Syllabus for PS 5003, Section 1
Intermediate Methodology
Spring 2018

Location:

    MW 5:00 – 6:15pm, 176 SH
    T 2:00 – 2:50pm, 177 SH (Lab)

Professor: Bryce J. Dietrich

Office:	314 Schaeffer Hall
Email:	bryce-dietrich@uiowa.edu
Web Page:	http://www.brycejdietrich.com
Office Hours:	R 1:30–4:30pm, and by appointment

Text: All readings will be scanned and uploaded. With that said, many of the readings will be from:

Introduction to Econometrics, Christopher Dougherty, 5th Edition

(I do not like asking people to purchase books until get student feedback. If we are happy with the book, I will ask future classes to purchase the text.)

Software: *STATA*, 14th Edition.

You are more than welcome to acquire your own copy of STATA, but I will be using the University of Iowa's Virtual Desktop. You can find installation instructions here. They also provide a comprehensive list of the software they provide in this article. If you are interested in additional STATA resources. Others have found the following books to be helpful. These books are **NOT** required for purchase. I list them here for reference purposes:

A Gentle Introduction to STATA, Alan C. Acock, 5th Edition, ISBN 978-1-59718-185-3

Data Analysis Using STATA, Ulrich Kohler and Frauke Kreuter, 3rd Edition, ISBN 978-1-59718-110-5

Material to be Covered: This is a course in applied statistical theory focusing on linear models. After covering the classic normal linear regression model and its assumptions, we will explore the consequences and remedies for violations of these assumptions, including omitted variables, heteroskedasticity, autocorrelation, and endogeneity. We will also explore the use and interpretation of continuous, ordinal, nominal, and dichotomous variables as well as interactions between them. Students will also learn the basics of data collection, organization and management; measurement; data visualization and display; and univariate, bivariate and multivariate descriptive statistics.

Goals:
(1) This class aims to help you learn to think about what it means to do statistical inference for both descriptive and causal claims.

(2) The point of the course is to position you to do the future learning that is at the core of your work as an academic analyzing data.

(3) I also hope that this course will help you continue to develop the acumen as a reader, writer, programmer and social scientist essential for your daily life as a social science researcher.

Expectations:
(1) You must be eager to learn. Eagerness, curiosity and excitement will impel your energetic engagement with the class throughout the term. If you are bored, not curious, or unhappy about the class you should come and talk with me immediately. Energetic engagement manifests itself in meeting with your classmates outside of the class, in asking questions during the class, and in taking the term paper seriously.

(2) You must be ready to work. Learning requires work. You will make errors. These errors are opportunities for you to learn – some of your learning will be about how to help yourself and some will be about statistics. Graduate school is a place for you to develop and begin to pursue your own intellectual agenda: this course is essential to help you achieve this end. Some trial and error is inevitable. This is all part of the learning process.

(3) You must follow my lead. You are more than welcome to offer constructive and concrete suggestions about how to teach the class as we go along, and I will value such evaluations

at any point in the class. I have made changes to this course in the middle of the term upon hearing great and useful ideas from students. I am happy to do so. That said, you must be willing to go along with my decisions about the material and sequence.

(4) You must have basic math literacy, including familiarity with probability theory, properties of estimators, rudimentary calculus, and linear algebra, as well as mastery of the basic statistics taught in POLI 5001. If you love learning about computing then you will get a lot out of this course – you will learn a lot about STATA, especially with regards to statistical theory.

Rules:
(1) Please ask questions when you don?t understand things; chances are you?re not alone.

(2) Please email me with questions/concerns outside of class. This is the best way to get a quick response. Do not drop by my office with the expectation that we can meet anytime. Please email, then come by my office hours first.

(3) Please don't miss class or section.

(4) Do the work. This does not mean divide the work up among your classmates so that you only do part of the work. Each person should engage with all of the work from week to week.

(5) All files will be submitted as PDFs. I will not accept Microsoft, Apple, or any other proprietary format. All file names should be in the following format: "name_assignment.pdf"

Homework: Problem sets are an important part of the curriculum and should help you prepare for the exams. They require solving mathematical problems, computer exercises, diagnosis and correction of regression assumption violations and applications in advanced topics. The problems must be emailed by 11:59PM on the date they are due. No late assignments will be accepted.

Exams: There will three exams. Two exams will be administered during the semester and one during finals week. Content of the exams are based on the textbook, course lectures, and the problem sets. Make up exams will not be given.

Replication Paper: Each student must produce a 10 page paper. The paper must replicate and extend the analysis in a published journal article. The article should speak to a topi

in the student's major field. The replication should re-produce the published results. The extension of the data analysis can be one of two forms. One type of extension is to cross validate the data analysis in a larger sample. The sample may be expanded in temporal or cross sectional units, motivated by some theoretical intuition. Another type of extension is to cross validate the data analysis based on an alternative model specification or estimator. The purpose is to assess the robustness of previous findings in the presence of confounding variables or alternative estimators. The analysis should also be motivated theoretically. The topic must be approved by the instructor.

Grading:

Homework	40%
Final Exam	15%
Midterm Exam #1	15%
Midterm Exam #2	15%
Replication Paper	15%

Lab Session: The course has a required lab session each week. During each lab session, we will discuss problems and issues in the weekly homework assignment, programming in STATA, and practice with STATA during each session.

Scale:

A+	98-100%
A	93-97.99%
A-	90-92.99%
B+	87-89.99%
B	83-86.99%
B-	80-82.99%
C+	77-79.99%
C	73-76.99%
C-	70-72.99%
D+	67-69.99%
D	63-66.99%
D-	60-62.99%
F	0-59.99%

Late Work and Make-Up Exams: Late work will not be accepted and no make-up exams will be given. There should be no problems meeting the expectations of the course. All the due dates are given, and I will make sure to give you plenty of notice ahead of time.

