Course Number:	EE 579 A / EEP 592 A
Course Name:	Electromagnetic Compatibility
Credits:	4
Class times:	W 6:00 – 9:00 pm
Location:	ECE 045
Class format:	Mostly in person, sometimes remote. Check announcements regularly. If you cannot make it at times, you can connect to Zoom or see recording on Canvas.

Instructor Name: Prof. *Mohammad S. Sharawi,* Ph.D., P.E.
Email: msharawi@uw.edu

Text Book: Not required.

References:
1. *Introduction to Electromagnetic Compatibility* by C. R. Paul, R. C. Scully and M. A. Steffka, 3rd edition, Wiley 2023
2. *Electromagnetic Compatibility Engineering*, by H. W. Ott, Wiley, 2009.
3. Selected readings from IEEE journals and other websites.

Course Description: Introduction to EMC and regulations. Non-ideal models of circuit components. Signals and their spectra. Conducted and radiated emissions and immunity. EMC tests and instrumentation. Analysis of shielding and grounding solutions. Introduction to signal integrity and EMC issues in transmission lines. Applications in Automotive and Aerospace.

Prerequisites: Electrical Circuits, and Electromagnetics

Course Objectives:

- Demonstrate knowledge of US and foreign EMC standards
- Use time and frequency representations of signals to analyze systems
- Describe the effects of parameters of electronic components at high frequency.
- Design a system considering factors that contribute to conducted emissions, radiated emission, and crosstalk
- Identify and analyze sources of radiated and conducted emissions

Grading policy:	HW assignments (done individually)	50%
	Mid-Term	20%
	Final Project	30%

Course material (on Canvas):

- Power point slides, HW assignments and solutions will be shared
- Reference papers, reference books
- We will use the circuit simulator LTSPICE, you can get a FREE copy from:

https://www.analog.com/en/resources/design-tools-and-calculators/ltspice-simulator.html

Tentative schedule:

Lecture		Dates	Topic			
1			Introduction / common units			ch.1 Paul
			EMC requirements and regulations I			ch. 2 Paul
			EMC requirements and regulations II			ch. 1 Ott
2			Time - Frequency Analysis I			ch.3 Paul
			Time - Frequency Analysis II			ch.3 Paul
3			Transmission Lines & Signal Integrity I			ch.4 Paul
			Transmission Lines & Signal Integrity II			ch.4 Paul
4			Non-ideal components			ch.5 Paul
			Noise Analysis			ch.8 Ott
5			Cabling			ch.2 Ott
			Grounding			ch.3 Ott
			MID TERM EXAM			
6			Balancing and Filtering			ch.4 Ott
			Shielding			ch.6 Ott
7			Conducted Emissions and Susceptibility I			ch.6 Paul
			Conducted Emissions and Susceptibility II			ch.6 Paul
8			Radiated Emissions and Susceptibility I			ch.8 Paul
			Radiated Emissions and Susceptibility II			ch.8 Paul
10			Applications: EMC in PCB design, Automotive, Aerospace			ch.16 Ott
11			**FINAL Presentations**			

Academic misconduct

Engineering is a profession demanding a high level of personal honesty, integrity, and responsibility. Therefore, it is essential that engineering students, in fulfillment of their academic requirements and in preparation to enter the engineering profession, shall adhere to the University of Washington's Student Code of Conduct (Links to an external site.). Any student in this course suspected of academic misconduct (e.g., cheating, plagiarism, or falsification) will be reported to the College of Engineering Dean's Office and the University's Office of Community Standards and Student conduct. (See CoE website (Links to an external site.) for a more detailed explanation of the academic misconduct adjudication process). Any student found to have committed academic

misconduct will receive a 0-grade on impacted academic work (e.g., assignments, projects, or exams).

Diversity, Equity, and Inclusion

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, abilities – and other visible and non-visible differences. All members of this class, including instructors, are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class.

Religious accommodations

Effective July 28, 2019, Washington State Senate Bill 5166 required that UW develop a policy for the accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. I am proud that my UW ECE colleague Rania Hussein. contributed to drafting and promoting this legislation. The UW's policy, including more information about how to request an accommodation, is available at Faculty Syllabus Guidelines and Resources. Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form available at: https://registrar.washington.edu/students/religious-accommodations-request/