

# Math 23A Syllabus Summer Session 2, 2024

## General Information

<b>Time:</b>	That's up to YOU
<b>Location:</b>	Wherever you have Internet!
<b>Course Authors:</b>	Tony Tromba, Frank Bäuerle
<b>Course Hosts:</b>	UCSC, UC Online
<b>Course Designer:</b>	Alan Roper
<b>Instructors:</b>	Frank Bäuerle, Longzhi Lin & Tony Tromba
<b>Teaching Assistants (TAs):</b>	See the complete list at the bottom of the home page.
<b>E-mail:</b>	<a href="mailto:calculus-group@ucsc.edu">calculus-group@ucsc.edu</a> ( <a href="mailto:calculus-group@ucsc.edu">mailto:calculus-group@ucsc.edu</a> )

## Course Learning Objectives

1. Master the differential calculus of several variables at a high level.
2. Topics to be mastered are the nature of the derivative as a matrix, vectors, vector fields, applications to physics and the theory of

extrema including Lagrange Multipliers.

## Office Hours (OH)

The instructors and TAs hold weekly office hours online via Zoom, our webinar software. A range of times are available. For details check the office hour page in the Support Options module.

## E-Textbook (Achieve)

The textbook (a customized version of *Calculus, Early Transcendentals, 2nd ed*, by Jon Rogawski) and *Vector Calculus, 6th ed*, by Marsden/Tromba and reading assignments are located on a web-based platform called Achieve. For details on how to access Achieve, go to the **Quick Start Guide** in the **Technical Setup Module**.

## Homework System (Achieve)

The homework assignments are located on a web-based platform called Achieve. For details on how to access Achieve, go to the **Quick Start Guide** in the **Technical Setup Module**.

## Grading Policy

The grade in this class is comprised of:

<b>On-line Homework (in Achieve)</b>	<b>30%</b>
<b>On-line Quizzes (in Achieve)</b>	<b>20%</b>
<b>Reading Assignments - Progress Check Questions (in Achieve)</b>	<b>0%</b>
<b>Midterm (online in Achieve)</b>	<b>20%</b>

**Comprehensive Final (online in Achieve)****30%**

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## Course Learning Objectives

1. Understand the concept of an instantaneous rate of change and the derivative of a function
  - Compute limits of functions using standard limit rules and L'Hospital's rule.
  - Understand the precise definition of continuity and the derivative of a function in terms of limits.
2. Learn how to calculate derivatives explicitly:
  - Know the formulas for the derivative of basic functions by heart (polynomials, basic trigonometric, exponentials, logarithms, power functions)
  - Know basic derivative rules (product rule, quotient rule, power rule, inverse rule, and chain rule) and how to apply them to compute the derivative of products, ratios, inverse and composite functions
3. Learn how to calculate derivatives implicitly:
  - Applications of chain rule for implicit differentiation to find derivatives of certain inverse functions and equations of tangent lines to curves.
4. Master how derivatives affect the behavior of a function:
  - Understand the relationship between first derivatives, higher order derivatives, and the properties of the graphs of functions.
5. Master the application of the derivative notion to optimization problems
  - Take a simple real life optimization problem, model it mathematically and use all the tools of differential calculus to solve it.

## Office Hours (OH)

The instructors and TAs hold weekly office hours online via Zoom, our webinar software. A range of times are available. For details check the office hour page in the Support Options module.

## Discussion Sections/T.A.'s

There are **optional online discussion sections** at various times (details TBA) that really are like drop-in hours. You do not need to enroll in them to attend.

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<b>Comprehensive Final (online in Achieve)</b>	<b>30%</b>

Roughly speaking, in assigning grades we follow the standard grading scale, but subject to several important modifications/caveats:

<b>Grade*</b>	<b>Score Range</b>
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<b>A+</b>	<b>97 and up</b>
<b>A</b>	<b>93-97</b>
<b>A-</b>	<b>90-93</b>
<b>B+</b>	<b>87-90</b>
<b>B</b>	<b>83-87</b>
<b>B-</b>	<b>80-83</b>
<b>C+</b>	<b>77-80</b>
<b>C</b>	<b>73-77</b>
<b>D</b>	<b>60-73</b>
<b>F</b>	<b>0-60</b>

**\*The above grading scale is subject to the following modifications/caveats:**

- **A SUFFICIENTLY HIGH SCORE ON THE FINAL EXAM** is required to pass the course. This is usually around 50%.
- We do **NOT** round scores up or down.
- We reserve the right to modify this policy based on overall class performance, i.e. there may be a small curve for the class in the sense that grade ranges that lead to certain grades are adjusted based on overall results.

