



Department of Electrical and Computer Engineering

ECE 6609 PD High Voltage Engineering Applications

Spring Term 2023

Course Outline

TEACHING TEAM:

Instructor			
Name	Office	E-mail	
Ayman El-Hag	██████████/Online	ahalhaj@uwaterloo.ca	
Teaching Assistants			
Name	Duty	Office	E-mail
TBD			

SCHEDULE

Type	Days				
	Mon.	Tues.	Wed.	Thurs.	Fri.
Lectures (TBD)					

COURSE CONTENTS:

Week	Lecture Topics
1	Introduction to high voltage engineering
2	High voltage generation
3	High voltage measurement
4	Destructive testing of power system assets: (routine, type and special tests)
5	Non-destructive testing of power system assets
6	Partial discharge measurement
7	Field testing of power system assets – transformers
8	Field testing of power system assets – Outdoor insulation system and underground cables
9	Introduction to application of machine learning in power system asset assessment
10	Electric field control
11	New trends in insulation design and monitoring
12	High voltage application in pollution control and biotechnology

REFERENCES:

- Class notes (will be posted weekly on LEARN).
- High Voltage Engineering- Fundamentals, 2nd Edition, E. Kuffel, W. S. Zaengl, and Kuffel, J. Oxford; Boston: Newnes, 2000.
- Selected review papers from the field of high voltage application

MARKING SCHEME:

Item	Weight
Term paper	25%
Simulation assignment	25%
Final Exam	50%
Total	100%

TERM PAPER:

Students will write a term paper related to the field inspection of power system assets. Details about the term paper topics will be provided in the first week of the course.

SIMULATION ASSIGNMENT:

Students will use a free machine learning software “WEKA” to classify certain defects in outdoor insulators and transformers. Details about the simulation assignment will be provided in the 9th week. **PRIOR KNOWLEDGE ABOUT MACHINE LEARNING IS NOT NEEDED TO DO THE ASSIGNMENT.** The user-friendly software “WEKA” will be used to do the assignment.

STUDENT RESPONSIBILITY:

Students are expected to know what constitutes academic integrity to avoid committing academic offences and to take responsibility for their actions. Students who are unsure whether an action constitutes an offence, or who need help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, TA, academic advisor, or the Undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy #71, [Student Academic Discipline](#). Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy#70, [Student Grievance](#).

STUDENT ACCOMMODATION:

Note for students with disabilities: AccessAbility Office ([AAO](#)), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AAO at the beginning of each academic term.

RESOURCES:

- Course web-site in UW-LEARN: <https://learn.uwaterloo.ca>
- Academic info (plagiarism): www.eng.uwaterloo.ca/~ugoffice/course_responsibilities.html

IMPORTANT DATES:

- Last day of lectures.