Math 132
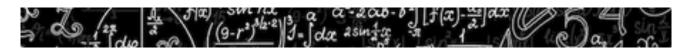
CALCULUS I

Dr. Douglas A. Lapp

Instructor Info

Instructor: Dr. Douglas A. Lapp
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Office Hours:
TR 2:00-3:00 pm (PE 222);
TR 10:00-11:00 (PE 135/Teams);
& by appointment.
MS Teams, use Code **nm0jbf6**
(For video on joining via Teams click here)
I also maintain an Open Door policy. If my door is open, feel free to drop in. If my door is closed, please take no offense. I am probably hiding because I have some deadline to meet. (Please Feel Free To Call or E-mail! I don't bite.)

Attendance

Class attendance is required.
Attendance will be taken each class period. More than 2 unexcused absences will cause your grade to be lowered a third of a letter grade for each occurrence beyond the first 2 (e.g. 3 missed classes would change a B to a B-, 4 missed classes would change a B to a C+).

About the Course

The purpose of this course is to examine the branch of mathematics called Calculus. You might say that we are going to study change. We will take a closer look at the behavior of functions and how we can predict this behavior. The course will focus on topics including functions, modeling, limits, continuity, derivatives and their applications, and the integral. The approach used will attempt to combine natural language, graphical, numerical, and symbolic representations of these topics and link them together for a deeper understanding of Calculus.

Instructional Methods

We will take an active learning approach and so you will be expected to engage in discussions and work with your fellow classmates to discover key concepts. Since our class will meet in the new Active Learning Classroom (ALC), the technology will allow us to have deeper discussions where *your ideas matter*. Be willing to share your thoughts with the class. Keep in mind that the only dumb question is a question unasked.

The TI-Nspire CX II CAS™ or TI-Nspire CX CAS™ calculator will be your primary tool for exploring Calculus. You may need to spend a little extra time initially familiarizing yourself with the calculator, but once you have become proficient with these machines I am sure you will find their use invaluable. I will be assigning an introductory activity using videos to help you become familiar with basic functionality of the device. Watching and following along with these video clips will be important and you will turn in an electronic file the first week of class.

As we know from research, mathematics is best learned by engaging students in exploration and justification of conjectures. Therefore, this course will model pedagogical methods set forth by organizations such as the National Council of Teachers of Mathematics and the Mathematical Association of America.

Grading

Your grade will be based on the following breakdown:

Midterm Exams (3)	10% each
Projects/Labs	20%
Homework Quizzes	20%
Quick Quizzes	5%
Exit Tickets	5%
Final Exam	20%
Total	100%

Your grade will then be figured on the following percent scale.

Scale:

[92, 100]	A
[90, 92)	A-
[87, 90)	B+
[82, 87)	B
[80, 82)	B-
[77, 80)	C+
[72, 77)	C
[70, 72)	C-
[67, 70)	D+
[62, 67)	D
[60, 62)	D-
[0, 60)	E

Assessment

You will be assessed using several methods. In order to get a better picture of a student's understanding of mathematics and to allow for diversity in learning styles, it is important to use multiple forms of assessment. You will have three midterm exams and a final exam. Throughout the semester you will be asked to work in groups on projects/laboratory activities and present your ideas to the rest of the class. These activities will all be part of your assessment along with quizzes.

Materials

Web Pages:

http://people.cst.cmich.edu/lapp1da (Dr. Lapp's page)

http://people.cst.cmich.edu/lapp1da/math-132.html (MTH 132)

Text & Technology

Text: Boelkins, M., Austin, D., & Schlicker, S. (2018). *Active Calculus (Updated)*. Available free for download at https://activecalculus.org. Note that this link contains both the html version and the pdf. You will want to bookmark the html version as well as download the pdf for use when you are offline (these are FREE). If you would like a print version of this text, Amazon has a copy available for only around $20. If you try to purchase it online, make sure you get the 2018 ***Updated*** version.

Technology: For Math 132, you will need a graphing calculator with a Computer Algebra System (CAS) that will also work with our wireless calculator network. A computer algebra system is simply a device that will do symbolic manipulations such as finding symbolic derivatives or integrals, expanding algebraic expressions, working with matrices, or solving equations exactly. For this purpose, you will need a TI-Nspire CX CAS or TI-Nspire CX II CAS that can be used with the wireless network. Be careful NOT to get the regular TI-Nspire CX or CX II since they do NOT have a computer algebra system. Make sure it is the TI-Nspire CX **CAS** or CX II **CAS**. If it does not say both "CX" and "CAS" in the name, it is not the right one. Please bring it to every class meeting and make sure it has a sufficient charge. **When you purchase your calculator, it comes with computer software, so be careful not to throw away the activation code with the packaging.** If you order your calculator and it has not yet arrived by the first day of class, there are a limited number of calculators available for checkout from the library Checkout Desk. These will be due back in about two weeks, so please make sure to order a calculator soon.

