ECE 7843 (Proposed): Advanced Topics in Power Systems

Course Description

Advanced topics of power system protection, beginning with equipment protection and evolving into system wide protection design and operation to accommodate smart-grid technologies.

Prior Course Number: 741
Transcript Abbreviation: Adv Top Pwr Sys
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Graduate
Student Ranks: Masters, Doctoral
Course Offerings: Spring
Flex Scheduled Course: Never
Course Frequency: Even Years
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec
Expected out-of-class hours per week: 6.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq: 5042 or 740.
Exclusions: Not open to students with credit for 741.
Cross-Listings:

Course Rationale: Existing course.

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.1001
Subsidy Level: Doctoral Course

Course Goals

Introduce electric power system protection concepts
Elaborate on specific protection criteria for individual components, i.e., for generators, for transformer, for lines, etc.
Present system-wide protection principles as applied to central station systems
Present protective schemes unique for smart-grid topologies from a system perspective
Present protective schemes unique for smart-grid topologies from a grid component perspective

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Review energy supply system structure and operation: current and smart-grid implementation and appropriate protection strategies	6.0							

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Protection concepts unique to various system components: generators, transformers, transmission lines, etc.	10.0							
System-wide protection philosophies/principles for various modes of system operation, e.g., with and without islanding	10.0							
Adaptive relaying applied to modern grid operation	10.0							
Presentation and review of multi-week projects.	6.0							

Representative Assignments

Review of current literature on various topics related to course content; present a summary to class.
Multi-week projects related to various aspects of component and system protective systems analysis and design.
Multi-week projects related to smart-grid and renewable energy systems protection strategies.

Grades

Aspect	Percent
Mid semester exam	25%
Final exam	25%
Homework	15%
Multi-week projects	35%

Representative Textbooks and Other Course Materials

Title	Author
current publications and industry standards in technical jounals such as IEEE	

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
**	a	An ability to apply knowledge of mathematics, science, and engineering.
*	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
*	g	An ability to communicate effectively.
*	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
*	i	A recognition of the need for, and an ability to engage in life-long learning.
**	j	A knowledge of contemporary issues.
**	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

Updated abbreviation, prereqs, exclusions, goals and topics to conform to university format 3/29/12

Corrected prereq to 5042, not 5020 June 12, 2015

Updated text info, 5/10/17, CED

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