CALCULUS 1 (MATH 1210–090)
FALL 2016 SYLLABUS

Instructor: Liz Fedak   Office: LCB Loft   Office Hours: Tuesday 2:00-3:00 PM in office
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Course Information: Functions and their graphs, differentiation of polynomial, rational
and trigonometric functions. Velocity and acceleration. Geometric applications of the deriv-
ative, minimization and maximization problems, the indefinite integral, and an introduction
to differential equations. The definite integral and the Fundamental Theorem of Calculus.
It is a 4 credit course.

Prerequisite Information: "C" or better in ((MATH 1050 AND 1060) OR MATH 1080
OR (MATH 1060 AND Accuplacer CLM score of 80+)) OR AP Calc AB score of 3+ OR
Accuplacer CLM score of 90+ OR ACT Math score of 28+ OR SAT Math score of 630+.

Course Materials: The following resources are used in this course.
- Textbook: Varberg, Purcell, and Rigdon, *Calculus with Differential Equations*, 9th
  ed.
- Website: https://utah.instructure.com/

Additional Resources: Students looking to improve their skills more quickly may wish to
take advantage of the following university-provided resources.
- Math Tutoring Center: offers drop-in tutoring and a computer lab. Located in the
  underground passageway between JWB and LCB, Room 155. You can find more
  information at http://math.utah.edu/ugrad/mathcenter.html.
- University Tutoring Services: inexpensive private tutoring services provided by the
  university. Located in 330 SSB.
- Supplementary Notes and Past Exams: http://www.math.utah.edu/online/1210/.

Overview: This is an exclusively online class, run primarily through the Canvas interface.
You can access the Canvas page through CIS or by logging in at https://utah.instructure.com/.
(Typing in utah.instructure.com without https:// at the beginning takes you, inexplicably,
to a car dealership website.) **Students must check the Canvas page, as well as their
UMail address([uID]@utah.edu) regularly for course information, updates, and
resources.**

There are video lectures linked on the homepage (http://www.math.utah.edu/lectures/
math1210.html) discussing the main points of the chapter; however, students will need to
supplement these lectures with careful reading of the book sections. In addition to the

tutoring services listed above, students are strongly encouraged to interact with both the instructor and their classmates, either through office hours of the online discussion board.

This course is not a learn-at-your-own-pace course. It follows the University's semester-based academic calendar and has hard due dates for homework and exams. Because course learning is guided through an online interface, it does provide greater time flexibility than a traditional lecture course. However, with great time flexibility comes great time responsibility: use your time wisely and effectively.

The instructor will try her best to be helpful, responsive, and available; yet it is the student's responsibility to ask questions well in advance of homework due dates. You can expect instructor replies within one day of sending during normal daytime hours, although the instructor will often respond much sooner. It is imperative that you get started on the WebWork assignments early so that you allow time for responses to any questions you might have. **In general, you should not expect an answer to homework question posed past midnight until the next day.**

Grading: The grade percentage breaks down as follows:

Webwork Assignments	20%
Quizzes	10%
Midterm 1	20%
Midterm 2	20%
Final	30%

Final course letter grades will be determined from the final course percentage as follows:

E	D-	D	D+	C-	C	C+	B-	B	B+	A-	A
0-50	50-62	63-66	67-69	70-72	73-76	77-79	80-82	83-86	87-89	90-92	93-100

In addition, **your lowest two homework scores will be dropped, and if your final grade is higher than your lowest midterm grade, your lowest midterm grade will be replaced by your final grade. This will ONLY apply to midterms the student has taken; if a student misses a midterm exam, their grade will remain zero.**

The instructor retains the right to modify this grading scheme during the course of the semester; students will, of course, be well notified of any adjustments. Midterm and final tests may be graded on a curve, if necessary.

Homework: Two types of homework will be assigned in this class: WebWork assignments (20%), and quizzes (10%).

- WebWork assignments will be due on Thursdays at 1 AM when no exam is scheduled. For specific due dates and times, please consult the course calendar. Students will be emailed a WebWork username and password automatically on the first day of class (or a day or so after a late add.) Students must log in to the WebWork environment by following the links given on the 'Assignments' page on Canvas, or by going to

(link TBD, still setting up WebWork)

There will be 11 Webwork assignments plus one introductory assignment. The number of questions per assignment and hence the total points each assignment is worth will vary. The introductory Demo assignment (due August 22) is graded.

In WebWork, students get immediate feedback on their work, which aids in the learning process. A student is given a problem, consults the book for relevant examples, works through the problem, then inputs the answer into the WebWork interface. If the student gets it right, great! If not, there are several strategies for success: First, the student should go through their steps again and read the question carefully. Second, re-consult the text. Third, consult Canvas for relevant discussion posts on the problem. If you find a problem difficult, chances are other students do too!

