1210-90 Calculus I, Summer 2017

Course Information: Math 1210 Calculus II 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 Description: Functions and their graphs, differentiation of polynomial, rational and trigonometric functions. Velocity and acceleration. Geometric applications of the derivative, minimization and maximization problems, the indefinite integral, and an introduction to differential equations. The definite integral and the Fundamental Theorem of Calculus.

Instructor: Dr. Matt Cecil

Email: mcecil@math.utah.edu

Office Hours: Tuesdays 1:30-3:30 in JWB 104, or by appointment. Online office hours will be held on Monday evenings 8:30-9:30pm.

Text: *Calculus with Differential Equations*, by Varberg, Purcell, and Rigdon (9th edition)

For information on purchasing the textbook, go to http://www.math.utah.edu/schedule/bookInfo/

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 utah.instructure.com. Students should check the Canvas page regularly for course information and resources. Email notifications and correspondence will be sent to the student's UMail address ([u-number]@utah.edu); this email account must be checked regularly.

There are short lectures posted Canvas discussing the main points of the chapter; however, students will need to supplement these lectures with careful reading of the book sections. Students have many resources available to use in learning the course material in addition to the text, posted videos, and the assigned problem sets. These include

- **Interaction with the Instructor**- The instructor will be available to meet in person or online for office hours, will respond to emails, and participate in discussion boards.

- **Interaction with Other Students**- The Canvas interface makes connecting with other students easy. Though it is required that every student do his or her own work, you are encouraged to form study groups and/or ask questions of your peers. Students are encouraged to answer discussion posts too.

- **Math-Department Tutoring Lab**- Room 155 of the T. Benny Rushing Mathematics Center (in the basement connector between the LCB and JWB math buildings). For more information, see http://www.math.utah.edu/ugrad/mathcenter.html.

- **Supplementary Notes & Past Exams**- There is a departmental webpage for the class that has some additional resources, including exams from past semesters. See http://www.math.utah.edu/online/1210/.

- **Anything Else...**- There are many free resources available on the web that may be helpful. Beware, however, that the quality and accuracy of these resources vary. If you find a helpful website or video, feel free to share it with the other students.

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 this time flexibility comes the responsibility to use your time wisely and effectively.

The instructor will try his/her best to be helpful, responsive, and available. However, 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 7:00pm until the next day.

Keys to Success: To be successful in this online course format, a student must be an active participant in their own learning. This requires motivation, time management, and discipline. Here are some strategies that will be effective:

- **Get Started Early-** Get started learning the material early in the week. You will retain and understand the material better if you do a small amount of work each day for a few days than if you try to cram the week's material into one day. Plus, starting early gives you plenty of time to get questions answered from discussion or email. Set aside specific times each week that you will devote to the course work. If you work a job during the day or are more of a night owl, pretend that the homework is due the night before it actually is; that way, you will be sure to get it done in time, and you will have the next day to get any remaining questions answered. Do not wait until the last minute!

- **Work Examples-** A math textbook is not good bedtime reading. You should be actively working while you are reading. Get out paper and pencil and read through the text and examples, working through each step on your paper. If you do not understand a step, go back and work through it again. Progress may be quite slow, but your time will be rewarded by a better understanding of the material.

- **Print Out Homework-** Print out the WebWork problems and do them first carefully with paper and pencil. Remember that, although WebWork only requires an answer, exams will be taken with paper and pencil. On exams, it will be important that you show your work and that your work is clear and legible. Your method is as important as your final answer! Practice this on your WebWork assignments.

