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| **COURSE TITLE** |  |  |
| FRE 530: Econometrics with Time Series Data | | |
| **COURSE INFORMATION** | | |
| Session and term: 2022 W2 Class location: MCML 154  Class times: M/W 5:30-7:00 PM Lab times: Wed 4:30-5:30  Course duration: Feb 27 – Apr 14 Credits: 1.5 | | |
| **COURSE DESCRIPTION** | | |
| This course will introduce students to the basic techniques of time series econometrics and will investigate both univariate and vector processes in time series models. The goal of this course is to provide students with sufficient understanding and application of time series methods to be comfortable working within a modeling environment (i.e., forecasting roles, food and resource macroeconomic studies, etc.) that deals with time series analysis. A variety of models and analytical methods will be investigated in this course including stationary and non-stationary forecasting models, asymptotic theory for time series, linear regression with time series data, Box-Jenkin’s modeling strategy (ARIMA), Vector Autoregression (VAR), ARCH and error correction models. The emphasis of this course is on understanding the econometric time-series methods and its application using real data. | | |
| **INSTRUCTOR INFORMATION** | | |
| Instructor: Kurt Niquidet, Ph.D.  Phone: 778 222-7375 Office location: TBD  Email: [kurt.niquidet@ubc.ca](mailto:kurt.niquidet@ubc.ca), niquidet@cofi.org Office hours: By appointment | | |
| **LEARNING OBJECTIVES** | | | |

After this course, students will be able to:

* Decompose time series into its constituent parts and be able to deal with both stationary and non-stationary time series data
* Estimate and interpret univariate and multivariate time series econometric models (basic and more advanced models).
* Apply estimated time series models to areas of policy analysis and forecasting.
* Understand the role of predictive analytics in the context of a number of applications to business, finance and resource economics
* Be proficient using R Studio to exploratory time series analysis; apply advanced time series econometric methods and estimation methods to empirical data.
* Be capable of critically evaluating published econometric research that use advanced time-series econometrics methods

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| **LEARNING MATERIALS** |
| Lecture materials and discussions will be drawn from a variety of textbooks and journal papers. You will be provided with electronic Chapter files that will be posted in Canvas as reference and reading material.  Time Series analysis is a rich and complex area and the following references may be drawn upon in this course:   * "Applied Econometric Time Series", 4th Edition by Walter Enders, John Wiley and Sons, 2015. * “Time Series Analysis: Univariate and Multivariate Methods”, 2nd Edition, Wei, W., Pearson 2006. * “Applied Econometrics”, 3rd Edition by D. Asteriou and S. Hall, MacMillan Education, 2016. * “Forecasting: Principles and Practice”, 2nd Edition by Rob J Hyndman and George Athanasopoulos. |

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| **ASSESSMENTS** |

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| Assignments | View MFRE online schedule | **25** |
| Project ( Team or Individual) & Presentation | View MFRE online schedule | **35** |
| Participation | View MFRE online schedule | **10** |
| Final Exam | View MFRE online schedule | **30** |
| **TOTAL** | | **100** |

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| **COURSE SCHEDULE** |

**Note: Topics may change to some extent but these are the major elements**

1. Week 1 - Stationarity

* Stochastic trends and spurious regression.
* Differencing and order of integration.
* Difference in log prices as a measure of return.
* Meaning of unit root.
* Dickey Fuller and Augmented Dickey Fuller (ADF) test.
* R application to corn prices and the corn basis (spot minus futures).

2. Week 2 - Co-integration

* Accessing on-line data.
* Working with dates and weekly data in R.
* Relationship between co-integration and stationarity.
* Expected theoretical long run relationship between prices of diesel fuel and soybean oil (bio-fuel connection).
* Two-step Engels-Granger test for co-integration.
* R application of Engels-Granger test for diesel fuel and soybean oil prices.

3. Week 3 - Error Correction Model (ECM)

* Overview of the error correction model (ECM).
* Using the ECM to estimate short run price dynamics (e.g., price convergence).
* Co-integrating vector (long run relationships).
* Estimating and the analyzing the ECM with diesel fuel and soybean oil prices (in R).

4. Week 4 - Vector Autoregression (VAR) and Impulse Response

* Overview of two-variable, stationary VAR.
* Structural VAR.
* Recursive simulation.
* Impulse response function
* R application to Canadian and U.S. global exports.

