San Jose State University/Department of Economics
ECON 281, Advanced Topics in Economics – Economic Forecasting, Sec 1, Fall, and 2018

Contact Information

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Office Hours:	W 6pm – 6:30pm and by appointment
Class Days/Time:	W 6:30pm – 9:15pm
Classroom:	DMH 358

Course Description

People routinely plan around the weather forecast, and are often displeased when it unfolds differently than expected. Similarly, movements in the economy matter to individuals, businesses, and governments, and these economic agents are likewise uncomfortable with unexpected changes in the economy. Thus, reliable ways to forecast economic variables are useful.

The purpose of this course is to introduce an array of methods and practices for analyzing time-series data and generating statistical forecasts. This will be accomplished through a mix of theoretical discussions and software-based applications to real-world problems. As will become clear, many familiar methods of inference are not well adapted to analyzing data with a time component, although some time-series methods do have close cross-sectional analogues.

Who should take this course? Economics 203A (Economic Research Methods) has long been the flagship statistical course for the economics MAs; this course is intended as its companion. Any student with graduate school aspirations should take this course. Students interested in the quantitative aspects of macroeconomics decisions will benefit greatly from this material as well. Practicing business professionals and consultants value these skills.

You are encouraged to use R. R is free, available on almost every operating system, and there are thousands of add-on packages to do almost anything you could ever want to do. I recommend you use [R](#) with [RStudio](#).

Throughout this course, I will provide you with intuitive explanations of the main theoretical concepts needed to be a forecaster. You will learn from hands-on demonstrations of model-building, forecasting and policy analysis, using data sets from a wide variety of countries.

Course Structure

This course is designed to provide a hybrid experience, including both face-to-face and online activities.

Contact time will be divided in the following way:

90% face-to-face

10% online

Online sessions will be a blend of self-paced and group activities using Canvas. Activities will consist of reading, voiceover PowerPoint lectures, online quizzes, discussion forums, and email.

Face-to-face sessions will be held on the San Jose State campus in DMH 358 only on Wednesdays.

Course Goals and Learning Objectives

This course aims to strengthen your skills in macroeconomic forecasting and policy scenario analysis. The course will focus on the application of econometric techniques for modeling the dynamic behavior of macroeconomic variables (for example, consumption, investment, inflation, etc.) and their response to policy changes.

CLOs	PLOs	Assignment
1. Explain properties of time series data and model design.	PLO 3 research methods PLO 4 Specialist Area-Quantitative Methods PLO 5 Communication	Learning outcomes are satisfied by weekly problems sets that contain two parts. The theory part helps students to gain basic understanding of the time series analysis. The application part asks

		students to do practical time series analysis using R. Seven quizzes are designed in a way such that students have to correctly identify the methods and apply them to real world problems.
2. Choose an appropriate macroeconometric model for a given set of data and evaluate the model. Specifically, use VAR or VECM model for model building and forecasting.	PLO 4 Specialist Area-Quantitative Methods	Weekly homework and quizzes
3. Be able to apply R in time series/forecasting situations	PLO 4 Specialist Area-Quantitative Methods	Such expected learning outcome are satisfied by the weekly R project which requires that students form an interesting forecasting question, gather relevant data, apply appropriate methods, and write up their results in the form of a well-written report.
4. Compute forecasts for uncertainty and for policy analysis	PLO 4 Specialist Area-Quantitative Methods	Weekly homework, quizzes and final project

Recommended Texts/Readings

The course material will be based on a set of materials being prepared by the instructor, but the following textbooks are highly recommended and they are FREE!

1. Hyndman and Athanasopoulos, Forecasting Principles and Practice, (online), http://otexts.org/fpp2/

2. Diebold, F.X. (2015), Forecasting, Department of Economics, University of Pennsylvania, http://www.ssc.upenn.edu/~fdiebold/Teaching221/Forecasting.pdf

Coursework Commitment

This is a three-unit graduate level course. SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of three hours per unit per week, including participating course activities, completing problem sets, mastering software languages, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at http://www.sjsu.edu/senate/docs/S12-3.pdf.

Prerequisite

A background in undergraduate statistics and econometrics, as taught in a standard economics program, is presumed. Time series analysis in economics rests on the mathematical and statistical models. Students should be comfortable with simple algebra and equations.

Demonstrations and applications will be conducted using R—a popular programing language for estimating and simulating forecasting models that has become a standard in industry, central banks and academic institutions worldwide. R is required for your participation in the course. Bur prior knowledge of R is not necessary, as it will be taught in the lectures.

Course Requirements and Assignments

The course grade will be based on bi-weekly quizzes, weekly problem sets, a final exam, and a project. The scores are averaged with the following weight:

Assignment	Weight
Problem Sets (lowest dropped)	25%
Quizzes (lowest dropped)	40%
Final Exam	15%
Project	20%

Quizzes

This course requires the use of **LockDown browser** for all quizzes. You must bring a laptop equipped with a LockDown browser to take quizzes in class. You can download and install Lock Down browser when you are going to take a practice quiz on Canvas.