- **Ignore your Calculator-** Do your WebWork assignments without a calculator. There are a few WebWork problems that do expect numerical answers, but most problems do not require a calculator. For example, suppose you find that an answer to a problem is $\frac{\sqrt{5}}{3} + \sin\left(\frac{\pi}{4}\right)$. You could get out your calculator and find that this equals 1.45246..., then input 1.4525 into the WebWork blank. However, it is better to input the whole expression and let WebWork handle the calculation. In this example, you would input 'sqrt(5)/3+sin(pi/4)'. This is better for three reasons. If you need to use this answer in another part of the problem, you can simply cut and paste and/or modify your entry appropriately in the new blank. This eliminates any rounding errors that might cause your second answer to be counted as incorrect if the rounded decimal form is used. Secondly, if you enter decimal answers, it is virtually impossible for the instructor to understand what you are doing to arrive at that answer. This makes it difficult for the instructor to diagnose the problem by looking at your previous answers. Finally, you will not be allowed calculators on your exams, so you should not become dependent on it. Kick the calculator habit!

- **Use Homework as a Tool-** You should view the WebWork homework as a tool for accessing and evaluating your understanding of the course material. Getting a high homework score is desirable, of course. However, that should not be your only goal. WebWork questions vary in difficulty and relevance, but they will often follow an example in the book quite closely. All you are required to input is the answer, and it may be possible to get that answer by shortcut methods (following computations in the book, finding a pattern in previous answers, etc). It is not in your best interest to take shortcuts; any additional points you get by these methods will be negated by points you miss on an exam where the problems will be different and you will be expected to show all of your work. There is nobody looking over your shoulder to make sure you are doing the WebWork problems honestly, so you need to police yourself. If you get a correct answer but are not totally confident of the method, go back and work it again.

- **Seek Help if Needed-** If you are having difficulty with a concept or question, it is up to you to seek help from the instructor, other students, or a tutor. You should attempt to be an honest evaluator of your own understanding. Constantly ask yourself, 'How well do I understand this concept?' One way to evaluate this is to pick a problem from the end of the section in the book. If you can't get started or keep getting stuck, then you clearly are lacking some necessary component of understanding. So seek out help. There is no shame in getting assistance. Learning mathematics alone is difficult for everyone and often you just need a nudge back in the right direction. Make sure the help you are getting is directed at your conceptual understanding and not just how to get the final answer. Whether or not you get a particular answer correct or not on your homework will have a negligible effect on your course grade, but whether or not you understand the underlying concept will ultimately have an effect on your course grade through higher exam scores.

Grading: The following are the grade components and the percentage each contributes to a student's final grade:

WebWork Assignments (25%) - Homework will be due more or less weekly and will utilize the Webwork environment. For specific due dates and times, please consult the course calendar. Students will be emailed a Webwork user name and password automatically a few days after course registration. Students must login to the WebWork environment by following the link given on the 'Assignments' page in Canvas, or by going to

http://webwork3.math.utah.edu/webwork2/math1210summer2017-90/

There will be 11 homeworks in total, plus an introductory assignment. The number of questions per assignment and hence the total points each assignment is worth will vary. The introductory assignment 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.

Midterm Exams (45%) - 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 or written half. You will be given a sheet on which to write your answers for the written 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. The main 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. Exam scheduling can be done in Canvas. For instructions, go to

http://tlt.utah.edu/wp-content/uploads/2015/08/Exam-Scheduling-for-Students.pdf

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.

Score distributions of the midterm exams will be centered at 70 or higher. What this means is the following: Once the exams have been graded, the exam average will be computed. If it is above 70, then there will be no score adjustment. If it is below 70, then points will be added to everyone's score so that the exam average is 70. For example, if the average of the first midterm is 64, then everyone will have 6 points added to their exam scores, making 70 the new exam average. This only applies to the first two midterm exams and not the final exam.

Final course letter grades will be determined as follows: If X is your course percentage weighted according to the above, then $\{X \geq 88\% \Rightarrow A, X \geq 85\% \Rightarrow A-, X \geq 82\% \Rightarrow B+, X \geq 73\% \Rightarrow B, X \geq 70\% \Rightarrow B-, X \geq 67\% \Rightarrow C+, X \geq 58\% \Rightarrow C, X \geq 55\% \Rightarrow C-, X \geq 52\% \Rightarrow D+, X \geq 43\% \Rightarrow D, X \geq 40\% \Rightarrow D-, X < 40\% \Rightarrow E\}$.

