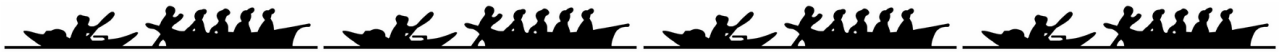

Advanced Economic Methods

Course syllabus - (10 ECTS) Fall 2025 - University of Greenland - Ilisimatusarfik

Course details

Lecturer: Dr. Brian Beadle, Assistant Professor. -*Ilisimatusarfik*, email: brbe@uni.gl
Language of instruction and assessment: English

Course description

This course offers an in-depth exploration of applied regression techniques with applications in economic analysis, social science research, and business analytics. It is designed for students with introductory training in statistics and economics, and begins with a review of univariate and multivariate regression. More advanced topics are explored throughout the course, including time series analysis and diagnostic challenges such as multicollinearity, heteroskedasticity, and omitted variable bias. The sessions are structured to combine conceptual lectures with hands-on activities using the statistical software `R`.

Learning outcomes

By the end of this course, students will be able to:

1. **Apply** fundamental econometric methods including classical cross-section and time-series regression, as well as testing and solving for multicollinearity, heteroskedasticity, and autocorrelation
2. **Implement** advanced econometric techniques such as dynamic models, simultaneous equation systems, limited dependent variable models (logit/probit), vector autoregression (VAR) analysis, and dummy variable regression
3. **Demonstrate** proficiency in `R` programming, including data preparation, model estimation, diagnostic testing, and creating professional reports using `RMarkdown`
4. Critically **interpret** and **evaluate** econometric results in economic contexts, assess model appropriateness, and communicate findings effectively through proper documentation and reporting practices

Teaching method

Lecture-based with in-class activities and discussions

Evaluation

At the end of the semester, students will complete a comprehensive data analysis project. Each student must complete two comprehensive analyses and compile the completed project into a single `RMarkdown` file. Tasks include (1) data preparation, (2) analysis (including regressions and diagnostics), (3) interpretation of results, and (4) visualizations. Projects will be evaluated using the Greenlandic Grading Score (GGS) based on the accuracy of the code, methodological rigor, clarity and accuracy of interpretations, and the quality of the presentation. The final document must be submitted in English. AI tools are allowed but strongly discouraged due to their propensity for coding errors.

Literature and class activities

The table below outlines the tentative schedule for the course. Almost all classes are split into two parts. The first part is lecture-based following the textbook *Applied Econometrics* (fourth edition) by Asteriou

and Hall. A copy of the book will be available in the university library, and all lecture slides will be available online after completion of the lecture.

The second part of each class is a coding exercise to learn how to run regressions, diagnostics, and plots in `R`. Complete tutorials for all exercises are provided by the lecturer at brianbeadle.github.io/aem.html. The first activity, *Intro to R - setup and data prep*, is currently available and provides all information on installing `R` and `RStudio`. Both programs are free, available for Mac and PC, and will be required to complete the final project.

Week	Topic and Activity	Reading
37	**Lecture:** Review of classical linear regression (simple and multiple) *Activity: Introduction to `R` – setup and data prep*	Ch. 3 & 4
38	**Lecture:** Multicollinearity *Activity: Identifying and treating multicollinearity*	Ch. 5
39	**Lecture:** Heteroskedasticity *Activity: Tests and solutions for heteroskedasticity*	Ch. 6
40	**Lecture:** Autocorrelation *Activity: Handling autocorrelation*	Ch. 7
41	**Lecture:** Misspecification *Activity: Exploring functional forms, omitted variables, and errors*	Ch. 8
42	**Lecture:** Dummy variables *Activity: Regressions with dummy variables*	Ch. 9
43	**Lecture:** Dynamic econometric models *Activity: Exercises in dynamic econometric models*	Ch. 10
44	**Lecture:** Simultaneous equation models *Activity: Exercises on systems of equations*	Ch. 11
45	**Lecture:** Limited dependent variable models *Activity: Running and interpreting logit and probit models*	Ch. 12
46	**Lecture:** VAR models and causality tests *Activity: Testing VARs and causal inference interpretations*	Ch. 15
47	**Lecture:** Presenting quantitative data *Activity: Generating code files using `RMarkdown`*	TBD
48	**Review and Final Project Prep**	–

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