Some more detailed explanation for the grading is in order:

- **Online Homework:** All online homework assignments are available in Achieve which is accessed directly from each lesson, or you can click on MacMillan Higher Education link in the left NavBar. Due dates are posted in the weekly schedule and are listed in the Syllabus link or in the Calendar link at the top of the page. **You have an unlimited number of attempts on all online homework questions and most questions provide feedback or hints if you answer incorrectly.**

**Words of advice re homework: Think of the homework as your opportunity to learn the material and expect to spend MANY hours doing homework. The system will provide solutions to many problems for you to check your answers and work, but do not use this to short cut your homework. The process of struggling to find a solution, while possibly aggravating and stressful, is a necessary part in your comprehension of the material for many of you. If you go to the solutions too soon and too often, you may not learn the material well enough to do well on the tests. Good scores on the homework are easy to get, but getting a solid understanding of the material is not easy.**

**Note: In calculating your final grades we will be dropping your lowest three online homeworks.** Therefore, if you missed a HW or scored poorly one it will not affect your final grade.

- **On-Line Quizzes:** On-line quizzes take place in weeks 2 and 4 and are found in Achieve. Unlike regular on-line homework assignments, they are limited in time and do not give hints or feedback for incorrect answers. There will be partial credit (where appropriate) on on-line quizzes. Your TA and instructors will check your answers and may assign partial credit after the computer score has been calculated. That is, your final score on a quiz or other on-line test may be higher than what you see after you submit your test to Achieve. See the schedule below or click on Calendar at the top of the page to find due dates/times.

**Note: There are no makeup quizzes, but if you miss one of the quizzes for any reason whatsoever, we will use your final exam score to stand in for this quiz score.** Therefore, if you missed a quiz, this will minimize the impact on your final grade.

- **Reading Assignments:** No, we are not watching you when you read, but reading the book is a mandatory and important component of the course. This session there is no reading score. You have unlimited attempts on each question. You will encounter them regularly when you read the assigned sections in your E-book. All readings are due on the dates noted below in the weekly schedule. You can also find the due dates by clicking on Calendar at the top of the page.
- **Discussion on Piazza and Study Group Participation:** This is a tricky one. Research shows that student success in on-line learning increases with active participation in discussion groups. On the other hand, we understand that not everybody needs help nor may want to collaborate with others. Now if you don't need help, you can still help others, and the fact is that explaining math to others helps you understand the math more deeply, so it is to your benefit also. **Active participation on Piazza is**

**strongly encouraged.**

- **Curve:** We do not curve individual tests, but there **may** be a small curve for the class in the sense that grade ranges that lead to certain grades are adjusted based on overall results.
- In addition, and very importantly, **A SUFFICIENTLY HIGH SCORE ON THE FINAL EXAM** is required to pass the course. This is usually around 50%.
- **Extensions:** There are **NO EXTENSIONS** beyond the following grace periods and late submission policy:
  - A) Quizzes and Midterm in Achieve: there is a 10 hour grace period and **no penalty if you submit your assignment within 10 hours of the due date.**
  - B) Homework assignments in Achieve: you can submit your assignment late **up to five days**, with a **10% penalty for each day the assignment is late. This policy does not apply to the week 5 homework.**

## Midterm and Final Exams

The **midterm** is **unproctored** and administered on Achieve similar to how the quizzes are administered.

The **final exam** is **proctored** and will be administered on Achieve.

Please go to our **Exam Information Page** in the Course Overview and Policies module for details on Midterm and Final dates, times, locations and requirements.

**Important:** There are **no make-up exams given**. If you miss the midterm, your score on the final will count for both the midterm and

the final. If you miss the final exam, you will fail the class. **We CANNOT accommodate individual travel plans. You need to take the exams when scheduled.**

Students often fail to understand that **the course ends with the final exam** which by its very name is **final**. Grades cannot be adjusted afterwards for extra work or other reasons unrelated to the actual course.



## Accommodations

Students requiring accommodations for learning should make sure that the Disability Resource Center (DRC) or similar unit at your home campus sends us their accommodation form as soon as possible.

