Math 251X - Calculus I
Spring 2018
Syllabus

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.

Optional Materials

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.

Course Description

From the UAF course catalog:

A first course in single-variable calculus. Topics include limits; continuity and differentiation of functions; applications of the derivative to graphing, optimization, and rates of change; definite and indefinite integration; and the Fundamental Theorem of Calculus.
Note: Credit may not be earned for both MATH F251X and MATH F230X.
Prerequisites: MATH F151X and MATH F152X; or MATH F156X; or placement.
Attributes: UAF GER Mathematics Req
Lecture + Lab + Other: 4 + 1 + 0

Why is Calculus so important?

Calculus is one of mathematics' premiere computational tools. It is the language of physics and engineering, and much of chemistry, economics, biology, and (yes) a broad portion of mathematics, providing a mathematically precise framework for studying how quantifiable information changes with time, and how to understand those changes. For example, position and energy in mechanics, the velocity of a fluid, magnetic field strength, and probabilities in brownian motion all involve continuous quantities described using calculus. In addition, calculus is used to approximately describe things that are actually discrete, like populations or votes or the numbers of molecules in a chemical process.

The two principle tools of calculus are differentiation and integration.

Differentiation concerns how changes in one variable affect another. It is used to answer such questions as: How does a population of bacteria change as time changes? or How does the temperature of the ocean change as depth increases?

Integration, on the other hand, is a kind of reverse process to differentiation. We use it to answer questions such as: If we know how much a population is changing during a year, can we reconstruct the total population change for the year? Can we determine the absolute size of the population at the end of the year?

In this course we need to *develop the mathematical theory* of derivatives and integrals and we need to learn *how and when* to apply these tools in applications.

Course Goals & Student Learning Outcomes

In addition to learning the basics of limits, derivatives, and integrals, students will be expected to master problem solving skills, learn to manipulate abstract symbols and develop deductive arguments in mathematics. Students completing the course will have the mathematical foundation to be successful in Calculus II and will have encountered a broad spectrum of mathematical applications.

Students completing the course should:

- be able to evaluate the limit of a variety of elementary functions numerically, algebraically, and graphically and to interpret what the value of a limit may indicate about the behavior of a function or graph,

- recognize whether a function or graph is continuous,

- know the definition of the derivative and how to apply that definition to simple functions,

- develop facility applying the basic rules of differentiation,

- be familiar with common interpretations of and applications of the derivative,

- know the Fundamental Theorem of Calculus and how and when to use it,

- develop facility applying the basic rules of integration,

- be familiar with common interpretations of and applications of the integral.

Instructional Methods

This course meets FIVE days a week. A variety of methods will be employed over the whole of the semester including lectures, homework, worksheets, quizzes, and group work.

Class Attendance

Class attendance (5 days per week) is mandatory. Much research has indicated that consistent class attendance is strongly correlated with student success – whether measured by increased understanding or final course grade. **Failure to adequately participate in class can result in a faculty-initiated withdrawal.** *Inadequate participation* would include 5 unexcused absences from class or repeatedly failing to participate in classroom activities.

Communication

Students are expected 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. If an instructor needs to contact a student, he or she will first attempt to do so in class. If the student fails to appear in class, the instructor will contact the student via his/her `@alaska.edu` account. Repeated failure to respond to instructor emails may result in a faculty-initiated withdrawal.

Blackboard will be used extensively in this class to communicate with students. Announcements, grades, Written Homework assignments and solutions to these assignments will be posted in Blackboard. It is the responsibility of each student to check his/her grades in Blackboard regularly and report any issues to his/her instructor.

Online Course Materials

Most course materials will be posted on the course webpage (https://sites.google.com/alaska.edu/calculus-one) including a copy of this syllabus, class notes, sample tests and proficiencies with solutions, quiz and test solutions.

Recitations

The recitation hour is focused on reviewing material from the previous week, asking questions related to this material, preparing for the quiz and taking the weekly quiz. Students should always bring three things to recitation: paper, writing utensil, a question. The first half-hour will be dedicated to review and questions. The second half-hour is dedicated to taking the quiz.

