THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 614-002: Numerical Methods I
Spring 2020 Graduate Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: Theory and techniques of scientific computation, with more emphasis on accuracy and rigor than Math 611. Machine arithmetic. Numerical solution of a linear system and pivoting. Interpolation and quadrature. Iterative solution of nonlinear systems. Computation of eigenvalues and eigenvectors. Numerical solution of initial- and boundary-value problems for systems of ODEs. Applications. The class includes examples requiring student use of a computer.

Number of Credits: 3

Prerequisites: Math 222, Math 337, Math 340, and proficiency in a computer language (FORTRAN, C, or C++), or departmental approval.

Course-Section and Instructors

Course-Section	Instructor
Math 614-002	Professor B. Hamfeldt

Office Hours for All Math Instructors: Spring 2020 Office Hours and Emails

Required Textbooks:

Title	*An Introduction to Numerical Analysis*
Author	Atkinson
Edition	2nd
Publisher	John Wiley & Sons, Inc.
ISBN #	0-471-62489-6

ExtraInfo

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 6, 2020**. It will be strictly enforced.

COURSE GOALS

Course Objectives: Students will gain experience in developing, analyzing, and implementing common numerical methods for a range of mathematical problems.

Course Outcomes

- Students should gain an understanding of common numerical methods.
- Students should know how to apply numerical methods to various mathematical problems.
- Students should have an improved ability to derive and program numerical methods.

Course Assessment: Outcomes are assessed through homework assignments, a midterm exam, and a comprehensive final exam.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework	40%
Midterm Exam	30%
Final Exam	30%

Your final letter grade will be based on the following tentative curve.

A	90 - 100	C	70 - 75
B+	86 - 89	F	0 - 69
B	80 - 85		
C+	76 - 79		

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

Homework Policy: Homework assignments/projects will be given frequently; some will involve writing computer programs in a computer language such as C, FORTRAN, or Matlab. Each assignment must be handed in at the beginning of class. Late assignments are NOT accepted. Assignments will be graded for correctness, completion, and clarity.

Exams: There will be one midterm exam held in class during the semester and one comprehensive final exam. Exams are held on the following days:

Midterm Exam	March 11, 2020
Final Exam	May 8 - 14, 2020

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the Math Department's Examination Policy. This policy will be strictly enforced.

Makeup Exam Policy: To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

- http://math.njit.edu/students/policies_exam.php

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Accommodation of Disabilities: Disability Support Services (DSS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Disability Support Services (DSS) website at:

- https://www.njit.edu/studentsuccess/accessibility/

Important Dates (See: Spring 2020 Academic Calendar, Registrar)

Date	Day	Event
January 21, 2020	T	First Day of Classes
January 31, 2020	F	Last Day to Add/Drop Classes
March 15 - 22, 2020	Su-Su	Spring Recess: No Classes/ University Open
April 6, 2020	M	Last Day to Withdraw
April 10, 2020	F	Good Friday - University Closed
May 5, 2020	T	Friday Classes Meet - Last Day of Classes
May 6 & 7, 2020	W & R	Reading Days
May 8 - 14, 2020	F - R	Final Exam Period

Course Outline

Week	Date	Topics
1	1/22	Intro
2	1/27 & 1/29	Errors
3	2/3 & 2/5	Root-finding
4	2/10 & 2/12	Function approximation and interpolation
5	2/17 & 2/19	Function approximation and interpolation
6	2/24 & 2/26	Function approximation and interpolation
7	3/2 & 3/4	Numerical integration
8	3/9 & 3/11	**MIDTERM (MARCH 11)**
--	3/16 & 3/18	Spring Recess
9	3/23 & 3/25	Numerical integration
10	3/30 & 4/1	Numerical ODE

11	4/6 & 4/8	Numerical ODE
12	4/13 & 4/15	Numerical ODE
13	4/20 & 4/22	Iterative methods for linear systems
14	4/27 & 4/29	Iterative methods for linear systems
15	5/4	Review and/or additional topics

Updated by Professor B. Hamfeldt - 1/21/2020
Department of Mathematical Sciences Course Syllabus, Spring 2020