Math 253X UX1 - Calculus III

Fall 2021

Course Description

An introduction to multivariable calculus, including vectors and vector-valued functions, partial derivatives and applications of partial derivatives (such as tangent planes and Lagrange multipliers), multiple integrals, volume, surface area, and the classical theorems of Green, Stokes and Gauss.

Course Information

Credits	4.0 credits
Prerequisites	The prerequisite for MATH 253X is MATH 252X with a grade of C or better. Students not meeting this prerequisite are not eligible to take this course and will be dropped.

Instructor Information

Name:	Mahmud Alam
Office:	Chapman 301E
Phone:	907 371 4970
E-mail:	gmalam@alaska.edu
Office Hours:	M, W, F 03:00 PM-04:00 PM(or by appointment)

Grader Information

Name:	Isela Amezquita
E-mail:	ieamezquita@alaska.edu

Course Reading Materials

- **Textbook:** Calculus (standard or 'early transcendentals') *or* Multivariable Calculus, 8th ed., by J. Stewart, Chapters 12-16 only
- *WebAssign Access Code.* You will be doing a significant portion of your homework online. To do this you must have a WebAssign access code. If you purchase your textbook from the UAF bookstore this code will come packaged with your text. If not, you can purchase one on www.webassign.net. If you have not yet purchased a code, don't fret! WebAssign grants you a two-week "trial" period where you can use the service without paying. You also have access to an eBook on WebAssign.

Course overview and learning outcomes

Multivariable calculus is concerned with functions of many variables. Whereas in MATH 251 and MATH 252 you study functions of a single variable (height as a function of age $h(a)$, $f(x)$), in multivariable calculus functions will have more input variables (temperature of a particle in 3-space) or be vector-valued functions (position in 3-space $(x(t), y(t), z(t))$.

Our goal this semester is to extend your knowledge of calculus into the 2-, 3-, and $n-$dimensional realms. All of the techniques you learned from single variable calculus come into play here. Indeed, taking derivatives and computing integrals in the multivariate setting depends intimately on the ability to apply skills from univariate calculus.

Other interesting topics like vector fields and alternative coordinate systems appear. Multivariate calculus is essential for further study in physics, chemistry, engineering, economics, statistics and many other fields, as well as in mathematics. Though visualization in three dimensions can be hard at first, the benefit is well worth the effort.

Students will become competent in multivariable calculus, and gain some experience of its applications to other fields. Students will be able to visualize surfaces in three dimensions, and compute double and triple integrals, and multivariate derivatives.

Instructional Methods

This course is designed for online instruction primarily through UAF Blackboard, but active participation from the students is expected. This is not an independent study course. Regularly scheduled assignments and assessments with firm due dates will pace the course. All exams (COVID-permitting) will be proctored, closed book, closed notes and no calculators.
If you would prefer a course with live lectures, or not comfortable taking online classes, you should instead enroll in the synchronous delivery section FX1.

Homework

Basic Assignments are done through the on-line WebAssign system, and can be expected to take about 1 hour per lecture. This is the primary way you practice the material to learn it. Problems are multiple choice or fillin-the-blank, and are computer graded. Online homework is due before 9 pm. You will be allowed five attempts on each question. You will be able to make at most 5 attempts on each problem. After the due date/time you may request an automatic 2-calendar-day extension for any assignment with a 25% penalty on your score. We are going to access WebAssign directly from Blackboard. To do so your browser must be configured to accept third-party cookies. If you are having technical troubles contact OIT (https://www.alaska.edu/oit/) or WebAssign directly (https://webassign.com/support/student-support/).

Here are the steps to access WebAssign from Blackboard.

- Log in to Blackboard.
- Click on the **Courses** tab.
- Click on our course, Math 253X.
- In the course menu, click Tools.
- Click Access WebAssign.

The first time you access WebAssign from Blackboard, a new linked WebAssign account is automatically created for you. If you already have an account you may have to contact WebAssign's student tech support to link your accounts. If you are having trouble with WebAssign, please let your instructor know **and** contact WebAssign's student tech support. (https://webassign.com/support/student-support/)

Uploading Notes: Each week you will need to upload the notes filled during the time you listen to the video lectures. These assignments will be graded on completion. The notes you upload to the **Blackboard** must be ONE, single PDF file containing all of the notes from the current week. Make sure the files you submit have all of the pages and that the pages are in order. The due date for the notes are **Friday**.

