ARE 256B: Applied Econometrics II
University of California, Davis
Winter 2026 Syllabus

Instructor:	Bulat Gafarov, office hours: Fridays 3:00-4:00 or by appt.
TA:	Mahdi Shams (mashams@ucdavis.edu), office hours: TBA.
Class Website:	All course materials will be available on Canvas UC Davis.
Lectures:	Mondays and Wednesdays 2:10-3:30 pm in Olson Hall 244.
Section:	Fridays 9:00-9:50 am in Storer Hall 1344.
Assignments:	Four problem sets.
Exams:	There will be a midterm and a final.
Grading:	30% Assignments, 30% Midterm, 40% Final.

COURSE DESCRIPTION

This course builds on ARE 256A, which is the pre-requisite. In ARE 256A, you learned about the key applied econometric tool, *linear* regression, and how to use it for *causal* inference primarily with *cross-sectional* data. There are three directions that this course takes you beyond 256A: (1) nonlinear models in the cross-sectional setup, (2) linear time series and panel models. The first topic is particularly useful when the dependent variable is binary (e.g. employment status) or censored (e.g. income). In the second topic, we will discuss caveats and advantages of using time-dependent data.

COURSE MATERIALS & RESOURCES

Textbooks: Similar to ARE 256A, the primary textbooks here are: (1) *Introductory Econometrics: A Modern Approach* 7th Edition by Jeffrey Wooldridge, (2) *Mastering 'Metrics* by Joshua Angrist and Joern-Steffen Pischke. I will also post *Running Stata Like a Boss: The Extreme Stata Manual* by James A. Chalfant.

Lecture Notes: Lecture Notes will be provided for each section of the course on Canvas UCDavis as well as a softcover hardcopy. It is best to always bring them with you, so you can take notes on them directly.*I assume that you have read the slides for the corresponding lecture in advance and come to the class prepared.* This way we can spend more time for active discussion in the class.

Assignment and Midterm Policy: Assignments must be submitted on their due date. As for midterm, there is no make-up. If you miss a midterm, then greater weight will be given to the final in your grade, specifically 70%. You are expected to uphold the UC Davis Code of Academic Conduct (`http://sja.ucdavis.edu/cac.html`) at all times.

ARE 256B Tentative list of topics

	Monday	Wednesday
Week 1	Intro to nonlinear models LS Estimation, bias, std. errors	Random utility model Std. errors
Week 2	Discrete outcome models Logit; Goodness of fit; Interpretation	Maximum likelihood & Resampling Efficiency, Asy. Normality
Weeks 3	(MLK day)	Censoring and Sample-Selection Tobit & Heckit
Week 4	Causal inference Randomized experiments	IV
Week 5	RDD	Fuzzy RDD
Week 6	Review	Midterm
Week 7	(President's day)	Stationary Univariate Time Series: ACF; MA Representation, AR models
Week 8	Autocorrelated residuals HAC std. errors	Multivariate time series Local Projection; Dynamic causal effects
Week 9	Nonstationary models Spurious regression; Co-integration	Linear Panel Models: Fixed Effects Regression;
Weeks 10	Linear Panel Models: Time effects; Clustered std. errors	Difference-in-Differences Estimation (Diff-in-Diff)