**University of Management and Technology**

**Course Outline**

Course code: **EL423** Course title: **Power System Protection Lab**

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| --- | --- |
| Program | BSEE |
| Credit Hours | 1 |
| Duration | One Semester |
| Prerequisites | -- |
| Resource Person | Fahad Usman Khan |
| Counseling Timing  (Office # 7, Hall # 510, SEN Building ) |  |
| Contact | Ext: 3665  Fahad.khan@umt.edu.pk |

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

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

**Introduction:**

Power System Protection is the branch of power system concerned with the principles of design and operation of equipment called Relays, which detects abnormal power system conditions, and initiates corrective action as quickly as possible in order to return the power system to its normal state.

**Learning Objective:**

Students who complete this course will have gained a theoretical and applied understanding of power system protection. The implementation of different kind of relaying procedures will enhance the general understanding of the power system protection. Having successfully completed the module, the student will be able to:

* Choose among the different types of protection schemes to suit a given application task.
* Explain the operation and performance of different types of protective relays.
* Apply engineering studies for different types of power system protection schemes.
* Interpret results and correlate them with theoretical predictions
* Write a technical repots.

**Teaching Methodology:**

Lectures will be used to describe and develop the concepts.

Group tasks will be given to enhance interactive learning.

**Grade Evaluation Criteria**

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

**Marks Evaluation Marks in percentage**

Lab Sessional Evaluation 40%

Final Viva Voce 60%

Total 100%

**Recommended Text Books:**

* Power System Relaying, 3rdedn. By Stanley H. Horowitz and Arun G. Phadke

**Reference Books:**

* Protective Relaying principles and application, 3rdedn. By J. Lewis Blackburn and Thomas J. Domin
* Fundamentals of power System Protection by Y.G. Paithankar and S. R. Bhide

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

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| --- | --- |
| **Week** | **Topics** |
|  | Introduction to Simulink. |
|  | Simulation of over current relay in Matlab. |
|  | Simulation of Delay Time over current relay in Matlab. |
|  | Simulation of over current relay by using Matlab function. |
|  | Relay Coordination using Matlab function. |
|  | Simulation of over voltage and under voltage relay. |
|  | Simulation of over voltage and under voltage relay by using Matlab function. |
|  | Simulation of distance protection relay for transmission lines in Matlab |
|  | Simulation of differential relay for power transformer in Matlab |
|  | Simulation of Volts per hertz protection scheme for transformer in Matlab |
|  | Power transformer protection using Matlab function |
|  | Rotating machinery protection scheme implementation in Matlab |