

The University of Texas at Tyler
Department of Electrical Engineering

EENG 5303: Computational Methods in Electromagnetics

Syllabus

Catalog Description:

Numerical methods for the solution of boundary value problems in electrical engineering applications: the finite difference method (FDM), the charge simulation method (CSM), the method of moments (MOM) and the boundary element method (BEM). Applications include the simulation and modeling of electrostatic, magnetostatic, electromagnetic problems, active shielding of power frequency magnetic fields, optimization of high voltage electrodes and heat transfer problems.

Prerequisites: Electromagnetics (EENG 3303), Matrix Methods for Engineers (MATH 3203), Linear Circuit Analysis II (MATH 3305)

Credits: 3 (3 hours lecture, 0 hours laboratory per week)

Text(s): TBA

Additional Material: MATLAB

Course Coordinator: TBA

Topics Covered: (paragraph of topics separated by semicolons)

The Finite Difference Method (FDM), Charge Simulation Method (CSM), Method of Moments, Boundary Element Method (BEM)

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Objectives¹: By the end of this course students will be able to:

1. Apply the finite difference method to solve engineering problems
2. Implement the charge simulation method to model electrostatic, magnetostatic and electromagnetic problems
3. Apply the method of moments to solve scattering problems
4. Apply the boundary element method to solve engineering problems

¹Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes²: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. Graduates of the program will possess a breadth and depth of knowledge in electrical and computer engineering.
2. Graduates of the program will possess and demonstrate oral and written communication skills.
3. Graduates of the program will demonstrate the capability to perform independent learning and investigation.

²*Numbers in brackets refer to course objective(s) that address the Program Outcome.*

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Date: 3 June 2009