**University of Management and Technology**

School of Engineering

Department of Electrical Engineering

**Course Outline**

Course code: **EE406L** Course title: **Power System Analysis And Design Lab**

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| Program | BSEE |
| Credit Hours | 1 |
| Duration | One Semester |
| Prerequisites | EE 212 Electrical Network Analysis |
| Resource Person | Muhammad Haris(1)  Fahad Usman Khan(2)  Awais Saeed(3) |
| Counseling Timing  (Office # S-3/33 ) | See Office Window |
| Contact | [muhammad.haris@umt.edu.pk](mailto:muhammad.haris@umt.edu.pk)  [fahad.khan@umt.edu.pk](mailto:fahad.khan@umt.edu.pk)  awais.saeed@umt.edu.pk |

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

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

**Learning Objective:**

Upon Completion, the students will be able:-

* To model and simulate any power system network using MATLAB and Power World Simulator.
* To do Steady-state analysis of power flow in power system networks.
* To do Transient analysis of symmetrical and unsymmetrical faults in power system networks.

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

**Learning Methodology:**

Lectures, 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**

Lab Sessionals 40%

Final Viva/Quiz 60%

Total 100%

**Recommended Text Books:**

* Power System Analysis by John J. Grainger & William D. Stevenson, Jr. [1]
* Power System Analysis by HadiSaadat, Latest Edition [2]

**Reference Books:**

* Power System Analysis by Stevenson [1]

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

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| **Week** | **Course Contents** | **Relevance to Theory Course** |
| 1 | Introduction to SimPowerSystems™ block of  MATLAB | Chapter#1 of TB1 |
| 2 | Steady-State Analysis of a single phase power  system by SimPowersystems blockset of Matlab | Chapter#1 of TB1 |
| 3 | Analysis of a Three phase power system by  SimPowersystems blockset of Matalb. | Chapter#1,2 of TB1 |
| 4 | Ybus in MATLAB | Chapter#7 of TB1 |
| 5 | Kron Reduction in MATLAB | Chapter#7 of TB1 |
| 6 | Gauss Seidel in MATLAB | Chapter#7 of TB1 |
| 7 | Newton Raphson in MATLAB | Chapter#7 of TB1 |
| 8 | Building Zbus in MATLAB | Chapter#8 of TB1 |
| 9 | Introduction to ETAP and power system modeling | Lab Manual |
| 10 | Transient stability and load flow analysis of power system in ETAP | Chapter#10 of TB1  Lab Manual |
| 11 | Implementation of one line diagram and its power flow analysis in Power world simulator | Lab Manual |
| 12 | Fault Calculation in MATLAB Simulink | Chapter#10 of TB1 |
| 13 | Fault Calculation in MATLAB | Chapter#10 of TB1 |