This hour is mandatory for all students in all sections. Failure to attend, showing up late, leaving early, or failing to participate in classroom activities will be considered inadequate participation.

Evaluation

In this course your grade will be determine by a variety of assessments: online homework (WAH), written homework (WRH), weekly quizzes, two proficiency tests, two midterms and a cumulative final exam. A summary rubric can be found at the end. Details for each category follow.

Week 1: Review & ALEKS PPL

Students with a strong grasp of prerequisite material are much more likely to be successful in Calculus. In order to aid student mastery of this material, the first week of class is focused on brushing up prerequisite knowledge. In class, we will discuss Chapter 1 of our textbook. Outside of class, students will be working in a program called ALEKS. This program tailors the problems to the needs of the student.

In the first week students are *required* to:

- enroll in the Spring 2018 Calculus I Cohort of ALEKS PPL
- complete an initial placement test (approx 1-2 hours) by Wednesday January 17 at 11:59pm
- complete 90% of the ALEKS pie   OR   spend 10 hours in Learning Mode by Monday January 22 at 11:59pm
- complete a *proctored* ALEKS PPL test (approx 1-2 hours) on Tuesday January 23. Note: Taking the proctored ALEKS PPL test will replace the usual Tuesday Recitation hour.

The proctored ALEKS PPL test will count as **two** quiz grades. Completion of your ALEKS pie or 10 hours in Learning Mode will count as your first online homework grade.

WebAssign Homework

Starting week 2, WebAssign homework will be assigned multiple times each week. It is the student's responsibility to keep up with these due dates. These homework assignments provide students with the opportunity to practice routine problems and receive immediate feedback on correctness. It will be most effective if you attempt all of the problems later the same day that material is discussed in class. For example, if we talk about section 2.3 on Monday, you should attempt all of the 2.3 WebAssign problems later that afternoon or evening.

Best Practices for using WebAssign:

- attempt every single problem the same day the topic was covered in class
- have class notes and notebook paper ready
- **write down your work for each problem along with the number of the problem and circle your final answer**
- keep your work (Why? So a tutor/teacher/classmate can help figure your what went wrong if needed. Also, so *you* can remember either what you did right or where you got stuck.)

Webassign Logistics:

- You (usually) get 5 chances to get a problem correct.
- Each section will be due at 11 pm.
- Bonus points can be earned for exemplary WebAssign completion.
- You may request an automatic 3-day extension though you will only be allowed to earn back half the remaining points.
- Each WebAssign assignment is equally weighted. No scores are dropped.

WebAssign Access:

You will 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/`).

- Log in to Blackboard.
- Click on the **Courses** tab.
- Click on our course, Math 251X.
- 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/`)

WebAssign gives free access for two weeks after the start of class. To continue using WebAssign after that either enter an access code or purchase access online.

Written Homework

The purpose of Written Homework is to give you an opportunity to tackle more challenging and interesting problems and practice writing proper mathematical solutions.

Written Homework is due at the beginning of class on Monday. Best Practices for Written Homework:

- Follow the Written Homework Guidelines posted on the course webpage.
- Figure out the solution to each problem on *scratch* paper. Once you have the correct solution, copy that solutions – including appropriate work – onto the sheet of paper you will turn in. That is, you should have initial drafts and final drafts of problems.
- Start the problems early so you have time to ask questions.
- CHECK YOUR ANSWER using your calculator, the web, the math lab, a study buddy. Get help if your answer is incorrect.
- Get your graded homework back, look over any problems you missed, and place it in a notebook.

Written Homework is open book, open notes, you may use a calculator, you may work in groups, and you are encouraged to go the the Math Lab to get help. **You must show all relevant work**, and at the discretion of the grader, points will be deducted if steps are skipped. Solutions should be organized and legible. Points will be deducted for sloppiness or not following the guidelines.

Late homework is not accepted. No homework grades are dropped. All Written Homework Assignments will be equally weighted.

Solutions to written homework will appear on Blackboard.

