

## MATH 1210-002 Calculus I, Summer 2018

**Class Meetings:** M-F from 12:00-1:30 in AEB 320

**Instructor:** Nathan Willis

**Email:** willis@math.utah.edu

**Office Hours:** Monday 1:30-2:30, Wednesday 10:30-11:30, Thursday 1:30-3:00, or by appointment in JWB 226.

**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/>

**Final Exam:** Thursday, August 2nd 2018, 10:00 AM-12:00 PM.

**Course Information:** Math 1210 Calculus I 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.

**Canvas:** Canvas will be used for posting course announcements, homework assignments, grades, files and any relevant supplementary material. You are also welcome to make use of the Canvas discussion board to discuss course problems or topics. You can access the Canvas page through CIS or by logging in at [utah.instructure.com](http://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.

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

- **Homework Assignments (25%)**- Roughly four textbook sections are due most Tuesdays and Fridays at the beginning of class. You will have at least a week to turn work each homework. If you click on a homework assignment in the Assignments tab in Canvas, you will see the list of assigned problems. You are encouraged to form study groups and work together on the homework, however you are expected to turn in your own work. That is, blatant copying of each others work will result in a 0. Three of the problems will be selected for grading by the grader, each graded out of 5 points. There will also be 5 points given for completion. You must present your work in a neat and organized manner and **STAPLE** your assignments; failure to comply with either of these will result in you not receiving the completion points for the assignment. Homework will only be accepted in class, no electronic copies. Homework that is not turned in to me by the time I leave the classroom on the day it is due, is considered late. **No late homework will be accepted**, therefore the two lowest homework scores will be dropped.
- **Quizzes (5%)**- Daily group quizzes will be given every day in class, with the exception of exam days and super quiz days. These will be short 1 problem quizzes, designed to be completed in 5 minutes. The groups will be randomly assigned by the instructor. **No make up quizzes will be given**, therefore the lowest 5 quizzes will be dropped.
- **Super Quizzes (15%, 5% each)**- The week before each exam there will be a super quiz, on which you will work alone. These are a mix between a quiz and an exam. They will be exam style questions. Super quizzes will generally be 2-3 questions, designed to be completed in 25 minutes. Dates of the super quizzes are Wednesday June 20th, Wednesday July 11th, and Friday July 27th. **No makeup super quizzes will be given** except in the case of a documented emergency.

- **Midterm Exams (30%, 15% each)**- Two 90-minute midterm exams will be given on select Fridays. You will have the whole class period to complete the exam. A review sheet will be posted a week prior to the midterm that will cover the same material. Dates of the midterm exams will be Friday June 29th and Friday July 20th. **No makeup exams will be given** except in the case of a documented emergency.
- **Final Exam (25%)**- A two-hour comprehensive exam will be given **Thursday, August 2nd 2018, 10:00 AM-12:00 PM**. As with the midterms, a review sheet will be posted a week prior. **No makeup exam will be given.**

**Final Course Grades:** Final course letter grades will be determined as follows: If  $X$  is your course percentage weighted according to the above, then  $\{X \geq 93\% \Rightarrow A, X \geq 90\% \Rightarrow A-, X \geq 87\% \Rightarrow B+, X \geq 83\% \Rightarrow B, X \geq 80\% \Rightarrow B-, X \geq 77\% \Rightarrow C+, X \geq 73\% \Rightarrow C, X \geq 70\% \Rightarrow C-, X \geq 67\% \Rightarrow D+, X \geq 63\% \Rightarrow D, X \geq 60\% \Rightarrow D-, X < 60\% \Rightarrow E\}$ . For example, at the end of the semester if your grade is an 89.97, then you will receive a B-. 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. No individual adjustments will be made to final grades.

#### Additional Resources

- **Tutoring Center & Computer Lab**- There is free tutoring in the T. Benny Rushing Mathematics Student Center (room 155, the lower level between JWB and LCB), as well as a computer lab. For more information see <http://www.math.utah.edu/undergrad/mathcenter.php>
- **Private Tutoring**- University Tutoring Services, 330 SSB. There is also a list of tutors at the math department office JWB 233.
- **Departmental Videos**- The math department has a full set of lecture videos which you are welcome to use to supplement our course material. These can be found at <http://www.math.utah.edu/lectures/>

**Calculators:** Calculators will not be allowed on exams. They may be used on homework, but you should still write out the details of your computation. It is in your best interest not to become too dependent on your calculator since they will not be allowed on exams.

