Illinois Institute of Technology  
Stuart School of Business  
Course Syllabus  
Computational Finance – MSF526  
Spring 2017

Instructor Information

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Office hours: Group office hours shall be scheduled  
TA Information: TBC

Course Information

Course #: 526  
Course name: Computational Finance  
Course description: Most of the mathematics behind the risk management techniques, pricing models and algorithmic trading would be of no practical use without automated solvers, scenario builders, and other algorithms. This class concentrates on translating from ideas and mathematics to the practicalities of implementation.  
Course day and time: Wednesdays, 1:50pm - 4:30pm  
Course location: Robert A. Pritzker Science Ctr 240  
Course Objectives: On completion of the course, the student should expect to demonstrate expertise in the following topics:

- Bootstrapping and Root finding for estimating the Implied Volatility  
- Regressions and Robust Estimation  
- Monte Carlo and Variance Reduction  
- High-dimensional Models and Correlated Processes  
- Credit Modeling  
- Finite Differences  
- Optimization In Multiple Dimensions  
- Backtesting algorithmic trading strategies  
- Stochastic Volatility
- Quadrature

**Pre-requisites:**

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<th>Required Course Materials</th>
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<tr>
<td><strong>Text:</strong></td>
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<tr>
<td>Materials:</td>
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<tr>
<td>Software:</td>
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<tr>
<td>Programming Skills:</td>
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<td>Text References:</td>
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<table>
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<th>Recommended Course Materials</th>
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<tr>
<td><strong>Supplemental texts/reading:</strong></td>
</tr>
<tr>
<td>- Brandimarte, Numerical Methods in Finance and Economics</td>
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<tr>
<td>- Hilpisch, Python for Finance: Analyze Big Financial Data</td>
</tr>
<tr>
<td>Software:</td>
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<td>Some other good books:</td>
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<td>Text References:</td>
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<th>Course &amp; Instructor Policies</th>
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<td><strong>Make-up:</strong> Verifiable medical emergency or, at the disgression of the instructor, with prior consent.</td>
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<td><strong>Late work:</strong> At the disgression of the instructor and automatically subject to a 10% penalty unless due to verifiable medical emergency.</td>
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<td><strong>Special assignments:</strong> N/A</td>
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<td><strong>Class attendance:</strong> Any student that misses more than three classes will forfeit a 10% penalty towards their final grade. It is the responsibility of the student to ensure that they keep abreast of the class material.</td>
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<td><strong>Classroom conduct:</strong> Cell phones to be turned off. Laptop use in class for work only. The instructor reserves the right to ask any student disrupting the class to leave the room. An oral exam will be given in lieu of a mid-term or final if the student is suspected of plagiarism during a written exam.</td>
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</table>

**Discipline:** The instructor reserves the right to ask any student disrupting the class to leave the room. An oral exam will be given in lieu of a mid-term or final if the student is suspected of plagiarism during a written exam.
Grading System/Policy

Percentages for assignments:

- Class Exercises/Participation: 10%
- Homework: 35%
- Mid-Term: 20%
- Final: 35%

Grade scale: A-C (graded to a curve)

Incompletes:

Disabilities

Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources. The Center for Disability Resources (CDR) is located in 3424 S. State St., room 1C3-2 (on the first floor), telephone 312 567.5744 or disabilities@iit.edu.
Copyright/Plagiarism/Academic Integrity
Rules on Plagiarism and Academic Integrity

Plagiarism and other violations of academic integrity are strictly prohibited and subject to penalty as defined by the University. Information about the IIT academic requirements for graduate students can be found at:

http://www.iit.edu/graduate_college/pdfs/Graduate_Student_Handbook.pdf

The academic integrity material in the handbook is found at page 31 in the IIT student handbook. Other parts of the handbook also contain material and rules that apply to graduate students. Students will be expected to conform to the rules and procedures set forth in the handbook.

The code of conduct governing writing by students at IIT requires original writing, prohibits plagiarism and provides severe sanctions for plagiarism. Original writing consists of thinking through ideas and expressing them in your own way. If the ideas are from other sources, use footnotes or other citation methods to indicate the source of the ideas. Plagiarism is the act of passing off someone else’s work or ideas as your own. The sanctions include, but are not limited to, expulsion and the imposition of a punitive grade of ‘E’.

What is Plagiarism?

Often there is some confusion as to what constitutes plagiarism. Plagiarism is the act of passing off someone else’s work as your own. To assist in providing an understanding of the types of writing that constitute plagiarism, three types of are each discussed below. Also discussed below is the problem of “string citations.” String citations are not plagiarism, but many professors will reject string citations because they are not the student’s original work.

Word for Word copying: The use of any phrase or excerpt from another source requires the use of quotation marks around the copied material, or if the material is more than a few lines, the copied material should be placed in its own indented paragraph. A citation in proper form is always required to identify the source.