Written Problems: In addition, I will assign a set of problems to be done by hand. You need to show all work leading to the solution. Written homework is due on Monday each week. You will submit the written homework as a single PDF file on **Gradescope**. You may not collaborate or use any form of online help (solution manuals, question/answer boards, etc.). But you are encouraged to ask me questions about assignments (during office hours, or by email) or use the services of the UAF MathLab (online tutors are available). Late written homework is accepted but at a potential penalty. The grade for a late written homework will be the minimum between the

grade your work would have earned if turned in on time and the total possible number of points minus two points per day late (including weekends).

Four Unproctored 45 minutes Quiz will be given (see schedule). No form of collaboration or help is allowed on quizzes. In particular, quizzes are closed book, closed notes, and calculator-free. Material from quizzes will be similar to those in lecture notes and homework assignments. On the designated day of the quiz, you will log in to **Gradescope** past 5 pm to take the quiz, and you will have 45 minutes total to work out the problems and enter your PDF file with the solutions. The deadline to complete the quiz (not start it) is midnight. No make-up for quizzes is allowed. Please honestly follow the rules on these, as cheating will not increase your grade substantially. You are encouraged to work with others on the written homework, but you must write up solutions independently. You will learn nothing from simply copying someone's solution. The best approach is 1) make a first attempt at all problems alone, 2) work with a classmate on any difficulties, 3) write up complete solutions alone.

Examinations

Midterm: There will be two two-hour midterm exams (exact dates (COVID-permitting) are Tuesday, September 21 and Tuesday, November 02.
Final: There will be a cumulative two-hour final exam on Tuesday, December 07. No form of collaboration or help is allowed on the exams. The exams should be **proctored** on the indicated days either at the eCampus center (COVID-permitting) or via video conferencing by zoom.
Procedure of the midterm exams and the final exam: If you have zoom access and wish to be proctored via zoom: On exam day, you will go to the Join Office Hours menu and join the Zoom exam session (there will be one session 3 PM-5 PM; please have your video on, but we will keep everyone muted; use the chat if you have questions; once I can see you, you will come to gradescope and download the exam. The time you click on the exam is time-stamped for gradescope and will serve as the starting point for the 120 min. limit (printing/scanning/uploading times are all part of the 120 min.); you may choose to either print or use blank paper to work on the exam; if the latter, clearly label your answers with the associated problem number and use the same number of pages as the pdf (gradescope will not allow you to submit more / fewer pages); Once completed, you will scan and upload the exam as a single PDF to the gradescope. Once I confirm the submission in gradescope while you are in the Zoom chat, you are done and can leave the Zoom session.

If you do not have access to Zoom with video: you will take your exam either with an approved proctor, if not local to Fairbanks, or if local, at the UAF eCampus Exam Center. (basically, if you are not in Fairbanks, you need first to send in the Proctor Information, if you are in Fairbanks, schedule a time to take your exam); this option is **time-sensitive and/or space-sensitive, so you need to send them the info ASAP.**

Missed examinations or assignments that are not approved in advance will result in a zero grade on that exam or assignment. No make-ups will be allowed except in unforeseeable circumstances (e.g., documented illness, quarantine, family emergencies, etc.). Notifying me by email or a note that you will miss an exam or due date is not sufficient for advance approval; you must speak with me via Zoom if you believe you have a valid excuse.
Calculators or similarly capabilities on smart phones or computers may be used on any homework, but not on quizzes or exams.
Auditing of this course will only be allowed for those who agree to participate fully, as evidenced by completion of homework, midterm exam, and class participation.

Evaluation

In this course you will be evaluated based on your performance in Uploading Notes, WebAssign, Written Homework, Unproctored Quizzes, two Midterm Exams and the Final Exam. These components will be weighted as follows:

Uploading Notes		05%
WebAssign Homework		10%
Written Homework		15%
Unproctored Quizzes		10%
Midterms	(15% each)	30%
Final Exam		30%

Grading

The grading scale used will be the plus/minus letter grades (97-100%=**A+**, 93-96%=**A**, 90-92%= **A-**, 87-89%=**B+**, 83-86%= **B**, 80-82%= **B-**, 77-79%=**C+**, 70-76%=**C**, 67-69%=**D+**, 63-66%= **D**, 60-62%= **D-**, and below 60%=**F**). The instructor reserves the right to make the brackets of this scale wider. An incomplete will be given due to extreme circumstances beyond your control (you will need to provide verifiable proof). After the drop date, students who do not wish to continue with the course will be responsible for withdrawing themselves. If a student chooses to stop participating in the course after the withdrawal deadline, this will result in a grade of **F**.

