ECO 450: Forecasting in Economics and Business

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Office Hours:
- Monday/Wednesday: 11:00 – noon and 2:30 – 5 p.m.
- Tuesday: 9:00 – noon
(or by appointment)

Department: Economics and Finance

Class meeting time and place: M/W, 1-2:15 p.m. in McGee 224
Class website: https://d2l.sfasu.edu/

Catalog Description: An introduction to the forecasting techniques used frequently in economics and business.

Prerequisites: ECO 231, ECO 232, and ECO 339


Attendance Policy: I will keep an official record of your class attendance until the 12th class day, even though it does not formally enter into your course grade.

Course Requirements/Grading/Attendance Policy:
Grades will be based on three exams (the first two worth 50 points and the final worth 70) and seven mini-projects (worth 10 points each), for a total of 240 points in the course. Note: no makeup exams will be given, and exams will only be excused if you promptly provide me verifiable evidence that the absence is excused based upon SFA policy (the absence was caused because of health, family emergencies, or student participation in approved university-sponsored events). If the exam is excused, the weight of the excused exam will be dropped from the course. Assignments will be submitted via a drop box in D2L and late assignments will not be accepted.

Letter grades are based on a ‘straight scale’ (from 240 possible points):
90% and above is an A
80% and above is a B
70% and above is a C
60% and above is a D
Less than 60% is an F

Student Learning Outcomes:
Upon successful completion of the course a student will:
1.) Use the appropriate terminology of economic/business forecasters.
2.) Use appropriate technology to plot economic/business data and forecasts.
3.) Use multiple regression models to forecast using cross-sectional data.
4.) Use various techniques to forecast in time-series data.
5.) Evaluate the performance of forecasting models, and understand criteria for model selection.
Tentative Content Calendar:

**Week 1:** Introduction to forecasting (Chapter 1) and introduction to R  
**Week 2-3:** The forecaster’s toolbox: visualization, transformations, and forecast accuracy (Chapter 2/3)  
**Week 4:** Practical forecast considerations (Chapter 4)  
**Week 5:** Simple linear regression and statistical inference review (Chapter 5)  
Exam #1  
**Wednesday, September 25th**  
**Week 6:** Forecasts with simple linear regression (Chapter 5)  
**Week 7:** Multiple regression models (Supplemental readings)  
**Week 8:** Model selection criteria for multiple regression (Chapter 5 and supplemental readings)  
**Weeks 9:** Time-series decomposition (Chapter 6)  
Exam #2  
**Wednesday, October 30th**  
**Week 10-11:** Smoothing techniques for forecasting (Chapter 7)  
**Weeks 12-14:** Autoregressive (AR), moving average (MA), and ARIMA models (Chapter 8)  
Final Exam:  
**Monday, December 9th at 1:30 p.m**

Program Learning Outcomes:

Program learning outcomes define the knowledge, skills, and abilities students are expected to demonstrate upon completion of an academic program. These learning outcomes are regularly assessed to determine student learning and to evaluate overall program effectiveness. You may access the program learning outcomes for your major and particular courses at [http://www.sfasu.edu/cob/ug-plo.asp](http://www.sfasu.edu/cob/ug-plo.asp)

Withheld Grades--Grades Policy (5.5)

At the discretion of the instructor of record and with the approval of the academic unit head, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F, except as allowed through policy related to active military service. If students register for the same course in future semesters, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. Please refer to the complete policy at [http://www.sfasu.edu/policies/course-grades.pdf](http://www.sfasu.edu/policies/course-grades.pdf).

General Student Policies: Academic Integrity (4.1)

Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit. Please read the complete policy at [http://www.sfasu.edu/policies/student_academic_dishonesty.pdf](http://www.sfasu.edu/policies/student_academic_dishonesty.pdf)

Students with Disabilities

To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided.
Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the full Student Conduct Code at http://www.sfasu.edu/policies/student-conduct-code.pdf ). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic, or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the iCare Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.

Course Topics (Details)

1. Introduction to forecasting
   a. Terminology and methods introduction
   b. Cross-sectional vs. time-series forecasting
   c. Some examples/case studies
2. The forecaster’s toolbox
   a. Visualization of data
   b. Time-series patterns
   c. Some simple forecasting methods
   d. Some simple forecast evaluation criteria
   e. Training and tests
3. Practical forecast considerations
   a. Principles and limitations of forecasts
   b. Best practices in forecasting
4. Simple linear regression
   a. Review of framework
   b. Review of statistical inference (hypothesis tests/confidence intervals)
   c. Functional forms
   d. Use to forecast
5. Multiple regression
   a. Introduction and intuition
   b. Cross-sectional and time-series applications
   c. Dummy variables
   d. Model selection criteria and diagnostics
6. Time series decomposition
   a. Trend, seasonality, cycles
   b. Common decomposition methods
      i. Moving averages
      ii. Additive versus multiplicative decomposition
      iii. Forecasting with decomposition
7. Some additional smoothing techniques for forecasting
   a. Exponential smoothing intuition and application
   b. Application of smoothing to forecasting
8. Autoregressive (AR), moving average (MA), and ARIMA models
   a. Stationarity and differencing
   b. Autoregressive models
   c. Moving average models
   d. Unit root tests
   e. ARIMA modeling
   f. Using ARIMA models to forecast
9. **Time permitting:** Forecasting Binary outcomes (example: Logistic regression)