Applied Electromagnetic (10510MS 406100), 2016F

Class Time: MnF4Fn

Class Room: B02, Bldg. Delta,

Instructor: Ta-Jen Yen (嚴大任)
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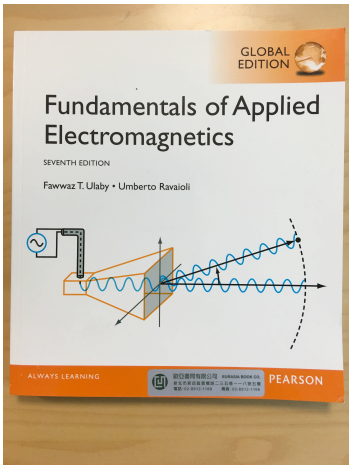
Textbooks: Fundamentals of Applied Electromagnetics (7th edition), *Fawwaz T. Ulaby & Umberto Ravaioli*, 歐亞書局



Grading: Homeworks (25%)
Midterms (x2, 50%)
Final (25%)

TAs: TBA

TA Hours: B02, Bldg. Delta,7 pm, Wednesdays

Content:

The subject of ***Applied Electromagnetics*** plays a fundamental role in science, technology, and society. The rich content of this subject covers various aspects, and is usually delivered within two semesters, not one semester as we plan to do. Herein, we manage to introduce the most demanded thrusts within one semester, starting from transmission lines. Next, we move to electrostatics and magnetostatics, then advance to dynamic cases, and finally lead to Maxwell equations, the cornerstone of Electromagnetics. The following parts are plane-wave propagation, polarization, wave reflection/transmission, and some novel progress in modern electromagnetics. In addition to the propagation waves, we will also show you the guided and confined waves, and their counterpart of transmission lines (in the very beginning). The last part of this course deals with principles of radiation by currents in wires, which then enable practical devices of antennas. Notice that all lectures and tests are given by English. With these well-organized thrusts aforementioned, I hope you enjoy the journey of ***Applied Electromagnetics*** through this semester.

Class Schedule of Applied Electromagnetics (2016F)

Week	Date	Chapters	Content
1	9/12	**Syllabus**	Syllabus
	9/16		Holliday
2	9/19	**Transmission Lines**	lumped-element model, transmission line equations
	9/23		wave propagation on a TL, lossless TL
3	9/26		power flow on a lossless TL
	9/30		Smith chart, impedance matching
4	10/3	**Electrostatics**	quick review of vector analysis
	10/7		charge and current distributions, Coulomb's law, Gauss's law
5	10/10		Electric scalar potentials, conductors, dielectrics
	10/14		electric boundary conditions (BCs)
6	10/17		electrostatic potential energy
	10/21	**Midterm #1**	
7	10/24	**Magnetostatics**	magnetic force
	10/28		Biot-Savart law, Maxwell's magnetostatic equations (Gauss's & Ampere's laws)
8	10/31		vector magnetic potential, magnetic BCs
	11/4		inductance, magnetic energy
9	11/7	**Maxwell's equations for time-varying fields**	Faraday's law, transformer & generator
	11/11		dispalcement current, BCs for electromagnetics, charge-current continuty
10	11/14		electromagnetic potentials
	11/18	**Plane-Wave Propagation (1/2)**	time harmonic fields, complex permittivity and Drude-Lorentz model, wave equations
11	11/21		TA hour
	11/25	**Midterm #2**	
12	11/28	**Plane-Wave Propagation (2/2)**	Mie theory
	12/2		wave propagation in lossless and lossy media, electromagnetic power density
13	12/5		wave polarizations
	12/9		Mueller's matrix
14	12/12	**Wave Refelction and Transmissin**	Snell's law (also Fermat's principle), Fiber optics
	12/16		Fresnel equations
15	12/19		transfer matrix
	12/23	**Novel Phenomena**	surface plasmon polaritons (SPPs)
16	12/26		negative refractive index media (NRIM)
	12/30	**Guided and Confined Waves**	conducting tubes
17	1/2		Holliday
	1/6	**Radiation and Antennas**	the short dipole
18	1/9		antenna radiation charcteristics
	1/13	**Final**	

This schedule is subject to being adjusted upon actual intruction progess and students' feedback.