COLORADO STATE UNIVERSITY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ECE 641 – *Electromagnetics*, Fall 2014

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 11:00am–12:15pm, Engineering E 202

Office Hours: Tuesday 12:30pm–1:30pm, Thursday 12:30pm–1:30pm, or by appointment

Textbook: - Electromagnetic Fields and Energy, Hermann A. Haus and James R. Melcher, online version, MIT OpenCourseWare, 1998, Courtesy of Massachusetts Institute of Technology.

- Jianming Jin, Theory and Computation of Electromagnetic Fields, Wiley, Dec. 2010

- Lecture notes provided by the instructor.

Reference Texts:

- *Classical Electrodynamics,* John David Jackson, Third Edition, John Wiley & Sons, 1998.
- *Fields and Waves in Communication Electronics*, S. Ramo, J. R. Whinnery, and T. Van Duzer, Third Edition, John Wiley & Sons, 1994.
- *Electromagnetic Fields*, J. Van Bladel, Second Edition, IEEE Press, 2007.
- *Time-harmonic electromagnetic fields*, R. F. Harrington, New York, Wiley, 2001.
- *Advanced Engineering Electromagnetics*, C. A. Balanis, John Wiley & Sons, Inc., New York.

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:

Advanced analysis of static and time-varying electromagnetic fields and applications. Topics include electrostatic fields, magnetostatic fields, and low- and high-frequency electromagnetic fields, and selected applications. Electromagnetic properties of matter are studied, leading to the analysis and design of various electromagnetic devices and systems, including new electromagnetic materials. Analytical techniques for solving boundary-value problems, electromagnetic potentials, and electromagnetic-field theorems are discussed. Techniques for analysis of electromagnetic fields in rectangular, cylindrical, and spherical coordinates are studied.

(3) Organization of Course Topics:

		No.of Weeks (tentative)
1.	Electromagnetic fundamentals	1
2.	Electromagnetic potentials	2
3.	Electromagnetic theorems	1
4.	Electrostatic fields and applications	1
5.	Magnetostatic fields and applications	1
6.	Quasistatic electromagnetic fields and applications	1
7.	Boundary-value problems and analytical techniques	2
8.	Electromagnetic fields in rectangular coordinates	2
9.	Electromagnetic fields in cylindrical coordinates	2
10.	Electromagnetic fields in spherical coordinates	2

(4) Evaluation of Students and Grading Policy:

- Homework and projects (40%)
- Midterm Exam (30%)
- 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:
$97 \le x \le 100$ A+; $93 \le x < 97$ A; $90 \le x < 93$ A-; $87 \le x < 90$ B+; $83 \le x < 87$ B; $80 \le x < 83$ B-; $77 \le x < 80$ C+; $70 \le x < 77$ C; $60 \le x < 70$ 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 static and time-varying electromagnetic fields.
- Students will develop analytical skills in applied electromagnetics and ability to combine mathematical tools and physical understanding to effectively solve complex electromagnetic field problems.
- The course will expose students to examples of real-world applications of advanced electromagnetic theory, covering electrostatic fields, magnetostatic fields, electromagnetic induction, and low- and high-frequency electromagnetic fields.
- Students will be able to analyze realistic electromagnetic-field systems utilizing analytical techniques for boundary-value problems, electromagnetic potentials, and electromagnetic-field theorems.
- Students will develop in-depth understanding and appreciation of limitations of circuit theory as an approximation of field theory.
- The course will enable students to identify interesting and important research topics for Master's and Ph.D. work.