**Santa Clara University**

**ECON 174 – Time Series Analysis**

**Spring 2024**

**Instructor:** Dr. Orkhan Hasanaliyev

**Email:** [ohasanaliyev@scu.edu](mailto:ohasanaliyev@scu.edu)

Please start subject line with “ECON 174, <subject>” if you contact me by email or even better contact me via Camino

**Phone:** (919) 536-2594

**Office:** Lucas Hall 216zz

**Office Hours:** MF: 11:40 am – 12:40 pm, MWF: 3:30 pm – 4:30 pm.

If you would like to meet at different time, please feel free to contact me to schedule an appointment.

**Course Description:** This course introduces students to the econometric analysis of time series data. We focus on the use of time series models to forecast economic and financial variables. Students will learn how to classify and represent a time series, how to estimate various times series models and how to test a variety of hypotheses involving time series data. We discuss different methods of forecasting and how they can be evaluated. The goal of this course is that, at the end, you can independently create quality forecasts of time series. It emphasizes hands-on experience, and all students will acquire knowledge of the programming language R in the context of time series models and forecasting.

**Prerequisites:** A grade of C- or better in (ECON 1 and ECON 2 and ECON 3) and ECON 115 and ECON 41 and ECON 42 or permission of instructor.

## Required Course Materials:

1. **Required textbook:** *Forecasting: principles and practice* by Hyndman and Athanasopoulos, available free online at https://otexts.com/fpp3/
2. R and RStudio. More R packages will need to be installed during the course.

## Camino Resources:

Class announcements and materials such as syllabus, lecture slides, videos, instructions, assignments, and solutions to assignments, will be available on Camino. It is the student’s responsibility to check the Camino on a regular basis to update your information. For any course related emails, SCU email addresses listed on the Camino will be used.

**Grading:** Grades will be based on the following.

|  |  |
| --- | --- |
| **Peer Review Assignments** | **15%** |
| **Homework Assignments** | **30%** |
| **Exam** | **30%** |
| **Group Project** | **25%** |

**Peer Review Assignments:** There will be many small assignments which are going to be reviewed by an assigned fellow student. You can think of these assignments as a quiz type assignment. *Further instructions are provided on Camino.*

**Homework Assignments:** There will be about 4-5 assignments. Each assignment will be open for about one week. *For exact deadlines please check the Camino*.

**Exam:** Take-home exam will be released around the week 8 of classes.

.

**Group Project:** You need to form a group of two students. You have two options to explore: either work on your own developed idea or replicate an already published academic work. Details of the project will be discussed later in the quarter. Deadline for a topic choice is the end of Week 5. You need to make an oral presentation (about 20-25 minutes) during the last week of the quarter and write a report of your project, which must include all relevant data and code. Slides are needed for presentation; all students need to present; for deadlines see the following table:

|  |  |  |
| --- | --- | --- |
| Proposal Deadline | Presentations | Report Deadline |
| End of Week 5 | Last week of the quarter | June 12 |

The objective of this project is to give you the opportunity to analyze some published time series work or to implement time series techniques to a topic of your interest and get exposed to academic research. Please schedule an appointment with me early into the quarter to discuss your topic.

**Grading Scale:** The following grading scale will be used to assign letter grades to the corresponding numerical scores.

93 - 100% A 80 - 83% B- 67 - 70% D+

90 - 93% A- 77 - 80% C+ 64 - 67% D

87 - 90% B+ 73 - 77% C 0 - 64% F

83 – 87% B 70 - 73% C-

**Course Outline: *For Weekly Modules Please Check Camino Modules***

|  |
| --- |
| **Week/ Required Chapter Reading** |
| Week 1: April 3 – 7  Introduction and Review of the Course Requirements  Chapter 2: Time Series Graphics |
| Week 2: April 8 – 14  Chapter 2: Time Series Graphics  Chapter 3: Time Series Decomposition |
| Week 3: April 15 – 21  Chapter 3: Time Series Decomposition  Chapter 4: The Forecaster’s Toolbox |
| Week 4: April 22 – 28  Chapter 7: Time Series Regression Models |
| Week 5: April 29 – May 5  Chapter 8: Exponential Smoothing |
| Week 6: May 6 - 12  Chapter 9: ARIMA Models |
| Week 7: May 13 - 19  Chapter 9: ARIMA Models  Chapter 10: Dynamic Regression Models |
| Week 8: May 20- 26  **Take-Home Exam**  Chapter 10: Dynamic Regression Models |
| Week 9: May 27 – June 2  **May 27: Memorial Day – No class**  Chapter 12: Advanced Forecasting Methods |
| Week 10: June 3 – 7  Presentations |

The professor reserves the right to amend the syllabus as needed depending on work accomplished and needs of the class.

**Honor Code:** Students are expected to adhere to the terms of the university's academic honor code as spelled out in the Student Handbook. If you attempt to copy the homework from a fellow classmate, BOTH you and your fellow classmate who let you copy will receive ZERO credit. Any attempts to cheat or cheating on the exams will result in a grade of "F" for the course, which in some cases can lead to suspension or expulsion from the University.

