

16:958:565 Financial Time Series Analysis  
16:960:565 Applied Time Series Analysis

Tuesday 6:00–9:00 pm, SEC 209

• **Instructor:** Yaqing Chen  
  – Office hour: Tuesday 4:00–5:00 pm, at Hill Center 405  
  – Email: yqchen@stat.rutgers.edu

• **TA:** Ama Ampadu-Kissi-Owusu  
  – Office hour: Wednesday 1:00–2:00 pm (homework weeks only), at Hill 551  
  – Email: aka117@stat.rutgers.edu

• **Prerequisites:** First graduate level courses in mathematical statistics and applied regression. This course will cover a great deal of materials at a rapid pace and will require some programming skills (preferably R). Students who have had difficulty in previous mathematical statistics courses or programming may find that this course requires a considerable amount of time and effort, and should plan accordingly.


• **References:**  
  – Cryer, J. D. and Chan, K.-S. *Time Series Analysis with Applications in R.* 2nd ed. Springer, 2008. (The e-book is available through Rutgers Library. Accompanying R code and data sources can be found at [https://homepage.divms.uiowa.edu/~kchan/TSA.htm](https://homepage.divms.uiowa.edu/~kchan/TSA.htm).)

• **Computing:** R will be used for instruction. Free software is available at [http://www.r-project.org/](http://www.r-project.org/). If you go to Manuals on the left panel of the website, you will find a good introduction, *An Introduction to R*. A more advanced reference is *Modern Applied Statistics with S*, by Venables and Ripley. Springer, 2002, 4ed.

  The TA will be responsible for answering any questions regarding R for homework and project. You may also use other computing languages. Yet no tutorial or support will be provided in that case.

• **Course website:** Canvas. Lecture notes, homework, and course announcements will be posted on canvas. Rather than asking through email, you are strongly encouraged to post all questions regarding course materials including homework in “Discussion” on canvas or drop by the office hours of the instructor or the TA. You are also encouraged to contribute to answering or discussing questions asked by fellow students. Only discussions related to this course are allowed.
Evaluation: Homework (30%), exam (30%), and project (40%).

Homework: About eight homework assignments—give or take one—will be assigned weekly or biweekly. The lowest homework grade will be dropped. **No late homework will be accepted.** For each homework assignment, compile and upload a single .pdf document on canvas. Include all R source code for computing questions as appendix. Computer-generated output without detailed explanations and interpretations will not receive credit. Use a different typeface for your own answer to distinguish from computer output. A random subset of problems will be graded for each assignment. Homework solutions which will be posted on canvas.

Exam: The exam will take place on April 23 during regular class time and will be closed book, but you can bring one double-sided, letter-sized sheet of notes prepared by yourselves. You may use a basic calculator with no communication functionalities (e.g., cellphones, tablets, and laptops are not acceptable). **There will be no make-up exams.**

If you need exam accommodations, please refer to this website ([https://ods.rutgers.edu/exam-accommodations](https://ods.rutgers.edu/exam-accommodations)) for how you should proceed. Among other actions mentioned on the website, in particular, you must submit an exam request form to the Office of Disability Services (ODS) by no later than 1 week prior to the exam so that ODS can assist in setting up the exam accommodations.

Project: The course project is to be carried out by a team of two (or less) members. Your tasks are:

(i) to find an interesting time series dataset and to identify and quantitatively investigate a time series problem of practical significance using techniques learned in this class;

(ii) to search for more advanced methods in the literature, i.e. peer-reviewed journal/conference papers which are appropriate to address the problem of interest, apply the methods proposed in the literature to the dataset you investigate for the project, and compare the results with the methods you use in (i).

You should team up as early as you can after January 29 (the last day to drop the class) and discuss the problem and dataset to be investigated for the project. The problem your group would like to investigate should be submitted through email to the instructor and the TA along with the list of names and Rutgers IDs for the group members with all group members cc’d. Any two groups should not work on the same project. Projects are taken on a first come, first served basis. If the project your group proposes coincides with another group’s which is submitted earlier, then your group has to consider another project. The instructor will confirm whether your group can work on the proposed project through email. **Every group should have a question confirmed by the instructor by March 5.**

The work that you perform for the project will culminate into a literature presentation on March 26, a project presentation on April 16 and a project report due at 11:59 pm on April 26.


**Literature presentation.** Each team should prepare slides to present the relevant (advanced) methods/models in the literature out of the scope of this class, which they will use for the project. Each presentation should be TBA minutes and include what methods/models are available in the literature, what are the pros and cons, which of the methods the team plans to use, and why they are chosen, etc.

**Project presentation.** Each team should prepare slides to present their project. Each presentation should be TBA minutes and include: the time series problem and the dataset(s) of interest; the methods used to address the problem; the results obtained; conclusions and discussions.

**Project report.** The report should include: (1) Names and IDs for the group members; (2) Description of the question(s) or topic(s) you want to study, any involved datasets(s), and relevant existing analysis, (3) Models or methods that you use, (4) Your results and conclusions. **Any relevant analysis that has been done for the chosen data should be properly cited in your report.** The report should be written comprehensively and concisely at the same time. In particular, it should be no more than four pages (excluding tables, figures and supplementary material if any). Font sizes for the main text should be 11pt or 12pt with at least 1.2 line spacing. **No computing code should be included in main text of the report.** The report will be submitted in pdf format on canvas, accompanied by code and datasets that can be used to reproduce all results in the report. Each submission should be a zip file containing all the relevant files compressed.

- **Collaboration and academic integrity policy:** During exams, no collaboration whatsoever is allowed. On homework, you are welcome to discuss the problems and ideas with others, but you must write up your results yourselves, in your own words and based on your own understanding. For all class work you hand in for grading, copying from, or referencing without proper acknowledgment of, external sources or your peers constitutes plagiarism. It is strictly forbidden, so does letting others copy from you. The Rutgers Academic Integrity Policy will be enforced. Please be sure to read the details at [https://academicintegrity.rutgers.edu/sites/default/files/pdfs/current.pdf](https://academicintegrity.rutgers.edu/sites/default/files/pdfs/current.pdf).

- **Other resources:** If you are experiencing a psychological or emotional crisis or concerned about others in crisis, call CAPS at 848-932-7884. If you are dealing with a mental health emergency situation and CAPS is not open, please call Acute Psychiatric Services, available 24 hours, at 855-515-5700. More details including office hours of CAPS are available at [http://health.rutgers.edu/about-us/hours-locations/](http://health.rutgers.edu/about-us/hours-locations/).