

# UT MA Time Series ECO 395M

## Syllabus

Anastasia (Natassa) Zervou

### Lectures

Mondays and Wednesdays, 12:30-14:00 CT, BRB 2.136  
(with my best efforts for live streaming and recorded for online availability)

Spring Break: March 13-18

First & last class date: January 9-April 24; last class assignment due is Friday, April 28.

### Instructor and TA

Instructor: Anastasia (Natassa) Zervou-she/her/hers

Email: [azervou@utexas.edu](mailto:azervou@utexas.edu)

The best way to contact me is via email. Please indicate in the subject line the course number (ECO 395M)

Office Hours in Zoom: Mondays, 15:00-16:00 CT and as needed

Teaching Assistant: Maria Teresa Sarmiento

Email: [mtsarmiento@utexas.edu](mailto:mtsarmiento@utexas.edu)

Office Hours in Zoom: Thursdays 13:00-14:00 CT

Help sessions: Fridays 14:00-15:30 CT.

### Course Description, Prerequisites & Readings

Course Description: This is an advance econometrics course focused on time series issues with emphasis on empirical applications. The purpose of this course is to familiarize students with current techniques used in time series models with applications in macroeconomics and finance. Time series data introduces special issues to consider (vs. cross sections). We

will work on building time series models appropriate for different macroeconomic questions/applications and study ways to estimate them. Topics include distributed lag models, ARMA models, ARCH and GARCH models of volatility, unit roots; forecasting; impulse response functions, local projections, VARs; state-space models, recursive estimation and Kalman filtering; special applications on monetary policy shocks and fiscal shocks.

Prerequisites: The MA Econometrics course; if you have not taken that course you will need permission to register for Time Series.

Textbook: There is no required textbook for the course. You are responsible for studying the material taught during lectures, slides, notes, papers, and other material distributed.

Readings: There are several textbooks and resources that you may use (optional) for further readings beyond the course slides. The first part of the course is using information from the econometrics book you already have, "Introductory Econometrics", sixth edition, by J. Wooldridge. We will focus on the time series part (mostly chapters 10, 11, 12, 13, 16, & tentatively 18). I will be also using insights from: chapters 8 & 9 of the book "A Guide to Modern Econometrics", fourth edition, by M. Verbeek; chapters 7, 11, 12 of the book "Introduction to Econometrics", fifth edition, by C. Dougherty; chapters 7, 8, 9 of the book "Elements of Forecasting" by F. Diebold. The second part of the course is using mostly academic research papers. For the third part of the course we will keep using research papers, and also parts of the book "State space models with regime switching" from Kim and Nelson (the website for this book is: [Kim and Nelson book website](http://www.kim-nelson.com) )

Throughout the course we will be using various research papers, some of them listed below:

- Blanchard, O.J. and Quah, D., 1988. The dynamic effects of aggregate demand and supply disturbances. NBER
- Christiano, L.J., Eichenbaum, M. and Evans, C.L., 1999. Monetary policy shocks: What have we learned and to what end?. Handbook of macroeconomics, 1, pp.65-148
- Coibion, O., 2012. Are the effects of monetary policy shocks big or small?. American Economic Journal: Macroeconomics, 4(2), pp.1-32
- Gertler, M. and Karadi, P., 2015. Monetary policy surprises, credit

costs, and economic activity. *American Economic Journal: Macroeconomics*, 7(1), pp.44-76

- Jordà, Æ., 2005. Estimation and inference of impulse responses by local projections. *American economic review*, 95(1), pp.161-182
- Kilian, L., 2009. Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market. *American Economic Review*, 99(3), pp.1053-69
- Ramey, V.A., 2016. Macroeconomic shocks and their propagation. In *Handbook of macroeconomics* (Vol. 2, pp. 71-162). Elsevier
- Rossi, B. and Sekhposyan, T., 2010. Have economic models' forecasting performance for US output growth and inflation changed over time, and when?. *International Journal of Forecasting*, 26(4), pp.808-835
- Stock, J.H. and Watson, M.W., 1988. Variable trends in economic time series. *Journal of economic perspectives*, 2(3), pp.147-174
- Stock, J.H. and Watson, M.W., 2003. Forecasting output and inflation: The role of asset prices. *Journal of Economic Literature*, 41(3), pp. 788-829
- Stock, J.H. and Watson, M.W., 2018. Identification and estimation of dynamic causal effects in macroeconomics using external instruments. *The Economic Journal*, 128(610), pp.917-948

## Grading

Grading:

A) 35 points: There will be 7 homework assignments all having the same weight (5 points each) towards your grade.

