**PURDUE UNIVERSITY**

REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE

(10000-40000 LEVEL)

**DEPARTMENT:** Engineering

**EFFECTIVE SESSION:** Fall 2015

**INSTRUCTIONS:** Please check the items below which describe the purpose of this request.

- [ ] 1. New course with supporting documents
- [ ] 2. Add existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [ ] 6. Change in course credit type
- [ ] 7. Change in course attributes (department head signature only)
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

**PROPOSED:**

- Subject Abbreviation: ECE
- Course Number: 3XX
- Long Title: Energy Conversion Laboratory
- Short Title: Energy Lab

**EXISTING:**

- Subject Abbreviation
- Course Number
- Long Title
- Short Title

**TERMS OFFERED**

- Check All That Apply:
  - Summer
  - Fall
  - Spring

- CAMPUS(ES) INVOLVED:
  - Calumet
  - Cont Ed
  - Ft Wayne
  - Indianapolis
  - N. Central
  - Tech Statewide
  - W. Lafayette

**CREDIT TYPE**

1. Fixed Credit: Cr. Hrs.
   - [ ] Yes
   - [ ] No

2. Variable Credit Range: Minimum Cr. Hrs.
   - [ ] Or
   - [ ] To
   - [ ] [Check One]
   - [ ] Maximum Cr. Hrs.

3. Equivalent Credit: [ ] Yes

**Course Attributes:**

- Check All That Apply
  - 6 Registration Approval Type
  - 7 Variable Title
  - 8 Honors
  - 9 Full Time Prerequisite
  - 10 Off Campus Experience

**Schedule Type**

- Lecture
- Recitation
- Presentation
- Laboratory
- Lab Prep
- Studio
- Distance
- Clinic
- Experiential
- Research
- Ind Study
- Prac/Observ

- Minutes Per Mgr.
- Meetings Per Week
- Weeks Offered
- % of Credit Allocated

**Course Description (Include Requisites/Restrictions):**

Laboratory experiments in energy conversion including operation, testing, and applications of energy conversion machines including AC and DC motors and generators; experiments on magnetic circuits and transformers.

Co-requisites: ECE 32400 Introduction to Energy Systems

**Signature and Date:**

- Calumet Department Head
- Date
- Calumet School Dean
- Date
- Ft Wayne Department Head
- Date
- Ft Wayne School Dean
- Date
- Indianapolis Department Head
- Date
- Indianapolis School Dean
- Date
- North Central Department Head
- Date
- North Central Chancellor
- Date
- West Lafayette Department Head
- Date
- West Lafayette College/School Dean
- Date
- West Lafayette Registrar
- Date

**OFFICE OF THE REGISTRAR**
Course

ECE 3xx – Energy Conversion Laboratory

Type of Course

Required for EE programs

Catalog Description

Laboratory experiments in energy conversion including operation, testing, and applications of energy conversion machines including AC and DC motors and generators; experiments on magnetic circuits and transformers

Credits

1

Contact Hours

3

Co-requisite Courses

ECE 3xx00

Prerequisites by Topics

Basic understanding of AC and DC analysis of circuits, the design and analysis of basic electronic circuits, frequency response of circuits, power concept, and electromagnetism.

Textbook

Laboratory Experiment Notes

Course Objectives

This course will provide a basic understanding of magnetic circuits and their losses, single and three phase transformers, including voltage regulation and efficiency. Energy conversion principles, analysis and understanding of generators and motors will be discussed. Application of these concepts for DC and synchronous machines will be demonstrated. Their application to energy sustainability is also discussed. Several projects are included in which students design, simulate, build, test, and report on their findings.

Course Outcomes

Students who successfully complete this course will have demonstrated:

1. An ability to solve magnetic circuits, three phase and single phase circuits (a,e).
2. Understanding of operational principles of transformers. Be able to calculate voltage regulation, and efficiency (a,b,e)
3. Understanding of operational principles of synchronous machines. Be able to calculate speed regulation, and efficiency (a,b,e)
4. Understanding of operational principles of DC machines. Be
able to calculate voltage regulation, speed regulation and efficiency \((a, b, c)\)
5. An ability to use statistical methods and computer software to process experimental data \((a, k)\)
6. An ability to write formal technical report and perform oral presentation to convey engineering message efficiently \((g)\)

Laboratory Topics

1. Magnetic circuits and transformers: Transformer operations, connections, equivalent circuits, testing and practical use.
2. Alternating current machines-operation, testing and practical use.
3. Synchronous machines: Operation, excitation, equivalent circuits, testing and practical use.
4. Direct current machines: Operation, connections, equivalent circuits, control and applications.
5. Single-phase machines-special machines and applications
6. Three Phase power

Computer Usage
High

Laboratory Experience
High

Design Experience
High

Coordinator
Abdullah Eroglu, Ph.D.

Date
09/26/14