

Math 19A Syllabus

General Information

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|------------------------|---|
| Time: | That's up to YOU |
| Location: | Wherever you have Internet! |
| Course Authors: | Tony Tromba, Frank Bäuerle |
| Course Hosts: | UCSC, UC Online |
| Instructors: | Frank Bäuerle, Longzhi Lin and Tony Tromba. Contact: calculus-group@ucsc.edu (mailto:calculus-group@ucsc.edu) |

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)

<https://cole2.uconline.edu/courses/2125292/pages/office-hours>

The TAs hold office hours online via ZOOM, our webinar software. A range of times are available. Check the [Office Hours \(https://cole2.uconline.edu/courses/2125292/pages/office-hours\)](https://cole2.uconline.edu/courses/2125292/pages/office-hours) page in the Support Options module for details.

Discussion Sections

<https://cole2.uconline.edu/courses/2125292/modules/items/98337839>

/T.A.'s

Your TA's (teaching assistants) will help facilitate the on-line discussion groups and also hold [on-line office hours \(https://cole2.uconline.edu/courses/2125292/pages/office-hours\)](https://cole2.uconline.edu/courses/2125292/pages/office-hours). There are [discussion sections \(https://cole2.uconline.edu/courses/2125292/pages/sections-meeting-schedule?module_item_id=98337839\)](https://cole2.uconline.edu/courses/2125292/pages/sections-meeting-schedule?module_item_id=98337839) at various times on-line. Check the Support Options module for details.

Small Group Tutoring/MSI

<https://cole2.uconline.edu/courses/2125292/modules/items/98337843>

There may be **MSI (Modified Supplemental Instruction)** and/or small group tutoring (SGT) at UCSC which can be thought of as class-specific drop-in tutoring. The MSI section leader is a trained fellow student who has already taken the course. If available, details will be announced on Canvas and the [MSI \(https://cole2.uconline.edu/courses/2125292/modules/items/98337843\)](https://cole2.uconline.edu/courses/2125292/modules/items/98337843) page.

Study Groups

We are encouraging students from each UCSC college, as well as off-campus students, to volunteer to organize [study groups \(https://cole2.uconline.edu/courses/2125292/modules/items/98337845\)](https://cole2.uconline.edu/courses/2125292/modules/items/98337845).

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

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| Online Homework (in Achieve) | 20% |
| Written Homework (in Canvas) | 6% |
| On-line Quizzes (in Achieve) | 24% |
| Reading Assignments - Progress Check Questions (in Achieve) | 0% |
| Midterm | 20% |
| Final | 30% |

Some detailed explanation for the grading is in order:

- **Section Attendance:** This quarter section attendance does not contribute to your grade. We encourage attendance and the list of available sections can be found in the corresponding page in the support options module.
- **Online Homework:** All online homework assignments are available on Achieve. Due dates are posted in the weekly schedule. **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.
- **Written Homework:** There will be three written assignments, due in weeks 4, 7 and 9. These can be found and submitted in the assignments section in Canvas.

- **On-Line Quizzes:** On-line quizzes take place in weeks 3, 5, 8, and 10 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: In calculating your final grades we will be dropping your lowest quiz score. Therefore, if you missed a quiz or scored poorly on a quiz, it will not affect 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 and can contribute to a grade bump for the final grade.**
- **Curve:** We do not curve individual tests, but there **may** be a curve for the class in the sense that grade ranges that lead to certain grades are adjusted based on overall results. In addition, a sufficiently high score on the comprehensive exam is required to pass the course. Similarly, an exceptionally high score on the final exam can lead to a grade bump.
- **Extensions:** There are **NO EXTENSIONS** beyond the following grace periods and late submission policy:

A) Reading assignments in Achieve, written homework in Canvas and Quizzes and Exams 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.**

Accommodations

Students with disability accommodations who are not from UCSC should contact one of the instructors during office hours or via e-mail as soon as possible. This is *absolutely necessary* to insure that there is sufficient time to accommodate your needs to give you an equal chance of success in the course. Students from UCSC need not contact us since the DRC automatically sends us the accommodation letters.

We encourage all students who may benefit from learning more about Disability Resource Center (DRC) services to contact the DRC by phone at 831-459-2089 or by email at drc@ucsc.edu.

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>) 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).

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.

[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.