If you have questions about disabilities contact the UCSC Disability Resource Center (DRC) at (831) 459-2089 or at <http://drc.ucsc.edu> (<http://drc.ucsc.edu>) or the corresponding unit at your UC home campus. (<http://drc.ucsc.edu>)

The homework extension policy for DRC students with approved homework extension: (<http://drc.ucsc.edu>)

1. The extensions need to be requested **before** the assignment due date passes.
2. The extensions are given for **up to 3 days**.
3. The only exception to the above is when you have a documented medical emergency. In that case, you need to reach out to your DRC coordinator to request a longer extension, and provide documentation to them. They will determine if a longer extension is needed. You should ask them to contact us directly.

## Calculator Policy On Exams

**On exams, only scientific calculators** are allowed. In particular, graphing calculators or symbolic calculators who can do algebraic or symbolic work such as solving equations or differentiating are not allowed.

An example of an allowable calculator is a **TI 30**  (<https://education.ti.com/en/products/calculators/scientific-calculators/ti-30xa?keyMatch=calculator%20TI%2030>).

## Academic Honesty

All members of the UCSC community benefit from an environment of trust, honesty, fairness, respect, and responsibility. You are expected to present your own work and acknowledge the work of others in order to preserve the integrity of scholarship.

Academic integrity includes:

- Following exam rules
- Using only permitted materials during an exam

- Viewing exam materials only when permitted by your instructor
- Keeping what you know about an exam to yourself
- Incorporating proper citation of all sources of information
- Submitting your own original work

Academic misconduct includes, but is not limited to, the following:

- Disclosing exam content during or after you have taken an exam
- Accessing exam materials without permission
- Copying/purchasing any material from another student, or from another source, that is submitted for grading as your own
- Plagiarism, including use of Internet material without proper citation
- Using cell phones or other electronics to obtain outside information during an exam without explicit permission from the instructor

Any violation of the university's policy on academic integrity will result in a failing grade for the class and administrative sanctions imposed by the provost of your college. For the full policy and disciplinary procedures on academic dishonesty, students and instructors should refer to the [Academic Misconduct page](https://ue.ucsc.edu/academic-misconduct.html) [↗\(https://ue.ucsc.edu/academic-misconduct.html\)](https://ue.ucsc.edu/academic-misconduct.html) at the [Division of Undergraduate Education](https://www.google.com/url?q=https%3A%2F%2Fue.ucsc.edu%2F&sa=D&sntz=1&usg=AFQjCNEWt49mcpX1IY5XHVfOeb_oBfV_Kw) [↗\(https://www.google.com/url?q=https%3A%2F%2Fue.ucsc.edu%2F&sa=D&sntz=1&usg=AFQjCNEWt49mcpX1IY5XHVfOeb\\_oBfV\\_Kw\)](https://www.google.com/url?q=https%3A%2F%2Fue.ucsc.edu%2F&sa=D&sntz=1&usg=AFQjCNEWt49mcpX1IY5XHVfOeb_oBfV_Kw).

## Title IX/Care Advisory

The Title IX Office is committed to fostering a campus climate in which members of our community are protected from all forms of sex discrimination, including sexual harassment, sexual violence, and gender-based harassment and discrimination. Title IX is a neutral office committed to safety, fairness, trauma-informed practices, and due process.

Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support

and advocacy at the Campus Advocacy Resources & Education (CARE) Office by calling 831-502-2273. In addition, Counseling & Psychological Services (CAPS) can provide confidential, counseling support, 831-459-2628. You can also report gender discrimination directly to the University's Title IX Office, 831-459-2462. Reports to law enforcement can be made to UCPD, 831-459-2231 ext. 1. For emergencies call 911.


## Student Services

### [Counseling and Psychological Services](https://caps.ucsc.edu/) [\(https://caps.ucsc.edu/\)](https://caps.ucsc.edu/)

*Many students at UCSC face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.*

### [Slug Support Program](https://deanofstudents.ucsc.edu/slug-support/program/index.html) [\(https://deanofstudents.ucsc.edu/slug-support/program/index.html\)](https://deanofstudents.ucsc.edu/slug-support/program/index.html)


*College can be a challenging time for students and during times of stress it is not always easy to find the help you need. Slug Support can give help with everything from basic needs (housing, food, or financial insecurity) to getting the technology you need during remote instruction.*