All quizzes will consist of true/false and multiple-choice questions on…

• concepts

- definitions
- formulas
- data analysis

Problem Sets

There are approximately 13 problem sets. The problem sets are intended for students to review and apply materials from the lectures. Each problem set will contain two parts.

The **theory** part helps students to gain basic understanding of the time series analysis. It is kept at a minimum level but essential for progressing to deeper knowledge of time series. For this part, students are expected to work independently.

The **application** part asks students to do practical time series analysis using R. For this part, students are expected to work together in a group but hand in their separate copies.

In the application part, you will be asked to. . .

1. enter data;
2. graph data and some key measures;
3. specify a forecasting model with associated statistical hypotheses;
4. estimate a forecasting model;
5. interpret various diagnostics;
6. write an interpretation of the results and answer several questions.

Final Exam

The final exam will be an online exam using LockDown browser and a webcam (Respondus Monitor).

1. This course requires the use of LockDown browser and a webcam for online exams. The webcam can be built into your computer or can be the type that plugs in with a USB cable. Watch this short video to get a basic understanding of LockDown Browser and the webcam feature.

2. You can download and install Lock Down browser and Respondus when you are going to take a practice quiz on Canvas.

3. Note: Don't download a copy of LockDown Browser from elsewhere on the Internet; those versions won't work at our institution.

4. To take an online test, start LockDown Browser and navigate to the exam. (You won't be able to access the exam with a standard web browser.)

5. Finally, when taking an online exam, follow these guidelines:
   - Ensure you're in a location where you won't be interrupted
   - Turn off all mobile devices, phones, etc.

• Clear your desk of all external materials — books, papers, other computers, or devices
• Remain at your desk or workstation for the duration of the test
• If a webcam is required, make sure it is plugged in or enabled before starting LockDown Browser
• LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted
• If a webcam is required, you will be recorded during the test to ensure you're using only permitted resources

Project

In this course, you will be asked to apply the concepts that you learned in each lecture to estimate and evaluate your own econometric model. In particular, you will apply the techniques and models discussed in the lectures and exercises to U.S. data, specifically to estimate and evaluate a model of the U.S saving rate. More details will be announced in class.

Grading Policy

Final grades will be determined as follows:

Assignment	Weight	Dates
Problem Sets (lowest dropped)	25%	Due every Tuesday noon.
Quizzes (lowest dropped)	40%	9/5, 9/19, 10/3, 10/17, 11/7, 11/28
Final Exam (online)	15%	12/12, 7:45 pm – 10:00 pm
Project	20%	Due 12/5

Letter grades will be determined as follows:

A+ = 100-97%	A = 96-93%	A-= 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-77%	C = 76-73%	C- = 72-70%
D+ = 69-67%	D = 66-63%	D- = 62-60%
F = 59-0%		

Classroom Protocol

Please try to arrive on time.

In consideration of others, please don't talk during class! And silence phones.

Be sure to notice the specific due dates for assignments.

University Policies

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at http://www.sjsu.edu/provost/services/academic_calendars/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course.

- "Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material."
  - It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
  - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- "Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent."

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have

submitted, or plan to submit for another class, please note that SJSU's Academic Integrity Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

In 2013, the Disability Resource Center changed its name to be known as the Accessible Education Center, to incorporate a philosophy of accessible education for students with disabilities. The new name change reflects the broad scope of attention and support to SJSU students with disabilities and the University's continued advocacy and commitment to increasing accessibility and inclusivity on campus.

ECON 281 / Advanced Topics in Economics -- Economic Forecasting, Fall 2018, Course Schedule

Course Schedule

Week	Date	Topics
1	8/22	Syllabus, R Installation, R Basics, Managing Data Using R
2	8/29	Estimating/Forecasting a Linear Equation Using R, Statistics Basics and Review
3	9/5	Introduction to Time Series Data Identification of stationary processes **Quiz 1**
4	9/12	Estimation with Stationary Time Series and Model Selection Working with Data
5	9/19	Testing for Non-Stationarity and Unit Roots Is Our Data Non-Stationary? **Quiz 2**
6	9/26	Sources of Uncertainty Statistics for Forecast Assessment Theil's U Statistics
7	10/3	Introduction to Forecasting Strategies Applying Forecasting Strategies in R **Quiz 3**

Week	Date	Topics
8	10/10	Introduction to Structural Breaks Structural Breaks in R
9	10/17	Fan Charts and Fan Charts in R **Quiz 4**
10	10/24	Estimating VARs Forecasting with VARs
11	10/31	Structural VARs: Identification, Impulse Responses, and Variance Decomposition
12	11/7	Recursive Identification **Quiz 5**
13	11/14	Non-Recursive Identification
14	11/21	Introduction to Cointegration and Error Correction Vector Error Correction Models and Johansen Cointegration (**Online**)
15	11/28	Forecast with VECMs **Quiz 6**
16	12/5	Evaluating Regression Models **Project Due**
17	12/12	**Final Exam: Online from 7:45 pm to 10:00 pm**