Economic Forecasting
Econ 493 B1 - Winter 2023

Instructor:	Sebastian Fossati
Office:	Tory 7-11
Email:	sfossati@ualberta.ca

Lectures
Monday and Wednesday 9:30 am to 10:50 am in T 1-083 (Tory Building).

Remarks:

- There may be classes on which I am unavailable for our *face-to-face* lectures. On those days, the sessions will be on live Zoom or pre-recorded.

- Other sessions may be on Zoom if COVID-19 safety protocols demand it.

Office Hours
Friday 10:00 am to 12:00 pm. Note that an appointment must be booked in advance. Office hours may be adjusted throughout the term, and additional hours may be added before the midterm exams.

eClass
I will be using eClass to post course documents. These will include my lecture notes, assignments, answer keys to assignments, and some old exams (without answer keys). eClass will also be used for assignment submission.

Course Description
Econometrics is the study of statistics as applied in economics. We are interested in answering three kinds of questions. (1) How do we test a given scientific hypothesis? (2) How do we measure parameters of scientific interest? (3) What are good forecasting methods?

(1) and (2) are covered in Econ 399 and Econ 497. (3) is the main focus of Econ 493.

Specifically, we will discuss methods for modeling and forecasting economic data. Topics may include regression models, cross-validation, machine learning methods, classification, predictive analytics, and forecasting with time series data.

Learning Goals

By the end of the course students should: (1) Obtain an understanding of common statistical methods used in business and economic forecasting. (2) Develop the computer skills required to forecast business and economics data. (3) Gain insights into the problems of implementing forecasting methods for use in business and economics.

Course Prerequisites and Corequisites

Prerequisites: Econ 399 or consent of the department. These pre/corequisites are enforced by the department. If you do not have these pre/corequisites your registration may be cancelled.

Textbooks

We will mainly use two books, both are available for free online. If you prefer, paperback versions are available from Amazon.

- James, G., Witten, D., Hastie, T., and Tibshirani, R. (2021): An Introduction to Statistical Learning: with Applications in R, 2nd edition.
  Available here: `https://www.statlearning.com`

- Hyndman, R., and Athanasopoulos, G. (2018): Forecasting: Principles and Practice, 2nd edition.
  Available here: `https://otexts.org/fpp2/`

Additional Textbooks

You may also find the following textbooks useful (other editions can also be used).

- Békés, G., and Kézdi G. (2021): Data Analysis for Business, Economics, and Policy.

- Elliott, G. and Timmermann, A. (2016): Economic Forecasting.

- Hyndman, R., and Athanasopoulos, G. (2021): Forecasting: Principles and Practice, 3rd edition.

- Taddy, M. (2019): Business Data Science: Combining Machine Learning and Economics to Optimize, Automate, and Accelerate Business Decisions, 1st edition.

- Verbeek, M. (2012): A Guide to Modern Econometrics, 4th edition.

- Wickham, H., and Grolemund, G. (2017): R for Data Science.

Econometrics Package

R is used extensively in the course. R is a free software environment for statistical computing and graphics (`http://www.r-project.org`).

Evaluation
The final grade will be based on four homework assignments (10%, 2.5% each), a forecasting project (30%), a first midterm exam (30%), and a second midterm exam (30%). Further details will be provided as assignments are distributed. Regular class participation is expected. No extra credits are available.

Grades reflect judgments of student achievement made by instructors. These judgments are based on a combination of absolute achievement and relative performance in a class.

Remarks:

- Homework assignments will be a combination of computer problems using R and analytical problems. Everyone must turn in their own assignments, but collaboration is permitted. Late homework assignments will not be accepted. Solutions will follow after the assignments are handed in.

- The forecasting project will be a short length report. This report (and the associated proposal and class presentation) will have cumulative late penalties. The report must be completed in order to receive credit for this course. Detailed instructions will be distributed later.

    - Proposal due date: Monday February 27 at 11:59 am.
    - Final report due date: Friday April 14 at 11:59 am.

- First Midterm Exam: Wednesday February 15 at 9:30 am. Sample exam questions will be made available on the course website.

