

ECE 5047: High Voltage Engineering and Laboratory

Course Description

Dielectric strength and breakdown of gases, liquids, and solids, electric field design problems in power system equipment; laboratory study of high voltage insulation.

Prior Course Number: 747

Transcript Abbreviation: High Voltage Lab

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Undergrad, Graduate

Student Ranks: Junior, Senior, Masters, Doctoral

Course Offerings: Spring

Flex Scheduled Course: Never

Course Frequency: Every Year

Course Length: 14 Week

Credits: 3.0

Repeatable: No

Time Distribution: 2.0 hr Lec, 2.0 hr Lab

Expected out-of-class hours per week: 5.0

Graded Component: Lecture

Credit by Examination: No

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus

Prerequisites and Co-requisites: Prereq: 3040 (341), and enrollment in ECE major, or Grad standing in Engineering, Biological Sciences, or Math and Physical Sciences.

Exclusions: Not open to students with credit for 747.

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

Programs

Abbreviation	Description
CpE	Computer Engineering
EE	Electrical Engineering

Course Goals

Apply the knowledge of mathematics and engineering, especially in the areas of high voltage engineering, electromagnetics, and power engineering
Be able to design and conduct high voltage experiments through their experience in the High Voltage Laboratory
Be able to interpret data by the use of statistics
Be able to design a system, component or process, and apply simultaneously high voltage criteria

Work and write reports together as team members
Develop an ability to recognize, formulate and solve high voltage engineering problems
Understand professional responsibility through meticulous safety procedures
Communicate more efficiently, since weekly lab reports are required; and will practice report writing, programming, plotting and editing skills necessary for engineering practice
Use modern simulation and programming tools to solve problems related to contemporary engineering issues, such as high voltage transmission line design for wind power

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to high voltage engineering	3.0							
High voltage generation/measurements	3.0		3.0					
Electric and magnetic fields	3.0		3.0					
Breakdown in gases	3.0		3.0					
Breakdown in liquids	3.0		3.0					
Breakdown in solids	3.0		3.0					
Insulators, artificial aging	3.0		3.0					
Corona discharges	3.0		3.0					
Partial discharges	3.0		3.0					
Surge generators	3.0		3.0					

Representative Assignments

Lab report
Homework

Grades

Aspect	Percent
Lab reports and homework	35%
Quizzes	20%
Exams	45%

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.

Course Contribution		College Outcome
**	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 prereqs and exclusion to match university format.

Change grading weights 1/9/ 2017 BLA

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