Finally, utilize the "email instructor" button at the bottom of the Webwork problem page. Taken together, this virtual learning environment with real-time feedback is highly effective for learning.

- Quizzes (10%) are not quizzes in the traditional sense; rather, they will be open-ended problems designed to strengthen your mathematical communication skills and provide an opportunity for individual feedback from the instructor. On each of the 11 weeks when webwork assignments are due, a quiz will also be due at the same time (Thursdays at 1 AM). They will be found in the Quizzes section of Canvas.

    Quizzes will consist of one multistep problem that may or may not ask for a 'correct' numerical answer, but will require you to provide a writing sample to demonstrate your knowledge of the problem, understanding of subject matter, and ability to explain mathematical concepts. Each part of each problem in a quiz will be worth 2 points: 1 point for giving the correct answer, and 1 point for explaining your idea in complete sentences, without excessive grammatical errors (subject to the instructor's discretion).

    This is done for a number of reasons:
    − In higher levels of mathematics, communicating ideas to other people becomes just as important as being able to internalize concepts and solve difficult problems. Calculus represents a vital turning point in your mathematical career: you've developed the basic building blocks to understand some very deep concepts and get a taste of what mathematics is all about. Open-ended exercises encourage you to appreciate the subject matter as something more than a process where you plug in numbers to get another number.
    − Doing problems in a timed setting, such as a test, often gets much easier when you can organize ideas in a strong internal narrative. This exercise encourages you to think to yourself about the process required to solve each problem: which ideas are being used, and how; why each step is performed, what would happen if things were different, etc..
    − Students can often get discouraged if they find themselves making a lot of mistakes, or are unable to solve some types of problem, and can't figure out why. By explaining the subject matter directly to your instructor, you have a chance to correct or expand your intuition before it becomes vitally important—like during a test. It also encourages you to start a dialogue with the instructor and other students about unintuitive concepts.

– Talking about concepts with someone else is a great way to learn it! Here, you are encouraged to learn by teaching math to a captive audience: your instructor. The Canvas discussion board also provides opportunities for this type of learning.

Be sure to do both the weekly WebWork assignment and the weekly quiz on non-exam weeks!

Exams: Midterm Exams (40%): Two 90-minute exams will be given during the semester. Midterm exams will be given through the computer and will be composed of a multiple choice half and a short answer half. You will be given a sheet on which to write your answers for the short answer portion. No notes or calculators will be allowed. Exams must be taken in one of the U of U's exam proctoring centers. A student ID is required for entrance. Out-of-area students can arrange with UOnline to have exams administered by a proctor (see UOnline website for more information). YOU must schedule a block of time with the testing centers to take the exams during their normal 9:00-5:00 business hours. Students will be required to sign up for their time slot at least 1 business day before they take the exam (example: students wishing to take an exam on Wednesday must register for the exam by 11:59pm on Monday. Testing center is located in the Marriott Library, just to the left inside the main library entrance. Extension campuses in Bountiful and Sandy are also available. You can sign up for exams by clicking the 'Schedule Exams' tab in Canvas. For more details about the exam sign-up procedure, see the following document.

Final Exam (30%): One cumulative 150 minute exam will be given at the end of the semester. Follow the same instructions as above to sign up for a time and location.

Extra Credit Puzzles. There will be 5 extra credit questions in total, released on August 22, September 12, October 3, October 24, and November 14. You will have the full 3 weeks to complete the extra credit question; for example, the question released on August 22nd will be due midnight on September 12. The extra credit problems will rely on basic algebra rather than calculus concepts, but are designed to push your problem-solving ability to its limits. They're puzzles.

Being stuck on a hard problem for a long time can be incredibly frustrating, even to the point of doubting your own ability—yet ruminating on a hard problem by yourself is, by far, the best way to improve your problem-solving skills. This optional experience is offered to acclimate you to the feeling of mental struggle (maybe you'll even enjoy it!), and to communicate that not immediately being able to do a problem doesn't make one bad at math; rather, experiencing the struggle is what will strengthen your mind.

While it is encouraged to talk to your classmates about the homework, think about the extra credit puzzles on your own. I will start a post in the Canvas Discussion section one and a half weeks after each extra credit problem is posted to answer specific questions about the extra credit problem and point you in the right direction.

This will be your only opportunity for extra credit.

Other Important Information.

- Students MUST use their U-mail email account ([u-number]@utah.edu) for all student-instructor email correspondence, and must send email to the instructor using the

email address listed above. Check your U-mail regularly because all official class announcements will be sent through this email. Also, you should receive your WebWork login account information at this address at the beginning of the semester.

- If you are having difficulty with a Webwork problem and would like help from the instructor, please use the 'email instructor' button which is located on the problem page. This will send the instructor an email containing your question and a link which allows the instructor to view your specific problem and the previous answers you have input. This added information makes diagnosing your problem much easier.

