Global Learning Semesters
Course Syllabus
Course: MATH-462 Numerical Methods in Electromagnetics
Department: Computer Science
Host Institution: University of Nicosia, Nicosia, Cyprus

Course Summary		
Course Code	**Course Title**	**Recommended Credit Hours**
MATH-462	Numerical Methods in Electromagnetics	3
Semester Offered	**Contact Hours**	**Prerequisites**
Spring	42	MATH-475: Numerical Analysis II MATH-430: Partial Differential Equations
Department	**Level of Course**	**Language of Instruction**
Computer Science	Upper Division	English

Course Description

The following topics are covered: review of electromagnetic (EM) Theory, review of analytical methods, finite difference (FD) methods, finite-difference time-domain (FDTD) methods, finite element method (FEM), variational methods, method of moments (MoM), hybrid methods, visualization.

Instructor

Dr Anastasis Polycarpou

Course Aims and Objectives

This course introduces the student to the use of a variety of numerical methods for the solution of electromagnetic problems. Numerical methods in Electromagnetics utilize modern computer technology and mathematics to solve Maxwell's equations and to visualize the solution, which is a 2-D or 3-D vector plot of the electric and magnetic fields in the region of interest. A variety of methods are introduced starting with Analytical techniques, Finite Difference and Finite Difference Time Domain methods, Finite Element methods, Variational methods and the Method of Moments, and then, an overview of Hybrid methods. Particular emphasis will be placed on programming the numerical solution of various project assignments (implementing individual methods) using Matlab, Fortran or C language.

Teaching Methods

The course is delivered through a mixture of lectures, handouts, tutorials, practical exercises and assignments.

Course Teaching Hours

42 hours (42 hours lectures/presentations/tutorials). The course is delivered during the Spring semester in 14-weeks (3 hours/week).

Evaluation and Grading

Class Participation/Homework/Quizzes: 0-30%
Mid-Term(s):   30-50%
Final Exam: 40-50%

Readings and Resources

Required Textbook
Matthew N. O. Sadiku, "Numerical Techniques in Electromagnetics", Second Edition, CRC Press, 2000.