5. Week 5 - Introductory Forecasting

* Forecasting Evaluation Metrics.
* ARIMA models.
* Exponential Smoothing
* Seasonal Models

6. Week 6 - Advanced Forecasting Issues and Methods

* Multivariate models (VAR, GVAR, VECM)
* Forecast Combinations
* Nowcasting

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| **POLICIES** **APPLICABLE TO UBC MFRE COURSES** |
| **Respectfulness in the Classroom**  Students are expected to be respectful of their colleagues at all times, including faculty, staff and peers. This means being attentive and conscious of words and actions and their impact on others, listening to people with an open mind, treating all MFRE community members equally and understanding diversity. Students who act disrespectfully toward others will be asked to leave the class and be marked as absent for the day. They may also be removed from a team, lose credit for in-class assessments and activities, or be asked to complete a group assignment individually.  **Respect for Equity, Diversity, and Inclusion**  The MFRE Program strives to promote an intellectual community that is enhanced by diversity along various dimensions including status as a First Nation, Métis, Inuit, or Indigenous person, race, ethnicity, gender identity, sexual orientation, religion, political beliefs, social class, and/or disability. It is critical that students from diverse backgrounds and perspectives be valued in and well-served by their courses. Furthermore, the diversity that students bring to the classroom should be viewed as a resource, benefit, and source of strength for your learning experience. It is expected that all students and members of our community conduct themselves with empathy and respect for others.  **COVID-19 Considerations**  All students must assess themselves daily for COVID-19 symptoms prior to coming to class. Please stay home if you exhibit symptoms or have tested positive for COVID-19. A list of COVID-19 symptoms can be found [here](http://www.bccdc.ca/health-info/diseases-conditions/covid-19/about-covid-19/symptoms). Use the BC Ministry of Health’s [self-assessment tool)](https://bc.thrive.health/), to help determine whether further assessment or testing for COVID-19 is recommended. Full UBC COVID-19 Campus Rules can be found [here](https://srs.ubc.ca/covid-19/ubc-campus-rules-guidance-documents/#COVID-19%20Campus%20Rules) .**Note: Please stay home if you exhibit symptoms or have tested positive for COVID-19 and immediately contact Olivier Ntwali, Academic Program Coordinator, your Course Instructor, and your Course Assistant.**  **Recordings and In-Class Attendance**  There is no required distribution of recordings of class. Recording will be provided based upon on the decision of the course instructor. Classes are designed as and are intended to be in-person. Your attendance is expected. If you are unable to attend, the policy regarding missed classes described in the MFRE code of conduct and syllabus applies. It is your responsibility to ensure that you have the materials you need for missed classes.  **Writing Exams**  All exams will be in-person and will follow MFRE exam protocol (See Student Portal). Exams may be online, e.g., in Canvas, but students must be physically present and invigilated. If a student is unable to write an exam, they must have a verifiable doctor’s note and must contact the Course Instructor, Course Assistant, and MFRE Program Coordinator before the scheduled exam date/time. Documentation must be provided to explain your absence. If the documentation is considered legitimate, the Course Instructor will let you know how to proceed.  **Plagiarism** **Penalties**  Academic dishonesty and plagiarism are taken very seriously in the MFRE program. All incidences of plagiarism will be escalated to the MFRE Academic Director. Incidences of academic misconduct may result in a reduction of grade, a mark of zero on the assignment/exams of concern, failing the course or program, escalation/referral to the Dean’s office and/or President’s Advisory Committee on Student Discipline, and/or expulsion from UBC. **Note: If a MFRE student is required to extend his/her program due to failed course or unsatisfactory progress, they will need to pay the full MFRE tuition fees for that term(s) regardless of the number of courses that need to be retaken.**  It is each student’s responsibility to review and understand what constitutes academic dishonesty and plagiarism and how to avoid them. Review MFRE Code of Conduct, UBC academic dishonesty policies/penalties and course-specific policies.  **Turn it In Access for MFRE Courses: Internet-based plagiarism detection service**  **Turn it in has been set up for MFRE courses. Submit all assignments/papers to this service and review similarity index reports. Turn it in Login (**[**website**](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwixoaOfncf5AhWEHjQIHeXiBFAQFnoECAUQAQ&url=https%3A%2F%2Fwww.turnitin.com%2Flogin_page.asp%3Ferr%3D3400%26lang%3Den_us&usg=AOvVaw1uVSxBVdb7cjKueh31U9IH)**).** F**or instructions: See the Student Guide to MFRE Student Guide To Setting Up And Using Turn It In on the Student Portal** ([website.](https://blogs.ubc.ca/mfre2023/)). Use provided Class ID and Enrollment Key to access MFRE course folder, submit assignments/papers, and review similarity index reports. |

**Working with Others on an Assignment**

You are encouraged to work with other students, but you must turn in your own individual assignment. If you have an answer that is too close to another student’s answer, this will be considered academic dishonest and this will be handled according to the MFRE and UBC policies.

**Missing Classes/Labs**

Students are expected to attend all classes, labs, or workshops. If you cannot make it to a class, lab, or workshop due to a medical or personal emergency, please e**mail your instructor, your course assistant,** and **Olivier Ntwali, MFRE Program Coordinator** ahead of time to let them know. Students who miss classes regularly without a reasonable excuse may be subject to MFRE-imposed penalties at the discretion of the Academic Director.