- Second Midterm Exam: Wednesday March 29 at 9:30 am. Sample exam questions will be made available on the course website.

- No final exam.

- You must not use answers from previous years or answers posted online. If I determine that these conditions were violated, you will receive zero points on the assignment or exam, and the incident will be referred to the Dean's office for further action.

Class Presentations
All students are required to give a short presentation (10 to 15 minutes) on their forecasting project. Students will be required to prepare (about) 5 slides with the selected time series, some preliminary results (mainly graphs and tables), and a brief discussion of any problems faced. Presentations will take place during the last two weeks of class. Students should be ready to present at any time and are expected to attend every class.

Missed / Deferred Exams

Deferral of term work is a privilege and not a right; there is no guarantee that a deferral will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

There will be no make-up midterm exam. A student who misses the midterm exam because of incapacitating illness, severe domestic affliction or other compelling reason (including religious conviction) may have the percentage weight transferred to other class work.

Course Outline

Notes: ISL2 denotes "An Introduction to Statistical Learning: with Applications in R, 2nd edition". FPP2 denotes "Forecasting: Principles and Practice, 2nd edition".

1. An introduction to R, data cleaning, and plotting with R
   R for Data Science

2. Forecasting with regression models
   ISL2: ch. 3, 5.1, 6.1, 6.5

3. Shrinkage methods
   ISL2: ch. 6.2

4. Time series data
   FPP2: ch. 2

5. Forecasting with time series data
   FPP2: ch. 3

6. Regression models with time series data
   FPP2: ch. 5

7. ARIMA models
   FPP2: ch. 8

8. Seasonal ARIMA models
   FPP2: ch. 8, 6

9. Dynamic regression models
   FPP2: ch. 9

10. Other topics
    FPP2: ch. 7, 11, 12

Student Responsibilities

Academic Integrity: The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at www.governance.ualberta.ca) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

All students should consult the Academic Integrity website. If you have any questions, ask your instructor.

An instructor or coordinator who is convinced that a student has handed in work that he or she could not possibly reproduce without outside assistance is obliged, out of consideration of fairness to other students, to report the case to the Associate Dean of the Faculty. See the Academic Discipline Process.

Recording of Lectures: Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Disclaimer: Any typographical errors in this syllabus are subject to change and will be announced in class and posted on the course website. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this syllabus.

Recording of Virtual Meetings

Because I'll record zoom lectures, please read the following disclaimer: "Please note that class times for this course will be recorded. Recordings of this course will be used to allow students enrolled in the course to review the material and will be disclosed to other students enrolled in this section of the class. Students have the right to not participate in the recording and are advised to turn off their cameras and audio prior to recording; they can still participate through text-based chat. It is recommended that students remove all identifiable and personal belongings from the space in which they will be participating."

Recordings will be made available until the end of term and accessible eClass.

Please direct any questions about this collection to the professor of this course: Sebastian Fossati (`sfossati@ualberta.ca`).

Student Resources

The best all-purpose website for student services is: https://www.ualberta.ca/current-students.

Accessibility Resources: The University of Alberta is committed to creating work and learning communities that inspire and enable all people to reach their full potential. Accessibility Resources promotes an accessible, inclusive, and universally designed environment. For general information to register for services visit the Accessibility Resources webpage.

The Academic Success Centre: The Academic Success Centre offers a variety of workshops on effective study and exam strategies. There are in-person and online sessions available for a modest fee.

The Centre for Writers: The Centre for Writers offers free one-on-one writing support to students, faculty, and staff. Students can request consultation for a writing project at any stage of development. Instructors can request class visits and presentations.

Learning and working environment

The Faculty of Arts is committed to ensuring that all students, faculty and staff are able to work and study in an environment that is safe and free from discrimination and harassment. It does not tolerate behaviour that undermines that environment.

The University of Alberta acknowledges that we are located on Treaty 6 territory, and respects the histories, languages, and cultures of the First Nations, Métis, Inuit, and all First Peoples of Canada, whose presence continues to enrich our vibrant community.

Policy about course outlines can be found in the Evaluation Procedures and Grading System section of the University Calendar.