

WESTERN UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

ECE 9101/9011 - Computational Electromagnetics

COURSE OUTLINE –2017/2018

OBJECT:

This course deals with the mathematical description and modeling of electromagnetic fields. Field simulation techniques will be discussed, which will allow students to model different kinds of engineering problems with required accuracy. Steady and quasi-stationary two-dimensional field problems, as well as unsteady and three-dimensional problems will be considered.

CONTACT HOURS:

3 lecture hours/week

Tuesdays: 1:30-3:30pm, SSC2028

Thursdays: 1:30-2:30pm, SEB2100

(first class - Sept. 26, 2017)

COURSE CONTENT:

- Finite difference methods for static and time domain problems.
- Variational methods.
- Introduction to the Finite Element Method: one- and two-dimensional cases for the Laplace, Poisson and Helmholtz equations using linear elements and triangular discretization.
- Higher order finite element method.
- Automatic mesh generation.
- Introduction to COMSOL commercial software.
- Finite element method for non-linear problems.
- Finite element method for 3D Laplace equation.
- Introduction to the Boundary Element Method.

Reference Books:

M.N.O. Sadiku, "Numerical Techniques in Electromagnetics with MATLAB", CRC Press, 2009.

A.B.J. Reece and T.W. Preston, "Finite Element Methods in Electrical Power Engineering", Oxford University Press 2000.

C.A. Brebbia, J.C.F. Telles & L.C. Wrobel, "Boundary Element Techniques", Springer-Verlag 1984.

EVALUATION:

45% Assignments

55% Project

In accordance with the policy of the University, the grade assigned to all written and oral work presented in English shall take into account syntax, diction, grammar and spelling. In addition, in the professional life of an engineer, the manner in which oral and written communications are presented is extremely important.

CHEATING:

University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that may include expulsion from the program. If you are caught cheating, there will be no second warning.

INSTRUCTOR:

K. Adamiak (TEB255)

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