Intro to Numerical Methods

APAM E4300 (Sect. 001)

Monday 7:00-9:30 PM in 833 MUDD

Jan 22 – May 06

Course URL: http://www.math.columbia.edu/~fusco/APAM4300ESyllabus.htm

Instructor: Sandro Fusco - Email: fusco@math.columbia.edu
Office hours: Monday 5:30-7:00 PM (1106B MUdd), or by appointment

TAs: James Lee-Thorp
- E-mail: jpl2154@columbia.edu
- Office hours: Thursday 3:30 – 5:30 PM (287 Engineering Terrace)

Hasan Ozen
- E-mail: hco2104@columbia.edu
- Office hours: Wednesday 1:00 – 3:00 PM (287 Engineering Terrace)

Weiwei Shen
- E-mail: ws2215@columbia.edu
- No Office Hours

Grader: Weiwei Shen

Textbook: Numerical Methods: design, analysis, and computer implementation of algorithms, 1st Edition by Anne Greenbaum, Timothy P. Chartier (ISBN# 9780691151229). We will be covering roughly one chapter per week.

Overview: Prerequisites: MATH V1201, MATH E1210, and APMA E3101 or their equivalents. Some programming experience and MatLab will be extremely useful.

Introduction to fundamental algorithms and analysis of numerical methods commonly used by scientists, engineers, and mathematicians. This course is designed to give a fundamental understanding of the building blocks of scientific computing that will be used in more advanced courses in scientific computing and numerical methods for PDEs.

Topics include numerical solutions of algebraic systems, linear least-squares, eigenvalue problems, solution of non-linear systems, optimization, interpolation, numerical integration and differentiation, initial value problems and boundary value problems for systems of ODEs.

All programming exercises will be in MatLab, and some experience with this language will be useful. However, I will teach most things that are necessary and try to provide sufficient examples.

Requirements: There will be a midterm exam (Monday March March 11) and a cumulative final exam (Week of May 13). There will be weekly homework covering course materials from the previous weeks, which will be due every Tuesday.
**Help:** My office hours are on Monday 5:30 – 7:00 PM (before class, in 1106B Mudd), or by appointment (e-mail is the best way to contact me). I will have additional hours before the in-class exams. TAs will hold their office hours in 287 Engineering Terrace.

**Policies:**

**Exam Policy:**
No make-up exams will be given except in the following situations:
- Arrangements are made with the instructor prior to the date of the exam.
- A written excuse for missing the exam is provided from either a doctor in the case of illness or from the dean of the student’s school in all other circumstances.

**Homework Policy:**
Since this course covers a lot of material, it is imperative that students keep up on their weekly homework. Thus, homework will be collected one week after it is assigned. All Homework Assignments are due by 5pm on the due date in the E4300 Homework box in 200 Mudd (APAM). Homework papers can also be turned in during class. No late homework will be accepted!

**Grading Policy:**
The grade for the course will be based on the exams, homework assignments, and class participation. The final will be worth 25% of the final grade; the midterm exam will be worth 20%, homework 45%, class participation 10%.

**Attendance Policy:**
Attendance in this course is imperative, as we will be covering a vast amount of material in a short time. While I will not be basing any part of your grade directly on your attendance, the grading policy outlined above do not really allow for absences.

**Important Dates:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Monday Jan 21</td>
<td>Martin Luther King Jr. Birthday Observed – University Holiday</td>
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<tr>
<td>Monday Jan 28</td>
<td>First Day of Class</td>
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<tr>
<td>Tuesday, Feb 26</td>
<td>Last Day to Drop Class for Barnard, Columbia College, General Studies, GSAS, Cont. Education</td>
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<tr>
<td>Monday, Mar 11</td>
<td>Midterm Date</td>
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<tr>
<td>Monday, Mar 18 - Friday, Mar 22</td>
<td>Spring Recess</td>
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<td>Thursday, Mar 28</td>
<td>Last Day to Pass/Fail</td>
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<td>Last Day to Drop for Schools Not Noted Above</td>
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<td>Monday, May 6</td>
<td>Last Day of Classes</td>
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<td>Tuesday, May 7 - Thursday, May 9</td>
<td>Study Days</td>
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<tr>
<td>Friday, May 10 - Friday, May 17</td>
<td>Final Examination Week</td>
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**Disability Services:**
Students with disabilities requiring special accommodation should contact the Office of Disability Services promptly to discuss appropriate arrangements.