Course: ENPM620 – Computer Aided Engineering Analysis
Semester: Fall 2016
Day(s): M
Time: 7:00-9:40PM
Location: TBD
Instructor: Gil Sharon
Phone: 
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Course Description

Computer assisted approach to the solution of engineering problems. Review and extension of undergraduate material in applied mathematics including linear algebra, vector calculus, differential equations, and probability and statistics.

Course Objective:
The primary objective of this course is to provide you with the numerical-solution methodology for engineering problems. Topics to be covered include linear algebra, ordinary and partial differential equations, engineering statistics, and vector calculus. Computer software will be used for problem solving. The course is application oriented, and it will make use of engineering applications to provide impetus for the mathematics.

Required/Recommended Textbooks

There is no required textbook but you will need a computer for assignments

Software:
Any symbolic solver can be used in this course. MATLAB is widely used in industry and academia for numerical modeling applications and is available at the Engineering labs computers. Excel VBA is a good option.

Course Outline

1) Introduction to CAE
2) Solving Differential equations with scripts
3) Using Excel for engineering problems
4) Conditional statements in linear programming
5) Simple Image manipulation with transformation matrices
6) Vectors and orthogonal functions
7) Solving non-homogenous partial differential equations
8) Boundary conditions in numerical methods
9) Time dependent solutions
10) Interdependent differential equations
11) Cylindrical coordinate systems
12) Dimensional scaling of parameters
13) Applied Computer aided engineering
   a) Hyperbolic wave equations made simple
   b) Analytical and Numerical integration
   c) Curve fitting and minimizing errors
d) Numerical statistical analysis and the normal distributions

e) Finding a derivative using numerical methods

f) Simple beam equations

g) Fourier transforms