

# San José State University

## CoSS/Department of Economics

### ECON104, Mathematical Methods for Economics, Sec 61, Summer, and 2022

#### Course and Contact Information

Instructor: Dr. Rui Liu

Office  
Location: DMH 143

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Office Hours: No appointment needed: Canvas Discussion Board  
By appointment: Friday 1:30-2:00 pm via ZOOM

**Weekly Review Session via Zoom on 6/3, 6/10, 6/17, 6/24, 7/1, at 12:00-1:30 pm**

Class Days/Time : Join from PC, Mac, Linux, iOS or Android:  
<https://sjsu.zoom.us/j/88085497735?pwd=d1NjWmZ3RG1rRnFMTld2ZFZGOUZqdz09>

**Password: 104**

Classroom : Canvas

#### Course Description

The objective of the course is to survey some basic mathematical techniques that are widely used to connect important elements in economic theory and to solve economic problems. It is a mathematical restatement of the economic theory contained in microeconomics and macroeconomics.

## Course Learning Outcomes (CLO)

*Students will acquire enough mathematical skill to access literature that is most relevant to their study.*

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

CLO 1: *define and explain indifference curve, isoquant, cost minimization, profit maximization, equilibrium conditions in output and input markets, and the national income model.*

CLO 2: *identify and apply functions of one or more variables, simple differentiation, partial and total differentiation, and matrix algebra.*

CLO 3: *solve simple real-world optimization problems both mathematically and graphically.*

## Recommended Texts/Readings

### Recommended Textbook

Business Calculus, by Shana Calaway, Dale Hoffman, and David Lippman . The book is freely available at <http://www.opentextbookstore.com/buscalc/BusCalc.pdf>

*Essential Mathematics for Economic Analysis, 4th Edition, by Knut Sydsaeter, Peter Hammond and Arne Strom, ISBN: 9780273760689.*

### Optional Readings

*A Mathematical Approach to Economic Analysis, by P. Toumanoff & F. Nourzad*

## Coursework Commitment

This is a four-unit undergraduate level course. SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of three hours per unit per week, including participating course activities, completing problem sets, mastering software languages, and so on. More details about student workload can be found in [University Policy S12-3 \(Links to an external site.\)](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

## Course Requirements and Assignments

The course grade will be based on weekly problem sets, discussion participation, a group project, two midterms, a final exam. The scores are averaged with the following weight:

Assignment	Weight	Due Dates
Problem Sets (two lowest dropped)	35%	<b>Every Monday at 6:00 pm till 6/27; Thursday, 6/30, at 6:00 pm</b>
Weekly Discussion	5%	<b>Every Thursday at 6:00 pm</b>
Group project	10%	<b>Friday, 6/24, at 6:00 pm</b>
Midterm 1	15%	<b>Monday, 6/13, at 6:30 pm-8:00 pm</b>
Midterm 2	15%	<b>Monday, 6/27, at 6:30 pm-8:00 pm</b>
Final Exam	20%	<b>Available from 2:00 pm to 11:59 pm on Friday, 7/1</b>

### Problem Sets

Problem sets will be assigned on a weekly basis throughout the summer session (with a total of 10). Students may feel free to collaborate on problem sets in small groups, though each student must submit their own set of answers. Students should not post solutions on the general discussion board for all to see. Completed solutions to problem sets must be submitted through Canvas as WORD/PDF files by the deadline (i.e. 6:00 PM Monday night). No late submission is accepted. The lowest two scores on problem sets will be dropped. No make-up problem set will be given.

## **Discussion**

Five Weekly Discussions - Each week, you are expected to post at least one "muddy point" – that is, an unanswered question you have after completing the modules, an issue that you don't fully understand, or something that you just need clarification on. I will try my best to answer all your questions during the weekly review session.

## ***Midterm Exams***

Two midterms will be administered during the course. Exams will be cumulative with a focus on the most recent concepts presented. Non-graphing calculators will be required to complete some questions. Students will work individually on exams. Exams will have a time limit and students will be free to consult a **one-sided letter-sized cheat sheet** during the examination. No late submission is accepted. No make-up exam will be given.

Exams open and close at specific times per the syllabus and Canvas scheduling. You cannot enter the exam before or after the scheduled time. Check the syllabus and Canvas for exam days/times. All midterms use the Canvas proctoring system AND Respondus Lockdown Browser. All times are PST/PDT and you are responsible for awareness of any time zone differences.

## **Final Exam**

Final exam includes two portions- a multiple choice exam and a take-home exam. You will be given an "exam window"—a 10-hour period during which your exam must be taken.

The first portion is a **cumulative** multiple-choice exam using Respondus Lockdown Browser. You are allowed to use a one-sided letter-sized cheat sheet, a non-graphing calculator and two sheets of scratch paper during the examination. **The 90-minute exam will be made available from 2:00 pm to 11:59 pm on Friday, July 1.**

The second portion is an open-book and open-note take-home exam. But you may not consult or collaborate with anyone about the questions. **The exam starts at 2:00 pm and closes at 11:59 pm on Friday, July 1.** In order to complete the exam, you will write down your step-by-step solutions for each problem, scan your handwritten work using a smartphone to Canvas by midnight.

## ***Missed Exams***

Students are **required** to take exams according to schedule. A student who misses an exam will receive zero point on that exam. However, if a student has serious and compelling reasons, he/she needs to contact the instructor and receives the instructor's approval **in advance**. With an accepted excuse a makeup exam may be given.

