To: Dr. Jane Evans, Chair  
   Undergraduate Curriculum Committee

Through: Dr. Richard Schoephoerster, Dean  
         College of Engineering

Through: Dr. Patricia A. Nava, Associate Dean for Academic Affairs  
         College of Engineering

Through: Dr. Vivek Tandon, Chair  
         Curriculum Committee  
         College of Engineering

From: Dr. Miguel Vélez-Reyes, Chair,  
      Department of Electrical and Computer Engineering

Subject: Proposal to create EE 4384 Control Electric Power and EE 4387

DATE: September 25, 2014

The Department of Electrical & Computer Engineering request the approval of the proposal to create EE 4384 Control Electric Power and EE 4387 Power Electronics. These courses will contribute to the efforts of the department in strengthening its academic offerings in the Electric Power and Energy Systems. The proposed courses have already been taught as Special Topics.
The University of Texas at El Paso

Degree Proposal

Signature Page

Proposal Title: Creation of Upper Level courses in Electric Power and Energy Systems.

Department Chair: Dr. Miguel Velez-Reyes,
I have read the enclosed proposal and approve this proposal on behalf of the department.

Signature ____________________________ Date __________

College Curriculum Committee Chairperson: Dr. Vivek Tandon
I have read the enclosed documents and approve the proposal on behalf of the college curriculum committee.

Signature ____________________________ Date __________

College Dean: Dr. Richard Schoephoerster
I have read the enclosed documents and approve the proposal on behalf of the college. I certify that the necessary funds will be allocated by the college in support of this proposal.

Signature ____________________________ Date __________

Graduate Council/Undergraduate Curriculum Committee

Council Action: □ Approved □ Returned to the College

Date of Action Report: ________________________________

Signature, Chairman ____________________________
Course Add Form

Course Information

Subject Prefix and #  EE 4387  TCCN (If applicable)  

Title (29 characters or fewer):  Intro to Power Electronics

Dept. Administrative Code  
CIP Code  14.10  

Course Level (UG, GR, DR, or SP):  UG

Will this course be taught during a part of term in addition to a full 16-week term?  (Y/N):  N

If so, what term length will this course be taught in?  (e.g., 8 weeks)

How many times may the course be taken for credit?  (Please indicate 1-9 times):  1

Should the course be exempt from the “Three Repeat Rule?”  (Y/N):  N

Grading Mode:  X Standard  Pass/Fail  Audit

Description (600 characters maximum):

Introduction to the architecture and operating principles of electronic power converters. Modeling, simulation, and design of electronic power converters. Applications in areas such as power supplies, aerospace and vehicular power systems, and renewable energy will be discussed.

Contact Hours (per week):  3 Lecture Hours  Lab Hours  Other

Types of Instruction (Schedule Type):  (Underline all types of instruction which reflect how the course should be scheduled in Banner.):

A Lecture  H Thesis
B Laboratory  I Dissertation
C Practicum  K Lecture/Lab Combined
D Seminar  O Discussion or Review (Study Skills)
E Independent Study  P Specialized Instruction
F Private Lesson  Q Student Teaching

Equivalent Courses

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<th>Course Number</th>
<th>Concurrent Enrollment Permitted? (Y/N)</th>
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<tr>
<td>EE 3338</td>
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Corequisite Course(s):

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Restrictions

Indicate which of the following registration restrictions should be implemented:

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<th>Restriction</th>
<th>Yes/No</th>
<th>Test Name</th>
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<td>Departmental Approval</td>
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<tr>
<td>Classification</td>
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Rationale for Adding the Course

Briefly describe the rationale for adding this course.

Electric energy and power is an important technological area of great societal value. Power Electronics is a core area in Electric Power and Energy Systems. This course will provide training in this area that will prepare students for jobs in industry and perform research in the area.
Course Prefix and Number: EE 4387
Course Title: Introduction to Power Electronics
Credit Hours: 3

Prerequisite Courses:
EE 3385 with a min of C
EE 3338 with a min of C

Course Description:
Introduction to the architecture and operating principles of electronic power converters. Modeling, simulation, and design of electronic power converters. Applications in areas such as power supplies, aerospace and vehicular power systems, and renewable energy will be discussed.

Learning Outcomes:
1) Students will understand the architecture and operating principles of DC-DC, DC-AC, and AC-DC converters.
2) Students will be able to design a power converter given the specifications of the power application.
3) Students will be able to determine the current and voltage ratings of the semiconductor switches used in the converter.
4) Students will become familiar with and be able to utilize the power simulation software PSIM.

Required Materials:
2) Other documentation from class.

Course Policies:

Absence Policy:
Students are allowed to three absences regardless of the reason. After the fifth absence the students will be dropped from the class.

Punctuality:
Students will not be allowed to enter the class after the lecture has started. If a student wants to leave the class during the lecture, he/she will not be allowed to come back during the same lecture unless there is an emergency.
Poor Performance:
Students who repeatedly show poor performance during the course will be dropped from the class.

Course Drop Deadline:
The deadline to drop this course with an automatic W is stated on the UTEP academic calendar.

Cell Phone and Laptop Policy:
Cell phones and laptops (or similar devices i.e. PDAs, MP3 players, etc) are not permitted during the lecture. Students are required to turn off cell phones before entering the classroom. Cell phones should be placed out of sight (like in a purse or backpack). Students should NOT receive or make calls/text messages during class. Students using cell phones or other devices during class will be asked to leave.

