Statistical Analysis and Time Series  
IEOR E4709  
Spring 2017  
Department of Industrial Engineering and Operations Research, Columbia University,  
Time: Monday and Wednesday, 10:10-11:25  
Where: ??  

Instructor: Dr. Agostino Capponi, Office Hours: Wednesday, Mudd 535G, 5-6pm  
Email: ac3827@columbia.edu  

Teaching Assistant: ?, Email: ?  
Office Hours: Monday and Tuesday, 6pm-7pm in Mudd 301  
Recitation: Tuesday, 4-5pm  

Course Assistant: ? (email), ? (email), ? (email)  

Email Communication with Instructor and Teaching Assistants: When emailing the instructor or TAs, please make the subject of the email the following – “IEOR E4709, YOUR LAST NAME, ISSUE”. This will be beneficial for tracking email communications. Please include the issue in the subject (e.g., Homework Problem Question). Additionally, your email should follow good business letter writing principles. You can find more about business letter writing from the Columbia Writing Center at http://www.college.columbia.edu/core/uwp/writing-center. The email should have a salutation, appropriate grammar, correct spelling and capitalization, a clear description of the question or issue, and your full name.  

Prerequisite: The prerequisite for this class are  
IEOR E4150: Introduction to Probability and Statistics.  

Knowledge of some programming language, such as Mathematica, Matlab or R can be useful.  

Teaching facilities: I will use the classroom blackboard to explain to the class.  

Textbook: Excellent textbooks are  

However, I will write my lecture notes taking material from several sources. When using external material and research papers, I will make them available to the class.  

Course Objectives: Statistics and Time series Analysis plays a fundamental role in the construction, testing, and validation of models used in the financial industry, and otherwise.  

Homework Assignments: There will be biweekly homework assignments that will test you on class material. Students are encouraged to collaborate with each other, but each student must complete and submit his/her homework individually. Copying homework solutions from other students will not be tolerated and considered as cheating. Make sure all pages of the assignments are stapled together. Late assignments will not be accepted. Homework solutions will be usually posted the day after the homework is due.  

Recitations (Tentative): The TA will hold one recitation lecture the day before the homework is due. The objective of the recitation lecture is to go over the material tested on the homework and clarify concepts so to put students into the best conditions to successfully solve the problems.  

Exams: There will be one midterm exam on March 10, 2016, and one final exam. Both exams will be closed book although a formula sheet will be provided. The final exam will be comprehensive and include all material covered in the class. The final exam will be held in Math 203 from 9am to 12pm.
Weights
Homework: 30%
Midterm: 30%
Exam: 40%

Attendance Policy: Attendance of each lecture is mandatory.

Grading: The final grade will be based on the total number of points earned during the semester. If you earn 89% of the available (weighted points) you are guaranteed at least an A-, 79% guarantees at least a B-, 69% guarantees at least a C-, etc… However, the final scores might be adjusted at the discretion of the course instructor and will also depend on the overall performance of the class.

Course Topics: We will cover the below mentioned course topics:
- Simple and Multiple Linear Regression.
- Hypothesis Testing
- Bayesian Statistics
- Principal Component analysis, linear discriminant analysis.
- Time series analysis, Arch and Garch models
- High Frequency Statistics