Expectations for Success

Stay current and be prepared

- Read this entire syllabus and know the policies for each class in which you are enrolled – pay attention to deadlines and due dates! I will keep a Weekly To Do List on the left navigation column on Blackboard to remind you of assignments.

- Check the Course Calendar and Announcements in Blackboard and your email regularly (at least 2-3 times per week).

Instructional Video

In order to encourage discourse about mathematics, we will use MS Teams as a way to work together outside of class. My intention is for this to be your place in cyberspace to work collaboratively. **Microsoft Teams** provides a nice platform for this purpose. Our Teams class allows me to post video clips of my computer screen so that if some folks are struggling with a concept, I can help illustrate ideas in video form. I can also use it to help you learn some functionality of the TI-Nspire CX CAS, especially at the beginning of the course. I will organize the instructional video under the Files tab in MS Teams by using Chapter folders coordinated with the *Active Calculus* text.

In addition to using Teams for specific video posts and peer communication, I will also hold "**Office Hours Live**" as a live stream video feed during my Tuesday & Thursday *morning* office hours. I will stream from Pearce 135 (Collaborative Lounge) and **you are welcome to come in person as well**. If you wish to join remotely, I will be available for questions since you can post questions or comments live in the video chat window or simply ask by turning on your audio/video in Teams. There may also be students present at the same time and so this will just extend office hours to cyber space. I have created an open Team called *Office Hours* and you can access it in MS Teams by using Code **nm0jbf6** during office hours.

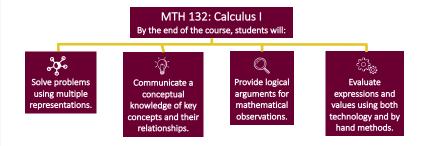- Keep current on class material, if for some reason you cannot attend the class.

- Keep current with all course assignments, quizzes, and examinations.

Final Reminders

- Be respectful of your peers and the instructor.

- Participate fully in your cooperative group (both in class and on assignments outside of class)

Student Learning Outcomes

The major goal of this course is to increase students' understanding of calculus. The information you learn here will be relevant to all students, whether as a general education requirement or studying to be an engineer or scientist or teacher. For example, the concept of a slope field where we approximate slopes in the plane with tiny segments is the big idea behind computing trajectories or creating 3D models. The learning objectives cover both content standards and standards for mathematical practice. We will organize these into four main categories with the specific mathematics content falling into each. Below is a graphic that summarizes the mathematical practices of the student learning outcomes for the course.

MTH 132: Calculus I
By the end of the course, students will:

| Solve problems using multiple representations. | Communicate a conceptual knowledge of key concepts and their relationships. | Provide logical arguments for mathematical observations. | Evaluate expressions and values using both technology and by hand methods. |

Homework Quizzes

Throughout the semester you will be given homework assignments. These will not be collected; however, you will be given quizzes based on the homework. All homework problems are fair game on the quizzes. The quiz questions will be taken directly from the homework assignments and you may use your homework on the quizzes—so bring your completed homework to every class. If you have completed the homework, the quizzes should be quite easy. If you have not completed the homework, there will not be sufficient time to complete the quiz, so it is in your best interest to complete each homework assignment prior to class. Please make plans now to allow sufficient time for homework. As homework is meant to be a learning experience, I want you to try something even if you are not sure. To encourage you to "give it your

best shot", any reasonable attempt (as judged by the instructor) on an item will earn you at least 70% on the item. **Your lowest quiz score will be dropped, thus there will be no make-ups for quizzes**.

Quick Quizzes

These quizzes are designed to give me a quick assessment to see if everyone is keeping up with course material. These quizzes will be given electronically through the wireless connection of your calculator and will take only a few minutes so that we can optimize class time. In general, the questions on these quizzes will test your understanding of the "big ideas" of the course or basic technological skills. Since these are intended as formative assessment so that I can adjust instruction, in total, they are only 5% of your course grade.

Exit Tickets

As another method of formative assessment, from time to time you will be expected to respond to questions by way of an exit ticket. This is simply a series of short questions related to what was taught that day. This will give me a quick view of how students are doing and whether or not I may need to revisit a topic at the next class. These exit tickets can be given via small sheets of paper or will be given electronically through the wireless connection of your calculator and will take only a few minutes. While the Quick Quizzes will focus on big ideas, the exit tickets will be directed at content we talked about in class that day. Like the Quick Quizzes, since these are intended as formative assessment so that I can adjust instruction, in total, they are only 5% of your course grade.