Tentative deadlines are: *Jan 27, Feb 3, Feb 17, Feb 24, March 10, March 31, April 14*

B) 44 points: two exams (non-cumulative) having the same weight (22 points each) towards your grade. Tentative exams dates: *February 27, April 24*.

C) 21 points: a research poster that needs to be completed using techniques that you learn from the course. A one-page proposal is due *March 27, noon CT*. The posters will be presented on *April 12 and April 17* during class (and

we might need to add some time on April 14, depending on how many people take the class). The final posters are due to be submitted on *April* 28 noon. Posters can be completed in pairs of two students, after random assignment.

Posters are a presentation mean of completed research. As such, the research expectations are the same as they would have been if you were writing a paper. Yet, given the tight length of the course, and the lengthy process of writing a paper, you are not requested to submit a paper; you are required to submit the poster, for receiving a grade for the course. Specific guidelines on the format will be offered.

## Course policies

### Assignments & grading

There will be 7 homework assignments all having the same weight towards your grade. I will be dropping half of the grade of the lowest assignment, i.e., the lowest assignment will count for half. If for example your lowest assignment is the fourth one (A4), then your final number grade will be calculated as:  $\frac{A1+A2+A3+A5+A6+A7+(\frac{1}{2}A4+\frac{1}{2}\frac{A1+A2+A3+A5+A6+A7}{6})}{7}$ .

Late homework, posters and reports will not be accepted neither other type of accommodation could be given. Half of the grade of the lowest assignment will not be taken into account to provide some flexibility. The dates of the assignments are announced at the beginning of the semester, and please allow time to be able to complete the assignment on time. Please take into account that there might be arising personal circumstances that disrupt your schedule, but also allow time in order to avoid internet interruptions and other technical problems, which I will not be able to accommodate.

There is no make-up exam for reasons outside the university excused absences: Dean of Students info. If unable to attend the first exam, the weight of the first exam will be transferred to the second exam, so the second exam will be weighted as 44 points. Those requests should be sent to Prof. Zervou in writing (email is fine) before the exam, or at the earliest possible. The TA does not handle those issues.

Re-grading requests refer to the whole assignment/exam and not to specific questions/parts. All requests should be made in writing (email

is fine) within five working days of receiving tests and assignments back. Later requests will not be accepted.

Students are allowed/encouraged to discuss the assignments with their working group assigned to them by the instructor at the beginning of the semester (but no other students). However, students must submit their own write-up of solutions (see honor code below for details). A student might choose not to participate in group activities; however, if two or more students of a group decide to discuss class material, then the whole group should be notified.

Posters can be presented and completed in pairs of two students, so this is a group project. If a student drops the class and one student is left alone in a project, I will randomly reassign the student to a group. If a student decides to switch credit/no credit, the expectations regarding the project remain the same.

Help sessions are part of the course material. We try to record the help sessions, so the answers to the homework solutions are available to you at all times. We do not post written solutions.

I will use plus/minus grade categories when assigning final grades (i.e. A, A-, B+, B,...D-, F). Grades will be curved, meaning that your letter grade will be assigned based on your weighted average course score and your performance relative to the rest of the class. Please do not ask me about extra credit or extra work to improve your grade, as these are not available.

All instructions, assignments, readings and essential information and communication will be on the Canvas website at Canvas link. Specifically, I will be updating the file "structure notes" with links to all class material. Please follow the updates to this file closely.

## **Use of Class Materials**

No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets, and additional problem sets, may be shared online or with anyone outside of the class unless you have my explicit, written permission. Unauthorized sharing of materials promotes cheating. It is a violation of the University's Student Honor Code and an act of academic dishonesty. I am well aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in sanctions, including failure in the course.

