Please note that this syllabus should be regarded only as a general guide to the course and is subject to change at the instructor’s discretion.

ADEC 7320.01, Econometrics, 3 credits
Woods College of Advancing Studies
Fall 2017 Semester, August 28 – December 16, 2017
Mondays 6:30pm – 9:00pm

Instructor Name: Gustavo Vicentini
BC E-mail: vicentig@bc.edu
Phone Number: 617-552-3900
Office: St Mary’s Hall South
Office Hours: By appointment

Boston College Mission Statement
Strengthened by more than a century and a half of dedication to academic excellence, Boston College commits itself to the highest standards of teaching and research in undergraduate, graduate and professional programs and to the pursuit of a just society through its own accomplishments, the work of its faculty and staff, and the achievements of its graduates. It seeks both to advance its place among the nation's finest universities and to bring to the company of its distinguished peers and to contemporary society the richness of the Catholic intellectual ideal of a mutually illuminating relationship between religious faith and free intellectual inquiry.

Boston College draws inspiration for its academic societal mission from its distinctive religious tradition. As a Catholic and Jesuit university, it is rooted in a world view that encounters God in all creation and through all human activity, especially in the search for truth in every discipline, in the desire to learn, and in the call to live justly together. In this spirit, the University regards the contribution of different religious traditions and value systems as essential to the fullness of its intellectual life and to the continuous development of its distinctive intellectual heritage.

Course Description
This course focuses on the application of statistical tools used to estimate economic relationships. The course begins with a discussion of the linear regression model, and examination of common problems encountered when applying this approach, including serial correlation, heteroscedasticity, and multicollinearity. Models with lagged variables are considered, as is estimation with instrumental variables, two-stage least squares, models with limited dependent variables, and basic time-series techniques.

Textbook (Required)


Textbooks (Recommended)


Statistical software
We will use the statistical software “STATA” to conduct empirical exercises throughout the course. This software is available at the University’s computer network. There are several useful online resources for learning STATA:

- Links from Stata website: [http://www.stata.com/links/resources-for-learning-stata/](http://www.stata.com/links/resources-for-learning-stata/)
- UCLA website: [http://www.ats.ucla.edu/stat/stata/](http://www.ats.ucla.edu/stat/stata/)
- BC presentation: [http://fmwww.bc.edu/GStat/docs/StatIntro.pdf](http://fmwww.bc.edu/GStat/docs/StatIntro.pdf)
- Others:
  - [http://www.schmidheiny.name/teaching/stataguide2up.pdf](http://www.schmidheiny.name/teaching/stataguide2up.pdf)

Canvas
Canvas is the Learning Management System (LMS) at Boston College, designed to help faculty and students share ideas, collaborate on assignments, discuss course readings and materials, submit assignments, and much more - all online. As a Boston College student, you should familiarize yourself with this important tool. For more information and training resources for using Canvas, click here.

In the case of any technical difficulties or concerns, please contact [canvas@bc.edu](mailto:canvas@bc.edu) or 617-552-HELP (4357) for immediate assistance.

NOTE: Canvas requires particular computer specifications and wifi access. It is important that you plan accordingly, particularly for courses that have online components.

Course Objectives
1. Gaining fundamental knowledge of terminology, principles, and methods used by applied econometricians such as economists, consultants, and data-driven business professionals.
2. Learning to apply course material to actual-world data-driven issues in order to improve thinking, problem solving, and decision making.
3. Learning how to effectively communicate data-driven and regression-driven results and insights to other professional in the area of economics, consulting, and business.
4. The student will demonstrate knowledge, skill and/or competency across cultural settings and will learn the impact of culture, gender, and age in statistics as demonstrated by actual real-world data-driven and regression-driven examples.
5. The student will demonstrate ethical knowledge, skill and/or competency, as appropriate for the course pertaining to econometrics as demonstrated by statistical real-world examples.

