

Course Syllabus: Sp21 MATH D001A 04Z, 04Z Calculus

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Course Description:

This course covers the fundamentals of differential calculus. Specifically, the course includes the basic concepts of analytic geometry, limits, derivatives, and their applications. The topics covered will include graphs and derivatives of algebraic, trigonometric, exponential, logarithmic, and hyperbolic functions. Applications, such as, motion, differentials, related rates, graphing, and optimization, will be covered. There will be a greater focus on mathematical rigor than is often present in precalculus courses, with extra emphasis on definitions, precise notation and logic.

Course Content:

- Introduction to limits, definition of limits, theorems on limits, one-sided limits, computation of limits using numerical, graphical, and algebraic approaches, delta-epsilon definition of limit
 - Continuity and differentiability of functions, determining if a function is continuous and differentiable at a real number
 - Limits involving infinity and asymptotes
 - Introduction to derivatives, and the limit definition of the derivative at a real number and as a function
 - Use of differentiation theorems, derivatives of algebraic, trigonometric, inverse trigonometric, exponential, logarithmic, and hyperbolic functions, the chain rule, implicit differentiation, differentiation of inverse functions, higher order derivatives
 - Use of derivatives for applications including equation of tangent lines and related rates, and differentials
 - Local/relative and global/absolute extrema of functions
 - Rolle's theorem and the Mean Value Theorem
 - The first derivative test, the second derivative test and concavity
 - Graphing functions using first and second derivatives, concavity, and asymptotes
 - Applications of extrema including optimization
 - Indeterminate forms, and L'Hopital's rule
 - Antiderivatives
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Important Notes:

- Since we are conducting the class fully online, I will look for your engagement through participation during synchronous sessions, and through the submission of assignments. **Be sure to submit all first week and second week assignments to get into the "rhythm" of the class. Please note that if you're not submitting any assignments, I will assume that you are not interested in the taking the class and may drop you (so you can get your refund)!**

- Taking classes online comes with a set of challenges, such as staying motivated, speaking up in class, conflicts with work and other responsibilities, working with classmates, getting help on material, feeling a sense of community with the class, lack of ideal workspace, in addition to technical issues, such as device malfunction and unreliable internet access. Almost half of all student report staying motivated as their greatest challenge. Here are my top recommendations for succeeding in my class in the online setting:
 1. **Log into our course in Canvas every day!** Check for upcoming deadlines and make sure you are aware of them.
 2. **Turn everything in!** Every homework, every discussion, every problem set. Also, don't miss any quizzes or exams.
 3. **Prepare for quizzes and exams as if they were closed-notes assessments.** That is, prepare as if you were allowed only paper, pencil and calculator. Preparing this way for quizzes will help you retain the material for exams. Preparing this way for exams will help you retain this material for when you need it for the next math or physics class(es).
 4. **Come to every synchronous session.** Allowing yourself to occasionally miss class is a slippery slope, and can easily turn into a bad habit that can cost you the grade you want in this class.
 5. **Come to the synchronous sessions prepared and ready to contribute!** Be sure to have watched the required videos so you can benefit from the synchronous session and, more importantly, contribute.
 6. **Don't wait to ask for help!** I cannot know what you don't tell me, especially in the online setting. If you're dealing with an unusual or an unexpected challenge, please let me know if I can do something to help keep the class manageable for you.
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Textbook and Calculator:

Great news: your textbook for this class is available for **free** online!

[Calculus, Volume 1 from OpenStax \(Links to an external site.\)](#), ISBN 1-947172-13-1

You have several options to obtain this book:

- [View online \(Links to an external site.\)](#) (Links to an external site.) (Links to an external site.)
- [Download a PDF \(Links to an external site.\)](#) (Links to an external site.) (Links to an external site.)

You can use whichever formats you want. Web view is recommended -- the responsive design works seamlessly on any device.

You will need a scientific calculator, and occasionally a graphing calculator, for this class. This can be a physical or an online app, such as the one at <https://www.desmos.com/> ([Links to an external site.](#)).

Prepared Lecture Notes:

The PDFs for prepared lecture notes will be shared with you. These are designed to help you keep your lecture notes organized. Please print them, or open on a tablet if you have the ability to annotate

electronically. As you watch the prerecorded video lectures, take notes! If you don't have access to a printer or a tablet, then simply take notes in a regular notebook, as you would in any other class. I hope that being able to pause and replay portions of the video will help you master the lecture material.