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. Note that, given the percentages outlined above, missing a midterm exam will result in a student's grade falling at least one and a half letter grades, while missing the final exam will result in a student's grade falling at least two letter grades. It is therefore unlikely a student will pass the class if any exam is missed.

Extra Credit- Participating in the Canvas Discussions allows you to earn a small amount of extra credit. Everyone who posts a discussion question or reply with mathematical content will receive one additional point on that week's homework assignment (maximum of one point per week). This does not seem like very

much, but a student who participates every week will add about 2% to their final course score. You will also find that the benefits you receive by participating in the discussions go well beyond the extra credit. Keep in mind, though, that to receive the maximum benefit you need to start participating early in the semester. Everyone benefits when there is more class participation in the Discussions. There will be no other extra credit opportunity.

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 http://www.math.utah.edu/online/1210/.

- 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.

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 0/0 (that simplify), non-zero number over 0, including limits that go to (positive or negative) infinity, limits that don't exist and limits that are finite.

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2. Use the limit definitions of derivative and definite integral for polynomial, rational and some trigonometric functions; understand definition of continuity.

3. Differentiate all polynomial, rational, radical, and trigonometric functions and 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, and then use all of 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 and basic u-substitution and the Fundamental Theorems of Calculus.

7. Apply the definite integral to compute area between two curves, volumes of solids of revolutions, arc length, surface area for surfaces of revolution and center of mass.

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. http://regulations.utah.edu/academics/6-400.php

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 & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veterans status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Student Names and Personal Pronouns: Class rosters are provided to the instructor with the students legal name as well as Preferred first name (if previously entered by you in the Student Profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected. If you need assistance getting your preferred name on your UIDcard, please visit the LGBT Resource Center Room 409 in the Olpin Union Building, or email bpeacock@sa.utah.edu to schedule a time to drop by. The LGBT Resource Center hours are M-F 8am-5pm, and 8am-6pm on Tuesdays.

Course Roadmap Week-by-Week: All WebWork due dates are Tuesday 11:00pm, except for the first Demo assignment. Homework answers and the next assignment will be posted one hour after due date time.

Week 1 WebWork demo assignment due May 19—learn to log in, navigate environment

Week 2 Assignment #1 due May 23, Chapter 1.1-3: Limits. **Note, Wednesday May 24th is the last day to drop course**

Week 3 Assignment #2 due May 30, Chapter 1.4-6: More Limits.

Week 4 Assignment #3 due Jun. 6 Chapter 2.1-3: The derivative and derivative rules.

Week 5 Assignment #4 due Jun. 13, Chapter 2.4-6: Trigonometric derivatives, chain rule, and higher-order derivatives. Exam 1 (Jun. 15 - Jun. 17). Register for a time using UOnline.

Week 6 Assignment #5 due Jun. 20, Chapter 2.7-9: Implicit differentiation, related rates, differentials and approximations. **Note, Friday Jun. 23 is the last day to withdraw from course**

Week 7 Assignment #6 due Jun. 27, Chapter 3.1-5: Maxima and minima, monotonicity and concavity, local extrema, practical problems, and graphing.

Week 8 Assignment #7 due Jul. 4, Chapter 3.6-8: Mean-Value Theorem, solving equations numerically, and antiderivatives.

Week 9 Assignment #8 due Jul. 11, Chapter 3.9 & 4.1-2: Differential equations, definite integrals. Exam 2 (Jul. 13 - Jul. 15). Register for a time using UOnline.

Week 10 Assignment #9 due Jul. 18, Chapter 4.3-6: Fundamental Theorem of Calculus, substitution, Integral Mean-Value Theorem, numerical integration.

Week 11 Assignment #10 due Jul. 25, Chapter 5.1-3: Areas of planes, volumes of solids.

Week 12 Assignment #11 due Aug. 1, Chapter 5.4-5.7: Length of a plane curve, work and fluid force, moments, center of mass, probability densities. Final Exam (Aug. 3 - Aug. 4). Register for a time using UOnline.