You are encouraged to work with other fellow classmates however you must submit your own individual assignment.

**Course Dropping/Withdrawing**: If you wish to withdraw from the course, be sure to file the necessary withdrawal forms with the Registrar's Office. If you simply stop attending without filling out the form, you will receive zeros for your remaining works, which would probably result in an “F” for the course. The last day to drop this course *without* a “W” grade is *April 26, 2024*. The last day to drop this course *with* a “W” grade is *May 17, 2024*.

**Accommodations for disability:** If you have a documented disability for which accommodations may be required in this class, please contact the Office of Accessible Education ([oae@scu.edu](mailto:oae@scu.edu), [http://www.scu.edu/oae](https://www.scu.edu/accessibility/)) as soon as possible to discuss your needs and register for accommodations with the University. If you have already arranged accommodations through OAE, please be sure to request your accommodations through your myOAE portal and discuss them with me during my office hours within the first two weeks of class.

**Academic Integrity:** The policies of the university regarding academic integrity will be strictly enforced. “A student who is guilty of a dishonest act in an examination, paper, or other work required for a course, or who assists others in such an act, may, at the discretion of the instructor, receive a grade of “F” for the course. In addition, a student found guilty of a dishonest act may be subject to sanctions, up to and including dismissal from the University, as a result of the student judicial process as described in the Student Handbook. A student who violates copyright laws, including those covering the copying of software programs, or who knowingly alters official academic records from this or any other institution is subject to similar disciplinary action.” (2013-14 Undergraduate Bulletin, pg. 412)

SCU also implements an Academic Integrity Pledge, which states: "I am committed to being a person of integrity. I pledge, as a member of the Santa Clara University community, to abide by and uphold the standards of academic integrity contained in the Student Conduct Code.

Academic integrity is part of your intellectual, ethical, and professional development. I expect you to uphold the principles of this pledge for all work in this class. I will clarify expectations on academic integrity -- including the use of AI tools such as ChatGPT and course sharing sites for all assignments and exams in this course. If you have questions about what is appropriate on any assignment, please let me know before you hand in work. For more resources about ensuring academic integrity in your work, see this [LibGuide on Academic Integrity](https://libguides.scu.edu/academic-integrity)

I ask that you affirm this pledge to your work in this class. **There is no tolerance for academic dishonesty.** You are encouraged to work with other fellow classmates however you must submit your own individual assignments.

**Discrimination, Harassment and Sexual Misconduct (Title IX):** Santa Clara University is committed to providing a safe learning environment for all students that is free of all forms of discrimination, sexual harassment, and sexual violence. SCU has dedicated staff trained to support you in navigating campus resources, accessing health and counseling services, providing academic and housing accommodations, helping with legal protective orders, and filing a formal complaint with the university or with law enforcement. Here are key resources:

[Confidential Survivor Advocate](https://www.scu.edu/wellness/survivor-advocacy--support/), (408) 551-3307;

[Counseling & Psychological Services (CAPS),](https://www.scu.edu/cowell/counseling-and-psychological-services-caps/) (408) 554-4501; and

[Equal Opportunity and Title IX Office](https://www.scu.edu/title-ix/), (408) 551-3043.

**Mutual Respect in the Classroom:** Please respect each other’s right to speak even when their view is different from your own. There is zero tolerance in my classroom for hazing, disrespect, and discrimination. Such behavior is a violation of student misconduct code and will be subject to further university disciplinary actions.

**Respect for Diversity:** It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students’ learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

**Gender Inclusive Language** This course affirms people of all gender expressions and gender identities. If you go by a different name than what is on the class roster, please let me know. Using correct gender pronouns is important to me, so I encourage you to share your pronouns with me and correct me if I make a mistake. If you have any questions or concerns, please do not hesitate to contact me. For more on personal pronouns see [www.mypronouns.org](http://www.mypronouns.org)

**Land Acknowledgment**: Santa Clara University occupies the unceded ancestral homeland of the Ohlone and Muwekma Ohlone people.

**Wellness Statement:** This is a very strange time. And we are all anxious. So, take care, especially now. Do your best in this class (and all of your classes). And cut yourself a break. Be kind to others and yourself. Get plenty of sleep, drink lots of water, move, get outside, and pay attention to beauty that isn’t coming to you on a screen. Eat good food; enjoy friends and family; look for opportunities to connect with others in new ways; pray, meditate or otherwise attend to your spirit. And ask for help when you need it. Lots of folks, including me, are here to support you. These resources may be especially helpful:

<https://www.scu.edu/wellness/>

The Wellness center provides resources to aid and promote student well-being. It is home to three student groups: the Peer Health Educators, the Violence Prevention Educators, and the Collegiate Recovery Program.

<https://www.scu.edu/cowell/counseling-and-psychological-services-caps/>

Santa Clara students are provided counseling sessions at no cost with Counseling and Psychological Services. See website for details and eligibility.

<https://www.scu.edu/osl/culture-of-care/>

If you are concerned for the mental or physical welfare of one of your peers, the Compassionate and Responsive Educators website provides resources for recognizing and helping someone in distress.