EE 485 – Energy Systems and Conversion – Fall 2015

Course Location

Section 001	1 Memorial	M W F 11:00 – 11:50 AM

Instructor

Ken Dudeck	ked2@psu.edu	(570) 450-3085
Office Hours:	M,W,F 12PM, T 2PM	104 Laurel

Course Materials

Textbook:

Electric Energy – An Introduction, 3nd Ed.
El-Sharkawi, M.A., CRC Press, 2009
ISBN: 978-1420062199

(optional text) Energy and Problems of a Technical Society
Kraushaar, J. and Ristinen, R., Wiley, 1993
ISBN: 978-0471573104

Learning Objectives

At the end of the course, the student is expected to:

1. Describe primary sources of power (e.g. fossil fuels, solar power), conduct simple analyses of the availability of these sources, and the describe processes through which each allows production of electrical power.
2. Discuss environmental impacts of various power sources, including issues associated with obtaining fuel (e.g. mining/drilling), power plant impacts (e.g. hydro power and sediment), and atmospheric issues such as emissions and climate change.
3. Develop the equivalent circuit for real transformers and perform simple transformer analyses
4. Apply equivalent circuits to perform elementary analysis of electrical machines (synchronous and induction motors as well as synchronous and induction generators)
5. Describe the function and operation of simple power electronic devices including rectifiers and inverters, and explain the role they play in alternative energy

Course Policies

Attendance:

Attending class is a necessary part of student success in this and any course. Students are expected to attend each and every scheduled course meeting. **Attendance is therefore mandatory. If a student cannot make class, they must contact me at least 3 hours prior to class.** Unexcused absences will be penalized one letter grade for the final course grades as per the following schedule.

Total Absences	Reduction in Final Grade
3	1 letter grade
5	2 letter grade
6	3 letter grades
7	Fail course

Homework:

Homework will be assigned and collected regularly throughout the semester. The assignments will be graded on a selective basis. Late homework will graded with a penalty of 50% for each week late. Students may work collaborate on homework assignments, but each student's submission should represent their own work. Copying of others' homework assignments is unacceptable. For computer based homework, each student is expected to produce their own version of the assignment even if they work together.

Grading Breakdown:

Assignment	Weight
Homework	25%
Quizzes	25%
Exams (3)	50%

Grading Scale:

The following scale will be used to determine the equivalent letter grade. The grades will not be curved.
93-100 : A 90-92 : A- 87-89 : B+ 83-86 : B 80-82 : B- 75-79 : C+ 70-74 : C 60-69 : D <60 : F

Tentative Schedule

Wk	Monday Date	Topic	Reading	Assignments
1	8/24	Syllabus and Power Distribution History The Power Distribution System Today Energy Resources and Usage	Ch. 1 & 2 Ch. 1 & 2 Ch. 3	 HW1
2	8/31	Energy Storage Hydro Power & Plants Quiz #1	6.7-6.8 4.1	HW1 Due HW2
3	9/7	*Labor Day (No Class)* Fossil Power & Plants Wind Power Plants	 4.2 6.2	HW2
4	9/14	Diodes and Photodiodes Photovoltaic Cells and Panels Geothermal, Tidal , Nuclear Power	6.1	Begin HW2 Due (Student Presentations)
5	9/21	Binary Numbers and Logic Into. Programmable Logic Controllers Review		
6	9/28	Exam #1 PLC Bit Programming PLC Timers and Counters		
7	10/5	PLC Control Processes & Applications Power Electronics Rectifiers	 10.1 10.2.1	
8	10/12	Power Inverters Electro-magnetics Primer Quiz #2	10.2.3	HW3 Due
9	10/19	Review of Three Phase Power Transformer Review/Intro OPEN	Ch. 7-8 11.1-11.3	
10	10/26	Three Phase Transformers Transformer Equivalent Circuit Rotating Magnetic Field	11.4 11.5 12.1	HW4 Due
11	11/2	Induction Motor Circuit & Power Induction Motor Torque & Speed Starting Torque & Linear Induction	12.2 12.2 12.2-12.3	
12	11/9	Induction Generator Review Exam #2	12.4	HW5 Due
13	11/16	Synchronous Generator Synchronous Generator 2 Synchronous Motor	12.5 12.5 12.6	 HW6 Due
	11/23	*Thanksgiving Break*		
14	11/30	DC Motors Stepper Motor Single Phase Motors	12.7 12.8 12.9	HW7 Due
15	12/7	OPEN Review Exam/Quiz #3		 HW 8 Due
F	12/14	Finals Week		

Campus Policies

Academic Integrity:

All students are expected to act with civility, personal integrity; respect other students' dignity, rights and property; and help create and maintain an environment in which all can succeed through the fruits of their own efforts. An environment of academic integrity is requisite to respect for self and others and a civil community.

Academic integrity includes a commitment to not engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty include cheating or copying, plagiarizing, submitting another persons' work as one's own, using Internet sources without citation, fabricating field data or citations, "ghosting" (taking or having another student take an exam), stealing examinations, tampering with the academic work of another student, facilitating other students' acts of academic dishonesty, etc.

Students charged with a breach of academic integrity will receive due process and, if the charge is found valid, academic sanctions may range, depending on the severity of the offense, from F for the assignment to F for the course.

Disability Statement:

Penn State is committed to providing access to a quality education for all students, including those with documented disabilities. If a student has a disability and wishes an accommodation for a course, it is the student's responsibility to obtain a University letter confirming the disability and suggesting appropriate accommodation. This letter can be requested from the campus Disability Contact Liaison, Jackie Walters, located in the Butler Teaching and Learning Resource Center (570-450-3005).

Faculty Senate's approved STRE Statement:

The SRTE, or the Student Rating of Teaching Effectiveness, is an important student-educator tool students can use to provide feedback regarding their instructor's performance and course content. In addition, it is used by faculty and administrators to improve and evaluate the quality of instruction. The SRTEs are completely voluntary and anonymous and are made available for students to take towards the end of the semester. Although voluntary, the faculty of Penn State Hazleton strongly recommend students complete the SRTEs in order to enhance the academic experience on campus.