

# Math 1220-090 Calculus II, Spring 2020

<b>Instructor</b>	Chee Han Tan (My first name is Chee Han)
<b>Contacts</b>	Office: JWB (John Widtsoe Building) 129, Department of Mathematics. Email: <a href="mailto:tan@math.utah.edu">tan@math.utah.edu</a> (Please include "Math 1220" in the subject line) In-Person Office Hours: Wednesday & Friday 12:30-1:30pm and by appointment. Online Office Hours: Thursday evenings 7-8pm. Office hours for exam weeks will be announced.
<b>Textbook</b>	<i>Calculus with Differential Equations</i> , by Varberg, Purcell, and Rigdon (9th edition). For information on purchasing the textbook, go to <a href="http://www.math.utah.edu/schedule/bookInfo/CalcBookInfo.pdf">http://www.math.utah.edu/schedule/bookInfo/CalcBookInfo.pdf</a> .
<b>Prerequisites</b>	"C" or better in (MATH 1210 OR MATH 1250 OR MATH 1270 OR MATH 1310 OR MATH 1311) OR AP Calculus AB score of at least 4 OR AP Calculus BC score of at least 3.  <i>Important note:</i> 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.
<b>Course Description</b>	Geometric applications of the integral, logarithmic, and exponential functions, techniques of integration, conic sections, improper integrals, numerical approximation techniques, infinite series and power series expansions, differential equations (continued).
<b>Expected Learning Outcome</b>	Upon successful completion of this course, a student should be able to: <ol style="list-style-type: none"><li>1. Compute derivatives and integrals for exponential, logarithmic, hyperbolic functions, and inverse trigonometric functions.</li><li>2. Integrate integrable functions using integration by parts, <math>u</math>-substitution, trigonometric substitutions, rationalising substitutions, partial fraction decomposition, and trigonometric identities. This includes knowing which techniques to apply to a given integral.</li><li>3. Use L'Hôpital's Rule to calculate indeterminate-type limits and also know what limits are the non-indeterminate forms and how to compute those limits.</li><li>4. Compute improper integrals.</li><li>5. Understand the difference between an infinite sequence and infinite series and determine if a sequence converges or diverges.</li><li>6. Determine whether or not an infinite series of numbers converges or diverges using a variety of tests.</li><li>7. Understand what it means for a Power Series to converge or diverge and be able to find the Taylor Series for a given function. Determine how closely a Taylor polynomial approximates a function using Taylor's Remainder Theorem.</li><li>8. Differentiate and integrate functions in polar coordinates.</li></ol>
<b>Overview</b>	Math 1220 Calculus II 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 <a href="https://utah.instructure.com/courses/601197">https://utah.instructure.com/courses/601197</a> . You 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 <b>be sure to check the UMail account regularly</b> . Alternatively, you can have Canvas notifications and announcements forwarded to an email address that you do check regularly.

There are short lectures posted each week on Canvas discussing the main points of the chapter. However, you 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 participate 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/1220/>.
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 your 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 7pm until the next day, so plan accordingly.

### Important Dates

Last day to add without a permission code: Friday, January 10  
Last day to add, drop (delete), audit, elect CR/NC: Friday, January 17  
Last day to withdraw from classes: Friday, March 6  
Last day to reverse CR/NC option: Friday, April 17  
**Midterm 1:** February 10 - February 15  
**Midterm 2:** March 23 - March 28  
**Final exam:** April 23 - April 29

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, inter-collegiate 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 incidence 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.

## Grading

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

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

**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 “Email 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 9am-5pm 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). 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 be 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 two 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 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 percentage. 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:

$88 \leq X \leq 100$	$\implies$	A	$58 \leq X < 67$	$\implies$	C
$85 \leq X < 88$	$\implies$	A-	$55 \leq X < 58$	$\implies$	C-
$82 \leq X < 85$	$\implies$	B+	$52 \leq X < 55$	$\implies$	D+
$73 \leq X < 82$	$\implies$	B	$43 \leq X < 52$	$\implies$	D
$70 \leq X < 73$	$\implies$	B-	$40 \leq X < 43$	$\implies$	D-
$67 \leq X < 70$	$\implies$	C+	$X < 40$	$\implies$	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.

## 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:

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, 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!
2. **Work Examples - Math is Not a Spectator Sport.** 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 are clearly 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 tests 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/1220/>.

**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 II 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. 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](mailto:bpeacock@sa.utah.edu) to schedule a time to drop by. The LGBT Resource Center hours are M-F 8am-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 course 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 brainstorm 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, Spring 2020

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 January 10 Learn how to log in, navigate environment.
Week 2	6.1	The Natural Logarithm Function
	6.2	Inverse Functions and Their Derivatives
	6.3	The Natural Exponential Function
	6.4	General Exponential and Logarithmic Functions
		WeBWorK 1 due January 17
Week 3	6.5	Exponential Growth and Decay
	6.8	The Inverse Trigonometric Functions and Their Derivatives
	6.9	The Hyperbolic Functions and Their Inverses
		WeBWorK 2 due January 24
Week 4	7.1	Basic Integration Rules
	7.2	Integration by Parts
	7.3	Some Trigonometric Integrals
		WeBWorK 3 due January 31
Week 5	7.4	Rationalising Substitutions
	7.5	Integration of Rational Functions Using Partial Fractions
	7.6	Strategies for Integration
		WeBWorK 4 due February 7
Week 6		<b>Midterm 1 (February 10 - 15)</b> <b>***Register for a time using Canvas***</b>
Week 7	8.1	Indeterminate Forms of Type 0/0
	8.2	Other Indeterminate Forms
	8.3	Improper Integrals: Infinite Limits of Integration
	8.4	Improper Integrals: Infinite Integrands
		WeBWorK 5 due February 21
Week 8	9.1	Infinite Sequences
	9.2	Infinite Series
		WeBWorK 6 due February 28



Week	Section	Topic
Week 9	9.3	Positive Series: The Integral Test
	9.4	Positive Series: Other Tests
	9.5	Alternating Series, Absolute Convergence, and Conditional Convergence WeBWorK 7 due March 6
Week 10		<b>SPRING BREAK</b>
Week 11	9.6	Power Series
	9.7	Operations on Power Series WeBWorK 8 due March 20
Week 12		<b>Midterm 2 (March 23 - 28)</b> <b>***Register for a time using Canvas***</b>
Week 13	9.8	Taylor and Maclaurin Series
	9.9	The Taylor Approximation to a Function WeBWorK 9 due April 3
Week 14	10.1	The Parabola
	10.2	Ellipses and Hyperbolas
	10.3	Translation and Rotation of Axes
	10.4	Parametric Representation of Curves in the Plane WeBWorK 10 due April 10
Week 15	10.5	The Polar Coordinate System
	10.6	Graphs of Polar Equations
	10.7	Calculus in Polar Coordinates WeBWorK 11 due April 17
Week 16/17		<b>Final Exam (April 23 - 29)</b> <b>***Register for a time using Canvas***</b>