Additionally, all these materials are copyright protected works. Any unauthorized copying of the class materials is a violation of federal law and may result in disciplinary actions being taken against the student.

### **Class Recordings**

Class recordings are reserved only for students in this class for educational purposes and are protected under FERPA. The recordings should not be shared outside the class in any form. Violation of this restriction by a student could lead to Student Misconduct proceedings.

### **Diversity, Equity, and Inclusion**

It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed, and that the diversity that students bring to this class can be comfortably expressed and be viewed as a resource, strength and benefit to all students. Please come to me at any time with any concerns.

### **Other**

Please do not use in class phones/laptop/tablets, as it is destructing to me and to your classmates. If you need to use technology inside the classroom for a specific reason, please talk to me before class.

## **University Policies & Resources**

### **Statement on Academic Integrity**

The University of Texas Honor Code states:

The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community. Each student in this course is expected to abide by the UT Honor Code and uphold academic integrity. Students who violate University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on academic dishonesty will be strictly enforced. For

further information, please visit the Student Conduct and Academic Integrity website at: [conduct](#).

What this means for this course: You are allowed/encouraged to study together with your groups and to discuss information and concepts covered in lecture and the recitation sections. However, this cooperation should never involve one student having possession of or copying directly from another student's work that is to be graded. Should such copying occur, both students involved will receive zeros for the assignment. In addition, directly copying from websites/books etc., for the homework will also return zero for the assignment. In addition, any collaborative behavior or use of unauthorized material for graded work, will lead to University disciplinary action. Finally, using books, notebooks, notes, electronic (e.g. phones) or other means during the exams, or copying from other students, violates the University and course policies.

### **ADA Notice**

The university is committed to creating an accessible and inclusive learning environment consistent with university policy and federal and state law. Please let me know if you experience any barriers to learning so I can work with you to ensure you have equal opportunity to participate fully in this course. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Services for Students with Disabilities (SSD). Please refer to SSD's website for more information: [SSD website](#). If you are already registered with SSD, please deliver your Accommodation Letter to me as early as possible in the semester so we can discuss your approved accommodations and needs in this course.

### **Counseling and Mental Health Center**

The Counseling and Mental Health Center serves UT's diverse campus community by providing high quality, innovative and culturally informed mental health programs and services that enhance and support students' well-being, academic and life goals. To learn more about your counseling and mental health options, call CMHC at (512) 471-3515. If you are experiencing a mental health crisis, call the CMHC Crisis Line 24/7 at (512) 471-2255.

## **Behavior Concerns Advice Line (BCAL)**

If you are worried about someone who is acting differently, you may use the Behavior Concerns Advice Line to discuss by phone your concerns about another individual's behavior. This service is provided through a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit behavior concerns website

## **BeVocal**

BeVocal is a university-wide initiative to promote the idea that individual Longhorns have the power to prevent high-risk behavior and harm. At UT Austin all Longhorns have the power to intervene and reduce harm. To learn more about BeVocal and how you can help to build a culture of care on campus, go to: BeVocal website.

## **Emergency Evacuation Policy**

Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated, or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors of the classroom and the building. Remember that the nearest exit door may not be the one you used when you entered the building.

- If you require assistance to evacuate, inform me in writing during the first week of class.

- In the event of an evacuation, follow my instructions or those of class instructors. Do not re-enter a building unless you are given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.

For more information regarding emergency evacuation, please contact the Office of Campus Safety and Security, 512-471-5767, safety website

## **Title IX Reporting**

Title IX is a federal law that protects against sex and gender-based discrimination, sexual harassment, sexual assault, sexual misconduct, dating/domestic violence and stalking at federally funded educational institutions. UT Austin is committed to fostering a learning and working envi-

ronment free from discrimination in all its forms. When sexual misconduct occurs in our community, the university can:

1. Intervene to prevent harmful behavior from continuing or escalating.
2. Provide support and remedies to students and employees who have experienced harm or have become involved in a Title IX investigation.
3. Investigate and discipline violations of the university's relevant policies (title IX relevant policies website).