*To get started with SLUG Support, please contact the [Dean of Students Office](https://deanofstudents.ucsc.edu/about/index-aboutdos.html)  [\(https://deanofstudents.ucsc.edu/about/index-aboutdos.html\)](https://deanofstudents.ucsc.edu/about/index-aboutdos.html) at 831-459-4446 or you may send us an email at [deanofstudents@ucsc.edu](mailto:deanofstudents@ucsc.edu).*

### [Slug Help/Technology](https://its.ucsc.edu/index.html) [\(https://its.ucsc.edu/index.html\)](https://its.ucsc.edu/index.html)

*The ITS Support Center is your single point of contact for all issues, problems or questions related to technology services and computing at UC Santa Cruz. To get technological help, simply email [help@ucsc.edu](mailto:help@ucsc.edu).*

### [On-Campus Emergency Contacts](https://www.ucsc.edu/help/) [\(https://www.ucsc.edu/help/\)](https://www.ucsc.edu/help/)

For all other help and support, including the health center and emergency services, start [here](https://www.ucsc.edu/help/)  (<https://www.ucsc.edu/help/>). **Always dial 9-1-1 in the case of an emergency.**

## Tentative Weekly Schedule

Week	Dates	Sections to be covered	Assignments Due
1	7/29 - 8/4	Sections 11.1, 11.2, 11.3, and 11.5	<ul style="list-style-type: none"> <li>Wk 1 Homework and Reading due <b>Tue 8/6 @ 11:59pm</b></li> </ul>
2	8/5 - 8/11	Sections 11.6, 11.7, 12.1, 12.2, 12.3 and <b>Quiz 1</b>	<ul style="list-style-type: none"> <li><b>Quiz 1</b> due <b>Fri 8/9 @11:59pm</b> (you have 90 minutes to complete)</li> <li>Wk 2 Homework and Reading due <b>Sun 8/11 @ 11:59pm</b></li> </ul>
3	8/12 - 8/18	Sections 13.1, 13.2, 13.3 Review and <b>Midterm.</b>	<ul style="list-style-type: none"> <li><b>Midterm</b> (online) <b>Fri 8/16</b></li> <li>Wk 3 Homework and Reading due <b>Sun 8/18 @ 11:59pm</b></li> </ul>
4	8/19 - 8/25	Sections 13.4, 13.5, 14.1, 14.2, 14.3 and <b>Quiz 2</b>	<ul style="list-style-type: none"> <li><b>Quiz 2</b> due <b>Fri 8/23 @11:59pm</b> (you have 90 minutes to complete)</li> <li>Wk 4 Homework and Reading due <b>Sun 8/25 @ 11:59pm</b></li> </ul>

5	8/26 - 8/31	Sections 14.4, 14.5, 14.6, 14.7, Review and <b>Final Exam</b>	<ul style="list-style-type: none"><li>• Wk 5 Homework and Reading due <b>Fri 8/30 @ 11:59PM</b></li><li>• <b>Proctored Final Exam</b> (online) <b>Due Sat 8/31, 5pm Santa Cruz time</b></li></ul>
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## Sections Covered

### 11. The Geometry of Euclidean Space

- 11.1 Vectors in Two- and Three-Dimensional Space
- 11.2 The Inner Or Dot Product, Length, and Distance
- 11.3 Matrices, Determinants, and the Cross Product
- 11.4 A Review of Conic Sections (Optional)
- 11.5 Polar, Cylindrical and Spherical Coordinates
- 11.6 A Survey of Quadratic Surfaces
- 11.7 n -Dimensional Euclidean Space

### 12. Paths and Curves in Space

- 12.1 Paths and Curves
- 12.2 Acceleration
- 12.3 Arc Length

### 13. Differentiation

- 13.1 The Geometry of Real-Valued Functions
- 13.2 Limits and Continuity
- 13.3 Differentiation
- 13.4 Properties of the Derivative

## 13.5 Gradients and Directional Derivatives

### **14. Higher-Order Derivatives: Maxima and Minima**

14.1 Iterated Partial Derivatives

14.2 Taylor's Theorem

14.3 Extrema of Real-Valued Functions

14.4 Constrained Extrema and Lagrange Multipliers

14.5 The Implicit Function Theorem [Optional]

14.6 Vector Fields

14.7 The Divergence and Curl of a Vector Field

14.8 Newton's Second Law (Optional)