ELECTRICAL, COMPUTER, AND SYSTEMS ENGINEERING DEPARTMENT

ABET COURSE SYLLABUS

EPOW-4850: Electric Power Engineering Design

Course Catalog Description: A structured and integrated design experience in which a plurality of analytical tools is invoked to meet a design specification for a selected item of hardware. This will involve electrical, thermal, mechanical, environmental and economic considerations, as appropriate, and may require laboratory and/or computer work in the design or evaluation. This is a writing-intensive course. May only be taken in the senior year.

Pre-Requisite Courses: EPOW-4010, EPOW-4020 or permission of instructor

Co-Requisite Courses: None

Prerequisites by Topic:

1. Power engineering fundamentals
2. Electromagnetic fields
3. Circuit and systems analysis
4. Basic mechanical and thermal analysis
5. Elements of materials science
6. Computer methods
7. Basic economics

Might be typical, but clearly depends on selected topic

Textbook: (and/or other required material) None usually prescribed, unless the chosen topic lends itself to a particular text

References: A reading list tailored to the chosen topic is usually provided. Relevant notes, papers, and presentations provided on WebCT/MDL Forum platform

Course Coordinator: J. Keith Nelson

Overall Educational Objective: This capstone design course is designed to bring together many of the topics taught in other courses in an application orientated design experience. In recent years, the course has been sometimes made multi-disciplinary by optimally including students of other disciplines.

Course Learning Outcomes:

1. Understand synthesis and innovation in the engineering design context.
2. Apply analytical skills in support of the design process
3. Learn to operate as a team player in group environment
4. Learn the practical nature of engineering design
5. Improve written and oral communication skills

How Course Outcomes are Assessed:

Conceptual design report	30%
Final design report	40%
Oral presentations	10%
Progress memoranda	20%

Relation to EE/CSE/EPE Outcomes

N = none
M = moderate
H = high

Outcome	Level	Demonstrate Proficiency
	N, M, H	e.g. Exams, projects, HW
Mathematics, science and engineering	M	In reports
Basic disciplines in Electrical Engineering	M	In memoranda
Depth in Electrical Engineering	H	In reports
Basic disciplines in Computer & Sys. Eng.	N	
Depth in Computer and Systems Eng.	N	
Electromagnetics, electromechanics, power semiconductors		Depends on the choice of design project
Power system behavior		

Electrical energy conversion		
Conduct experiments and interpret data	M	In class
Identify, formulate and solve problems	H	In teams
Design a system, component or process	H	In teams and reports
Communicate in written and oral form	H	In class
Function as part of a multi-disciplinary team	H	In and out of class
Preparation for life-long learning	N	
Ethical issues; safety, health, public welfare	M	In conduct
Humanities and social sciences	N	
Laboratory equipment and software tools	M	In class
Variety of instruction formats	M	Lecture/Workshop/ Lab.

Topics Covered:
(number of hours or classes for each)

1. Varies widely depending on the nature of the design assignment
2. The design assignment is usually chosen so as to involve several disciplines in addition to Electric Power.
3. The chosen problem will usually involve a "mainstream" Electric Power item such as power electronics, system design, or electromagnetic fields
4. Other candidate areas might also involve, mechanical, thermal, and environmental aspects
5. Non engineering topics, such as economics, safety, intellectual property, human factors, etc. will also often be interwoven

Computer Usage:

Varies dependent on project needs. However MatLab analysis, Finite Element Analysis, and Electromagnetic Transients Program (EMTP) usage would be typical.

Laboratory Experiences:

1. Students are often required to undertake a laboratory investigation to gather design data or test proof of concept
2. There is usually an experimental/constructional requirement built into the design specifications

Design Experiences:

1. The whole course in predicated on providing a design experience

Independent Learning Experiences:

1. None

Class/Lab Schedule:

MR: 10 – 11.50

Contribution to the Professional Component:

(a) College-level mathematics and basic sciences:	0 credit hours
(b) Engineering Topics (Science and/or Design):	3 credit hours
(c) General Education:	0 credit hours

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