**Course Profile**

**Semester: Summer 2020**

**Year:** 2020

**Level/Term:**3/1

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| **I. Course Code:** EEE 313 | | |
| **II. Course Title:** Electrical Machines II | | |
| **III. Credit:**3 | | **IV. Pre-Requisite:** EEE 233 |
| **V. Contact Hours:** | Lecture- 3 Hours/week | |
| **VI. Course Objectives:** | | |
| The objectives of this course are   1. To introduce with electrical machines. 2. To give the students requisite basic knowledge on the construction of different Machines likeDC and Synchronous generators and motors. 3. To make the students understand about the characteristics and performance of DC generators and motors and Synchronous generators and motors . 4. To introduce with solar cell and wind turbine. 5. To develop the ability so that the students can solve the problems on electrical machines | | |

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| **VII. Course Outcome (COs):** | | | | | | | |
| **Sl. No.** | **COs**  (Upon successful completion of this course, students should be able to) | **Corresponding POs** | **Bloom’s taxonomy domain/level\*** | | | **Delivery Methods & activities** | **Assessment tools** |
| C | A | P |
| CO 233-1 | **Familiarized** with basic principle and constructional feature of DC generators and motors, Synchronous generators and motors, solar cell and wind turbine. | PO1 | 1, 2 |  |  | Lecture & Tutorial | Quiz |
| CO 233-2 | **Determine** the equivalent circuit, vector diagram, voltage regulation efficiency of DC generators and motors, Synchronous generators and motors and also speed regulation of motors. | PO2 | **5** |  |  | Lecture and Slide | Quiz & Assignment |
| CO 233-3 | **Develop** the voltage equation of DC and synchronous generator and torque equation of motor with detail analysis of different characteristics**.** | PO1PO3 | **4, 6** |  |  | Lecture & Slide | Quiz &  Assignment |
| CO 233-4 | **Solve** mathematical problems on various Electrical machines. | PO2 | **3** |  |  | Lecture &Slide | Team work & Presentation Slide |

\*C: Cognitive, P: Psychomotor; A: Affective

**VIII. Course Plan with Detail Description:**

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| **Session** | **Contents** | **COs** |
| **Week 1** | Introduction of the course  Marks distribution and other issues of the course  Discussion about the Faraday’s law and synchronous generator | 1 |
| **Week 2** | Construction, Excitation systems, Determination of equivalent circuit of synchronous Generator | 1,2 |
| **Week 3** | Vector diagrams at different loads, Voltage regulation, factors affecting voltage regulation, Development of EMF equation, | 1,2, 3,4 |
| **Week 4** | Synchronous impedance, synchronous impedance method of predicting voltage regulation and its limitations. | 1, 3, 4 |
| **Week 5** | Parallel operation of synchronous Generator: Necessary conditions, synchronizing, circulating current and vector diagram | 1,2 |
| **Week 6** | Synchronous motor: Operation, effect of loading under different excitation condition, | 1,2,3, 4 |
| **Week 7** | Effect of changing excitation, V-curves and starting of Synchronous motor | 1,2,3, 4 |
| **Week 8** | DC generator: working principle,Types, no-load voltage characteristics, build-up of a self excited shunt generator, | 1,2,3 |
| **Week 9** | Critical field resistance, load-voltage characteristic, effect of speed on no-load and load characteristics and voltage regulation of DC generator | 2,3, 4 |
| **Week 10** | DC motor: Torque, counter emf, speed, torque-speed characteristics, | 2, 3, 4 |
| **Week 11** | starting and speed regulation, | 1,2 |
| **Week 12** | Wind turbine: Construction, basic principle and characteristics | 1, 2, 3 |
| **Week 13** | Solar cell: Construction, basic principle and basic characteristics | 1, 2, 3 |
| **Week 14** | Final Term Examination |  |

**IX. Evaluation Policy:**

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| **Marks Distribution:** | |  |  | | --- | --- | | Attendance  Quiz  Assignment  Presentation  Mid-semester  Final Exam | 7%  15%  5%  8%  25  40% | | **Total** | **100%** | |
| **Grading System:** | As per DIU rule |

**X. Resources:**

A. Text Book:

**\***A Text Book of Electrical Technology (AC & DC Machine) - by B.L Theraja& A.K. Theraja, Vol. II, Edition: 2005.

B. Reference Book:

\* Electrical Machinery Fundamentals - by Stephen J. Chapman, 4th Edition.

**XI. Course Instructor(s):**

* Name: Dr. Mohammad Tawhidul Alam [Signature: ]

Designation: Assoc. Professor

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