Introductory Econometrics ECONOMICS ECO 321 Department of Economics Stony Brook University

#### **General Information:**

Instructor:	Robert Millard		
Office:	SBS 633-S		
E-mail:	robert.millard@stonybrook.edu		
Office hours:	Office hours: Tuesdays and Thursdays 12:00pm-1:00pm		
Delivery mode:	TUTH 4:00-5:20 in person Melville Library E4320		
<b>Teaching Assistant:</b>	Kwanjai Yoo		
<b>Recitation times:</b>	(R01) TU 2:30-3:23PM Melville Library W4535		
	(R02) TU 11:30-12:25PM Melville Library W4530		
Undergraduate inqu	iries: Undergraduate coordinator is Victoria Judd: 631-632-7540, or		
SBS Room 601-S, or	ugeconomics@stonybrook.edu		

**Prerequisite Note:** Familiarity with mathematics and statistics is an essential prerequisite. Basic knowledge of calculus (especially simple partial derivatives), probability theory, and statistics are assumed throughout the course.

#### Prerequisite(s): C or higher in ECO 320 or AMS 310; C or higher in ECO 108.

You are responsible for ensuring that you have successfully completed all course prerequisites, and that you have not taken any anti-requisite courses. Lack of prerequisites may not be used as a basis for appeal. If you are found to be ineligible for a course, you may be removed from it at any time and you will receive no adjustment to your fees. This decision cannot be appealed.

If you find that you do not have the course prerequisites, it is in your best interest to drop the course well before the end of the add/drop period. Your prompt attention to this matter will not only help protect your academic record, but will ensure that spaces become available for students who require the course in question for graduation.

#### **Course Description:**

An introductory course in regression analysis which covers: simple linear regression models and properties; hypothesis testing, multiple linear regression model; model specification; heteroskedasticity; endogeneity and instrumental variables; introduction to time series; and autocorrelation.

#### **Course Objectives:**

This course offers an introduction to basic linear regression methods that are heavily used in economics, business, and other data sciences. Linear regression is a primary tool to model and understand the relationships between variables given a sample of observations (or dataset).

By the end of the course, students should be familiar with simple linear regression, multivariate regression, testing hypotheses and conducting inference on these models, testing

for violation in model assumptions and how to address. Students will also understand the basics of time series regression analysis and autocorrelation.

The empirical assignments will give students the opportunity to apply their knowledge to actual economic examples and applications. For instance, students will learn to apply the methods and analysis on real data using excel.

# **Course Learning Outcomes:**

After successful completion of this course, students will be able to:

- Understand the fundamental concepts of econometrics, and interpret regression results.
- Distinguish between correlation and causality
- Explain the concepts of unbiased and efficient estimators
- Analyze the properties of the simple and multiple linear regression model.
- Perform valid statistical inference
- Learn introductory analysis skills in excel

# **Textbook(s) and Course Materials:**

- Jeffrey M. Wooldridge, Introductory Econometrics: A Modern Approach, 7th edition, Cengage, 2016.
  - Introductory Econometrics A Modern Approach, 7th Edition, 7th Edition -9781337558860 - Cengage

Alternate texts that will also serve

- Earlier versions may have a similar presentation of the material, but individual chapters may be rearranged.
- James H. Stock and Mark W. Watson, Introduction to Econometrics, 4th Edition ISBN-13: 9780134461991.
- Dougherty, Christopher. Introduction to econometrics. Oxford university press, USA, 2011.

# (Tentative) Course Schedule:

The possibility exists that unforeseen events will make schedule changes necessary. Any changes will be clearly noted in course Announcements and/or through Stony Brook email.

Week	Date	Chapter	Due Dates
1	Aug 29	Intro: syllabus, course tools	
	Aug 31	Random Variables, Sampling, Estimation, and	
		Inference	
2	Sept 5	Probability and Stats review	
	Sep 7	Probability and Stats review	Quiz 1
3	Sep 12	Probability and Stats review	
	Sep 14	Simple Regression Model	
4	Sep 19	Simple Regression Model	
	Sep 21	Simple Regression Model	
5	Sep 26		Midterm 1

Sep 28	OLS Properties and Goodness of fit	
0ct 3	OLS Properties and Goodness of fit	
Oct 5	Multiple Regression Analysis	Quiz 2
Oct 10		Fall Break
Oct 12	Multiple Regression Analysis	
0ct 17	Multiple Regression Analysis	
0ct 19	Gauss Markov and Hypothesis Testing	
Oct 24	Gauss Markov and Hypothesis Testing	
Oct 26	Gauss Markov and Hypothesis Testing	
Oct 31	Dummy and Categorical Variables	Quiz 3
Nov 2	Dummy and Categorical Variables	
Nov 7	Dummy and Categorical Variables	
Nov 9		Assignment 1 due
Nov 14	Dummy and Categorical Variables	
Nov 16	Heteroskedasticity	
Nov 21		Midterm 2
Nov 23		Thanksgiving Break
Nov 28	Heteroskedasticity	
Nov 30	Endogeneity	Quiz 4
Dec 5	Endogeneity	
Dec 7	Time Series	Assignment 2 due
	Sep 28 Oct 3 Oct 5 Oct 10 Oct 12 Oct 17 Oct 19 Oct 24 Oct 24 Oct 26 Oct 31 Nov 2 Nov 7 Nov 7 Nov 7 Nov 7 Nov 9 Nov 14 Nov 16 Nov 21 Nov 23 Nov 23 Nov 28 Nov 30 Dec 5 Dec 7	Sep 28OLS Properties and Goodness of fitOct 3OLS Properties and Goodness of fitOct 5Multiple Regression AnalysisOct 10Oct 12Multiple Regression AnalysisOct 17Multiple Regression AnalysisOct 19Gauss Markov and Hypothesis TestingOct 24Gauss Markov and Hypothesis TestingOct 31Dummy and Categorical VariablesNov 2Dummy and Categorical VariablesNov 7Dummy and Categorical VariablesNov 14Dummy and Categorical VariablesNov 21Nov 21Nov 28HeteroskedasticityNov 30EndogeneityDec 5EndogeneityDec 7Time Series