Food and Drink Policy:
There is a No Food and Drink policy in the classroom except for water and coffee. Students who bring food and drinks in classroom will be asked to leave.

Behavior in Class:
Students are required to be quiet in the classroom during lectures. Students disturbing the class will be asked to leave.

Grading: Grading will be based upon a weighted average of quizzes and in class exams. Unannounced quizzes may be given at the beginning or during any class. No makeup will be given for missed quizzes. Exams are scheduled in advance and it is a requirement to take the exam at the scheduled date and time. Missed exams will only be allowed for students with medical reason that prevents their attendance (written notification from doctor required), military duties (notification to be provided in advance) and for other compassionate reasons. Business related activities, car problems, and over sleeping are not considered compassionate reasons. To avoid unforeseen problems, plan on arriving at the University extra early on exam days.

Assessment:
Quizzes: 20% of final mark
Midterm 1: 20% of final mark
Midterm 2: 20% of final mark
Final Comprehensive Examination: 40% of final mark
Students are required to take both midterms and the final exam in order to pass the class.

Letter grades will be assigned according to the following scale:
90 – 100 % A
80 – 89 % B
70 – 79 % C
60 – 69 % D
59 or below F

Academic Dishonesty:
“Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the *Handbook of Operating Procedures*, and available in the Office of the Dean of Students and the homepage of the Dean of Students at www.utep.edu, may result in sanctions ranging from disciplinary probation, to a failing grade in the work in question, to a failing grade in the course, to suspension or dismissal, among others.” (Quote from the Undergraduate and Graduate Catalog)

**Course Statements:**

**Accommodation under the ADA:**
If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

**Course Schedule:**

1. Introduction and Converter Classification (1 lectures)
2. Overview of Semiconductor Switches and Loss Calculation (2 lecture)
3. DC-DC Converters – Step Down Converter (5 lectures)

*First Midterm* *(after about a month from the beginning of the course)*

4. Step Up Converter (1 lectures)
5. Other DC-DC converter topologies and comparison (1 lecture)
6. One, Two, and Four Quadrant Choppers (2 lectures)
7. DC-AC Inverters – Single Phase Inverters (4 lectures)

*Second Midterm* *(after about two months from the beginning of the course)*

8. DC-AC Inverters – Three Phase Inverters (2 lectures)
9. AC-DC Converters – Uncontrolled Rectifiers (4 lectures)
10. AC-DC Converters – Controlled Rectifiers (3 lectures)
11. Design Issues of Power Converters (1 lectures)
Course Add Form

Course Information

Subject Prefix and #  EE 4384  TCCN (If applicable)  
Title (29 characters or fewer):  CONTROL OF ELECTRIC POWER  
Dept. Administrative Code  
CIP Code  
Course Level (UG, GR, DR, or SP):  UG  
Will this course be taught during a part of term in addition to a full 16-week term?  (Y/N):  N  
If so, what term length will this course be taught in?  (e.g., 8 weeks)  
How many times may the course be taken for credit? (Please indicate 1-9 times):  1  
Should the course be exempt from the “Three Repeat Rule?” (Y/N):  N  
Grading Mode:  X  Standard  Pass/Fail  Audit  
Description (600 characters maximum):  
Introduction to Flexible AC Transmission Systems (FACTS), High Voltage Direct Current (HVDC) power transmission systems, and electric drives and applications.  
Contact Hours (per week):  3  Lecture Hours  Lab Hours  Other  
Types of Instruction (Schedule Type): (Underline all types of instruction which reflect how the course should be scheduled in Banner.):  

Equivalent Courses

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**Rationale for Adding the Course**

Briefly describe the rationale for adding this course.

Electric energy and power is an important technological area of great societal value. Applications of power electronics in control of energy flows is a core area in Electric Power and Energy. This course will provide training in this area that will prepare students for jobs in industry and perform research in the area.
Course Prefix and Number: EE 4384
Course Title: Control of Electric Power
Credit Hours: 3

Prerequisite Courses:
EE3385 with a min C
EE4387 with a min C

Course Description: Introduction to Flexible AC Transmission Systems (FACTS), High Voltage Direct Current (HVDC) power transmission systems, and electric drives and applications.

Learning Outcomes:
1. Students will understand the concept of active and reactive power flow.
2. Students will understand the operating principle of shunt compensation and be able to design the components of a thyristor controlled reactor and of a thyristor switched capacitor.
3. Students will understand the operating principle of series compensation.
4. Students will understand the operating principle of phase shifters.
5. Students will understand the operating principle of a HVDC transmission system and be able to design its components.
6. Students will become familiar with DC and AC drives and their applications.

Required Materials:
3. Other materials distributed in class.

Course Policies:

Absence Policy:
Students are allowed to three absences regardless of the reason. After the fifth absence the students will be dropped from the class.
**Punctuality:**
Students will not be allowed to enter the class after the lecture has started. If a student wants to leave the class during the lecture, he/she will not be allowed to come back during the same lecture unless there is an emergency.

**Poor Performance:**
Students who repeatedly show poor performance during the course will be dropped from the class.

**Course Drop Deadline:**
The deadline to drop this course with an automatic W is December 4, 2014.

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Course Schedule:

1. Active and reactive power flow (2 lectures)
2. Shunt compensation (6 lectures)
   
   First Midterm (after about a month from the beginning of the course)
3. Series compensation (2 lectures)
4. Phase shifters (2 lectures)
5. HVDC Transmission (5 lectures)
   
   Second Midterm (after about two months from the beginning of the course)
6. Motion control (DC and AC drives) and applications (9 lectures)