Midterm & Final Exams

You will also be evaluated by three midterms and a final exam. The exam dates will be announced in class and will generally take place at logical breaks in the curriculum. Calculators are expected for the exam; however, there will be a *calculator-free* (skill) portion of the exams as well. Each exam grade will consist of two components: a skill portion in which a calculator will not be allowed (approximately 30%) and a regular portion in which you are encouraged to use all of the calculator's capability to solve or answer questions (approximately 70%). The skill portion of the exams will test if you can perform basic algorithmic procedures related to the mathematics content while the regular portions will test your understanding and problem-solving abilities.

Academic Integrity & Use of AI-Generated Materials

To promote integrity and deter dishonest academic work, it is assumed that you will conduct yourself within the University's expectations. Generative Artificial Intelligence (AI) tools and platforms (e.g., ChatGPT, Google AI, Boost.ai, Jasper, etc.) are new technological additions to the higher education landscape and are rapidly evolving. Submitting text and other products generated by AI tools and platforms as your own original work is prohibited and a violation of CMU's Academic Integrity policy. If the use of AI tools and platforms is appropriate within the context of a course, guidance on properly utilizing them, and appropriate methods of citation for direct quotations, ideas, diagrams, code, or paraphrased text generated through AI will be provided by your instructor.

Course Withdrawal

Students must DROP a course if they plan to stop attending before the course starts or prior to the second meeting time for face-to-face courses to get a refund. Dropping later than this will incur varying rates of refund (or none at all). For details, see the Drop and Withdrawal Chart. A drop removes the course from your record if done early enough. If you drop after the designated deadline, you may receive a W, but keep in mind that there is date after which you cannot drop. Again, details are given on the Registrar's webpage.

Recording of Class

In order to protect the intellectual property interests of the instructor, the privacy interests of student members of the class, and to encourage an open and fair exposition of all student views in the classroom without fear that student views expressed will be recorded and possibly posted in another forum, recording (video or audio) of classroom activity (or live video stream) and conversations is not permissible without the expressed, prior written consent of the instructor. Unauthorized recording of classroom activity shall be considered a violation of the CMU Student Code of Rights, Responsibilities, and Disciplinary Procedures as disruptive of a student's right to learn under 3.2.3 Disruption of Learning. While it is expected that students will attend live classes, I will consider streamed class in MS Teams if needed due to University recognized absences if students are required to not attend classes. It is important to note that only members of the class who have a University recognized absence will be able to stream the class and view instructional videos within Teams and sharing them outside this environment will constitute a violation of the CMU Student Code of Rights, Responsibilities, and Disciplinary Procedures as described above. Recording class sessions via other means (e.g. screen-casting software) is not permitted. Please remember that these recordings are not meant to replace class attendance, but rather as a means to study and reflect on course material.

Labs/Projects

During the semester you will participate in laboratory and/or project activities. These will be performed in a cooperative group environment of 3 to 4 students. Each group will be expected to turn in one final write-up per group that will be due the second class meeting immediately following the completion of the activity. Late lab assignments will not be accepted, except in the event of an extreme emergency. This exception is at the sole discretion of the instructor.

In addition, each group will be asked to present its findings from time to time to the rest of the class. These presentations will allow you to express yourself mathematically and encourage you to organize your thoughts before coming to class. The handouts as well as the lab activities are available in MS Teams. Please have a copy of each lab with you on the stated lab days. Some of the labs may have a Pre-Lab section. If this is so, you should have completed the Pre-Lab prior to class time. Since you are using a TI-Nspire CX CAS or CX II CAS, your lab may be in electronic form (a .tns file) on your calculator and will be distributed in class.

Since part of the reason for working in cooperative groups is to promote discourse among students on mathematical ideas, it is impossible to make up such an experience. **Therefore, there will be no make-ups for missed labs or activities**.

As stated above regarding labs and projects, each group will be asked to present its findings from time to time to the rest of the class. Since the person presenting is selected at random, your participation is expected, and it is in the group's interest to make sure all members have a solid grasp of the ideas developed by the group.

In order to facilitate group work outside of class, I will create open groups in MS Teams so that you can work together virtually via video channels in Teams.