Grading
- 50% Take-home assignments (individually or with one other student)
- 50% Research paper (individually or with one other student; includes presentations)

The graduate grading system for Woods College is as follows:
A (4.00), A- (3.67)
B+ (3.33), B (3.00)
B- (2.67), passing but does not count toward degree
C (2.00), passing but not for degree credit
F (.00)
All students can access final grades through Agora after the grading deadline each semester. Students who complete course evaluations can access grades earlier, as they are posted.

**Take-home assignments**
There will be at least four take-home assignments. These assignments can be completed individually or with one other student. In other words, you may work on these assignments by yourself or with a classmate. These assignments will involve the use of STATA to analyze economic data and implement econometric techniques. They will also contain some theoretical exercises. No make-up assignments will be given. Your lowest-scoring assignment will be dropped from your overall course grade. Late assignments will not be accepted.

**Semester empirical paper**
To be completed individually or with one other student, the semester paper is composed of four parts:

1) Identify a research topic; literature review (10%) due SEP 25 (3 weeks from start)
2) Data description (and presentation to class) (10%) due OCT 23 (4 weeks from part 1)
3) Econometric model and results (10%) due NOV 20 (4 weeks from part 2)
4) Final paper (and presentation to class) (20%) due DEC 11 (3 weeks from part 3)

Each of these four parts is described below in detail.

**End-of-chapter exercises (not collected/graded)**
The solutions to the (non-empirical) end-of-chapter exercises from the Stock/Watson textbook have been posted on the course website. Although these exercises will not be collected or graded, they are a crucial part of your learning process. Below you will find a list of the recommended (non-empirical) end-of-chapter exercises.

**Course Assignments**
It is expected that 8 hours per week of your study time will be spent on the take-home assignments, the semester paper, and the readings. Some weeks will require more, others less, but the average is approximately 8 hours per week.

**Written Work**
Woods College students are expected to prepare professional, polished written work. Written materials must be typed and submitted in the format required by your instructor. Strive for a thorough yet concise style. Cite literature appropriately, using APA, MLA or CLA style per your instructor’s requirements. Develop your thoughts fully, clearly, logically and specifically. Proofread all materials to ensure the use of proper grammar, punctuation and spelling. For writing support, please contact the Connors Family Learning Center.

**Use of laptops and cell phones in class**
The use of laptops, cell phones, beepers, pagers, or any type of signaling device is not permitted in class.

**Attendance**
Attending class is an important component of learning. Students are expected to attend all class sessions. When circumstances prevent a student from attending class, the student is responsible for contacting the instructor before the class meets. Students who miss class are still expected to complete all assignments and meet all deadlines. Many instructors grade for participation; if you miss class, you cannot make up participation points associated with that class. Makeup work may be assigned at the discretion of the instructor. If circumstances necessitate excessive absence from class, the student should consider withdrawing from the class. Consistent with BC’s commitment to creating a learning environment that is respectful of persons of differing backgrounds, we believe that every reasonable effort should be made to allow members of the university community to observe their religious holidays without jeopardizing their academic status. Students are responsible for reviewing course syllabi as soon as possible, and for communicating with the instructor promptly regarding any possible conflicts with observed religious holidays. Students are responsible for completing all class requirements for days missed due to conflicts with religious holidays.
**Accommodation and Accessibility**

Boston College is committed to providing accommodations to students, faculty, staff and visitors with disabilities. Specific documentation from the appropriate office is required for students seeking accommodation in Woods College courses. Advanced notice and formal registration with the appropriate office is required to facilitate this process. There are two separate offices at BC that coordinate services for students with disabilities:

- **The Connors Family Learning Center (CFLC)** coordinates services for students with LD and ADHD.
- **The Disabilities Services Office (DSO)** coordinates services for all other disabilities.

Find out more about BC’s commitment to accessibility at [www.bc.edu/sites/accessibility](http://www.bc.edu/sites/accessibility).

