**University of Management and Technology**

School of Engineering

Department of Electrical Engineering

**Course Outline**

Course code……EL-340…... Course Title………Electrical Machines Lab……

|  |  |
| --- | --- |
| Program | BSEE |
| Credit Hours | 1 |
| Duration | One semester |
| Prerequisites | EE-111 Circuit Analysis |
| Resource Person | Abdullah Khalid [1]  Muhammad Arif Saeed [2]  Raheel Zafar [3]  Saima Shaheen [4] |
| Counseling Timing  (Room# ) | See Office doors  EE Labs |
| Contact | [abdullah.khalid@umt.edu.pk](mailto:abdullah.khalid@umt.edu.pk)1  [arif.saeed@umt.edu.pk](mailto:arif.saeed@umt.edu.pk)2  [raheel.zafar@umt.edu.pk3](mailto:raheel.zafar@umt.edu.pk3)  [saima.shaheen@umt.edu.pk4](mailto:saima.shaheen@umt.edu.pk4) |

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

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

**Learning Objective:**

The lab deals with fundamental and practical aspect of Electrical Machines. It is designed to practically implement and observe the characteristics of Transformers, generators, Machines and their applications. The Lab directly contributes to **objectives** a, d, e and f of the HEC Electrical Engineering Curriculum.

Upon completion of this lab, students will:

* Have good understanding of basic electrical Machines, Transformers, Motors and Generators.
* Be able to analyze electrical circuits.

The Lab strongly supports expected **outcomes** a, d, f, i, l and m of the HEC Electrical Engineering Curriculum.

**Learning Methodology:**

Practical, 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 Manuals & Performance: 40%

Final Viva or Quiz + Performance: 60%

Total 100%

**Recommended Text Books:**

**Text book:** Electrical Machines, Drives and Power Systems by Theodore Wildi, 6th Edition.

**Reference Books:**

* Electric Machinery Fundamentals by Stephen J. Chapman, Latest Edition.
* Electric Machinery by Fitzgerald, Kingsley and Umans, Latest Edition.

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

Course code……EL-340…... Course title……Electrical Machines Lab………

|  |  |  |
| --- | --- | --- |
| **Week** | **Course Contents** | **Relevance to Theory Course** |
| 1. | To Investigate The Voltage Regulation of Single Phase Transformer | Article:10.13 |
| 2 | To Investigate The Voltage Regulation of Three Phase Transformer | Article:12.7 |
| 3 | To Perform The Open Circuit and Short Circuit Test of a Single Phase Transformer | Article:10.9,10.10 |
| 4 | To Perform the Short Circuit and Open Circuit Tests of a 3‐Phase Transformer | Article:12.7 |
| 5 | To Measure The Winding Resistances of DC Shunt Machine and Study The Magnetizing and Load Characteristics of DC Shunt Generator | Article:4.14,4.15,4.18 |
| 6 | To Study The Load Test of DC Series Motor | Article:5.8 |
| 7 | To Study The Load Characteristics of DC Compound Motor | Article:5.11 |
| 8 | To Investigate the Characteristics of 3-phase Induction Motor (Squirrel Cage Rotor) | Article:13.6,13.11,14.6 |
| 9 | To Investigate the Characteristics of 3-phase Induction Motor (Wound Rotor) | Article:13.16,14.6 |
| 10 | To Study The Characteristics of 3-Phase Synchronous Generator | Article:16.8,16.13 |
| 11 | To Study The Characteristics of 1-Phase Capacitor Start Induction Motor | Article:18.7 |
| 12 | To Study the Characteristics of 1-Phase Capacitor Run Induction Motor | Article:18.10 |
| 13 | To Study the Characteristics of 1-Phase Clutch Type Induction Motor | Article:18.1 |
| 14 | To Study The Control of 3-Phase Double Speed Induction Motor | Article:14.5 |
| 15 | To Study the Characteristics of Universal Motor | Article:18.13 |