Math 252X - Calculus II — synchronous online

Spring 2021

Instructor Information

Name:	Caleb Jurkowski
Office:	Chapman 301C
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Office Hours:	By appointment (Zoom)

Course Information

CRN:	33468
Credits:	4+1 credits
Section:	UX1
Prerequisites:	C- or better in Math 251X
Lecture:	MWF 11:45-12:45 R 11:30-12:30

TA Information

Name:	Oscar Hernandez
E-mail:	oihernandez@alaska.edu
Tutoring Hours:	TBA

Recitation Information

FXC:	11:30-12:30 Zoom
FXD:	2:00-3:00 Zoom

Required Course Materials

- *Calculus: Early Transcendentals 8th Edition*, James Stewart, ISBN-13: 978-1285741550 and ISBN-10: 1285741552.
- *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.
- A scanner or a smartphone with software/app for scanning documents and making PDFs out of them.
- Reliable internet access, preferably through a laptop or computer.
- Zoom! Class, office hours, and remote proctoring (if applicable) will take place on Zoom. It is recommended that you download Zoom both on a laptop/computer (https://zoom.us/download) AND a smartphone or mobile device (your favorite app store).

Optional Course Materials

- Optional: *Student Solutions Manual for Stewart's Single Variable Calculus: Early Transcendentals, 8th Edition* ISBN-13: 978-1305272422 and ISBN-10: 1305272420. This book contains fully worked solutions to all of the odd-numbered exercises in your textbook. This is not available through the UAF bookstore, but is available on Amazon (and probably elsewhere) to rent and buy.
- A printer to print off lecture note templates and written homework worksheets. An alternative would be a pdf annotator/note taking app on (e.g.) an i-pad pro.

Course Description

From the UAF course catalog:

"Techniques and applications of integration. Integration of trigonometric functions, volumes including those using slicing, arc-length, integration by parts, trigonometric substitutions, partial fractions, hyperbolic functions, and improper integrals. Numeric integration including Simpson's rule, first order differential equations with applications to population dynamics

and rates of decay, sequences, series, tests for convergence including comparison and alternating series tests, conditional convergence, power series, Taylor series, polar coordinates including tangent lines and areas, and conic sections."

Calculus II begins by picking up where Calculus I ended, integration. During the first unit we will discuss some more sophisticated techniques for integration (Chapter 7). We will then continue with applications of integration to physics and engineering (Chapters 6 & 8). The second half of the course will begin with a likely very new and unfamiliar topic: sequences and series (Chapter 11). Sequences and series can be used to attack many problems including, but not limited to, approximation of functions and approximation of integrals. We end the course with a few new methods of representing curves (Chapter 10). Specifically, we will discuss how curves can be represented using parameterizations and discuss an alternative system of graphing called the polar coordinate system. This topic functions as a preview to some ideas which will be covered and expanded upon in Calculus III.

Course Goals

In this course students will be expected to master problem solving skills, learn to manipulate abstract symbols and develop deductive arguments in mathematics. Additionally, students will encounter a broad spectrum of mathematical applications including, but not limited to:

- Various techniques of integration,
- Integration of improper integrals,
- Applications of integration to areas, volumes, arc length, work, and centroids.
- Convergence and divergence of sequences and series,
- Power series and their applications,
- Parameterizations of curves and polar coordinates.

Learning in the time of COVID

I recognize that this semester is unlike any semester in the last 100 years (with the exception of this past fall). Frequent bi-directional communication will be the key to our joint success.

- If some way the class is set up isn't working for you, please let your instructor know!
- If something goes sideways for you, please email or call your instructor and we can sort out how to help.
- If you get sick and can't finish something, let your instructor know as soon as possible and we'll see what we can work out.
- If you need someone to talk to about non-mathematical questions, Student Mental Health Services offers folks to talk to, with free options. In particular, they offer **Telehealth checkins** "for times when you feel you could use a little support, want to learn about skills you can use to maintain or improve your mental health, or you aren't sure if you're coping well and could use a professional perspective". Call 907-474-7043 to schedule.

