

Knight Foundation School of Computing and Information Sciences

Course Title: Numerical Analysis

Date: 03/20/2010

Course Number: MAD 3401

Number of Credits: 3

Subject Area: Foundations	Subject Area Coordinator: Hadi Amini email: amini@cs.fiu.edu
Catalog Description: Basic ideas and techniques of numerical analysis. Topics include: finite differences, interpolation, solution of equations, numerical integration and differentiation, applications, introduction to applied linear algebra. This course will make extensive laboratory use of the computer facility.	
Textbook:	
References:	
Prerequisite Courses: COP 2210 or CGS 2420 and MAC 2312	
Corequisite Courses: None	

Type: Elective for CS (Foundations group)

Prerequisites Topics:

Course Outcomes:

1. Master algorithms to find roots of equations and interpolation
2. Master numerical differentiation
3. Master numerical integration
4. Be familiar with finite differences
5. Be familiar with numerical solutions to differential equations
6. Be familiar with numerical error analysis
7. Master writing program solutions using the above techniques

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Relationship between Course Outcomes and Program Outcomes

BS in CS: Program Outcomes	Course Outcomes
a) Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms	1, 2, 3, 4, 5, 6, 7
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.	1, 2, 3, 4, 5, 6, 7
c) Demonstrate proficiency in problem solving and application of software engineering techniques	
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	
f) Demonstrate the ability to work cooperatively in teams.	
g) Demonstrate effective communication skills.	

Assessment Plan for the Course & how Data in the Course are used to assess Program Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan:
<https://abet.cs.fiu.edu/csassessment/>

Outline

Topic	Number of Lecture Hours	Outcome

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Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
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Oral and Written Communication

No significant coverage

Written Reports		Oral Presentations	
Number Required	Approx. Number of pages	Number Required	Approx. Time for each
0	0	0	0

Social and Ethical Implications of Computing Topics

No significant coverage

Topic	Class time	student performance measures

Approximate number of credit hours devoted to fundamental CS topics

Fundamental CS Area	Core Hours	Advanced Hours
Algorithms:		
Software Design:		
Computer Organization and Architecture:		
Data Structures:		
Concepts of Programming Languages		

Theoretical Contents

Topic	Class time
Numerical analysis	40 hours

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Problem Analysis Experiences

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Solution Design Experiences

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The Coverage of Knowledge Units within Computer Science Body of Knowledge¹

Knowledge Unit	Topic	Lecture Hours
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¹See https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf for a description of Computer Science Knowledge units