

COLORADO STATE UNIVERSITY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
ECE 642 – *Time Harmonic Electromagnetics*, Fall 2013
COURSE SYLLABUS

(1) Course Details:

Instructor: BRANISLAV M. NOTAROS, Professor, Eng C101C, Phone: (970) 491-3537

E-mail: notaros@colostate.edu, Web: www.engr.colostate.edu/~notaros

Class Meetings: Tuesday, Thursday 3:30pm-4:45pm, Engineering B 103

Office Hours: Tuesday 11:00am-12:00noon and 2:00pm-3:00pm,
Thursday 11:00am-12:00noon and 2:00pm-3:00pm, or by appointment

Textbook: - Jianming Jin, Theory and Computation of Electromagnetic Fields, Wiley, Dec. 2010
- Lecture notes provided by the instructor.

Reference Texts:

- *Advanced Engineering Electromagnetics*, C. A. Balanis, John Wiley & Sons, Inc., New York.
- *Time-harmonic electromagnetic fields*, R. F. Harrington, New York, Wiley, 2001.
- *Classical Electrodynamics*, John David Jackson, Third Edition, John Wiley & Sons, 1998.
- *Numerical Techniques in Electromagnetics with MATLAB*, Matthew N.O. Sadiku, Third Ed., CRC Press
- *Computational Methods for Electromagnetics*, A. F. Peterson, S. L. Ray, and R. Mittra, IEEE Press.
- *Numerical Methods for Engineering: An Introduction Using MATLAB and Computational Electromagnetics Examples*, Karl F. Warnick, SciTech Publishing, 2010

Grader: Elene Chobanyan, Electromagnetics Lab (Eng B110), elene.chobanyan@gmail.com, (970) 491-2967.

Elene's office hour: Mondays from 10 – 11 am, in Electromagnetics Lab, Eng B110.

(2) Course Description:

Course description:

Advanced time-harmonic electromagnetics concepts, with in-depth studies of electromagnetic waves, radiation, guidance, and scattering.

Maxwell's equations, radiation, boundary value problem, dyadic Green's functions, scattering theory. The course includes about ten projects in advanced electromagnetics using different analytical and computational (numerical) techniques in different real-world applications.

(3) Organization of Course Topics:

	<i>No.of Weeks (tentative)</i>
1. Static and low-frequency electromagnetic fields	2
2. Multi-conductor transmission lines	3
3. Electromagnetic radiation	2
4. Electromagnetic scattering	2

5. Metallic waveguides	1
6. Dielectric waveguides	1
7. Electromagnetic resonators	1
8. Wave propagation in complex media	2
9. Inverse scattering	1
10. Analytical and numerical techniques for time-harmonic electromagnetics	in all weeks

(4) Evaluation of Students and Grading Policy:

- Homework and projects (50%)
- Midterm Exam (20%)
- Final Exam (30%)

Grades will be assigned from A+ through F, including plus and minus categories (no C-, D+, and D-), according to the following grading rubric:

$97 \leq x \leq 100$ A+; $93 \leq x < 97$ A; $90 \leq x < 93$ A-; $87 \leq x < 90$ B+; $83 \leq x < 87$ B; $80 \leq x < 83$ B-; $77 \leq x < 80$ C+; $70 \leq x < 77$ C; $60 \leq x < 70$ D; $x < 60$ F;

(5) Academic Integrity Policy:

- This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog (<http://www.catalog.colostate.edu/FrontPDF/1.6POLICIES1112f.pdf>) and the Student Conduct Code (<http://www.conflictresolution.colostate.edu/conduct-code>). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.

(6) Course Objectives/Outcomes:

- The course will provide students with advanced electromagnetics concepts and in-depth understanding of electromagnetic waves, radiation, and scattering.
- Students will develop analytical skills in applied electromagnetics and ability to combine mathematical tools and physical understanding to effectively solve complex electromagnetic wave problems.
- The course will expose students to examples of real-world applications of advanced electromagnetic theory, covering propagation, guidance, radiation, and scattering of electromagnetic waves.
- Students will develop basic understanding of numerical techniques for time-harmonic electromagnetic field and wave computation and basic skills in computational electromagnetic methods and tools.
- The course will enable students to identify interesting and important research topics for Master's and Ph.D. work.