

FLORIDA INTERNATIONAL UNIVERSITY
Mechanical and Materials Engineering Department

Spring 2018 Advanced Analysis of Mechanical Systems EGM 6422

COURSE CONTENT

Review of Linear, Algebraic Sets of Equations Direct Methods Iterative Methods Vector and Matrix Norm Definitions	Chapt 2
Nonlinear Algebraic Sets of Equations-used to solve nonlinear PDEs	Chapt 2
Ordinary Differential Equations Single step methods available Multistep methods available	Chapt 6
Introduction to PDE's What PDE's characterize Classification of PDE's Finite Difference Notation	
Parabolic Differential Equations Explicit and Implicit Methods Initial and Boundary Conditions, Limiting Conditions Convergence, Stability and Consistency Well Posedness and Sufficiency Lax-Wendroff Conservation Equations Nonlinear Parabolic Equations and Schemes to Solve Them	Chapt 8
Elliptic PDE's Laplace Equation and Iterative Schemes to Solve It Poisson Equation Dealing with Limiting Conditions of Boundary Conditions NonCartesian Meshes and NonRegular Regions	Chapt 7-8
Hyperbolic PDE's Implicit and Explicit Schemes Problems of Stability in the Schemes Courant-Friedrichs-Levy Condition Numerical Integration along Characteristics-maintaining discontinuities Second Order Equations	Chapt 8
Optimization Linear Programming NonLinear Programming	Chap 7

TEXT:

C.F. Gerald and P.O. Wheatley, *Applied Numerical Analysis*, Addison-Wesley, 7th Ed.

REFERENCES:

Elementary Numerical Analysis by Conte and deBoor, McGraw-Hill Publishers
Applied Numerical Methods by Carnahan, Krieger Publishers
Advanced Calculus for Applications by Hildebrand, Prentice-Hall Publishers
Applied Numerical Methods for Digital Computations by James, Smith and Woford, 4th Edition, Harper Collins Publishers

GRADES

Grades will be determined on the basis of
1 Midterm Exam 40 % each
HW/Project 20 %
Final Exam 40 %

Letter Grades will be based as follows:

(A) 95 & above	(B+) 85-89	(C+) 73-76	(D) 60-65
(A-) 90-94	(B) 80-84	(C) 66-72	(F) below 60
	(B-) 77-79		

This is a preliminary syllabus subject to change.

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 during the first week of classes. Please come to see me if you are having problems or have suggestions on how to improve this rather compact course.

We will be meeting 2 times a week M 200-350 and W 200-250. Our meeting room will be EC1114

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