**Scholarship and Academic Integrity**

Students in Woods College courses must produce original work and cite references appropriately. Failure to cite references is plagiarism. Academic dishonesty includes, but is not necessarily limited to, plagiarism, fabrication, facilitating academic dishonesty, cheating on exams or assignments, or submitting the same material or substantially similar material to meet the requirements of more than one course without seeking permission of all instructors concerned. Scholastic misconduct may also involve, but is not necessarily limited to, acts that violate the rights of other students, such as depriving another student of course materials or interfering with another student’s work. Please see the [Boston College policy on academic integrity](http://www.bc.edu/academic-integrity) for more information.

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Topics, reading list, and end-of-chapter exercises

Review of probability and statistics

- Lecture notes (posted on course website)
- Stock/Watson textbook:
  - Chapter 2 (except Sub-section entitled “The Student $t$ Distribution” on pp. 41–42), Appendix 2.1
    - Chapter 2 end-of-chapter exercises: #2, 3, 5, 6, 7, 8, 10, 14, 15, 18, 19, 22, 26(a, b)
  - Section 17.2, Appendix 17.2
  - Chapter 3 (except Section 3.6), Appendix 3.3
    - Chapter 3 end-of-chapter exercises: #1, 3, 4, 5(c), 6, 8, 11, 13(a), 14, 16(a, b)

OLS regression, omitted variable bias, and model specification

- Lecture notes (posted on course website)
- Stock/Watson textbook:
  - Sub-section entitled “Theory That Matches Applications” on Preface chapter
  - Section 1.2
  - Sub-section entitled “Experimental Versus Observational Data” on pp. 7–8
  - Chapter 4, Appendix 4.2, Appendix 4.3
  - Section 17.3
    - Chapter 4 end-of-chapter exercises: #1, 2, 3, 6, 9, 10, 11, 12, 13
  - Chapter 5 (except Sections 5.5 and 5.6), Appendix 5.1
  - Sub-section entitled “Heteroskedasticity-Robust Standard Errors or OLS?” on pp. 694–695
    - Chapter 5 end-of-chapter exercises: #1, 2, 3, 4, 5, 6, 7, 10, 15
  - Chapter 6, Appendix 6.1, Appendix 6.2
    - Chapter 6 end-of-chapter exercises: #1, 2, 3, 4, 5, 6, 7(b), 9, 10
  - Chapter 7, Appendix 7.2
    - Chapter 7 end-of-chapter exercises: #1, 2, 3, 4, 5, 7, 8(a, d)
  - Chapter 8, Appendix 8.2
    - Chapter 8 end-of-chapter exercises: #1, 2, 3, 4, 5, 6, 7, 8, 10
  - Chapter 9
    - Chapter 9 end-of-chapter exercises: #3, 5, 7, 10, 11

Instrumental variables

- Stock/Watson textbook:
  - Chapter 12, Appendix 12.2 through Appendix 12.6
    - Chapter 12 end-of-chapter exercises: #1, 4, 5, 6, 7, 8, 9, 10

Regression discontinuity

- Lecture notes
Matching
- Lecture notes

Panel data
- Stock/Watson textbook:
  - Chapter 10, Appendix 10.2 (except Sub-section entitled “Distribution and Standard Errors When \( n \) Is Small” on pp. 383–384)
    - Chapter 10 end-of-chapter exercises: #1, 2, 3, 4, 5, 6, 10
  - Sub-section entitled “The Differences-in-Differences Estimator” on pp. 496–499
    - Chapter 13 end-of-chapter exercises: #4, 6, 7, 8

Discrete choice methods and maximum likelihood estimation
- Stock/Watson textbook:
  - Chapter 11, Appendix 11.2
    - Chapter 11 end-of-chapter exercises: #1, 2, 3, 4, 5, 6, 7, 9
- Train textbook:
  - Chapters 1-4, 6, 13

Censoring, truncation, and sample selection
- Lecture notes

Generalized method of moments (GMM)
- Lecture notes

Demand estimation
- Lecture notes

Quantile regression
- Lecture notes

Time series
- Lecture notes