Weekly Schedule:

- **Friday through Monday** (and other days): Read textbook, watch lecture videos (and take notes on the prepared notes), work on homework, respond to discussion boards, and study!
- **Tuesdays, Wednesdays, Thursdays:** We will have synchronous Zoom meetings on these days. The link can be found in the Zoom tab in Canvas. **The passcode is: calculus.** You're expected to attend each of these meetings. Be sure to watch appropriate lecture videos before attending these meetings. We will use these synchronous meeting times to go over your questions, work in groups and take quizzes and exams.

If, for any reason, you stop participating and intend to drop the class, please do an official drop in a timely manner. If you fail to do so, you will receive an 'F' in the class. Follow the deadlines for this class in My Portal. I do not have the ability to make exceptions to these.

Office Hours:

- Mondays 10:30 a.m. – 12:00 p.m. (Zoom link: <https://fhda-edu.zoom.us/j/97458286911> (Links to an external site.))
 - Wednesdays 1 p.m. – 2:30 p.m. (Zoom link: <https://fhda-edu.zoom.us/j/93287281341> (Links to an external site.))
 - Fridays 11 a.m. – 12 p.m. (<https://fhda-edu.zoom.us/j/95775202592> (Links to an external site.))
 - Or, by appointment (email me to schedule)
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Homework and Problem Sets

The best way to succeed in any math class is doing all of the assigned work correctly and in a timely manner, making sure you really understand what you are doing! Focus on how to think mathematically about problems, not just on following a procedure or learning a skill! Time spent on the homework and in-class group work on problem sets will directly benefit you on quizzes and exams.

Online Homework: You will have online homework for each section we cover. The homework will be embedded within Canvas, and will be graded for correctness. The links and due dates are within the modules. You will have 5 late passes, each of which will give you a 24-hour extension on the homework for a particular section.

Problem Sets: Each week, we will have a problem set that you will work on. These problems will be posted as a PDF in the Canvas modules. You are to start work on them in groups in Zoom breakout rooms, work them out on paper, and submit them individually by the deadline on Thursday. You will start

them in class, but will need to finish them up on your own. These sets include problem-solving and critical-thinking exercises that rely on your conceptual understanding of the material and related skills.

Problem Sets Submission Guidelines:

- *Even though the problems will be discussed in groups, write up your own solutions independently.*
 - *Label each problem clearly – use highlighter to mark the number, or put a box around it so it's easy to find. You don't need to write the question, just fully-worked out solutions.*
 - *Do the problems in order, showing all work neatly, clearly and completely.*
 - *Write your solutions out in full detail, as modeled in the textbook and in lectures. It's important to write up problem sets neatly, showing all work, and explaining the logic behind each step. You should also draw well-labeled and appropriately scaled diagrams and graphs when they are helpful in understanding your solution.*
 - *Submit a single PDF document, NOT multiple images. Use the Notes app on iOS, or a scanning app such as Adobe Scan or Genius Scan (both free), or something else from among many options. Be sure to check that your scanned copy is legible. I will need to be able to read it for you to get points.*
 - *Problem sets are due on Thursdays at noon. You can have a 24-hour extension with 10% penalty.*
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Participation:

Even though this is an online class, you are expected to participate. I expect you to:

- Ask questions during the synchronous portions of our class – you can raise your hand to speak, or use the chat feature in Zoom.
- Participate actively in breakout rooms during our synchronous sessions. Come to the synchronous session prepared, having at least watched the assigned videos and ideally, having read the appropriate textbook sections.
- Participate in weekly discussion boards (it's part of your grade)
- Post and answer questions in discussion boards (1 point extra credit for posting or answering a question)

Quizzes:

We will have eight 20-minute quizzes (see the last page of this document for calendar). These will be similar to your online homework. We will do them during the synchronous section of class. You will need to submit them on time to receive any points. *IMPORTANT: There will be NO MAKEUPS for any of the quizzes. However, your lowest quiz score will be dropped.*

Exams:

We will have three midterm exams, and a cumulative final exam. See the calendar for the dates. Exams must be taken at the scheduled time, so pay careful attention to their dates and times.

IMPORTANT: In case of an unforeseen emergency or illness due to which you cannot take an exam, please get in touch with me immediately, and I can work with you to find a solution. If this happens for the final exam, that may result in an 'Incomplete' (provided that you supply me with a sufficient proof).