- When asking about a problem, either via the Webwork "email instructor" button or discussion posts, please make sure to include the following information: (1) state the problem in your own words, (2) state your general strategy to solve the problem and any relevant intermediate computations, and (3), your answer. Often, you will find that if you take the time to write out the above information clearly, your mistake will become apparent. Also, the above information is important because the homework problems are randomized. No two students will get the same homework problems, so references to answers without the problem context will not be meaningful. When all three elements are included, the instructor can very often diagnose any problems in the student's computations and/or strategy and suggest a correction. The instructor will most likely not supply a complete answer in reply. The goal of instructor interaction is to facilitate learning. It is the student's responsibility to complete their own calculations to earn credit.

- Practice tests will be posted about a week prior to each exam. Practice exams will be similar in structure and format to the real exam. There are also exams and solutions from previous semesters which can be accessed through a link on the departmental webpage.

- Time limits will be enforced on every exam. It is the student's responsibility to make sure their exam is returned in the appropriate amount of time. The online exam will automatically close when your time has elapsed. You should not assume that someone from the testing center will come around and collect your exam when time has expired. In order to enforce this policy, the instructor will take points off of exams that are returned late. The amount of time the exam was in your possession is recorded on the exam and electronically by the testing center. The policy is to take 1 point off of a late exam for every 2 minutes it was out over the specified time limit.

- The university suggest that you use Firefox, Chrome, or Safari to login to Canvas, but not Internet Explorer. For any technical help with Canvas, you should contact the UOnline Helpdesk at (801) 581-6112. The Canvas interface (discussion posts, chat, etc.) should be used for Calculus I coursework only. The instructor moderates student activity and has the right to initiate disciplinary action in the event of inappropriate activity.

Student Responsibilities: All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully

and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, and I will do so, beginning with verbal warnings and progressing to dismissal from and class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

Expected Learning Outcomes: Upon successful completion of this course, a student should be able to:

1. Take limits of algebraic and trigonometric expressions of the form $\frac{0}{0}$ (that simplify), non-zero numbers over 0, including limits that go to $\pm\infty$, nonexistent limits and finite limits.
2. Use the limit definitions of the derivative and the limit definition of the definite Riemann integral for polynomial, rational and some trigonometric functions; understand limit definition of continuity.
3. Differentiate all polynomial, rational, radical and trigonometric functions, as well as compositions of those functions; perform implicit differentiation and compute higher-order derivatives.
4. Use differentiation to find stationary, singular and inflection points, as well as domain and limit information to determine vertical and horizontal asymptotes, then use that information to sketch the graph of a curve $y = f(x)$.
5. Apply differentiation to optimization and related rates problems.
6. Compute indefinite and definite integrals using the power rule, basic u-substitution, and the Fundamental Theorem of Calculus.
7. Apply the definite integral to compute area between two curves, volumes of solids of revolution, arc length, surface area for surfaces of revolution and center of mass.

ADA Statement: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581- 5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

Weekly Schedule: We cover the following:

Week	Chapters	Videos	Topics
8/22-8/26	1.1-1.3	1, 2, 2.5, 3	Slope of a Line, Limits, Limit Properties
8/29-9/02	1.4-1.6	4A-C, 5 ,6	Limits at Infinity, Squeeze Theorem, Trigonometric Limits, Continuity
9/05-9/09	2.1-2.3	7, 8, 9, 10	Slope of a Curve, Derivatives, Derivative Rules
9/12-9/16	2.4-2.6	11, 12, 13	Derivatives of Trigonometric Functions, The Chain Rule, Higher Order Derivatives
9/19-9/23	2.7-2.9	14AB, 15AB, 15.5	Implicit Differentiation, Related Rates, Differentials
9/25-9/30	–	–	**Midterm 1**
10/03-10/07	3.1-3.3	16AB, 17ABC, 18AB	Maxima and Minima, Local Extrema, Monotonicity
10/10-10/14	3.4-3.6	19AB, 20, 20.5	Sketching Graphs, Mean Value Theorem, Optimization
10/17-10/21	3.7, 3.8	21AB, 22	Bisection & Newton's Method, Antiderivatives
10/24-10/28	3.9, 4.1, 4.2	23, 24AB, 25AB	Differential Equations, Area, The Definite Integral
10/31-11/04	4.3-4.5	26, 27, 28ABC	Fundamental Theorems of Calculus, Mean Value Theorem for Integrals
11/07-11/11	–	–	**Midterm 2**
11/14-11/18	5.1-5.3	29AB, 30ABCD	Area of a Plane, Volume of Solids
11/21-11/25	5.4, 5.5	31ABC, 32	Length of a Plane Curve, Work
11/28-12/02	5.6, 4.6	33AB, 34AB	Moments & Center of Mass, Numerical Integration
12/05-12/08	–	–	Review for final