Instructional Methods

All the material for this course is available through UAF Blackboard. We will meet regularly on Zoom, and there will be regular due dates for reviewing those materials, doing related notes, written homework, quizzes, and taking exams.

Information on the different aspects of the class, such as notes, assignments, etc., is below.

Office hours will all be virtual and will again be on Zoom – by appointment. The page and links for office hours will show on Blackboard.

It is the responsibility of the student to stay tuned into the course page on Blackboard regularly and check/respond to email on a timely basis – reliable internet access is a necessity for an online course.

Policies

Successful, timely completion of this course depends on committing yourself early and maintaining your effort. You are responsible for keeping up with the material and turning things in on time. The pace of this course is fast, and material for each week (notes, WRH) will be available at the beginning of each week.

For virtually every issue that may arise, failure to promptly notify your instructor can only exacerbate things. If something comes up that hinders your ability to come to class or complete assignments, let your instructor know as soon as possible.

I encourage you to work with others and/or talk to me (in person, email, or virtually) for homework. However, write up all your work on your own. It is okay for a group to have an outline of a solution, but you need to write up the final solution on your own.

Cheating on an exam will result in an automatic zero recorded for the work. Cheating on the final exam will result in failure of the entire course. Should there be multiple instances of cheating by one student, they will be reported to the Center of Student Rights and Responsibilities and will be dealt with appropriately.

Posted grades for assignments, notes, and midterm exams are set by Tuesday, April 27. After that, no adjustments to posted grades will be made.

There are three vital things due during of the first week of class: The Introductory Assignment (R 1/14), the first WebAssign assignment (W 1/13), and the first set of notes (F 1/15) — each by midnight. ***If any of those items is not completed or turned in on time, you may be dropped from the course.*** Also be aware that there are other deadlines the first week of class.

Students who stop participating in the course may be withdrawn. Examples of inadequate participation include, but are not limited to:

- missing more than **four** lecture class times,
- missing **three** quizzes,
- not completing or not turning in **three** written homework assignments,
- not completing or not turning in **three** note submissions,
- repeatedly failing tests and quizzes with no attempt at remediation.

Evaluation

In this course you will be evaluated mainly based on your performance in homework, quizzes, midterm exams and a final exam. Student grades will be dependent upon: WebAssign homework (8%), written homework (12%), notes (2%), weekly quizzes (8%), three midterm exams (45%), and the (cumulative) final exam (25%). This breakdown is absolute, and extra credit will not be offered in lieu of assigned work or to make up for poor performance. More details on each of the categories can be found below.

The grading scale used will be the plus/minus letter grades:

A	93-100%	C	70-76%
A-	90-92%	C-	not given
B+	87-89%	D+	67-69%
B	83-86%	D	63-66%
B-	80-82%	D-	60-62%
C+	77-79%	F	$< 60\%$.

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**. Grades of no basis will not be awarded for lack of attendance after the withdrawal deadline.

Weekly Written Homework

Written homework give you a chance to tackle more challenging and interesting problems and practice writing up nice solutions. Homework will be posted on Blackboard and in Gradescope. Homework often will be due by midnight on Mondays[1]. The turn in day may be changed due to the exam schedule. Assignments can be turned in up to 24 hours late for 50% credit as long as the student has not looked at solutions. Those solutions will post shortly after midnight, and the instructor will verify solutions were not looked at before late submissions are accepted. Also, ***the lowest written homework grade will be dropped*** – if you fail to submit one assignment, that will be the dropped score. Note, it is best to submit all homework as it is practice for quizzes / exams. See the Weekly Schedule for specific dates.

All homeworks are open book, open notes, and you may use a calculator. You must show all relevant work, and at the discretion of the grader, points will be deducted if steps are skipped. (For example, if you work a problem in a manner that was not discussed in class, but appears when you select "show work" on Wolfram Alpha, no credit will be given!)