Evaluation:

Your final grade will be computed as follows:

Category		Points
Homework	27 @ 5 points each	135
Problem Sets	11 @ 10 points each	110
Weekly Discussions	Top 10 @ 7 points each	70
Quizzes	Top 7 @ 15 points each	105
Exams	3 @ 60 points each	180
Final Exam		100
TOTAL		700

Overall percentage	Your grade will be at least
97 % or greater	A+
92% to less than 97%	A
89% to less than 92%	A-
87% to less than 89%	B+
82% to less than 87%	B
79% to less than 82%	B-
75% to less than 79%	C+
70% to less than 75%	C
55% to less than 70%	D
less than 55%	F

Help:

1. Your classmates are a great resource. Ask for help and provide help to others either within your current groups or using Canvas discussion boards!
2. Message me through Canvas with questions or attend office hours. On online homework, you can message me by using 'Message Instructor' button.
3. Ask questions during our synchronous meetings.
4. Get help from De Anza's Math Student Success Center. See details at <http://deanza.edu/studentsuccess/>.
5. Use NetTutor for help through Canvas.

6. If you need any technical help with MyPortal, Zoom, Canvas, etc., visit <https://www.deanza.edu/online-winter/#Learning> (Links to an external site.).
 7. On the link above, under 'Student Services and Support', you will find links to services with some specific to this time, such as for help with tech equipment, food and financial assistance, health services, resources for undocumented students, etc.
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Academic Integrity:

All students are expected to exercise academic integrity throughout the term. Any instances of cheating or plagiarism will result in disciplinary action, which may include recommendation for dismissal. You are encouraged to work together on homework but simply copying down from someone else's work is wrong! Also, that activity will be of no help to you later. Cheating on a quiz or an exam will result in getting a 0 on it, an 'F' in the course or dismissal from the class. Also, each incident of cheating will be reported to the Dean of the Physical Science, Mathematics and Engineering Division. Please see the De Anza College's page on Academic Integrity: https://www.deanza.edu/policies/academic_integrity.html (Links to an external site.). Check out this video produced by De Anza College on this topic: <https://www.youtube.com/watch?v=4unoOe-I0eY> (Links to an external site.)

Disability Notice:

If you feel that you may need an accommodation based on the impact of a disability, please contact me privately to discuss your specific needs. Also, please contact Disability Support Programs & Services through <https://www.deanza.edu/dsps/> (Links to an external site.) for information or questions about eligibility, services and accommodations for physical, psychological or learning disabilities.

Honors Cohort:

This class is offered as an Honors cohort for interested students in the Honors Program. If you are interested in taking this class through the Honors Program, please email me so I can give you the Honors section add code. If you do not know about De Anza's Honors Program, please visit <https://www.deanza.edu/honors/>. If you take this class as an Honors cohort, you will be required to complete a substantial honors project. Failure to complete the project will result in a reduction of your grade.

Miscellaneous:

In any math class, and especially this one, your goal should be to get **ownership** of the material. This means that you understand the concepts, can demonstrate the skills, and explain the concepts and skills to someone that doesn't have them. The material covered in this class essential for the rest of the Math 1 (BCD) series and the Math 2 (AB) series. So, this is not a "learn and forget" class. Rather, it's a "learn well so you remember" class. Here are some tips to help you succeed.

1. **Stay on schedule.** While the video lectures can be watched any time, you should stick to the schedule I have recommended on the calendar. Don't fall behind! Be disciplined about this to stay on top of the class. When you watch the videos, take careful notes in the prepared lecture notes. Writing aids memory so you are more likely to retain the material you watched.
2. To succeed in any math class you must **do your work** (homework, problems sets, review, etc) **diligently**. I am aware that there are many sources that can provide you the answers and even the worked solutions to homework problems; however, such resources will be only be of so much use if you don't understand what you're doing. **Productive struggle** is essential in learning most things, especially mathematics. To learn and retain the material, you must sweat through the problems, especially ones that challenge you.
3. **Form a study group.** Exchange your contact information with at least 3 other people in the class. This will come in handy if you miss a class, or if you want to work with someone on homework, or while studying for an exam. **This is an essential college skill, especially for STEM students.**
4. **Read the textbook!** Simply watching the lectures is not enough to give you a complete idea of the material. I expect you to be familiar with the examples in the textbook in addition to in-class examples. I will cover different examples in the lecture videos than those in the textbook. The reason for this is to give you a richer set of examples to learn from.
5. **Review your notes** regularly and keep them complete! Ask questions about anything that's unclear in a timely manner to avoid losing points on quizzes and exams.
6. **Ask questions!** Whether it's to your classmates, me or a tutor, get your questions answered in a timely manner.
7. Make **summary review sheets** of important concepts for yourself throughout the term to make sure you have the key concepts, facts and skills organized in your head. This will help you prepare better for exams, but more importantly, it will come in handy when you truly need this material later.
8. **The quarter passes by faster than expected** – especially if you're new to the quarter system – and it's almost impossible to catch up, so plan accordingly.
9. **Practice discipline!** Succeeding in a college class requires personal discipline. This is especially true for online classes. It's quite easy to put things off until later, skip some video lectures, skip taking notes while watching them, distracting yourself with social media and other apps while doing class activities. A life skill you are expected to practice in the online setting is: Be mindful of what you are giving your attention to. Think carefully about your priorities, and give the most time and attention to your biggest priorities. Don't put off working on them because the task at the moment is hard or unpleasant. Learning anything that's worthwhile requires a sustained effort and discipline! And that practice is what ultimately leads to true personal growth.

