Math 1210-090 : Calculus I, Fall 2019

Instructor	Chee Han Tan (My first name is Chee Han)
Contacts	Office: JWB (John Widtsoe Building) 129, Department of Mathematics. Email: tan@math.utah.edu (Please include "Math 1210" in the subject line) Office Hours: Wednesday 11AM - 12PM and Friday 1:30 - 2:30PM. Online office hours will be held on Thursday evenings 7 - 8PM. Office hours for exam weeks will be announced.
Textbook	*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/CalcBookInfo-3.pdf.
Prerequisites	"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+. *Important note*: The mathematics department DOES enforce prerequisites for all undergraduate courses. If you were able to register for this class based on your enrollment in the prerequisite course last semester and you did not receive the minimum grade in that course to enter this class, then you will be dropped from this class on Friday of the first week of classes. If you are in this situation, it is in your best interest to drop yourself from this class and enroll in a class for which you have the prerequisites before you are forcibly dropped.
Course Description	Functions and their graphs, differentiation of polynomial, rational and trigonometric functions. Velocity and acceleration. Geometric applications of the derivative, minimisation and maximisation problems, the indefinite integral, and an introduction to differential equations. The definite integral and the Fundamental Theorem of Calculus.
Expected Learning Outcome	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 do not exist and limits that are finite.

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

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 critical points and inflection points, the signs of the first and second derivatives, and domain and limit information to determine vertical and horizontal asymptotes. Then use all of that information to sketch the graph of $y = f(x)$.

5. Apply differentiation to optimisation, related rates, linear approximation, and problems involving differentials.

6. Compute indefinite integrals and find antiderivatives, including finding constants of integration given initial conditions.

7. Compute definite integrals using the definition for simple polynomial functions. Compute definite integrals using the power rule, basic u-substitution, and the Fundamental Theorems of Calculus.

8. Apply the definite integral to compute area between two curves, volumes of solids of revolutions, arc length, surface areas of surfaces of revolution, and work problems.

Overview   Math 1210 Calculus I is a 4-credit course. This is an exclusively online class, run primarily through the Canvas interface. You can access the Canvas page through CIS or go to https://utah.instructure.com/courses/577298. Students should check the Canvas page regularly for course lectures and resources, announcements, grades, files, and any relevant supplementary material. I will hold you accountable for receiving these information. Email notifications and correspondence will be sent to the student's UMail address ([u-number]@utah.edu), so **be sure to check the UMail account regularly**. Alternatively, you can have Canvas notifications and announcements forwarded to an emaill address that you do check regularly.

There are short lectures posted on 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:

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

2. **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 post and answer discussions on Canvas (see Extra Credit below). That said, it is important that these mathematical discussions not be one-sided: the only real way to learn mathematics is to struggle through it, and not simply to accept the fruit of someone else's understanding.

3. **Math-Department Tutoring Center** - The math department offers free drop-in tutoring for students at the T. Benny Rushing Mathematics Student Center, located underneath the walkway between LCB (LeRoy Cowles Building) and JWB (John Widtsoe Building), and can be accessed by entering either building.
   Opening hours: Monday - Thursday 8AM - 8PM and Friday 8AM - 6PM.
   Website: http://www.math.utah.edu/ugrad/mathcenter.html

4. **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/.

5. **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, please feel free to share it with your classmates.

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.

Instructor communication expectations - I will try my 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 my replies within one day of sending during normal daytime hours, although I will often respond much sooner. It is imperative that you get started on the homework 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 questions posed past 7:00PM until the next day, so plan accordingly.

Grading   Grades for each student will be calculated using the following formula:

$$\text{WeBWorK Assignments (25\%) + Midterms (45\%) + Final (30\%)}$$

There will be no make-up homework assignments and exams. Students who miss an exam will receive a "0" on the missed exam.

WeBWork Assignments - Homework will be due more or less weekly and will utilise the WeBWorK environment. For specific due dates and times, please consult the course calendar. You must login to the WeBWorK environment by following the link given on the corresponding "Assignment" page in Canvas. There will be 11 homework assignments 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 demo 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 you get it right, great; if not, then there are several strategies for success. First, go through your 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, utilise the "emal instructor" button at the bottom of the WeBWorK problem page. Homework is a substantial part of your grade for the course (25%), it is to your benefit to do all your homework - partial credit is better than no credit.