[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/)**  [\(https://www.ucsc.edu/help/\)](https://www.ucsc.edu/help/). **Always dial 9-1-1 in the case of an emergency.**

Midterm and Final Exams

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. Exams will be online on Achieve.

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 final when it is 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 any reason.

Tentative Weekly Schedule

| Week | Dates | Sections to be covered/ Tests | Assignments Due |
|------|--------------|---|--|
| 1 | 9/28 - 10/8 | Introductory Videos & Sections 2.1, and 2.2 | <ul style="list-style-type: none"> Wk 1 Homework and Reading due Tue 10/8 @ 11:59pm |
| 2 | 10/9 - 10/15 | Sections 2.3., 2.4, 2.5 | <ul style="list-style-type: none"> Wk 2 Homework and Reading due Sun 10/15 @ 11:59pm |

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| 3 | 10/16 - 10/22 | Sections 2.6, 2.7, 2.8 and Quiz 1 | <ul style="list-style-type: none"> • Quiz 1 on Achieve, due Fri 10/20 @ 11:59pm • Wk 3 Homework and Reading due Sun 10/22 @ 11:59pm |
| 4 | 10/23 - 10/29 | Sections 3.1, 3.2, 3.3 | <ul style="list-style-type: none"> • Wk 4 Homework (including written homework #1) and Reading due Sun 10/29 @ 11:59pm |
| 5 | 10/30 - 11/5 | Sections 3.5 and 3.6 and Quiz 2 | <ul style="list-style-type: none"> • Quiz 2 on Achieve, due Fri 11/3 @ 11:59pm • Wk 5 Homework and Reading due Sun 11/5 @ 11:59pm |
| 6 | 11/6 - 11/12 | Sections 3.7, 3.8, 3.9 and Midterm | <ul style="list-style-type: none"> • Midterm: Saturday, 11/11 due @ 11:59pm • Wk 6 Homework and Reading due Sun 11/12 @ 11:59pm |
| 7 | 11/13 - 11/19 | Sections 3.10, 3.11, 4.2 | <ul style="list-style-type: none"> • Wk 7 Homework (including written homework #2) and Reading due Sun 11/19 @ 11:59pm |
| 8 | 11/20 - 11/26 | Sections 4.3 and 4.4 and Quiz 3 | <ul style="list-style-type: none"> • Quiz 3 on Achieve, due Sun 11/26 @ 11:59pm • Wk 8 Homework and Reading due Sun 11/26 @ 11:59pm |
| 9 | 11/27 - 12/3 | Sections 4.5, 4.6 | <ul style="list-style-type: none"> • Wk 9 Homework (including written homework #3) and |

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| | | | Reading due Sun 12/3 @ 11:59pm |
| 10 | 12/4 - 12/10 | Section 4.7, Final Exam Review, and Quiz 4 | <ul style="list-style-type: none"> • Quiz 4 on Achieve, due Fri 12/8 @ 11:59pm • Wk 10 Homework and Reading due Sun 12/10 @ 11:59pm |
| 11 | Final's Week | Final Exam | <ul style="list-style-type: none"> • Final Exam: Monday, 12/11 due @ 11:59pm |

Sections Covered

Chapter 2: LIMITS

- 2.1 Limits, Rates of Change, and Tangent Lines
- 2.2 Limits: A Numerical and Graphical Approach
- 2.3 Basic Limit Laws
- 2.4 Limits and Continuity
- 2.5 Evaluating Limits Algebraically
- 2.6 Trigonometric Limits
- 2.7 Limits at Infinity
- 2.8 Intermediate Value Theorem

Chapter 3: DIFFERENTIATION

- 3.1 Definition of the Derivative
- 3.2 The Derivative as a Function
- 3.3 Product and Quotient Rules
- 3.5 Higher Derivatives
- 3.6 Trigonometric Functions
- 3.7 The Chain Rule
- 3.8 Derivatives of Inverse Functions
- 3.9 Derivatives of General Exponential and Logarithmic Functions
- 3.10 Implicit Differentiation
- 3.11 Related Rates

Chapter 4: APPLICATIONS OF THE DERIVATIVE

- 4.2 Extreme Values

4.3 The Mean Value Theorem and Monotonicity

4.4 The Shape of a Graph

4.5 L'Hôpital's Rule

4.6 Graph Sketching and Asymptotes

4.7 Applied Optimization

4.8 Newton's Method (Optional)