

**Economics 623/723**  
Applied Macroeconometrics I  
**Winter 2017 Course Outline**

**Contact Information:**

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**Course Time, Location, Office Hours and Teaching Assistant:**

Time and location: TuTh, 1:00–1:20 pm, RCH 106  
Office hours: Wednesday, 10:15 – 11:45 am or by appointment

## 1 Course Description

This course will cover various topics in time series econometrics and empirical macroeconomics. The objective of the course is to provide basic methods to analyze macro/aggregate data, estimate time-series models, forecast major macro variables and simulate macro-models. The first part of the course introduces univariate time series models, elements of forecasting, model evaluation and detrending methods. The second part of the course presents empirical applications of structural VARs, factor analysis, state-space models and Kalman filtering. The course will provide a hands-on experience to macro data and students are encouraged to bring their laptop to class to replicate the methodology as well as the empirical models used in the lectures. We will be using different software packages, including Matlab and EViews.

## 2 Textbook and Readings

There are three textbooks that I will use for this course.

- (i) Diebold, Francis., “Time Series Econometrics: A Concise Course,” [FD1]
- (ii) Diebold, Francis., “Forecasting in Economics, Business and Beyond,” [FD2]
- (iii) Cochrane, John, “Time Series for Macroeconomics and Finance,” [JC]

In addition to the textbook, I will make copies of my lecture notes available on LEARN. The course contains a number of required readings. **You are expected to read all of the papers that are on the required reading list.** PhD students should also read some of the papers in the additional reading list. Most of the papers can be found online or from the author’s webpage. Please let me know if you cannot find a particular paper.

### 3 Lecture Topics and Readings

#### (I) Introduction to time-series data

- Software and data source
- Deterministic and stochastic trends
- Differencing and detrending

Readings:

- (i) FD1, chapter 1
- (ii) JC, chapter 2
- (iii) Gomez, V. 1999. “Three Equivalent Methods for Filtering Nonstationary Time Series,” *Journal of Business and Economics Statistics*, 17, 109-116.
- (iv) Cogley T., and James M. Nason. 1995. “Effects of the Hodrick-Prescott filter on trend and difference stationary time series: Implications for business cycle research,” *Journal of Economic Dynamics and Control* 19: 253-278

#### (II) ARMA processes and forecasting

- ARs, MAs and ARMAs
- Correlogram, lag length selection and impulse response function
- Forecasting and combining forecasts from different models

Readings:

- (i) FD1, chapter 2
- (ii) JC, chapters 3, 4, 5 and 6
- (iii) FD2, chapter 4, p 333-344

#### (III) Structural VARs

- Reduced-form VARs
- Short-run, long-run and sign restrictions
- Forecasting with VARs

Readings:

- (i) JC, chapter 7
- (ii) Killian, Lutz. 2011. “Structural Vector Autoregression,” *Handbook Of Research Methods And Applications In Empirical Macroeconomics*. This paper can also be downloaded at [www-personal.umich.edu/~lkilian/elgarhdbk\\_kilian.pdf](http://www-personal.umich.edu/~lkilian/elgarhdbk_kilian.pdf)

- (iii) Lutkepohl, H. 2011. “Vector Autoregressive Models,” in *Handbook Of Research Methods And Applications In Empirical Macroeconomics*. This paper can also be downloaded at [cadmus.eui.eu/bitstream/handle/1814/19354/ECO\\_2011\\_30.pdf](http://cadmus.eui.eu/bitstream/handle/1814/19354/ECO_2011_30.pdf)

(IV) Factor models

- Principal components
- Factor Analysis

(V) Unit roots, non-stationarity, breaks and cointegration

Readings:

- (i) JC, chapter 11

(VI) State-Space models and the Kalman filter

- State-space form
- Kalman filtering
- Time varying parameter models

Readings:

- (i) FD1, chapter 4, p 54-79

## 4 Evaluation

For MA students, the evaluation is as follows:

- Final exam at the end of the term (worth 35 percent). The exam is cumulative although there will be more weight assigned to the material covered after the midterm
- Midterm (worth 20 percent) on March 2nd, 2017
- 4 assignments worth 25 percent of your total marks
- Term paper worth 20 percent of your total marks

For PhD students, the evaluation is as follows:

- Final exam at the end of the term (worth 30 percent). The exam is cumulative although there will be more weight assigned to the material covered after the midterm
- Midterm (worth 15 percent) on March 2nd, 2017
- 4 assignments worth 20 percent of your total marks
- Term paper worth 20 percent of your total marks
- Short summary and replication of 2 articles worth 15 percent of total marks

## 5 Policy on Missed Tests and Assignments

- (i) Assignments have to be handed on time. If you miss the deadline, you will receive a mark of zero. No exceptions are allowed.
- (ii) No make-up tests or assignments will be provided.
- (iii) Students who miss a midterm for medical reasons have **one week** to submit the relevant medical certificate (original documents and not a photocopy or a scanned copy).
- (iv) Students who do not have a relevant medical certificate or who do not hand in the medical certificate on time will receive a mark of zero on any missed test.
- (v) The weight of the missed midterm will be automatically transferred to the final exam.

## 6 Policy on Remarking of Tests

All regrade requests must be submitted to me within one week of receiving the grade in question. In your request, you must clearly indicate the reasons why you want your midterm or your assignment to be regraded. Note that if you want your midterm and assignment re-graded, I will remark the entire piece of work. Your grade may go up, down or stay the same as a result of this.

## 7 Academic Integrity

### 7.1 Academic integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the [UWaterloo Academic Integrity webpage](#) and the [Arts Academic Integrity webpage for more information](#).

### 7.2 Discipline

A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about rules for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 - Student Discipline. For information on categories of offenses and types of penalties, students should refer to [Policy 71 - Student Discipline](#). For typical penalties check [Guidelines for the Assessment of Penalties](#).

### 7.3 Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](#), Section 4. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

### 7.4 Appeals

A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72 - Student Appeals](#).

## 8 Accommodation for Students with Disabilities

**Note for students with disabilities:** The [AccessAbility Services office](#), located on the first floor of the Needles Hall extension (1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.