Time Series

STAT 5141/6041, 2023 Spring Semester

Mon/Wed/Fri 11:15 a.m.-12:10 p.m., French Hall 2109

Instructor:	Dr. Hang Kim
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Office:	French Hall 5410
Office Hours:	See below

Course Description:

- The advanced-undergraduate-level and graduate-level course presents basic time series models and their applications.
- Enrollment Requirements: STAT 4131 or STAT 5132/6032
- **Additional Recommended Qualification**: If you do NOT have enough background in
  - linear algebra (MATH 2076), mathematical statistics (STAT 4121 or 6021), and linear models (STAT 4131 or 6031),

  please take those first before taking this course.

Statistical Software: The course uses free statistical software R for the "in-class" lab sessions and homework.

- Some former experience in R is required. Otherwise, you are expected to put in enough time to learn it beside classes and lab sessions.
- You are required to bring **your personal laptop** in the lab sessions to be held during some regular class hours.

Textbook:

- Required: Introductory Time Series with R, 2009, by Paul S.P. Cowpertwait and Andrew V. Metcalfe
- Reference book: Introductory to Time Series and Forecasting, by P. Brockwell and R. A. Davis.

Course Webpage: All course-related information will be posted on Canvas. Please check the course website periodically.

- You can also install the "Canvas Student" app on your smart phone.
  https://apps.apple.com/us/app/canvas-student/id480883488
  https://play.google.com/store/apps/details?id=com.instructure.candroid&hl=en_US&gl=US

Office Hours:

For an in-person meeting, please sign up the form through the following link:
https://www.signupgenius.com/go/10C0D4CA5AF2AA5FFC70-hang

- Please sign up at least 30 minutes before the meeting (to an empty slot).
- Put your name, year, and program, so the instructor can be prepared beforehand.
- Double-check that you succesfully singned up
  - by pressing "Save & Contiue" button after selecting the session,
  - then pressing "Sign Up Now" button.
  - If you correctly signed up, you should receive a confirmaiton email from the signupgenius.

Tentative Exam Dates: (The date can be adjusted depending on the coverage/speed of the lectures)

Midterm Exam: **(Tentative)** Wednesday, March 1, in regular class

- The midterm exam is a closed-book exam. However, you are recommended to bring **one 8.5 x 11-inch sheet of paper (both sides)**, with whatever facts, formulas, or explanations you find helpful.
- You will need to bring a calculator. Cell phones should not be used during tests.
- Unlike lower-level undergraduate-level courses, no test exam will be provided. However, the coverage of the exam will be clarified during the classes.

Take-Home Final: Due by Monday, April 24, 11:59 pm

- The detailed instruction about **the take-home final exam** will be provided in class.
- **Any act of cheating will not be tolerated**. See the "Academic Integrity Policy" section below.

Homework:

- Homework and its due date will be posted on Canvas throughout the semester.
- Submit an electronic version of homework via Canvas: a photocopy of your handwriting or a document using a word-processor software.
- **No late assignments will be accepted** unless there is an inevitable and documentable circumstance with approval by the instructor a priori or posteriori.
- Present your submission in a clear and readable format with sufficient details. **No credit** will be given to solutions lacking details or that are hard to read.
- All students must submit the work written in their own words. **No academic misconduct will be tolerated.** See the "Academic Integrity Policy" section on the next page.

Semester Grade Calculation:
Your final course grade will be assigned based on the total **100 points** that you have accumulated from

HW: 20 pts, Lab notes: 10 pts, Attendance: 10 pts,
Quiz: 20 pts, Midterm exam: 20 pts, Final exam: 20 pts,

according to the following grading scales:

Grade	A	A-	B+	B	B-	C+	C	F
Accumulated Scores	93.0 - 100.0	90.0 - 92.9	86.0 - 89.9	83.0 - 85.9	80.0 - 82.9	76.0 - 79.9	70.0 - 75.9	0.0 - 69.9

Note: The graduate grading scale (http://www.uc.edu/registrar/faculty_resources/grading_scales.html#grad) also applies for the undergraduate students, i.e., there are no grades: C-, D+, D, and D-.

Grades for Auditing: To get "T" for auditing, students are required to attend classes with at most 6 unexcused absences. The students who audit the course are not required to turn in HW and take exams.

Attendance:

- For the first unexcused absence, no point is deducted. Starting the second, each unexcused absence counts for one-point deduction up to the maximum of 10 points deduction.
- Academic-/athletic-/medical-related absences may be excused upon a prior notice to the instructor and a permission.

"Planned" Chapter Coverage / "Tentative" Schedule:

This course covers selected chapters from the textbook, in the following order.

- CH 1. Time Series Data [Lab1]
- CH 2. Correlation
- CH 4. Basic Stochastic Models [Quiz1] [HW1]
- CH 6. Stationary Models [Quiz2] [Lab2]
- CH 5. Regression with Time Series [Midterm]

- CH 7. Non-stationary Models [HW2] [Lab3]
- CH 9. Spectral Analysis [Quiz3] [HW3]
- CH 12. State Space Models (as time permitted) [Take-home Final]

Note: This schedule is a tentative plan. **Actual coverage/order of the chapters can be changed**.

Policies

Academic Integrity Policy: The University Rules, including the Student Code of Conduct, and other documented policies of the department, college, and university related to academic integrity will be enforced. Any violation of these regulations, including acts of plagiarism or cheating, will be dealt with on an individual basis according to the severity of the misconduct. (http://www.uc.edu/conduct/Academic_Integrity.html)

> Note: Any misconduct may result in **the failure of the entire course (with semester grade F)**, not only the failure of a test or homework.
>
> In this class, the academic misconduct includes, but is not limited to, the following actions:
> 1. Copy **classmates' homework** or cheat **classmates' exams**,
> 2. Copy **homework solutions** provided to students who took the same course **in previous semesters**,
> 3. Copy **homework solutions** downloaded or available **from internets** (even there are no copyrights or warnings on the documents displayed) or an anonymous source,
> 4. as well as other misconducts which are prohibited by the Student Code of Conduct.

Personal Communication Devices Policy: Cell phones must be either turned off or put on vibrate mode during class. Additionally, please make all efforts not to use cell phones during the class time.

Email Communication Policy: All communications must be done via a **valid UC email**. The instructor will try his best to reply within a business day from receipt of emails. Any correspondence using a personal account, e.g., Gmail account, will not be responded.

Special Needs Policy: If you have any special need related to your participation in this course, including identified visual impairment, hearing impairment, physical impairment, communication disorder, and/or specific learning disability that may influence your performance in this course, you should talk with the instructor to arrange for reasonable provisions to ensure an equitable opportunity to meet all the requirements of this course. At the discretion of the instructor, some accommodations may require prior approval by Disability Services. In order to take advantage of those available accommodations, students may contact the Disability Services Office at 210 University Pavilion (https://www.uc.edu/campus-life/accessibility-resources.html).

Regrading Policy: If a student believes that grading errors have occurred, the student should request for regrading **within the next five days after receiving the graded work**. This will apply even if the student is absent on the day the work is returned unless prior permission was obtained from the instructor.

Special Note: *This syllabus is a guideline for the course. Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is subject to change with an advanced notice.*