Course Description

The course focuses on numerical methods for modeling, pricing and risk management of financial instruments, including derivatives. It covers:

→ **Deterministic methods**, such as finite difference methods for ODEs and PDEs, explicit and implicit schemes, and free boundary problems for American options.

→ **Stochastic methods**, such as Monte Carlo simulation, including variance reduction and quasi-Monte Carlo.

→ **Data-driven methods**, including calibration and filtering techniques.

Course Objectives

→ **Learn** the basic numerical analysis methods.

→ **Understand** how to apply these in option pricing.

→ **Implement** the corresponding algorithms in C++.

→ **Learn** to communicate the results of an analysis through oral presentations and written reports.

Special Accommodation

In compliance with the University of Illinois policy and equal access laws, appropriate academic accommodations are offered for students with disabilities.

Logistics

**Lectures:**
M/W 1.00pm – 2.40pm
259 English Building

**Office Hours:**
M/W 3.00pm – 4.00pm
or by appointment

**Teaching Assistant:**
Runqi Hu (runqihu2@illinois.edu)

**TA’s Office Hours:**
T 3.30-4.30pm (Room 18 TB)

**Course Website:**
On Piazza: piazza.com/illinois/spring2017/ie525/home
(grades will be posted on Compass 2g)

**Textbook**
*Numerical Methods in Finance and Economics: A MATLAB-Based Introduction*
P. Brandimarte (Wiley).

**Prerequisites:** FIN 500

Instructor:
Alexandra Chronopoulou

Office: 216D Transportation Building

Email: achronop@illinois.edu

Phone: (217) 300 - 0851
Coursework

- **Homework assignments** will be posted on Illinois Compass2g. All students are required to submit a hard copy of the hw in the beginning of the lecture. **No late homework will be accepted.** The homework will account for 20% of your grade.

- There will be **2 in class midterms**, for which the tentative dates are 2/25/15 and 04/06/15, each accounting for 25% of your grade.

- There will be a **group project** in the end of the semester, instead of a final exam. Each group will need to reproduce the results of an article, write a report and present in class. The written reports will be due on 05/06/15 and the oral presentations will be scheduled on the last week of classes. The project will account for 30% of your grade.

**Re-grading**

If you want to dispute your work’s grade, all requests should be made in writing (email is ok) within a week, after receiving your graded work. Please note that when you ask for a question to be re-graded, the entire assignment may be re-graded, and there is a possibility of losing points.

**Letter Grades**

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<thead>
<tr>
<th>Letter Range</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90.00-100.00</td>
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<tr>
<td>B</td>
<td>80.00-89.99</td>
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<td>C</td>
<td>70.00-79.99</td>
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<td>D</td>
<td>60.00-69.99</td>
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<tr>
<td>F</td>
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*The letter range includes +/-.*

The instructor reserves the right to make any changes she considers academically advisable. Such changes, if any, will be announced in class. It is your responsibility to attend the class and keep track of the proceedings.

**Additional Readings**


**Academic Integrity**

It is expected that all students will support the idea of academic integrity and be responsible for the integrity of their work. The university has a published policy on academic integrity that may be found at [http://www.library.illinois.edu/learn/research/academicintegrity.html](http://www.library.illinois.edu/learn/research/academicintegrity.html)