It's best to print out the weekly homework worksheet – if you don't print, do problems in order on blank/lined paper. Upon completion, this needs to be submitted as a single scanned pdf to Gradescope. Again, see the Logistics menu on Blackboard for more information and how to submit the homework.

Your solutions should be *nice, neat* solutions. Points will be deducted for sloppiness. The homework that you submit should be your **final** draft! It is best to first work the problems on scratch paper and then rewrite the solution onto the handout. The following is a great template for writing (e.g.) solutions to integration problems. Note I will demonstrate this organization for virtually every problem in this class.

Compute the following definite integral.

$$1)\ \int_{\pi/4}^{\pi/2} \cot x\,dx = \int_{0}^{\pi/4} \frac{\cos x}{\sin x}\,dx$$

$$\begin{pmatrix} u = \sin x \\ du = \cos x\,dx \end{pmatrix}^{\dagger} = \int_{\sqrt{2}/2}^{1} \frac{du}{u}$$

$$= \ln|u|\Big|_{\sqrt{2}/2}^{1}$$

$$= \ln(1) - \ln\left(\sqrt{2}/2\right) = \boxed{\ln\sqrt{2}}$$

Besides outlining the general organization strategy of working *vertically*, this example demonstrates how to write solutions that have two separate computational threads. The main work is connected through the string of equals signs; there is a side work computation - u-substitution in †. We will have "side work" for most integrals we compute in this class; this work generally needs to be separate (to the left or right) of the main solution to the problem. If the work is too long to be completed in a single column, you may start a next step in a new column.

[1] with a few exceptions - see the detailed course schedule

Compute the following definite integral.

$$1)\ \int_0^{\pi/4} \tan x\,dx = \int_0^{\pi/4} \frac{\sin x}{\cos x}\,dx = \ln|u|\Big|_{\sqrt{2}/2}^{1}$$

$$\begin{pmatrix} u = \cos x \\ du = -\sin x\,dx \end{pmatrix} = -\int_1^{\sqrt{2}/2} \frac{du}{u} = \ln(1) - \ln\left(\sqrt{2}/2\right) = \boxed{\ln\sqrt{2}}$$

$$= \int_{\sqrt{2}/2}^{1} \frac{du}{u}$$

Remember, if you cannot go back to track a mistake, your work needs better organization.

WebAssign Homework

Online homework will be assigned with due dates multiple times each week using the online tool WebAssign. We will access WebAssign directly through the Blackboard course page. To do so your browser must be configured to accept third-party cookies. The link for WebAssign is in the left hand Blackboard menu. That link will take you to the class WebAssign page where you can see all the assignments. These assignments will give you immediate feedback on some more of the straightforward problems. You will usually have 5 chances to get a problem correct.

Late WebAssign homework will be accepted for 90% credit within 5 days of the original due date. The late penalty is only assessed on the problems which are incomplete or incorrect. For example, if you have a 50% on an assignment and the due date passes, you can work on the remaining 50% and earn a maximum grade of 95%!! In order to complete assignments late, you need to start ("download") the assignment before the due date. Then you can "Request an extension" after the due date/time.

If you have questions about the WebAssign homework, it works best if you ask them through the WebAssign system with the "Ask your Teacher" option. Please allow up to 1 business day for a response (see Instructor Response Time later).

You will need to purchase access to WebAssign. If you did not do so through the bookstore, you can purchase it directly during the registration process.

While I normally link WebAssign access to the Blackboard course page, this feature has apparently conflicted with a recent update to Blackboard. Therefore, you can gain access to WebAssign through a stand-alone portal (website):

- Go to `https://www.webassign.net/`
- You may need to create an account and/or log-in.
- You will need to enter the class key code: `uaf 9757 9449`.

Module Notes

Each day's class has note templates we will go through in class. At the beginning of the week's notes, write the names of the others in your small group from class, and these completed notes are due each Friday by midnight. You will submit the handwritten notes as a single scanned pdf in the link located in "Turn in notes" in the left-hand Blackboard menu. See the Logistics menu on Blackboard for more information and how to submit notes. Half credit will be given for notes up to the respective exam covering those sections, but no credit will be given after that.