### ***Group Project:***

The group project should be completed by 2-3 students. You will be randomly assigned to a group at the beginning of the course. Projects are mainly designed to hone your skills on mathematical modeling based on the tools introduced in the class. Each group is expected to submit **one** electronic copy of the project to Canvas by the specified deadline.

### ***Announcements***

**Announcements will be posted in Canvas on a regular basis. They will appear on your Canvas dashboard when you log in and/or will be sent to you directly through your preferred method of notification from Canvas. Please make certain to check them regularly, as they will contain any important information about upcoming assignments or class concerns.**

### **Using LockDown Browser and a webcam (Respondus Monitor) for online exams**

This course requires the use of **LockDown Browser** and a **webcam** for online exams. The webcam can be built into your computer or can be the type that plugs in with a USB cable. Watch this [short video \(Links to an external site.\)](#) to get a basic understanding of LockDown Browser and the webcam feature.

You can download and install Respondus when you are going to take Respondus enabled exam on Canvas or through the link:

<http://www.respondus.com/lockdown/download.php?id=967937270> (Links to an external site.)

**Note: Don't download a copy of LockDown Browser from elsewhere on the Internet; those versions won't work at our institution.**

To take an online test, start LockDown Browser and navigate to the exam. (You won't be able to access the exam with a standard web browser.) For additional details on using LockDown Browser, review this [Student Quick Start Guide \(PDF\) \(Links to an external site.\)](#). For frequently asked questions regarding LockDown Browser, please visit

<http://www.sjsu.edu/ecampus/teaching-tools/respondus/faq/index.html> (Links to an external site.).

Finally, when taking an online exam, follow these guidelines:

- Ensure you're in a location where you won't be interrupted
- Turn off all mobile devices, phones, etc.
- Clear your desk of all external materials — books, papers, other computers, or devices
- Remain at your desk or workstation for the duration of the test
- If a webcam is required, make sure it is plugged in or enabled before starting LockDown Browser
- LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted
- If a webcam is required, you will be recorded during the test to ensure you're using only permitted resources

## Grading Policy

*Letter grades will be determined as follows:*

A+ = 100-97%	A = 96-93%	A- = 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-77%	C = 76-73%	C- = 72-70%
D+ = 69-67%	D = 66-63%	D- = 62-60%
F = 59-0%		
Unsatisfactory		

## Class Delivery Mode

This course is delivered online through Canvas. Success in the course requires active participation by logging in to the web based course site multiple times a week to read assigned text sections, review lecture videos, updates and announcements, to complete assignments, take exams. An average student should set aside a minimum of 20-25 hours per week for this summer intensive course. Although, depending on your level of comfort and experience with calculus and technology, your individual time commitment may vary.

Check out, “What Makes a Successful Online Student?” at:

<http://www.ion.uillinois.edu/resources/tutorials/pedagogy/studentprofile.asp>

## Technology Requirements

This is a technology heavy class since it is in the online environment. You must have a computer that has the most up to date operating system, Microsoft office, up to date web browser and associated media players, a webcam, microphone and earphone capabilities. There are computers available on campus and at libraries, tech centers, proctoring centers, etc., but you will need to search these resource out for yourself, if needed.

Some have expressed a concern that their computers may be exposed to viewing during sessions or exams. In particular, the exam software requires that you show ID, scan your room and be visible throughout the entire exam and all aspects are recorded. If this is a concern of yours please reevaluate your desire to participate in an online course as these are all requirements of such courses. If you do wish to participate but do not wish to use your computer consider purchasing one strictly for use in this program or consider attending at a local library using their computers. These decisions are yours and the instructor is not responsible for any additional effort or cost you may need to expend to satisfy those desires.

You must also have the necessary system requirements to smoothly run the Canvas site. In an online class it is your responsibility to ensure you have the proper technology to view the online curriculum. I cannot provide tech support for your system or software. Canvas or SJSU ecampus can provide support for your system to get you started.

Canvas: [https://docs.google.com/forms/d/e/1FAIpQLScH7-UunrDkUrUUJig5aPIKJmpjXF84Pua\\_1Fpe0bpgVx5pw/viewform](https://docs.google.com/forms/d/e/1FAIpQLScH7-UunrDkUrUUJig5aPIKJmpjXF84Pua_1Fpe0bpgVx5pw/viewform)  
Or SJSU ecampus: <http://www.sjsu.edu/ecampus/> or: (408) 924-2337

**Technical support** is provided on campus when you are having technical difficulties such as password reset, browser problems, computer problems, accessibility and issues encountered when using Canvas courses. <http://www.sjsu.edu/ecampus/> or: (408) 924-2337 or: [ecampus@sjsu.edu](mailto:ecampus@sjsu.edu)

## University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

## ECON 104 / Math Econ, Summer 2022, Course Schedule

*List the agenda for the semester including when and where the final exam will be held. Indicate the schedule is subject to change with fair notice and how the notice will be made available.*

## **Course Schedule**

Week Topics, Readings, Assignments,  
Deadlines  
Syllabus

1 Properties of Functions, Chp 4, 5  
  
Differentiation, Chp 6  
  
Derivatives in Use, Chp 7

2 Single Variable Optimization,  
Chp 8

### **Midterm Exam**

3 Functions of Many Variables,  
Chp 11  
  
Multivariable Optimization, Chp  
13  
  
Constrained Optimization, Chp  
14

4 Matrix and Vector Algebra,  
Chp15  
  
Determinants and Inverse  
Matrices, Chp 16

### **Group Project due Midterm Exam**

5 Linear Programming

### **Final Exam**