Math 1A Calculus - Tentative Calendar: Spring 2021

	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Week 1	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr	7-Apr	8-Apr
	<i>Watch Videos: 2.1, 2.2, 2.3</i>				Orientation/Questions Problem Set 1	Questions Problem Set 1	Questions Quiz 1 (on 2.1, 2.2, 2.3)
Week 2	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr
	<i>Watch Videos: 2.4, 2.5, 3.1</i>				Questions Problem Set 2	Questions Problem Set 2	Questions Quiz 2 (on 2.4, 2.5, 3.1)
Week 3	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr
	<i>Watch Videos: 3.2, 3.3</i>				Questions Problem Set 3	Questions Problem Set 3	Questions Quiz 3 (3.2, 3.3)
Week 4	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr
	<i>Watch Video: 3.4, 3.5</i>				Questions Problem Set 4	Questions Problem Set 4	Midterm Exam 1 (on 2.1 - 3.5)
Week 5	30-Apr	1-May	2-May	3-May	4-May	5-May	6-May
	<i>Watch Videos: 3.6, 3.7, 3.8</i>				Questions Problem Set 5	Questions Problem Set 5	Questions Quiz 4 (on 3.6, 3.7, 3.8)
Week 6	7-May	8-May	9-May	10-May	11-May	12-May	13-May
	<i>Watch Videos: 3.9, 6.9</i>				Questions Problem Set 6	Questions Problem Set 6	Questions Quiz 5 (on 3.9, 6.9)
Week 7	14-May	15-May	16-May	17-May	18-May	19-May	20-May
	<i>Watch Videos: 7.1 (Vol 2), 7.2 (Vol 2)</i>				Questions Problem Set 7	Questions Problem Set 7	Midterm Exam 2 (on 3.6 - 3.9, 6.9, 7.1, 7.2)
Week 8	21-May	22-May	23-May	24-May	25-May	26-May	27-May
	<i>Watch Videos: 4.1, 4.2</i>				Questions Problem Set 8	Questions Problem Set 8	Questions Quiz 6 (on 4.1, 4.2)
Week 9	28-May	29-May	30-May	31-May	1-Jun	2-Jun	3-Jun
	<i>Watch Videos: 4.3, 4.4, 4.5</i>				Questions Problem Set 9	Questions Problem Set 9	Questions Quiz 7 (on 4.3, 4.4, 4.5)
Week 10	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun	10-Jun
	<i>Watch Videos: 4.6, 4.7</i>				Questions Problem Set 10	Questions Problem Set 10	Midterm Exam 3 (on 4.1 - 4.7)
Week 11	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun
	<i>Watch Video: 4.8, 4.9, 4.10</i>				Questions Problem Set 11	Questions Problem Set 11	Questions Quiz 8 (on 4.8, 4.9, 4.10)
Finals Week	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun
	<i>Prepare for Final Exam</i>				Final Exam 9:15 - 11:15 a.m.		

Student Learning Outcome(s):

*Analyze and synthesize the concepts of limits, continuity, and differentiation from a graphical, numerical, analytical and verbal approach, using correct notation and mathematical precision.

*Evaluate the behavior of graphs in the context of limits, continuity and differentiability.

*Recognize, diagnose, and decide on the appropriate method for solving applied real world problems in optimization, related rates and numerical approximation.