#### **Assessments and Grading:**

All assessments will be based on lecture material. The breakdown of the grades are as follows:

Assessment	Description	% of Grade
Participation	Attendance will be taken at	10%
	random dates throughout the	
	course.	
Midterms (x2)	1 hour length: Demonstrate	20% each
	understanding of course material	
Quizzes (x4)	Demonstrate understanding of	5% each
	specific topics	
Assignments (x2)	Gain experience using methods	15% each
	learned in class	
Optional Final	Exam Period	Will replace lowest
		midterm grade

<u>Participation:</u> I will take attendance at several random dates throughout the semester. Students will be required to write their name and student number to prove attendance, as well as answer an associated question related to the course material. Questions will be related to the course material and delivery (e.g., "tell me one thing you do not understand about [a topic]"). The participation grade is based on class attendance and answering the question, not the content of the answer. This will help me identify topics the class is having trouble understanding.

<u>Midterms</u>: 1 hour in length, delivered on dates shown in schedule above. No make-up midterms will be given. Students who miss a midterm with an **approved/ valid excuse** may use the optional final to replace missed midterm.

<u>Quizzes:</u> 15 minutes at the beginning of class a quiz will be delivered. No extra time given for students showing up late. Missed quizzes with a valid excuse result in re-weighting of other quizzes. Missed quizzes without a valid excuse will result in a grade of zero.

Assignments:

- MS Word template or excel file for the assignment will be provided
- A complete sample assignment will be provided for guidance of completing your assignment
- Video tutorials will go through all technical requirements to complete your assignment
- Assignments will be due by the start of class. Late assignments will be penalized 10% for each day. Assignments handed in more than 48 hours following the due date will receive a grade of zero.

Letter Grade	Points or Percentage
93% - 100%	Α
90% - 92.9%	A-
85% - 89.9%	B+
82% - 84.9%	В
80% - 81.9%	B-
78% - 79.9%	C+
73% - 77.9%	С
70% - 72.9%	C-
65% - 69.9%	D+
60% - 64.9%	D
0% - 59.9%	F

### **Grade Distribution**

NOTE: There will be NO reweighting of final grades. The best way to make up for a bad mark, is by improving your grade with other course assessments.

# Tips on How to Be Successful in this Class:

Students in this class should understand the level of autonomy and self-discipline required to be successful.

- Read text before each class. You may not understand everything initially, but you will be a step ahead when we cove topics in class.
- Make it a daily habit to ensure you have seen everything posted to help you succeed in this class.
- Connect with others. Try forming an online study group and meet on a weekly basis for study and peer support.

• Do not be afraid to ask questions. If you have questions or are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).

# **University and Course Policies**

# **Student Accessibility Support Center Statement:**

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Inion Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: <u>https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities</u> and search Fire Safety and Evacuation and Disabilities.

To receive an accommodation for a covid related absence please see: <u>https://www.stonybrook.edu/commcms/studentaffairs/studentsupport/Covid%20Support.php</u>

# Academic Integrity Statement:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at <a href="http://www.stonybrook.edu/commcms/academic\_integrity/index.html">http://www.stonybrook.edu/commcms/academic\_integrity/index.html</a>

**Important Note:** Any form of academic dishonesty, including cheating and plagiarism, will be reported to the Academic Judiciary.

### **Critical Incident Management:**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

### **Course Policies:**

### **Understand When You May Drop This Course:**

If you need to drop or withdraw from the course, it is your responsibility to be aware of the tuition liability deadlines listed on the registrar's <u>Academic Calendar</u>. Before making the decision to drop/withdraw you may want to [contact me or] refer to the University's policies:

- Undergraduate Course Load and Course Withdrawal Policy
- Graduate Course Changes Policy

## **Incomplete Policy:**

Under emergency/special circumstances, students may petition for an incomplete grade. Circumstances must be documented and significant enough to merit an incomplete. If you need to request an incomplete for this course, contact me for approval as far in advance as possible. You should also read the University's policies that apply to you: <u>Undergraduate Bulletin</u> Graduate Bulletin

# **Course Materials and Copyright Statement:**

Course material accessed from Blackboard, Zoom, Echo 360, VoiceThread, etc. is for the exclusive use of students who are currently enrolled in the course. Content from these systems cannot be reused or distributed without written permission of the instructor and/or the copyright holder. Duplication of materials protected by copyright, without permission of the copyright holder is a violation of the Federal copyright law, as well as a violation of Stony Brook's Academic Integrity.