**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.
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.

**Important Dates:**

|  |                     |
|--|---------------------|
| Classes begin                                  | Monday, June 11     |
| Last day to add without a permission code      | Monday, June 18     |
| Last day to drop (delete) classes              | Monday, June 18     |
| Last day to add, elect CR/NC, or audit classes | Monday, June 18     |
| Midterm 1                                      | Friday, June 29     |
| Independence Day                               | Wednesday, July 4   |
| Last day to withdraw from classes              | Saturday, July 7    |
| Last day to reverse CR/NC option               | Saturday, July 7    |
| Midterm 2                                      | Friday, July 20     |
| Pioneer Day                                    | Tuesday July 24     |
| Classes end                                    | Wednesday, August 1 |
| Final Exam                                     | Thursday, August 2  |

**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 (CDA), 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, veteran's 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 student's 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](mailto: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 (Subject to Change):

| Week | Dates     | Sections                     | Material  |
|------|-----------|------------------------------|---|
| 1    | 6/11-6/15 | 0.7, 1.1, 1.2, 1.3, 1.4, 1.5 | Syllabus and Introduction<br>Trigonometric functions review<br>Introduction to limits<br>Main Limit Theorem<br>Limits involving infinity<br>Limits of trigonometric functions   |
| 2    | 6/18-6/22 | 1.6, 2.1, 2.2, 2.3, 2.4      | Continuity<br>Tangent lines to curves<br>The derivative<br>Derivative rules<br>Derivatives of trigonometric functions<br><b>Last day to add, drop, elect CR/NC, or audit<br/>Super Quiz 1 on Wednesday</b>              |
| 3    | 6/25-6/29 | 2.5, 2.6, 2.7, 2.8           | Chain rule<br>Higher-order derivatives<br>Implicit differentiation<br>Related rates<br><b>Exam 1 on Friday</b>  |
| 4    | 7/2-7/6   | 2.9, 3.1, 3.2, 3.3, 3.4      | Differentials and approximations<br>Max and min of functions<br>Monotonicity and concavity of functions<br>Practical problems<br><b>Last day to withdraw or reverse CR/NC<br/>No class Wednesday (Independence Day)</b> |
| 5    | 7/9-7/13  | 3.5, 3.6, 3.7, 3.8, 3.9      | Graphing functions<br>Mean Value Theorem for Derivatives<br>Solving equations numerically<br>Antiderivatives<br>Brief introduction to differential equations<br><b>Super Quiz 2 on Wednesday</b>                        |
| 6    | 7/16-7/20 | 3.9, 4.1, 4.2, 4.3, 4.4      | The Definite Integral<br>First Fundamental Theorem of Calculus<br>Second Fundamental Theorem of Calculus<br>Method of substitution<br><b>Exam 2 on Friday</b>   |
| 7    | 7/23-7/27 | 4.5, 4.6, 5.1, 5.2           | Mean Value Theorem for Integrals<br>Use of symmetry for integration<br>Numerical integration<br>Area of a plane region<br>Volumes of solids<br><b>Super Quiz 3 on Friday<br/>No class Tuesday (Pioneer Day)</b>         |
| 8    | 7/30-8/1  | 5.3, 5.4, 5.5                | Volumes of solids<br>Arc length<br>Work and Fluid Force   |

**Final remarks about the course:**

- In a regular semester, per university policy "A University credit hour shall represent approximately three clock hours of the student's time a week for one semester" (<https://regulations.utah.edu/academics/6-100.php>). Therefore, in a regular semester since this is a 4 credit class you should plan to spend 12 hours a week on this course. However, since this a half semester course, you should plan to spend 24 hours a week on this course. We will meet for 7.5 hours a week, therefore you should plan to spend approximately 16 hours per week on this course outside of lecture times.
- There will be plenty of opportunities to discuss and work examples with your classmates during each lecture. Therefore, please refrain from side conversations during lecture as it is distracting both to me and to other students.
- I am always happy to answer any questions, therefore if you have any confusion **please ask questions**. If you are uncomfortable speaking during class you are encouraged to come ask questions during office hours or email me.