Quizzes

Frequent quizzing has been shown to be an effective way to consolidate new material and root-out misconceptions. Nearly every Tuesday in the Recitation hour, there will be a 30 minute quiz in the second half of the class. The quiz will cover the material taught in the classes held since the previous quiz. Quizzes are given under testing conditions; thus books, notes, and calculators are not allowed. **Quiz grades are an excellent predictor of test scores so it is in your best interest to take these seriously.** Quizzes cannot be made up except with a documented excused absence. No quiz grade will be dropped. Solutions to quizzes will be posted on the course webpage.

Proficiencies, Midterms, and the Final Exam

There will be two Proficiencies (one on derivatives and one on integrals), two midterm exams, and a cumulative final exam. Sample proficiencies, midterms, and finals are available at the course webpage.

Midterm 1	Wed 14 Feb
Derivative Proficiency	Wed 7 Mar
Midterm 2	Wed 11 Apr
Integral Proficiency	Wed 25 Apr
Final Exam	Wed 2 May

Proficiency policy: Each Proficiency will be 30 minutes in length and consist of several derivative (or integral) problems graded right or wrong (no partial credit). In order to pass, a student must earn a score of at least 85%. A student may have *three* attempts at a proficiency. Grading rubric is below.

attempt	score	outcome
first	85-100%	earn the score on proficiency, done.
	0-84%	retake proficiency
second	85-100%	earn 85% on proficiency, done.
	0-84%	retake proficiency
third	85-100%	earn 70% of the score on proficiency, done.
	0-84%	earn 0% on proficiency

Midterm policy: All midterm exams are the same for all sections. They are written and approved by all instructors teaching the course. Midterms are given in the evenings in one of two time slots: (A) 5pm-6pm or (B) 6pm-7pm. Note that students choosing time slot A will be required to stay in the classroom until 6pm.

Any student who cannot attend either time slot *must notify his/her instructor at least one week in advance* in order to make other arrangments.

Make-up Midterms will be given only for documented excused absences.

Final Exam policy: The final exam is mandatory and cumulative. It is scheduled on Wednesday May 2 from 1:00pm-3:00pm. It is not possible to take the Final Exam early or late. Also, in an effort to reward the student who makes significant improvement over the course of the term, a stellar grade on the final may overcome a deficiency on the midterms and improve a student's final grade.

Summary Rubric

Webassign Homework Average	7.5%
Written Homework Average	7.5%
Quiz Average	15%
Derivative Proficiency	7.5%
Midterm 1	15%
Midterm 2	15%
Integral Proficiency	7.5%
Final Exam	25%
total	100%

The grading scale used will be the plus/minus letter grades (93-100%=**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**). This scale represents a guarantee. The instructors reserve the right to lower the scale.

Faculty Initiated Withdrawal triggered by Inadequate Student Participation

Students who stop participating in the course will be withdrawn. Here are some indications of inadequate participation:

- missing class five times
- not completing or not turning in **three** written homework assignments
- failing to participate in classroom activities
- repeatedly failing tests and quizzes with no attempt at remediation

Tutoring

There are many resources available on campus to help you be successful in this course. If you have questions you can meet with any of the instructors or the TA during their respective office hours. There is a **free, drop-in** tutoring center on campus called the Math and Stat Lab. The Math and Stat Lab is located on the third floor of the Chapman Building (room 305) on the main UAF campus. For more information about the Math lab (hours, tutor availability) visit their web page: `http://www.uaf.edu/dms/mathlab/`.

If the large-group setting of the Math and Stat Lab is not for you, there is also **FREE** one-on-one (or small group) tutoring available in room 302 in the Eielson Building. For one-on-one tutoring you must schedule an appointment. See `http://www.uaf.edu/dms/mathlab/` for a calendar listing tutor availability and to schedule an appointment.

Support Services

In addition to the Math Lab, 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).

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. The instructors will work with the Office of Disability Services (208 Whitaker, 474-5655) to provide reasonable accommodations to students with disabilities.

DMS Academic Policies

1. *Incomplete Grade* Incomplete (I) will only be given in DMS 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 (currently 9 weeks into the semester) 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 the instructor, department head 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.