Math 251X - Calculus I

Summer 2019; MTWR 12:00-1:55; Sydney Chapman Building 106

Instructor: Jordy Bernard
Office: Chapman 306A
Contact: jwbernard@alaska.edu; (970) 846-6109

Required Course Materials

- *Calculus: Early Transcendentals 8th Edition*, James Stewart, ISBN-13: 978-1285741550 and ISBN-10: 1285741552.

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:

Math 251X - Calulus 1: 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: Appropriate score on the math placement test; or MATH F151X and MATH F152X; or MATH F156X; For students who have previously received a grade below C- or a W in MATH F251X: MATH F251R or MATH F251S (MATH F251S must be taken concurrently). Corequisites: MATH F251L. 4.000 Credit hours 4.000 Lecture hours

Math 251L - Recitation section for Calculus I: Activities may include worksheets, quizzes and problem sessions associated with corresponding lecture material from MATH F251X. Corequisites: MATH F251X. Offered Fall and Spring 0.000 Credit hours 0.000 Lecture hours 1.000 Lab hours

Attributes: UAF Core Mathematics Req, UAF Degree Mathematics Req, UAF GER Mathematics Req

Prerequisites: ALEKS Overall Test 1 078 or ALEKS Overall Test 2 078 or ALEKS Overall Test 3 078 or ALEKS Overall Test 4 078 or ALEKS Overall Test 5 078 or AP Exam - Calculus AB 3 or AP Exam - Calculus AB subscore 3 or (Undergraduate - UAF level MATH F107X Minimum Grade of C- or Undergraduate - UAF level MATH F151X Minimum Grade of C- and (Undergraduate - UAF level MATH F108 Minimum Grade of C-) or Undergraduate - UAF level MATH F152X Minimum Grade of C-) or (Undergraduate - UAF level MATH F156X Minimum Grade of C-)

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 four days a week. Each day the course will begin with a lecture (from 12:00-1:15) followed by a lab session (from 1:25-1:55) where students will work proplems with the assistance and feedback of the instructor. Students must be enrolled in and must attend the lecture and recitation. A variety of instructional methods will be employed over the whole of the semester including, exams, written homework, and group work.

Class Attendance

Class attendance (4 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 as well as UAF Blackboard accounts on a regular basis. 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.

Recitations

Each day's recitation period is focused on solidifying recently learned material. It is an opportunity to spend more time on more challenging material, get more practice on homework-like problems, and prepare for quizzes and tests. This hour will always involve progressing through a worksheet so students should come to class prepared to be active. Always bring a graphing calculator, paper, and writing implement.

The Recitations are mandatory for all students. 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: written homework, three midterms and a cumulative final exam. A summary rubric can be found at the end. Details for each category follow.

Written Homework

There will be weekly written homework due at the beginning of class on Thursday

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.

Late homework is not accepted. All Written Homework Assignments will be equally weighted.

Solutions to written homework will appear on Blackboard.

Best Practices for Written Homework:

- Start with TWO sheets of paper: the scratch paper and the final draft paper.
- Start the problems early so you have time to ask questions.
- First attempt problems on the scratch paper.
- CHECK YOUR ANSWER using your calculator, the web, the math lab, a study buddy. Get help if your answer is incorrect.
- Write the correct solution (not just an answer) on your final draft.
- Get you graded homework back, look over any problems you missed, and place it in a notebook.

Midterms, and the Final Exam

There will be three midterm exams and a cumulative final exam. Sample midterms and finals will be provided.

Midterm 1	Thur 13 June
Midterm 2	Wed 03 July
Midterm 3	Thur 25 July
Final Exam	Thur 08 Aug

Midterm policy:

Any student who cannot attend a midterm *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 Thursday August 08 during normal course hours (12:00-1:55).

Summary Rubric

Written Homework Average	25%
Midterm 1	15%
Midterm 2	15%
Midterm 3	15%
Final Exam	30%
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 your instructor during 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/`.

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.

DMS Academic Policies

1. *Incomplete Grade* Incomplete (I) will only be given in Computer Science, 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 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.

Student Rights and Protections

Every qualified student is welcome in my classroom. 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 your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/ OR GRADUATE STUDENT VERSION: Student protections and services statement: Every qualified student is welcome in my classroom. 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. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/