Midterm Exams - 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 proctored. Exams can be taken in one of the University of Utah's exam proctoring centers (Marriott Library or Sandy). A student ID is required for entrance. 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 require 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). Out-of-area students can arrange to have exams administered by a proctor (see UOnline website for more information; acceptable proctors include other university testing centers and public libraries). Virtual Proctoring IS NOT ALLOWED in this course. Exam scheduling can be done in Canvas using the "Schedule Exams" tab.

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 added to everyone's score so that the exam average is 70. For example, if the average of the first midterm is 62, then everyone will have 8 points added to their exam scores, making 70 the new midterm average. **This only applies to the midterm exams and not the final exam**.

Final Exam - One 150-minute cumulative 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 - 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 on 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 discussion. **There will be no other extra credit opportunity**.

Letter Grades　Letter grades will be assigned from your percentage total grade X as follows:

$$88 \le X \le 100 \implies \text{A} \qquad\qquad 58 \le X < 67 \implies \text{C}$$
$$85 \le X < 88 \implies \text{A}- \qquad\qquad 55 \le X < 58 \implies \text{C}-$$
$$82 \le X < 85 \implies \text{B}+ \qquad\qquad 52 \le X < 55 \implies \text{D}+$$
$$73 \le X < 82 \implies \text{B} \qquad\qquad 43 \le X < 52 \implies \text{D}$$
$$70 \le X < 73 \implies \text{B}- \qquad\qquad 40 \le X < 43 \implies \text{D}-$$
$$67 \le X < 70 \implies \text{C}+ \qquad\qquad\quad X < 40 \implies \text{E}$$

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 be 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.

Important Dates　Last day to add without a permission code: Friday, August 23
Last day to add, drop, audit, elect CR/NC: Friday, August 23
Last day to withdraw from classes: Friday, October 18
Last day to reverse CR/NC option: Wednesday, November 27
Midterm 1: September 23 - September 28
Midterm 2: November 4 - November 9
Final exam: December 9 - December 13

All students are expected to arrange their personal schedule to allow them to take the exam. Students with university excused absences (band, debate, student government, intercollegiate athletics) should make alternate arrangements with me as soon as possible if the absence interferes with any course components.

Cheating　A first incidence of cheating will result in a score of 0 for the work. A second incidence of cheating may result in a score of 0 for the class. Particularly severe first incidences may count as second incidences and result in a grade of 0 for the class. I will not hesitate to report all such incidences to the appropriate authorities.

Keys to Success　To be successfull 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:

1. **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, pretand 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!

2. **Work Examples** - A math textbook is not a 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.

3. **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 skill on your WeBWorK assignments.

4. **Ignore your Calculator** - You should do your WeBWorK assignments without a calculator except for the few problems that do expect numerical answers. For example, suppose you find that an answer to a problem is $\sqrt{5}+\sin(\pi/4)$. You could get out your calculator and find that this equals 2.94317..., then input 2.9432 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) + sin(pi/4)". This is better for three reasons. First, 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. Finally, calculators will not be allowed on exams, so it is in your best interest not to become too dependent on it.

5. **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.

6. **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.

| Other Information and Policies | **Email** - Students MUST use their UMail 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 UMail regularly because all official class announcements will be sent through this email (be sure to turn on your notifications in Canvas). Also, you should receive your WeBWorK login account information at this address at the beginning of the semester. |

Help with WeBWorK - 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 randomised. 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 - 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/.

Exam Time Limits - 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.

Details about Canvas - 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.

Veterans Center	If you are a student veteran, the University of Utah has a Veterans Support Center located in Room 161 in the Olpin Union Building. Hours: M-F 8-5PM. Please visit their website for more information about what support they offer, a list of ongoing events and links to outside resources: http://veteranscenter.utah.edu/. Please also let me know if you need any additional support in this class for any reason.
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 (CDA), located at 162 Olpin Union Building. To do so, contact CDA at 801-581-5020 (V/TDD) to set up an appointment. CDA 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 CDA.
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 honour 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 8-5PM.
Wellness Statement	Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at `https://www.wellness.utah.edu` or 801-581-7776.
Safety Statement	The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit `https://safeu.utah.edu/`.
Additional Policies	Due to experience, I have decided to make some additional policies regarding my classroom administration and grading.

1. There will be no retakes of exams, for any reason.

2. There will be no cursing nor negative ranting (for example, "math sucks") on any written work turned in. The penalty for such things on your written work will be a zero score on that assignment or test.

