Computational Electromagnetics

Code	Credit Hours
EE-945	3-0

Course Description

The course provides understanding of numerical methods to seek solutions of Maxwell's equations. Due to the high fidelity of Maxwell's equations in describing electromagnetic physics in nature, often time, a numerical solution obtained by solving Maxwell's equations are more reliable than laboratory experiments. This field is also known as computational electromagnetics. This course covers the numerical solvers for electromagnetics and provides detail understanding of their implementation.

Textbooks:

M.N.O. Sadiku, Numerical Techniques in Electromagnetics, CRC Press, 3rd EditionUnderstanding the Finite-Difference Time-DomainMethodJohn B. Schneider

Reference Book:

Analytical Modeling in Applied Electromagnetics, S. Tretyakov , Artech House , 2003

Approximate Boundary Conditions in Electromagnetics, T.B.A. Senior and J.L. Volakis , IEEE Press , 1995

Electromagnetic Fields , J.V. Bladel , IEEE Press , 2007

ASSESSMENT SYSTEM FOR THEORY

Quizzes	10-15%
Assignments	5-10%
Project (optional)	5-10%
Midterms	30-35%
Final Exam	40-50%

Topics covered in the Course and Level of Coverage	Duration
Finite Precision	6 hrs
Brief Review of Electromagnetics	6 hrs
Introduction to the FDTD MethodThe Yee Algorithm	9 hrs
Differential-Equation Based ABC's	9 hrs
Two-Dimensional FDTD Simulations	9 hrs
Advanced Topics	9 hrs