San José State University
Social Sciences/Economics
ECON 103A, Introduction to Econometrics, Section 1, Spring, 2023

Course and Contact Information

Instructor:	Dr. Sanchita Mukherjee
Office Location:	DMH 214
Email:	sanchita.mukherjee@sjsu.edu
Office Hour:	Tuesdays 10:30am-11:30am (PST) via Zoom and/or by appointment Zoom Link: https://sjsu.zoom.us/j/88573988576
Class Days/Time:	MoWe 9:00AM - 10:15AM
Classroom:	Dudley Moorhead Hall 165
Prerequisites:	ECON 101 and introductory statistics (SOCI 15, STAT 95, UNVS 15S or equivalent)

Course Description (Required)

This course is an introduction to applying statistical techniques to economic issues. The course will cover practical methods for organizing and analyzing economic data, testing economic hypotheses, and measuring economic relationships. Regression analysis is the main empirical method and topics we will cover include basic statistical and probability theory, simple and multiple regression models, dummy variables, multicollinearity and heteroskedasticity.

Course and Program Learning Objectives (CLOs and PLOs)

This course reinforces PLO3: **research methods** and PLO5: **communication,** and introduces PLO4: **areas**: *quantitative methods*. Specific CLOs for this course include:

CLO 1.) Explain basic methods in econometrics and identify correct procedures

a) Explain the difference between variables and a statistic in the context of a regression equation.
b) Define the terms "causal effect" and "ideal experiment". Explain the difference between descriptive statistics, inferential statistics, and causal inference.
c) Give an example of a regression coefficient estimate that suffers from omitted variable bias, and explain how the *regression control* technique could reduce bias in the example.
d) Describe all the numbers in a regression results table in an economics book or journal article; write the regression equation, identifying the independent and dependent variables; identify the main independent variable of interest; interpret the models, including polynomial and log models; test their statistical significance; evaluate them in terms of any potential bias.
e) Discuss best practices in estimating standard errors.

CLO 2: Use technology to analyze data

a) Create summary statistics for variables in a data set using the R software program.
b) Estimate a regression model (coefficients and standard errors) and create a scatterplot with a regression line in R.
c) Download data from the Internet and read it into a statistical software package
d) Run an R script associated with a published research study by modifying the directory path, installing required packages, loading data, and obtaining results.

e) Create a new script by modifying an existing script, and use your original results in a term paper

CLO 3: Prepare a scholarly research paper describing an original regression analysis:

a) Formulate an interesting and important research question.
b) Locate and describe data from Internet or other sources.
c) Search and analyze scholarly literature related to research question.
d) Write a review of econometric literature that is integrated and not merely an annotated bibliography; list and describe relevant studies and their research questions, the data and methods they used, and the results they found. Highlight any studies that provide compelling estimates of well-defined causal effects, or explain why a study does not.
e) Develop, estimate and interpret a statistical model that can be used with the data to answer a question which is original and contributes to the literature.

Required Texts/Readings (Required)

Textbook

Real Econometrics: The Right Tools to Answer Important Questions by Michael Bailey (2nd Edition)
ISBN-13: 978-0190857462
ISBN-10: 0190857463
It is available at any of the online outlets (Amazon, for example). Used copies are fine. Also, avoid getting the international edition, since it is different.

Other technology requirements / equipment / material

The class will use a computer program called R to gain practical experience in econometrics. All students must have installed on their home machines free R and R Studio software.

Course Requirements and Assignments (Required)

1) Problem Sets (40% of your grade, 10% each):

There will be 4 problem sets due, each of which involves empirical analysis. The data for the problem sets will be posted on Canvas. Please submit assignments on Canvas on the day they are due. Assignments handed in after answers are distributed will receive no credit.

2) Exams (30% of your grade):

There are 2 Midterm exams (20% total, 10% each) and 1 comprehensive Final exam (10% of your grade). All of these exams will be multiple choice problems. Please bring a half-page green scantron (882-E) and a calculator with you on the exam day. Please use a pencil (and NOT a pen) on your scantron. Also, please do not fold the scantron. The machine cannot read it if it's been folded.

3) Term Paper Proposal (10% of your grade) – min. 500 Words

To avoid last minute chaos, a proposal is required by **Friday, Apr 7, 2023**. The proposal should include why the topic is interesting, how you will obtain data, and how you estimate equations of interest. Please submit your proposal on canvas. I will show you where to submit and how.
I will post a term paper proposal **template** for you on Canvas that you can use for your proposal.
You should have a minimum of 3 relevant papers that you have come across in your literature search already. Of course, you will have MORE as time goes on. I do NOT expect at the proposal stage for you to have completed your full literature review yet. But you should have read at least one article directly related to your topic and have found a couple more that look interesting.

4) Draft Term paper/Project (10% of your grade) – min. 10 pages, min. 2000 words:
One major goal of this course is to provide you with skills and knowledge of both the theory and the practical tools necessary to start your own research. The best way to achieve this goal is to write an original research paper. The paper will discuss why you chose the topic, economic model, econometrics specification, data and empirical findings. I will post an example term paper for you on Canvas that you might find helpful.