Communication

Blackboard will be used extensively in this class to communicate with students. All announcements, handouts, solutions, and grades will be posted in Blackboard. It is the responsibility of the student to check Blackboard regularly and report any issues to their instructor. Additionally, the student must check their `@alaska.edu` e-mail daily. If you prefer to use another e-mail it is best to set up your `@alaska.edu` account to forward to your preferred account.

Some Important Information

COVID-19 statement: Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website: https://sites.google.com/alaska.edu/coronavirus/uaf?authuser=0

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

Student protections statement: UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/.

Disability services statement: I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.

Student Academic Support:

- Speaking Center (907-474-5470, uaf-speakingcenter@alaska.edu, Gruening 507)
- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Gruening 8th floor)
- UAF Math Services, uafmathstatlab@gmail.com, Chapman Building (for math fee paying students only)
- Developmental Math Lab, Gruening 406
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, https://www.ctc.uaf.edu/student-services/student-success-center/)
- For more information and resources, please see the Academic Advising Resource List (https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf)

Student Resources:

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- Student Health & Counseling [6 free counseling sessions] (907-474-7043, https://www.uaf.edu/chc/appointments.php, Whitaker 203)
- Center for Student Rights and Responsibilities (907-474-7317, uaf-studentrights@alaska.edu, Eielson 110)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.eduasuaf.office@alaska.edu, Wood Center 119)

Nondiscrimination statement: The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination. For more information, contact:

UAF Department of Equity and Compliance
1760 Tanana Loop, 355 Duckering Building, Fairbanks, AK 99775
907-474-7300
uaf-deo@alaska.edu

Important Dates to Remember

See http://https://catalog.uaf.edu/calendar/ for a more detailed description of these dates.

First Day of Instruction and late registration begins	Monday, August 23
Last day for student- and faculty-initiated drops with refund	Friday, September 03
Deadline for tuition and fee payment; 5 p.m. in person, midnight at UAOnline	Friday, September 03
Labor Day (no classes, most offices closed)	Monday, September 06
Midterm 1	Tuesday, September 21
Deadline for student and faculty-initiated withdrawals	Friday, October 29
Midterm 2	Tuesday, November 02
Thanksgiving break (no classes, most offices closed)	Wednesday-Sunday, Nov 24- 28
Last day of instruction	Saturday, December 04
Final Exam	Tuesday, December 07
Deadline for faculty to post grades, noon	Wednesday, December 15

Course Schedule

Here is a tentative schedule of the topics we will cover during the semester. If necessary, changes to this schedule will be announced via Blackboard.

	Dates	Content	Comments
Week 1	Aug 23- 29	12.1, 12.2, 12.3, 12.4	
Week 2	Aug 30- Sept 05	12.5, 12.6	
Week 3	Sept 06-12	13.1, 13.2, 13.3	M holiday **Quiz 1 on Sept 07**
Week 4	Sept 13-19	13.3, 13.4 14.1	
Week 5	Sept 20-26	14.2, 14.3	**Midterm 1** Tuesday, Sept 21
Week 6	Sept 27- Oct 03	14.4, 14.4, 14.5, 14.5	
Week 7	Oct 04-10	14.6, 14.6, 14.7, 14.8	**Quiz 2 on Oct 05**
Week 8	Oct 11-17	15.1, 15.2, 15.2, 15.3	
Week 9	Oct 18-24	15.4, 15.4, 15.5	**Quiz 3 on Oct 19**
Week 10	Oct 25-31	15.6, 15.7, 15.8	
Week 11	Nov 01-07	15.9, 16.1, 16.2, 16.2	**Midterm 2** Tuesday, Nov 02
Week 12	Nov 08-14	16.3, 16.3, 16.4, 16.5	
Week 13	Nov 15-21	16.6, 16.7	**Quiz 4 on Nov 16**
Week 14	Nov 22-28		
	Nov 24-28		Thanksgiving Break
Week 15	Nov 29- Dec 05	16.8, 16.9	
	Tuesday, December 07	**3PM-5PM**	Final Exam