Plagiarizing by Paraphrase: When a writer uses a source, substitutes words and sentences, or even changes the order but keeps the meaning of the original, a citation is required. In the example given below, the original is on the left. The paraphrase in the right box constitutes plagiarism.

| Original: It is not generally recognized that at the same time when women are making their way into every corner of our work-world, only one percent of the professional engineers in the nation are female. A generation ago, this statistic would have raised no eyebrows, but today, it is hard to |
| Paraphrase: Few people realize now that women are finding jobs in all fields, that a tiny percentage of the country’s engineers are female. Years ago this would have surprised no one, but now it seems incredible. |
The writer could avoid plagiarism here by acknowledging the source and providing a proper citation.

Mosaic Plagiarism: Here the writer lifts phrases and terms from the source and embeds them in his own prose. An example follows in which the lifted phrases are underlined:

The pressure is on to get more women into engineering. The engineering schools and major corporations have opened wide their gates and are recruiting women zealously. Practically all women engineering graduates can find attractive jobs. Nevertheless, at the moment, only one percent of the professional engineers in the country are female.

Mosaic plagiarism is sometimes caused by careless note taking. However, it looks dishonest and is judged as such. The use of quotation marks around the original wording and citation avoid the problem of plagiarism. Often a better approach is to use paraphrase or to quote directly (with appropriate citations).

Plagiarism can be avoided by providing citations for the sources of any material, including ideas, phrases, or sentences that you have used in your paper. A number of different systems are available for providing citations. The key to all of them is that the writer must clearly identify for the reader the sources of all material (including ideas) that have come from somewhere else.

String Quotation Problem: Sometimes a student will write a paper consisting of a string of quotations. It is usually much better for a student to provide his or her own analysis and write the paper in his/her own words. Many professors will reject a paper consisting primarily of material quoted from other sources because they do not view such a paper as the student’s own work. Prior to writing your paper, be sure to understand your professor's view with respect to string quotations.
The Stuart School of Business Student Etiquette Code

Students are expected to respect the following Code of Student Etiquette at all times:

- **No electronics.** You may not use laptops, mobile phones, tablets, or related devices in class **unless permitted to do so by the instructor.** It is distracting to your classmates to sit beside or behind you while you email, text, or browse social media.

- **Punctuality and Behavior.** Class will start on time. It is distracting to your classmates for you to be climbing to your seat and settling in while they are trying to pay attention to the lecture. Leaving then returning during class is disruptive and should occur only in emergencies. We will have a short bathroom/snack break in the middle.

- **Seating.** Your assigned seat for the semester will be the seat you choose for the second class session. I use assigned seats to help me keep track of class discussion, and also to have a place to direct prospective students and visitors to sit.

- **Beverages and Snacks.** You are welcome to bring something to drink to class. Please don’t bring food and eat during the lecture – you may eat outside of the classroom during breaks.

- **Attendance and Class Participation.** Attendance, preparation, and participation are expected and represent an essential component of the learning experience. Class participation is evaluated based on the **quality of participation, not its “quantity.”** You should be prepared to provide insights, observations, inferences, or conclusions that not only express your viewpoint, but also defend your analysis. Your comments should be relevant to the topic at hand, and should advance the discussion. A simple opinion or viewpoint is not very valuable without any justification. Valuable comments respond to, elaborate on, lend support to, contradict, or correct a comment by one of your classmates. Counter-productive comments include opinions without a justifying argument, pure repetition of previous points, class interruptions that do not advance the discussion, and rambling, vacuous or disparaging comments.

- **Academic Integrity.** All students are expected to act with utmost civility and personal integrity; to respect other students’ dignity, rights and property; and to help create and maintain an environment in which all students can succeed through the fruits of their own efforts. Academic integrity includes a commitment to not engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty include cheating or copying, plagiarizing, submitting another persons’ work as one’s own, using sources without citation, having another student take your exam, tampering with the work of another student, and facilitating other students’ acts of academic dishonesty. Sanctions for breaches in academic integrity range from a fail grade in an assignment or test to a fail grade in the course, as well as severe disciplinary sanctions up to and including suspension or expulsion.

When interacting with fellow students in online discussions and in other web-enabled activities, students are further expected to respect the following **Online Code of Conduct** at all times:

- Do not dominate any discussion. Allow others the opportunity to join in the discussion.
- Do not use offensive language. Present your ideas appropriately.
- Be cautious in using Internet language. Do not capitalize all letters or rely heavily on acronyms.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
• Never make fun of someone’s ability to read or write.
• Share tips with other students.
• Keep an “open-mind” and be willing to express your opinion. Respect minority opinions.
• Reread your posting and edit before you push the “Send” button.
• Do not hesitate to ask for feedback.
• Using humor is acceptable. Do not use sarcasm as a form of humor – it is easily misinterpreted.