



Computational Electromagnetics

ECE 7011

Credit Hours:

3.00 - 3.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Advanced topics in numerical methods for solving Maxwell equations, including finite element methods, integral equation methods, and their hybridization.

Prerequisites and Co-requisites:

Prereq: 5510 (715) or 6010.

Course Goals / Objectives:

- Learn advanced topics in 3D vector finite element methods for solving Maxwell equations
 - Learn advanced topics in fast method, such as FFT-based methods, fast multipole methods, and rank-deficiency based methods, for solving surface integral equation methods
 - Introduced to various mechanisms of coupling finite elements to integral equation methods for solving unbounded electromagnetic problems
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Course Topics:

- FEMs: Vector finite elements, low frequency instability, ABCs, PML, preconditioners, MOREs, TDFEM
 - IEs: Low frequency instability for EFIE, Calderon preconditioners, internal resonance and CFIE, IE-FFTs, Rank-deficient fast methods, FMM, VSIEs
 - Hybrid finite elements and boundary elements methods: conventional FE-BI, DDM-FE-BEM, preconditioners
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Designation:

Elective