**University of Management and Technology**

School of Engineering

Department of Electrical Engineering

**Lab Outline**

Course code: **EL212** Course title: **Electrical Network Analysis Lab**

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| Program | BSEE |
| Credit Hours | 1 |
| Duration | One semester |
| Prerequisites | EE110L Circuit Analysis Lab |
| Resource Person(s) | Khalid Ijaz  Bilal Anwar |
| Counseling Timing | See office window |
| Contact | [khalid.ijaz@umt.edu.pk](mailto:khalid.ijaz@umt.edu.pk)  bilal.anwar@umt.edu.pk |

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

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

**Learning Objective:**

Upon completion of this Lab, students will be able to:

* Learn the use of Laboratory equipment (Oscilloscope, Function Gen, DC Supply)
* Learn Frequency responses on various passive circuit elements
* Learn Applications of Sinusoidal Steady State Analysis, Three Phase systems and Power Factor
* Learn the Magnitude & Phase plots of Passive Filters

**Learning Methodology:**

Software, Hardware, participative, viva voce

**Grade Evaluation Criteria**

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

**Marks Evaluation Marks in percentage**

Weekly Lab performance 40

Final Viva and Performance 60

Total 100

**Reading Material:**

Lab Manuals

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

**Course code:** EL212  **Course title:** Electrical Network Analysis Lab

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| **LAB** | **EXPERIMENT TITLE** | **RELATED TOPICS** | **EQUIPMENT** |
| 1 | AC Analysis Lab Hardware and Software Familiarization | Oscilloscope Basics  Proteus Circuit Simulator | Oscilloscope  Function Generator  Computer System with Proteus |
| 2 | Oscilloscope and Phase Measurements | Sinusoidal and Phasors  Sinusoidal Steady State Analysis | Oscilloscope  Function Generator  Resistors  Capacitors  Inductors |
| 3 | Phase Shifters | Applications of Sinusoidal and Phasors | Oscilloscope  Function Generator  Resistors  Capacitors |
| 4 | AC Bridge circuits | Working and Analysis of AC Bridges. | Oscilloscope  Function Generator  Resistors  Capacitors |
| 5 | Capacitance Multiplier and Oscillators. | Applications of Sinusoidal Steady State Analysis | Oscilloscope  Function Generator  Resistors  Capacitors  Inductors |
| 6 | Power Factor Measurement and its Improvement | Power Factor and Power Factor Correction  Power Measurement | Oscilloscope  Function Generator  Resistors |
| 7 | Current And Voltages In Balanced Three Phase System | Three Phase Systems  Phase Sequence indicators  Residential Wiring | Oscilloscope  Function Generator  Resistors  Capacitors  Inductors |
| 8 | Frequency Response of RC Series and RC Parallel Circuits | Frequency Response  RC Series and Parallel Circuits  Bode Plots  Decibel Scale | Oscilloscope  Function Generator  Resistors  Capacitors  Inductors |
| 9 | Frequency Response of RL Series and RL Parallel Circuits | Frequency Response  RL Series and Parallel Circuits  Bode Plots  Decibel Scale | Oscilloscope  Function Generator  Resistors  Capacitors  Inductors |
| 10 | Magnitude & Phase Response Of Resonant RLC Series Circuits | Series Resonance | Oscilloscope  Function Generator Resistors  Op-Amp |
| 11 | Low Pass and High Pass Filters | Active Low Pass Filters  Active High Pass Filters | Oscilloscope  Function Generator  Resistors  Capacitors  Inductors |
| 12 | Band Pass Filters And Band Stop Filters | Passive Band Pass Filters  Passive Band Stop Filters | Oscilloscope  Function Generator |
| 13 | Fourier Analysis | Fourier Series | Oscilloscope  Function Generator  Resistors  Capacitors  Inductors |