Collaborative Groups

You will be placed in random collaborative groups every week or so (at natural breaks in activity). This will allow you to work with a variety of people throughout the semester. To accomplish this, when you are asked to form or change groups, you will draw a random card from a deck when you enter the classroom and then sit at the assigned table corresponding to your group card (e.g. 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K, A). You will work and sit in this location until the groups get rearranged again. As stated earlier, there will also be groups in MS Teams corresponding to these group names as well so that you can collaborate

Name, Gender Identity, and Gender Expression

Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name and/or pronoun. Please let me know about any differences as soon as possible so that I may make the appropriate changes to my records. For more information regarding CMU's commitment to making campus a safe space for people of all sexualities and gender identities, visit the Office of LGBTQ Services (Bovee University Center 108).

Accommodations

CMU provides students with disabilities reasonable accommodations to participate in educational programs, activities or services. Students with disabilities requiring accommodations to participate in class activities or meet course requirements should register for services through Student Disability Services, 120 Park Library, 989-774-3018, www.cmich.edu/ess/studentaffairs/SDS/.

with each other outside of class.

Within each group, roles will also be randomly assigned. Another aspect of group work to help promote an equitable environment is requiring students to take on different roles within the group from time to time so that everyone develops team skills and shares the workload. While there are many good roles that can be used depending on the type of group work, the roles we will use for this course will be: Facilitator/Resource Manager, Recorder, Reporter, and Understanding Coordinator. These roles should suffice to cover most of the needs of the group while exploring mathematics. So that over time, group members will take on a variety of roles, your role for each "shuffling" of the groups will be given by the suit of your card (♣,♦,♥,♠).

♣ Facilitator/Resource Manager: Obtains needed materials and keeps the group on track. Monitors time to make sure the group is ready to participate in class discussions when the class is brought together to share results. Makes sure all group members share during discussions.

♦ Recorder: Keeps a record of the group's discussion and develops the final write-up for submission.

♥ Reporter: Provides explanations of the group's findings to the larger class during discussion. The Reporter will rely on the Recorder's notes and written summaries (often displayed on whiteboards or via calculator screen).

♠ Understanding Coordinator: Makes sure all members of the group participate and understand what is being said by members of the group. The Understanding Coordinator may ask group members to re-voice the contributions of others to make sure the meaning is clear.

Since each group will generally hand in only one report, as you list the names of the group members at the top, please also list the role they played in the lab or project. Keep in mind that you may at times be placed into a group of size 3 rather than 4. If this happens, one member of your group may be called on to fulfill two roles.

Face Covering and Social Distancing

Face coverings, such as masks, are optional. If you need to wear a mask, please feel free to do so. As every person's situation is different, we will all respect each others' choices for personal protection and be sensitive to the needs of our classmates. Should the situation change and CMU decides to change policy, please refer to the COVID-19 Resources page at https://www.cmich.edu/about/covid-19-information-and-resources.

Comments

You and I are part of a team. If we work together I think we will both come away from this course having learned a great deal. You have the potential to teach me as well. Feel free to share your ideas about mathematics with the class and with me. As was illustrated in the video I showed on the first day of class from Fred Rogers, making mistakes is part of learning and we should not be afraid of making mistakes. We actually learn more from our mistakes than we do our successes. Please feel comfortable contributing to class discussions. Our class is a Safe Zone where we are able to support each other. If you need help, come see me. It is important to get help as soon as possible to avoid falling behind. Call me if you need to see me. I won't bite—I promise. To encourage you to actually read this syllabus, within the first week of classes, when you get to this sentence, email me a picture of Spock from Star Trek and I will add 2 bonus points to your homework quiz category if you do so prior to the second week of class.

Expectations for Students and Instructor

CMU understands the benefits of pluralism and embracing diversity and is committed to cultivating an "irresistible culture of inclusion." Therefore, CMU faculty strive to create safe and inclusive learning environments in which students can respect and celebrate diversity through inclusive and mutually respectful language. CMU is committed to transforming as an institution to respond to support enlightened change around ever-evolving attitudes of inclusion.

Student Expectations	Instructor Expectations
Actively participate in whole-class and groups discussions.	Have fun sharing how cool mathematics is.
Be respectful of the ideas and contributions of others.	Encourage students to share their views and show respect as they share.
Share your ideas (even if you think you might be wrong).	Reinforce to students that they are capable of understanding mathematics.
Complete all assignments.	Be prepared for class.
Turn off your cell phones unless needed for class activities.	Respond swiftly and effectively to student concerns.
Come to class on time, as we often begin with a quiz or opening warm-up.	Grade objectively, consistently, and promptly.
Discuss class concerns with me either after class or during designated office hours.	Assure students that making mistakes is OK and part of the learning process.
Come prepared for class by completing readings or pre-activity investigations prior to class.	Accommodate differences in students' learning.
	Provide time in class for students to engage with the instructor and classmates about course ideas.