You Try Problems

Immediate practice of recently introduced mathematics material is important to internalize said material. At the end of most lessons are (usually) 3 problems to practice. Solutions are posted on the suggested day for such lessons. I encourage you to work through these problems as best you can without looking back at the notes.

(More) Suggested Problems

There will be suggested, optional problems from the text given at the end of every lesson. If you find yourself struggling, the only way to get better is to practice. The suggested problems will be odd-numbered problems. The answers can be found in the back of the text and most have fully worked solutions on-line. If you wish to do so, a student solutions manual that contains fully worked solutions to all of these problems could be purchased.

Recitation & Quizzes

The recitation time on Tuesdays is focused on reviewing material from the previous week, asking questions related to this material, preparing for quizzes and exams, and taking the weekly quiz.

On most Tuesdays, there will be a quiz covering material due the day before. These quizzes are available to start between noon and 11pm on the day of, but ideally you would take the quiz shortly after recitation. Check the course schedule for specific days and included topics for each quiz. ***The lowest quiz grade will be dropped*** – if you fail to take a quiz, that will be the dropped score.

Quizzes are posted on Gradescope. From the time you download the quiz, you will have 45 minutes to submit your completed quiz. Quizzes are open book/notes, and a basic calculator is allowed [no symbolic manipulation, etc.].

Exams

We will have three midterm exams and a final exam in this course. The midterms will be either 60 or 90 minutes (depending on content), and each is worth 15% of your grade. The cumulative final exam is two and a half hours and is worth 25% of your grade. Note, the final exam is designed to be a two hour exam, but extra time is built in due to the semester's challenging circumstances. All exams are closed notes and book, and no calculator is allowed. Depending on the exam, some specific resources may be allowed – any exception will be announced on Blackboard and in class well in advance.

Exams will take place in-person during normal class time with logistics worked out well in advance. For those not able to meet in-person, a remote proctoring backup plan is in place. More details to come.

Make-up midterms will be given only in negotiation with your instructor.

Midterm 1	Thurs 2/4
Midterm 2	Mon 3/1
Midterm 3	Thurs 4/8
Final Exam	Tues 4/27

Tutoring & Resources

There are many resources available on campus to help you be successful in this course.

- Online tutoring. To make an appointment for online tutoring, go to `https://fairbanks.go-redrock.com`. For more information about tutoring services, check out `www.uaf.edu/dms/mathlab`.
- Zoom office hours. To make an appointment for office hours, go to `https://doodle.com/mm/2030459165/schedule-time`.

- Campuswire. Forum to ask (and answer!) questions. I will also chime in.
- In addition to the MathLab, Student Support Services offers free tutoring (in many subjects) to students that qualify for their program.
- ASUAF offers private tutoring for a small fee (based on student income).

The above links and more information are located in the "I need help!" page in Blackboard. Besides tutoring information, there are tips for getting help with content for the course.

Late Add Policy

Any student who adds the course late has 72 hours from the time of their enrollment (including holidays/weekends) to catch up on any work that they have missed. It is solely the responsibility of the student to meet this deadline.

Important Dates to Remember

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

First day of instruction	Monday, Jan 11
Deadline for adding classes/late reg.	Friday, Jan 22
Last day for student- and faculty-initiated drops	Friday, Jan 22
Deadline for tuition and fee payment	Friday, Jan 22
Last day for student- and faculty-initiated withdrawal	**Monday, Apr 26**
Last day of instruction	Monday, Apr 26
Final Exam	Tues, Apr 27

Course Calendar

A detailed course calendar (title: Weekly Schedule) is found in a separate document on Blackboard. Besides scheduled content, it includes due dates for notes, homework, and exams.

Zoom Classtime

Classtime for the synchronous sections, and recitations for both synchronous and asynchronous sections, will be held via Zoom.