Paper Structure (min. 10 pages, min. words 2000):

I. Title page: should include the title of the paper, your name and the abstract
II. Abstract: This should be less than 50 words and summarize the topic, methodology, and main findings. It should appear on your title page.
III. Introduction: This section should state the nature and objectives of the project. Make sure to provide some background or motivation for why your project is interesting.
IV. Literature Review: Literature review is a comprehensive summary of previous research on your chosen topic. The literature review surveys scholarly articles, books, and other sources relevant to your particular area of research. It creates a "landscape" for the reader, giving them a full understanding of the developments in the field.
IV. Description of the model. The model should be clearly stated and any equations carefully explained. You should write out the econometric model you plan to estimate, and discuss the expected impact of the exogenous variables in your model.
V. Data description and model estimation. You should use the techniques developed in class to analyze your data and estimate your model. Make sure to describe the dataset you are using by providing summary statistics of important variables. Your results should be reported and discussed in this section and could include: parameter estimates, standard errors, t-statistics, F-statistics, R-squared, tests for autocorrelation, heteroskedasticity, and possible multicollinearity, as appropriate.
VI. Conclusion. Review the major findings as well as possible extensions for future work. Make sure to mention any limitations of your approach as well as alternative explanations of your results. Policy implications, if any, could also be included in this section.
VII. Tables and graphs. Your paper must include at least one table and one graph. The tables and graphs should be well-labeled and accessible to the reader—**do not merely print out your regression output with cryptic variable names directly from R**.
VIII. References. You should have a minimum of 4 relevant papers that you have come across in your literature review.
Appendix If you have a lot of regression results or other details in your theoretical/statistical model that merit to be included yet, they may distract the reader, you may include them in an appendix.

5) Final Term paper/Project (10% of your grade) – min. 10 pages, min. 2000 words:

I will have 10 min one-one-one meeting with every student (please see course schedule below for details) where we will go over the draft term paper. I will give you my feedback on the paper. You can ask me any questions you have. Then you will write the final term paper incorporating the feedback. The structure of your final term paper will be the same as the paper structure mentioned under Draft Term paper.

Paper Structure (min. 10 pages, min. words 2000):

I. Title page: should include the title of the paper, your name and the abstract
II. Abstract: This should be less than 50 words and summarize the topic, methodology, and main findings. It should appear on your title page.

III. Introduction: This section should state the nature and objectives of the project. Make sure to provide some background or motivation for why your project is interesting.
IV. Literature Review: Literature review is a comprehensive summary of previous research on your chosen topic. The literature review surveys scholarly articles, books, and other sources relevant to your particular area of research. It creates a "landscape" for the reader, giving them a full understanding of the developments in the field.
IV. Description of the model. The model should be clearly stated and any equations carefully explained. You should write out the econometric model you plan to estimate, and discuss the expected impact of the exogenous variables in your model.
V. Data description and model estimation. You should use the techniques developed in class to analyze your data and estimate your model. Make sure to describe the dataset you are using by providing summary statistics of important variables. Your results should be reported and discussed in this section and could include: parameter estimates, standard errors, t-statistics, F-statistics, R-squared, tests for autocorrelation, heteroskedasticity, and possible multicollinearity, as appropriate.
VI. Conclusion. Review the major findings as well as possible extensions for future work. Make sure to mention any limitations of your approach as well as alternative explanations of your results. Policy implications, if any, could also be included in this section.
VII. Tables and graphs. Your paper must include at least one table and one graph. The tables and graphs should be well-labeled and accessible to the reader—**do not merely print out your regression output with cryptic variable names directly from R**.
VIII. References. You should have a minimum of 4 relevant papers that you have come across in your literature review.
Appendix: If you have a lot of regression results or other details in your theoretical/statistical model that merit to be included yet, they may distract the reader, you may include them in an appendix.

Grading Information (Required)

Your grade will be based upon:

Assignments	% of your grade	Due Dates
4 Problem Sets	40% total, 10% each	See Course Description below for due dates
Midterm 1	10%	Wed 3/8, in-person, in-class (Please bring a Scantron 882E and a Calculator)
Midterm 2	10%	Wed 4/12, in-person, in-class (Please bring a Scantron 882E and a Calculator)
Term Paper Proposal	10%	Fri, 4/7 by 11:59pm (Submit on Canvas)
Draft Term paper	10%	Fri 4/28 by 11:59pm (Submit on Canvas)
Final Term Paper	10%	Fri, 5/19 by 11:59pm (Submit on Canvas)
Final Exam	10%	Tuesday, May 23 from 7:15-9:30 AM at DMH 165 (Please bring a Scantron 882E and a Calculator)

97-100 A+	93.0-96.9 A	90.0-92.9 A-
87.0-89.9 B+	83.0-86.9 B	80.0-82.9 B-
77.0-79.9 C+	73.0-76.9 C	70.0-72.9 C-
67.0-69.9 D+	63.0-66.9 D	60.0-62.9 D
Below 60 F		

You will find the Final Exam schedule for Spring 2023 at:
https://www.sjsu.edu/classes/final-exam-schedule/spring-2023.php

Late Submission Policy:

Due dates for every assignment are provided on the course syllabus and course schedule (and posted on Canvas). Unless otherwise stated, assignments are due on those days. However, I recognize that sometimes "life happens." In these instances, you may use your allotted one flex day. These days allow you to submit an assignment up to one day late without penalty. You can use this day for any assignment and for any reason. You do not need to provide me with the reason: simply email me and tell me you would like to use your flex day.