Administrative Home: The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at http://clas.uiowa.edu/students/handbook.

Electronic Communication: University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences (Operations Manual, III.15.2, k.11).

Accommodations for Disabilities: The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which include but are not limited to mental health, attention, learning, vision, and physical or health-related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS. See http://sds.studentlife.uiowa.edu/ for information.

Academic Honesty: All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies Handbook).

CLAS Final Examination Policies: The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be

shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint: Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. (**Wenfang Tang, 335-2358**) Complaints must be made within six months of the incident (CLAS Academic Policies Handbook).

Understanding Sexual Harassment: Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather: In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.

Calendar: The calendar below gives the dates of exams and other important deadlines for the course. Readings should be completed **prior** to the start of class. This calendar is subject to change.

<u>Week 1</u>
Monday 15 Jan	MLK Day
	No Class
Tuesday 16 Jan	Course Overview
	Dougherty, R1
Wednesday 17 Jan	Basic Concepts, Part I
	Dougherty, R2-R8

<u>Week 2</u>
Monday 22 Jan	Basic Concepts, Part II
	Dougherty, R9-R11
Tuesday 23 Jan	Linear Regression (STATA), Part I
	No Readings
Wednesday 24 Jan	Basic Concepts, Part III
	Dougherty, R12-R13

<u>Week 3</u>
Monday 29 Jan	Simple Linear Regression, Part I
	Dougherty, 1.1-1.3
Tuesday 30 Jan	Linear Regression (STATA), Part II
	No Readings
Wednesday 31 Jan	Simple Linear Regression, Part III
	Dougherty, 1.4-1.6

<u>Week 4</u>
Monday 5 Feb	OLS Properties, Part I
	Dougherty, 2.1-2.3
Tuesday 6 Feb	OLS Monte Carlo
	Dougherty, 2.4
Wednesday 7 Feb	OLS Properties, Part II
	Dougherty, 2.5, Appendix 2.1

	<u>Week 5</u>
Monday 12 Feb	Hypothesis Testing, Part I
	Fisher, 1935
	Rosenbaum, Ch 2
Tuesday 13 Feb	Linear Regression (`STATA`), Part III
	No Readings
Wednesday 14 Feb	Hypothesis Testing, Part II
	Rosenbaum, Ch 5
	Dougherty, 2.6-2.7
	Problem Set #1 Assigned
	<u>Week 6</u>
Monday 19 Feb	OLS Properties, Part III
	Dougherty, 2.5, Appendix 2.1
Tuesday 20 Feb	Linear Regression (`STATA`), Part IV
	No Readings
Wednesday 21 Feb	Midterm Review
	No Readings
	Problem Set #1 Due
	<u>Week 7</u>
Monday 26 Feb	Midterm Exam #1
	No Readings
Tuesday 27 Feb	Multiple Regression (`STATA`), Part I
	No Readings
Wednesday 28 Feb	Multiple Regression, Part I
	Dougherty, 3.1-3.3
	<u>Week 8</u>
Monday 5 March	Multiple Regression, Part II
	Dougherty, 3.4
Tuesday 6 March	Matrix Algebra
	No Readings
Wednesday 7 March	Multiple Regression, Part III
	Dougherty, 3.5-3.6

Monday 12 March	Spring Break
	No Class
Tuesday 13 March	Spring Break
	No Class
Wednesday 14 March	Spring Break
	No Class

Week 10

Monday 19 March	Dummy Variables, Part I
	Dougherty, 5.1-5.2
Tuesday 20 March	STATA Introduction, Part IV
	No Readings
Wednesday 21 March	Dummy Variables, Part II
	Dougherty, 5.3-5.4
	Replication Abstract Due
	Problem Set #2 Assigned

Week 11

Monday 26 March	OLS Assumptions, Part I
	Dougherty, 8.1-8.3
Tuesday 27 March	STATA Introduction, Part V
	No Readings
Wednesday 28 March	OLS Assumptions, Part II
	Dougherty, 8.4-8.5
	Problem Set #2 Due

Week 12

Monday 2 April	Midterm Review
	No Readings
Tuesday 3 April	Replication Lab, Part I
	No Readings
Wednesday 4 April	MPSA
	No Class

<u>Week 13</u>
Monday 9 April   Midterm Exam #2
No Readings
Tuesday 10 April   STATA Introduction, Part VI
No Readings
Wednesday 11 April   Unusual and Influential Data, Part I
Fox, 11.1-11.7

<u>Week 14</u>
Monday 16 April   Non-Normality, Nonconstant Error Variance, Nonlinearity, Part I
Fox, 12.1-12.3
Tuesday 17 April   STATA Introduction, Part VII
No Readings
Wednesday 18 April   Non-Normality, Nonconstant Error Variance, Nonlinearity, Part II
Dougherty, 7.1-7.3

<u>Week 15</u>
Monday 23 April   Collinearity, Part I
Fox, 13.1
Tuesday 24 April   STATA Introduction, Part VIII
No Readings
Wednesday 25 April   Collinearity, Part II
Fox, 13.2
Figures/Tables Due

<u>Week 16</u>
Monday 30 April   Robust Regression
Fox, 19.1-19.5
Tuesday 1 May   Final Exam Review
No Readings
Wednesday 2 May   Missing Data
Fox, 20.1-20.3
Peer Replication Due

	<u>Week 17</u>
Monday 7 May	Final Exam
	No Readings
Tuesday 8 May	Final Exam
	No Readings
Wednesday 9 May	Final Exam
	No Readings
	Replication Paper Due