3. If there are any emergencies that prevents you from attending the exam or turning in homework, it is 100% your responsibility to notify me before any of these events. I will try my best to accomodate and help you in some manner, which I am truly happy to do; but the longer you wait to communicate me, the less I can and am willing to do to help. The best way to contact me is by email or in office hours. Please keep in mind that I do not check my email regularly during the weekend.

4. If you have questions about any exam or homework grade, or you want to appeal the grading, you must bring it to me within one week of the return of the exam or homework. I am happy to look over your appeal and/or questions and give my feedback to benefit your learning.

5. Please make sure you do your best throughout the semester, knowing the grading scheme and what's expected of you, and come talk to me if you need further study strategies. I will be happy to brainstrom ideas to help you maximise your study strategies and improve your mathematical understanding. However, I will NOT offer any additional extra credit at the end of the semester or any other way for you to improve your grade at that time. No exceptions. Please respect this and do not ask for special favours or extra credit when you realise you do not like your grade. Most likely, I just will not respond to such emails or questions in person. Your need to get into a certain program, or needing a specific grade for your work or scholarship or not wanting to upset whomever is paying for your college are all your own personal dilemmas that are truly independent from how I assign grades. The only way to "better your grade" at the end of the semester is to retrieve your final exam, compare it to the solutions, and see if you have any grading appeals. If you do have grading appeals on the final exam, please turn it in to me. I an happy to look over those and possibly give points back, if it is warranted. Other than that, I consider it disrespectful of me and my time for you to ask for a higher grade than you earned, or for some possible way to increase your grade, at that point.

Disclaimer	This syllabus is not a binding legal contract. I reserve the right to make changes as I see fit at any time, but all adjustments will be announced on Canvas.

Course Schedule, Fall 2019

All WeBWorK due dates are Friday 11PM. Homework answers
and the next assignment will be posted soon after due date time.

Week	Section	Topic
Week 1		WeBWorK demo assignment due August 23
		Learn how to log in, navigate environment.
Week 2	1.1	Introduction to Limits
	1.3	Limit Theorems
		WeBWorK 1 due August 30
Week 3	1.4	Limits Involving Trigonometric Functions
	1.5	Limits at Infinity; Infinite Limits
	1.6	Continuity of Functions
		WeBWorK 2 due September 6
Week 4	2.1	Two Problems with One Theme
	2.2	The Derivative
	2.3	Rules for Finding Derivatives
		WeBWorK 3 due September 13
Week 5	2.4	Rules for Finding Derivatives
	2.5	The Chain Rule
	2.6	Higher-Order Derivatives
		WeBWorK 4 due September 20
Week 6		**Midterm 1 (September 23 - 28)**
		Register for a time using UOnline
Week 7	2.7	Implicit Differentiation
	2.8	Related Rates
	2.9	Differentials and Approximations
		WeBWorK 5 due October 4
Week 8		**FALL BREAK**
Week 9	3.1	Maxima and Minima
	3.2	Monotonicity and Concavity
	3.3	Local Extrema and Extrema on Open Intervals
	3.4	Practical Problems
		WeBWorK 6 due October 18

Week	Section	Topic
Week 10	3.5	Graphing Functions Using Calculus
	3.6	The Mean Value Theorem for Derivatives
	3.7	Solving Equations Numerically
	3.8	Antiderivatives
		WeBWorK 7 due October 25
Week 11	3.9	Introduction to Differential Equations
	4.1	Introduction to Area
	4.2	The Definite Integral
		WeBWorK 8 due November 1
Week 12		**Midterm 2 (November 4 - 9)** ***Register for a time using UOnline***
Week 13	4.3	The First Fundamental Theorem of Calculus
	4.4	The Second Fundamental Theorem of Calculus and the Method of Substitution
	4.5	The Mean Value Theorem for Integrals and the Use of Symmetry
	4.6	Numerical Integration
		WeBWorK 9 due November 15
Week 14	5.1	The Area of a Plane Region
	5.2	Volumes of Solids: Slabs, Disks, Washers
	5.3	Volumes of Solids of Revolutions: Shells
		WeBWorK 10 due November 22
Week 15	5.4	Length of a Plane Curve
	5.5	Work and Fluid Force
		Thanksgiving
Week 16	5.6	Moments and Center of Mass
		WeBWorK 11 due December 6
Week 17		**Final Exam (December 9 - 13)** ***Register for a time using UOnline***