Catalog Description:
Theory and application of the finite element method to the solution of continuum type problems in heat transfer, fluid mechanics, and stress analysis.

Instructor  Prof. A. Diaz
2555 EB  353-9861
Office Hours  M 9:00 – 10:00   W 9:00 – 10:00
Lecture  MWF  3:00-3:50  2205 EB

TEXTBOOK  Class notes will be available from web site
REFERENCES
Fish and Belytschko A First Course in Finite Elements. Suggested only as reference.
Thomas J. R. Hughes, The Finite Element Method: Linear Static and Dynamic Finite Element Analysis (Dover Civil and Mechanical Engineering).

WEB PAGE  www.egr.msu.edu/~diaz/

Topics
Direct Approach for Discrete Systems
Strong and Weak Forms for One-Dimensional Problems
Second order boundary value problems (1D)
Scalar field problems: heat conduction, advection-diffusion
Triangular elements
Computer implementation
Isoparametric elements
Numerical integration
Vector field problems: elasticity equations
Beam elements
Eigenvalue problems
Time dependent problems
Special topics: Lagrange multipliers, adaptive finite elements, sensitivity analysis, nonlinear problems

Grading

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<tr>
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<th>Homework</th>
<th>20 %</th>
<th>Only some (randomly selected) problems will be graded</th>
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<tbody>
<tr>
<td>E1</td>
<td>Exam 1</td>
<td>30 %</td>
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<td>E2</td>
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<td>P</td>
<td>Term project(*)</td>
<td>20 %</td>
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- Each graded item (H, E1, E2, P) will be assigned a grade in range [0.0 - 4.0]
- Course grade = 0.20*H + 0.3*E1 +0.3*E2 + 0.20*P rounded (up or down) to the nearest “university scale” grade in set {0.0, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0}

(*) TO RECEIVE A PASSING GRADE STUDENTS MUST BE AVAILABLE DURING THE FINAL EXAM HOUR ASSIGNED TO THIS COURSE:
Monday, April 28, 2014  3:00-5:00 p.m.