, stability, causality, step and impulse response of LTI systems. | **TB.2 &TB.3** |
| 5 | LTI system and their properties | **TB.2 &TB.3** |
| 6 | Fourier series, plot of saw tooth wave, magnitude and phase calculation  | **TB.1 & TB.3** |
| 7 |  Fourier transform | **TB.2 &TB.3** |
| **Mid Term VIVA/performance (8th Week)** |
| 8 | Continuous time convolution | **TB.2 &TB.3** |
| 9 | Discrete time convolution  | **TB.2 &TB.3** |
| 10 | Concept of frequency in continuous-time and Discrete-time signals | **TB.2** |
| 11 | Signal sampling and reconstruction | **TB.2** |
| 12 | Time and frequency characterization of signals and systems | **TB.2** |
| 13 | Z-transform using residuez method, pole-zero plot | **TB.2 &TB.3** |
| 14 | Inverse z-transform in matlab | **TB.2 &TB.3** |
| 15 | System representation in the Z-domain and solution to the difference equations. | **TB.2 &TB.3** |
| **Final VIVA/performance (Comprehensive)** |