

SAMPLE SYLLABUS

This syllabus is to be used as a guideline only. The information provided is a summary of topics to be covered in the class. Information contained in this document such as assignments, grading scales, due dates, office hours, required books and materials may be from a previous semester and are subject to change. Please refer to your instructor for the most recent version of the syllabus.

ABET Course Syllabus EEE360

1. **Course: EEE 360 Energy Systems and Power Electronics**
2. **Credits and Contact Hours:** 4 Credit Hours (lecture, lab), Topics: Engineering
3. **Course Coordinator:** Dr. Anamitra Pal, Assistant Professor
4. **Textbook:** G. Karady, K. Holbert, *Electric Energy Conversion and Transport using an Interactive ComputerBased Approach*, Second Edition, John Wiley and Sons Inc. ISBN 978-0-470-93699-3- 2013. Lecture notes posted on class webpage.
Supplemental materials: None
5. **Specific course information**
 - a. **Catalog description:** Three-phase circuits, renewable and conventional energy supply systems, synchronous generators, transformers, induction and DC machines, power electronics for motor speed control and rectification, per unit systems and power system representation.
 - b. **Prerequisites or co-requisites:** EEE202, EEE241
 - c. **Required/elective/selected elective:** Selected Elective, Required for majors and minors.
6. **Specific goals for the course**

Students will obtain basic knowledge and develop problem solving ability in electric energy conversion and utilization.

 - a. **Outcomes of instruction:**
 1. Students understand electric energy conversion, transport, and utilization.
 2. Students understand the operation of electric machines, such as motors and generators.
 3. Students can analyze electric machine performance.
 4. Students have knowledge of electronic control of electric machines
 - b. **Outcomes of Criterion 3 addressed by the course:**
 - (1) The energy system is a basic building block to the national infrastructure. Understanding the operation of this system is a basic part of electrical engineering knowledge.
 - (2,4) This course presents basic engineering knowledge by explaining the electric energy transport from the generator to the customers and the use of energy in motors.
 - (6) Lab experiments on core electrical engineering concepts.
7. **Brief list of topics to be covered**
 1. Introduction
 2. Electric power system description
 3. Electric generating stations
 4. Single-phase circuit
 5. Three-phase circuit
 6. Transformers
 7. Synchronous machines
 8. Induction machines
 9. DC machines
 10. Introduction to power electronics

Computer Usage: Use of MATLAB for solving homework problems is strongly recommended. The course starts with individual components of energy systems and explains how they are integrated in a

practical

power system. The role of computers for solving power flow problems is explained via slide presentations. Several homework problems require extensive survey of literature (web search).

Laboratory Experiments:

Students meet weekly for a three-hour laboratory under the guidance of a TA.

1. Single-phase power
2. Three-phase power
3. Transformers
4. Induction motors
5. Single-phase induction motors
6. Synchronous machines
7. Alternator synchronization
8. DC machines and special machines
9. Power electronics

An introductory lecture at the beginning of the semester explains the laboratory safety procedures.

Each laboratory experiment is introduced by a short lecture, outlining the objectives of the experiments. The students submit a written report evaluating the results of each experiment.

Course Contribution to Engineering:

Some of the examples and assignments require the solution of open-ended problems where the student has to consider alternative solutions. In addition, they must consider economic and reliability constraints.

Person preparing this description and date of preparation: Anamitra Pal, June 2021.