**Centre for Accessibility**

The [Centre for Accessibility](https://students.ubc.ca/about-student-services/centre-for-accessibility) (CfA) facilitates disability-related accommodations and programming initiatives designed to remove barriers for students with disabilities and ongoing medical conditions. If you are registered with the CfA and are eligible for exam accommodations, it is your responsibility to let Olivier Ntwali, Academic Program Coordinator, and each of your Course Instructors know. You should book your exam writing with the CFA using its [exam reservation system](https://students.ubc.ca/about-student-services/centre-for-accessibility#exam-reservation-system): for midterm exams or quizzes, at least 7 days in advance; and final exams, 7 days before the start of the formal exam period.

**Copyright**

All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline and could be subject to legal action. Any lecture recordings are for the sole use of the instructor and students enrolled in the class. In no case may the lecture recording or part of the recording be used by students for any other purpose, either personal or commercial. Further, audio or video recording of classes are not permitted without the prior consent of the instructor.

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| **ACADEMIC HONESTY** |

Academic misconduct that is subject to disciplinary measures includes, but is not limited, to the following:

* **Plagiarism**, which is intellectual theft, occurs where an individual submits or presents the oral or written work of another person as his or her own. Correct citations must be provided where applicable for all reports/assignments. In many UBC courses including MFRE/FRE courses, you will be required to submit material in electronic form. The electronic material will be submitted to a service which UBC subscribes, called TurnItIn. This service checks textual material for originality. For more information, review the [TurnItIn website](https://www.turnitin.com/').
* **Cheating**, which may include, but is not limited to falsification of any material subject to academic evaluation, unauthorized collaborative work; or use of unauthorized means to complete an examination.
* **Submitting others work as your own**, may include but not limited to i. using, or attempting to use, another student’s answers; ii. providing answers to other students; iii.  failing to take reasonable measures to protect answers from use by other students; or iv. in the case of students who study together, submitting identical or virtually identical assignments for evaluation unless permitted by the course instructor.
* **Working with Others on an Assignment** You are encouraged to work with other students, but you must turn in your own individual assignment. If you have an answer that is too close to another student’s answer, this will be considered academic dishonesty and this will be handled according to the MFRE and UBC policies.
* **Resubmission of Material**, submitting the same, or substantially the same, essay, presentation, or assignment more than once (whether the earlier submission was at this or another institution) unless prior approval has been obtained from the instructor(s) to whom the assignment is to be submitted.
* **Use of academic ghostwriting services**, including hiring of writing or research services and submitting papers or assignments as his or her own.

**Student Responsibility**: Students are responsible for informing themselves of the guidelines of acceptable and non-acceptable conduct for examinations and graded assignments as presented via MFRE Code of Conduct; MFRE Turn it in, Course Syllabus, MFRE Instructors; Canvas and UBC academic misconduct policies.

**Penalties for Academic Dishonesty**: The integrity of academic work depends on the honesty of all those who work in this environment and the observance of accepted conventions. Academic misconduct is treated as a serious offence at UBC and within the MFRE program. Penalties for academic dishonesty are applied at the discretion of the course instructor. Incidences of academic misconduct may result in a reduction of grade or a mark of zero on the assignment, examination, or course and/or the matter is referred to the Dean’s office and/or President’s Advisory Committee on Student Discipline. **Note: If a student needs to extend his/her program due to a failed course or unsatisfactory progress, they will have to pay the full MFRE tuition fees for that term/s.**

**Resources:** Review the following:

**UBC Policies of Academic Honesty:**

* UBC Academic Misconduct and Discipline ([website.](http://www.calendar.ubc.ca/Vancouver/index.cfm?tree=3,54,111,0))
* UBC Learning Commons web-based Academic Integrity ([website](https://learningcommons.ubc.ca/resource-guides/understand-academic-integrity/))

**Turn it In Access for MFRE Courses:**

* Turn it in Login ([website](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwixoaOfncf5AhWEHjQIHeXiBFAQFnoECAUQAQ&url=https%3A%2F%2Fwww.turnitin.com%2Flogin_page.asp%3Ferr%3D3400%26lang%3Den_us&usg=AOvVaw1uVSxBVdb7cjKueh31U9IH)) and Student Guide to MFRE Student Guide To Setting Up And Using Turn It In on the Student Portal ([website](https://blogs.ubc.ca/mfre2023/))

**Citing Sources:**

* UBC Learning Commons Citation Resource (website)
* Purdue Lab How to Cite Sources ([website)](https://owl.purdue.edu/)

**Plagiarism**

* Purdue University Plagiarism Overview ([website)](https://owl.purdue.edu/owl/avoiding_plagiarism/index.html)
* SFU Avoiding plagiarism ([website](https://www.lib.sfu.ca/help/academic-integrity/plagiarism))