

UNIVERSITY OF MASSACHUSETTS LOWELL

Electromagnetics I (EECE.3600)

Fall, 2018

Instructor: Prof. Xuejun Lu

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Course Website: <http://faculty.uml.edu/xlu/16.360/index.htm>

Office Hours: MWF 11:00 am -12:00 pm

Text: *Fundamentals of Applied Applied Electromagnetics* by F. T. Ulaby, 7th Edition,

Course contents:

- Review waves and phasors.
- Transmission lines.
- Review vector analysis.
- Electrostatics and Magnetostatics.
- Maxwell equations for time-varying fields,

Course objectives:

By the end of this semester, you are expected to:

- Understand basic transmission line principles, modeling, and equations.
- Solve transmission line problems using analytic formulas or Smith chart.
- Get familiar with vectors in cylindrical and spherical coordinate systems.
- Learn gradient, divergence, and curl in these coordinate systems.
- Calculate path, surface and volume integrals in these coordinate systems.
- Understand Divergence and Stokes' Theorems and know how to use these theorems.
- Understand Columb's law and use it to calculate charge induced electric field.
- Understand electric field intensity, electric flux density and their relations.
- Learn electrical potentials, Gauss' Law and know how to use them.
- Know where the boundary conditions originate and how to use them.
- Be able to calculate capacitance of some simple structures.
- Understand Biort-Savart law, Ampere's law and be cable to calculate current generated magnetic field.
- Calculate forces experienced by current or moving charged particles in a magnetic field.
- Be able to calculate inductance for simple structures.
- Understand magnetic boundary conditions.
- Understand Faraday's law and be able to calculate electromotive forces.
- Understand Maxwell equations and their integral forms.
- Be able to calculate electric filed from harmonic magnetic filed and vice versa.
- Solve simple electromagnetic problems involving time changing electric and magnetic fields.
- Get familiar with library resources and be able to start self –learning.

Grading Policy:

- Two in-class exams: 40%

- Homework 10%
- Biweekly Quiz: 10%
- Final: 40%
- Self-learning project extra 5%

Course Policy:

- Cheating in any exam will not be tolerated!
- Plagiarism in self-learning project will result in a grade of “F” in this class.
- You must attend all exams. Failure to attend will result in a grade of “F”. If you have a “valid” reason for not coming to an exam, you must let the instructor know in advance!
- Make sure to check the class website for updates!
- It is the student’s responsibility to check the homework solutions posted on the class website and understand the solutions.

Project (extra 5%):

Write a 1-page short essay on their thinking of Green energy technologies with reference citation support. The energy can be wind, solar, water, or any other form. Any topic such as generation, storage will fine.