Once you've exhausted your flex day, then point deductions will occur for any assignment submitted after the deadline. An assignment submitted 24 hours of the due date will only be eligible for 80% of the maximum number of points allotted. Assignments submitted more than 24 hours after the due date will not be accepted. If you experience extenuating circumstances (e.g., you are hospitalized) that prohibit you from submitting your assignments on time, please let me know. I will evaluate these instances on a case-by-case basis.

- **There will be no makeup exams. Please make your travel plans accordingly.**
- **Cheating on exams will result in an automatic F for the entire course.**
- **I do not offer extra credit work to an individual student.**

Online Classroom Protocol

In consideration to your classmates and me, be on time, stay for the duration of the class and avoid any disruptive activities within the classroom (cell phones, side conversation, etc.)

University Policies (Required)

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course.

- "Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material."
    - It is suggested that the green sheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
    - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.

- "Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent."

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person's ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Integrity Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

In 2013, the Disability Resource Center changed its name to be known as the Accessible Education Center, to incorporate a philosophy of accessible education for students with disabilities. The new name change reflects the broad scope of attention and support to SJSU students with disabilities and the University's continued advocacy and commitment to increasing accessibility and inclusivity on campus.

ECON 103A-01/ Intro to Econometrics, Spring 2023, Course Schedule

Tentative Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	1/25	Introduction, Syllabus, Download and Install R Review of Statistical Concepts, what is Econometrics?
2	1/30	Chapter 1 Bailey, Introduction to R
2	2/1	Chapter 2: Bailey: Stats in the Wild: Good Data Practices
3	2/6	Chapter 2: Bailey: Stats in the Wild: Good Data Practices
3	2/8	Chapter 3: Bivariate OLS **Problem Set 1 due Fri 2/10 by 11:59pm on Canvas**
4	2/13	Chapter 3: Bivariate OLS
4	2/15	Chapter 3: Bivariate OLS
5	2/20	Chapter 4: Hypothesis Testing
5	2/22	Chapter 4: Hypothesis Testing **Problem Set 2 due Fri 2/24 by 11:59pm on Canvas**
6	2/27	Chapter 4: Hypothesis Testing
6	3/1	Chapter 4: Hypothesis Testing
7	3/6	Midterm 1 Review
7	3/8	**Midterm 1 (in class 9AM - 10:15AM) (Please bring a Scantron 882E half page green one, pencils and a calculator)**
8	3/13	Chapter 5: Multivariate OLS
8	3/15	Chapter 5: Multivariate OLS
9	3/20	Chapter 5: Multivariate OLS
9	3/22	Chapter 6: Dummy Variables **Problem Set 3 due Fri 3/24 by 11:59pm on Canvas**
10	3/27	Spring Recess, No Class, Campus Closed
10	3/29	Spring Recess, No Class, Campus Closed
11	4/3	Chapter 6: Dummy Variables
11	4/5	Chapter 6: Dummy Variables **Term Paper Proposal due Fri 4/7 by 11:59pm on Canvas**
12	4/10	Midterm 2 Review
12	4/12	**Midterm 2 (in class 9AM - 10:15AM) (Please bring a Scantron 882E half page green one, pencils and a calculator)**
13	4/17	Chapter 7: Specifying Models
13	4/19	Chapter 7: Specifying Models **Problem Set 4 due Fri 4/21 by 11:59pm on Canvas**

Week	Date	Topics, Readings, Assignments, Deadlines
14	4/24	Chapter 7: Specifying Models
14	4/26	Chapter 10: Experiments: Dealing with Real World Challenges **Draft Term Paper Due on Fri 4/28 on Canvas by 11:59pm**
15	5/1	Chapter 10: Experiments: Dealing with Real World Challenges
15	5/3	Chapter 10: Experiments: Dealing with Real World Challenges
16	5/8	Draft Term Paper Feedback (in-person 10-min one-on-one meeting with each student), No in person lecture
16	5/10	Draft Term Paper Feedback (in-person 10-min one-on-one meeting with each student), No in person lecture
17	5/15	Final Review **Final Term Paper Due on Fri 5/19 on Canvas by 11:59pm**
Final Exam	**5/23**	**Tuesday, May 23 from 7:15-9:30 AM at DMH 165 (Please bring a Scantron 882E half page green one and a Calculator)**