Economics 882

James G. MacKinnon

January, 2025

1 Introduction

- ECON 882 is a masters-level course that deals with **machine learning**, also called **statistical learning**.

- It is assumed that all students have taken a serious masters-level econometrics course like ECON 852.

- The emphasis will be on developing an intuitive understanding of the key ideas of statistical learning, as well as familiarity with a number of widely-used methods.

- Students are expected to learn how to employ a variety of machine-learning methods using either R or Python. The instructor is more familiar with R.

- Lectures: Tuesdays 10:00–11:20, Thursdays 8:30–9:50.

- There will also be tutorials, on Thursdays from 4:00 to 5:00, taught by the TA, Mehtab Hanzroh.

2 Books

- Much of the course will be based on the books

  - *An Introduction to Statistical Learning, with Applications in R*, Second Edition, by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani (Springer, 2021); hereafter ISLR.

- *An Introduction to Statistical Learning, with Applications in Python*, by Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, and Jonathan Taylor (Springer, 2023); hereafter ISLP.

These are essentially the same book, except for the computer programs. They can legally be obtained as PDF files. Go to `https://www.statlearning.com/`.

- The course may also cover some material based on the more advanced book *Elements of Statistical Learning* by Trevor Hastie, Robert Tibshirani, and Jerome Friedman, Second Edition (Springer, 2009)—hereafter ESL— and on other sources. This book can also be downloaded freely.

- In addition, some use will be made of the book *Applied Causal Inference Powered by ML and AI* by Victor Chernozhukov, Christian Hansen, Nathan Kallus, Martin Spindler, and Vasilis Syrgkanis, arXiv:2403.02467; see `https://causalml-book.org/`. It can also be downloaded freely.

- The course website is here:

  `http://qed.econ.queensu.ca/pub/faculty/mackinnon/econ882/`

- Regular assignments (3 of them) will be worth 40% of the final mark, and the empirical project will be worth 60%.

- Students should choose their own topic and dataset for the empirical project. It would be advisable to discuss the choice with the instructor and/or the TA.

- Answers to each assignment should be submitted to the TA as a single PDF file.

- The due date for the empirical assignment will depend on when grades have to be submitted to the Graduate School. It will probably be around the very end of April.

The total cost of all required learning materials is $0.00.