

FLORIDA INTERNATIONAL UNIVERSITY  
Mechanical and Materials Engineering Department

Fall 2018

Intermediate Analysis of Mechanical Systems

EGM 5315

COURSE CONTENT

1. Review of Ordinary Differential Equations (ODE)
  - o Review of First Order ODE (constant and non constant coeff)
  - o Review of Second Order ODE (constant and non constant coeff)
  
2. Partial Differential Equations Generated by Fluid/Thermal and Solid Mechanics Problems
  - o Recognition of elliptic, parabolic and hyperbolic PDE's
  - o Solution methodology used
    - o Method of Characteristics
    - o Canonical Forms
    - o Reduced canonical forms
  
  - o Derivation of the governing equation of motion for a continuous system
    - o complete description--boundary conditions
  
  - o Solution Methodology continued--Separation of Variables
    - o The Eigenvalue Problem
    - o Fourier Series revisited
  
  - o Sturm-Liouville problem and non-homogeneous boundary conditions
  
  - o Method of Characteristics Revisited
  
  - o Transform methods--Laplace and Fourier Transforms
  
  - o Self-Similar problems

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Reference Texts for PDE portion --These can be bought from the department at a total cost of \$45  
Applied Partial Differential Equations by Donald Trim, PWS-Kent

Certain sections of Solution of Partial Differential Equations by W.C. Reynolds notes from Stanford University will be provided as well.

Reference Texts for the ODE portion:

- o Advanced Calculus for Applications by Hildebrand Prentice-Hall Publishers
- o Elementary Differential Equations by Boyce and DePrima John Wiley Publishers

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Grade will be determined on the basis of	2 Exams	30 % each
	HW/Project	10 %
	Final Exam	30 %

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Tentative Grading Scheme:	95 and above	A	80 – 84.99	B	67 – 72.99	C
	90 – 94.99	A-	77 – 79.99	B-	60 – 66.99	D
	85 – 89.99	B+	73 – 76.99	C+	Below 60	F

*Florida International University is a community of faculty, staff and students dedicated to generating and imparting knowledge through 1) excellent teaching and research, 2) the rigorous and respectful exchange of ideas, and 3) community service. All students should respect the right of others to have an equitable opportunity to learn and honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.*

Please be on time to class and keep up with the work. There is a lot of work to cover and it will be difficult for you if you do not do the homework assignments. My office hours will be announced at the end of the first week. Please come to see me if you are having problems or have suggestions on how to improve this rather compact course.

At present we will meet in EC3327 on W 10-1150am and also F 11-1150am. However, that is subject to change. The website on which materials related to this class will be <http://web.eng.fiu.edu/levy>. Videotapes related to this class will be available so that the class can be handled as a distance learning class.

**This is a preliminary syllabus subject to change. All changes will be announced on the class website.**