GENERAL COURSE INFORMATION:

ADVANCED ELECTROMAGNETIC THEORY Part a

Spring semester of 2020

EE 570a – Lec 30788R Dis 30958R

Welcome to ADVANCED ELECTROMAGNETIC THEORY, Part a, the first part of an advanced course on applied electromagnetics. This course has 30 lectures, 15 discussion sessions, 13 homeworks, 1 midterm exam, and one final exam. Below are relevant information concerning this course; feel free to clarify any additional points that you may have directly with the instructor.

Prerequisite: EE 470 or equivalent;

Credit: 4 units;

Instructor: Prof. Aluizio Prata, Jr. [office: PHE 618;
tel: (213) 740-4704; email: prata@usc.edu];

Teaching Assistant: Kazem Bakian-Dogaheh [office: DRB 226;
tel: (323) 749-1994; email: bakiando@usc.edu];

Text: Class notes and (loosely followed) Constantine Balanis, *Advanced Engineering Electromagnetics*, second edition (ISBN 978-0-470-58948-9);

Lectures: Tuesday and Thursday 09:00 – 10:50 in THH 215;
Discussion: Tuesday 14:00 – 15:50 in VKC 207;

Instructor Office Hours: Tuesday and Thursday, 11:00 to 11:45
Tuesday, 16:00 to 17:15, and by appointment;

TA Office Hours: Friday, 16:00 to 18:00, and by appointment.

Material covered and homework schedule:

Week #	HWK # and due date	Material Covered
1		Vector algebra Electric charges and currents. Maxwell's Equations.
2		Maxwell's Equations (cont.). Magnetic charges and currents. Polarization charges and currents.
3	HWK 01, Jan, 30, Thursday	Magnetization charges and currents. Constitutive parameters. Linearity conditions.
4	HWK 02, Feb. 06, Thursday	Impressed, induced, and displacement charges and currents. Duality principle. Boundary conditions.
5	HWK 03, Feb. 13, Thursday	Power and energy in an electromagnetic field. Time-harmonic Maxwell's equations. Complex vectors.
6	HWK 04, Feb. 20, Thursday	Polarization of time-harmonic fields.
7	HWK 05, Feb. 27, Thursday	Complex Poynting theorem. Complex constitutive parameters. Charge relaxation.
8	HWK 06, Mar. 05, Thursday	Wave equation and its solution in Cartesian coordinates.
9	HWK 07, Mar. 12, Thursday	Wave equation and its solution in cylindrical coordinates. Bessel functions.
10	HWK 08, Mar. 26, Thursday	Generalized plane waves. Energy propagation velocity.

		Polarization of plane waves. Orthogonality of complex vectors.
11	HWK 09, Apr. 02, Thursday	Refection and transmission of plane waves.
12	HWK 10, Apr. 09, Thursday	Refection and transmission of plane waves (cont.).
13	HWK 11, Apr. 16, Thursday	Solving Maxwell's equations using potentials.
14	HWK 12, Apr. 23, Thursday	Solving Maxwell's equations in Cartesian and cylindrical coordinates.
15	HWK 13, Apr. 30, Thursday	Solving Maxwell's equations in spherical coordinates. Associated Legendre functionss. Radiation.

The homework is due *at the very beginning* of the corresponding lecture, on the due date. No late homeworks are accepted.

Exam schedule:

Exam	**Date**	**Time**	**Location**	**Material Covered**
Midterm	Tue., Mar. 31	14:00–15:50	VKC 207	Assignments 1–8
Final	Tue., May 12	08:00–10:00	THH 215	All course material

All exams are of the closed-book type. The only books allowed during the exams are mathematics books, and your own class notes and homework solutions. You may also use a calculator. You are responsible for all material covered in class, on the assigned readings, and on the homework problems.

You must take the exams at the scheduled times. If you are absent during an exam, you will receive a zero grade unless you have a valid reason for your absence, *and* you have discussed it with Prof. Prata *prior* to the exam. Bring your USC ID card to each exam; it may be checked during the exam.

For information on policies regarding academic conduct and assistance for students with disabilities please consult the web site http:/ee.usc.edu/sacss .

Grading Policy: The final grade of the course is computed using an weighted average of the midterm exam (with 35% weight), the final exam (with 45% weight), and of the thirteen homeworks (their average weighted by 20%).