Office. Economics Building 105.

Meetings. Mondays, Wednesdays and Fridays 12:00 PM - 12:50 PM in ECON 119.

Office hours. Mondays 4:30 PM - 6:00 PM and by appointment. For appointment send an email to carlos.martins@colorado.edu.

Prerequisites. Successful completion of ECON 3818 or equivalent is a required pre-requisite. ECON 4818 is desirable but by no means necessary.

Objectives. Introduce statistical models, estimation and testing procedures used in analyzing financial data.

Class URL. http://spot.colorado.edu/~martinsc/ECON_4858.html.

Grades. Grades (A-F) will be based on the following:

- There will be four sets of homework questions whose answers will be graded. Each set accounts for 10 percent of your course grade. Some of these questions will involve the use of MATLAB, a software that is freely available on campus.
- There will be one midterm examination. It accounts for 30 percent of your course grade.
- There will be a final examination. It accounts for 30 percent of your course grade.

Dates for the examinations:

<table>
<thead>
<tr>
<th>Examination</th>
<th>Date and Time</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>October 15 (Part 1) and 17 (Part 2), Econ 119</td>
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<tr>
<td>Final Examination</td>
<td>December 15, 10:30 AM - 1:00 PM, Econ 119</td>
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Homework sets will be available on the class web site with their respective due dates.

Textbook.


Additional.

   This book gives an informal and historical account of the development of many of the models we treat in class. Great reading for all students in this course.
   These books contain much of the material in our textbook. In many instances, however, the treatment is more advanced.
   This is an advanced textbook, normally used in graduate courses. Its study is recommended for those
   that have taken more advanced courses in probability, statistics and econometrics and are looking for
   a deeper understanding of what we discuss in class.

   Jersey.
   This is one of many step-by-step manuals/guide to MATLAB that are commercially available. It is
   very easy to read and provides speedy access to the many resources this software offers.

**Topics.**

All readings are from the textbook and class notes.

1. Introduction and Basic Concepts for Probability and Statistical Models
   - Random variables
   - Distribution functions, Cumulative distribution functions
   - Quantiles, moments, order statistics
   - Skewness, kurtosis and heavy tail distributions
   - Multivariate distributions, marginals and conditional distributions
   - Prediction Estimation - maximum likelihood, least squares
   - Hypothesis testing and confidence intervals

2. Returns
   - The random walk model
   - The efficient market hypothesis

3. Regression
   - Least squares estimation
   - Regression and best linear prediction
   - Non-normality and data transformations

4. Time Series Models
   - Stationarity
   - Autoregressive AR(p) models and estimation
   - Moving average models MA(q) and estimation ARMA/ARIMA models
   - Model selection: Akaike's information criterion (AIC) and Bayesian information criterion (BIC)
   - Forecasting
   - ARCH and GARCH models

5. Portfolio theory
   - Trading off expected return and risk
6. The capital asset pricing model
   Capital market line, security market line
   Security characteristic line
   Using CAPM in portfolio analysis
   Factor models

7. Fixed income securities
   Zero-coupon bonds, coupon bonds
   Yield to maturity
   Term structure
   Continuous compounding
   Continuous forward rates
   Sensitivity of price to yield

8. Value-at-Risk
   One asset
   Portfolio

9. Options pricing
   Call options
   The law of one price
   Pricing calls
   Martingales
   The Black-Scholes model, formula and its use
   Puts
   Evolution of option prices
   Leverage of options and hedging

Important information.

- If you qualify for accommodations because of a disability, please submit a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail dsinfo@colorado.edu.

If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with me.

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