- Please mute your audio when you are not speaking so that background noise does not disrupt the class.
- You may choose to turn off your video; please present an avatar unique to you, however.
- I will stop for questions regularly. Politely interrupt me if necessary.
- I will call on students by name to answer questions in class. You can always say "pass" if you don't want to answer.
- I dont mind chit-chat in the chat window, but keep it focused on class, and please ask questions out loud.
- Everyone should participate in the small group discussions.

Class and recitation attendance is expected. Students who stop participating in the course may be withdrawn. If you have technological limitations to participating in class you need to email/call your instructor to sort things out as soon as you can.

Recordings

Our zoom sessions will be recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. Likewise, students who unmute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the chat feature, which allows students to type questions and comments live. Recordings will only be made available on Blackboard to other students in the class and will be deleted at the end of the semester.

Instructor Response Time

Please e-mail me if you need any assistance. I will usually answer e-mails promptly, but e-mails received outside of the workday may not receive a response until the following day. Students should see a response within 1 business day. Any e-mails received over the weekend may not receive a response until Monday morning. If I do not respond within one business day, please e-mail me again (noting the netiquette below). If you do not receive a response within two business days, please contact the Department of Mathematics and Statistics directly.

Class Netiquette

Netiquette (net + etiquette) addresses civility and professionalism in online communications. Adhering to some basic guidelines further ensures the success of our communications and collective learning experience. In e-mail communication, Zoom virtual office hours, and collaboration with other students:

- Do not use offensive language.
- Use correct spelling and grammar.
- Be respectful of others.
- Be patient and understand online communication is nowhere near efficient as face-to-face communication.
- Keep an "open mind".

Furthermore, I am open to questions and suggestions, but e-mail communication directed at me should polite, professional, and respectful. Any e-mailed requests to me expressing outright disrespect will be ignored, regardless of the merits of the message.

Disability Services

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials. I will work with the Office of Disability Services (208 Whitaker, 474-5655) to provide reasonable accommodations to students with disabilities.

Student Protections

Every qualified student is welcome in my class. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc. to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. *As required,* if I notice or am informed of *certain types of* misconduct, then I am required to report it to the appropriate authorities. For more information on you rights as a student and the resources available to you to resolve problems, please go to the following site: https://www.uaf.edu/handbook/.

COVID-19

Students should keep up-to-date on the universitys policies, practices, and mandates related to COVID-19 by regularly checking this website:

`https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students?authuser=0`

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

DMS Academic Policies

1. *Incomplete Grade* Incomplete (I) will only be given in Mathematics or Statistics courses in cases where the student has completed the majority (normally all but the last three weeks) of a course with a grade of C or better, but for personal reasons beyond his/her control has been unable to complete the course during the regular term. Negligence or indifference are not acceptable reasons for the granting of an incomplete grade.
2. *Late Withdrawals* A withdrawal after the deadline from a DMS course will normally be granted only in cases where the student is performing satisfactorily (i.e., C or better) in a course, but has exceptional reasons, beyond his/her control, for being unable to complete the course. These exceptional reasons should be detailed in writing to me, department chair, and dean.
3. *No Early Final Examinations* Final examinations for DMS courses shall not be held earlier than the date and time published in the official term schedule. Normally, a student will not be allowed to take a final exam early. Exceptions can be made by individual instructors, but should only be allowed in exceptional circumstances and in a manner which doesn't endanger the security of the exam.

Habits that Increase Success

The items listed below are things a student can do to increase the amount of material learned and his/her chances of ending the semester with a passing grade. The items are based on a combination of internal and nation-wide studies.

1. Attend every class.
2. Make a weekly schedule that includes at least 10 hours set aside for Calculus II outside of class/recitation.**
3. Work every problem on every homework assignment (written or online) independently. Check your answer and get help quickly when you have questions. Do extra, suggested problems.
4. Take quizzes seriously. Prepare for them and rework all missed problems on a blank copy of the quiz. Note that "rework" is not the same is "looking over" missed problems.

**If a student skips class and/or has weak prerequisite knowledge, this course will require more. Schedule these Calculus study hours the same way you schedule class meetings or work hours.