Beginning January 1, 2020, Texas Senate Bill 212 requires all employees of Texas universities, including faculty, report any information to the Title IX Office regarding sexual harassment, sexual assault, dating violence and stalking that is disclosed to them. Texas law requires that all employees who witness or receive any information of this type (including, but not limited to, writing assignments, class discussions, or one-on-one conversations) must be reported. I am a Responsible Employee and must report any Title IX related incidents that are disclosed in writing, discussion, or one-on-one. Before talking with me, or with any faculty or staff member about a Title IX related incident, be sure to ask whether they are a responsible employee. If you would like to speak with someone who can provide support or remedies without making an official report to the university, please email advocate email. For more information about reporting options and resources, visit title IX website, contact the Title IX Office via email at [titleix@austin.utexas.edu](mailto:titleix@austin.utexas.edu), or call 512-471-0419.

## **Personal Pronouns**

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name, unless they have added a preferred name with the Gender and Sexuality Center, which you can do so here: [diversity website](#). I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the gender pronouns you use (she/he/they/ze, etc). Please advise me of any changes early in the semester so that I may make appropriate updates to my records. For instructions on how to add your pronouns to Canvas, visit [pronouns website](#).

## **Land Acknowledgment**

(I) We would like to acknowledge that we are meeting on Indigenous land. Moreover, (II) We would like to acknowledge and pay our respects to the Carrizo & Comecrudo, Coahuiltecan, Caddo, Tonkawa, Comanche, Lipan Apache, Alabama-Coushatta, Kickapoo, Tigua Pueblo, and all the American Indian and Indigenous Peoples and communities who have been or have become a part of these lands and territories in Texas, here on Turtle Island.

## Lectures (tentative)

I will be posting detailed description of the lectures together with lecture recordings and assignment links, on the "Structure Notes" file in Canvas. Please follow that file closely.

1. Lecture 1 (Mon 01/9)  
Syllabus; Time series irregularities; Distributed Lag model; IRFs
2. Lecture 2 (Wed 01/11)  
OLS assumptions
3. Lecture 3 (Wed 01/18)  
AR, MA, ARMA models; ACF, PACF
4. Lecture 4 (Mon 01/23)  
Autocorrelation/heteroskedasticity
5. Lecture 5 (Wed 01/25)  
Unit roots
6. Lecture 6 (Mon 01/30)  
Model selection
7. Lecture 7 (Wed 02/1)  
Forecasting
8. Lecture 8 (Mon 02/06)  
Forecasting
9. Lecture 9 (Wed 02/08)  
Forecasting/Discuss Poster structure
10. Lecture 10 (Mon 02/13)  
Cointegration/Tale of two econometricians
11. Lecture 11 (Wed 02/15)  
VAR, short run restrictions
12. Lecture 12 (Mon 02/20)  
VAR application: Killian oil price shocks
13. Lecture 13 (Wed 02/22)  
Review

14. Lecture 14 (Mon 02/27)  
Exam 1
15. Lecture 15 (Wed 03/01)  
VAR, long run restrictions
16. Lecture 16 (Mon 03/06)  
Macroeconomic Shocks: Identification
17. Lecture 17 (Wed 03/08)  
Local projections
18. Class 18 (Mon 03/20)  
Monetary policy shocks: what we know so far
19. Class 19 (Wed 03/22)  
Monetary policy shocks: what we know so far
20. Class 20 (Mon 03/27)  
Maximum Likelihood Estimation
21. Class 21 (Wed 03/29)  
State Space Model
22. Class 22 (Mon 04/03)  
Kalman Filter
23. Class 23 (Wed 04/05)  
Kalman Filter Application, Time Varying Parameter model
24. Class 24 (Mon 04/10)  
Kalman Filter Application, TVP and Matlab code
25. Class 25-26 (Wed 04/12 & Mon 04/17)  
Poster Presentations Fair
26. Class 27 (Wed 04/19 )  
Review
27. Class 28 (Mon 04/24 )  
Exam 2
28. 04/28 noon  
Poster due