Engineering Calculus I - Math 1310  
Fall 2016 - Sect 9 (10/11)

Lectures: MTWF 7:30am-8:20am - LCB 215  
Labotary: H 7:30-8:20am - WBB 207 - Section 10  
H 12:55pm-13:45pm - WBB 207 - Section 11  
Instructor: Christel Hohenegger  
Office: LCB 333  
Phone: (801) 585-1637  
E-mail: choheneg@math.utah.edu  
Webpage: http://www.math.utah.edu/~choheneg  
TA: TBA - LCB Loft  
Course webpage: CANVAS on CIS (http://cis.utah.edu)  
Office Hours: TBD or by appointment


Updates: Topics covered and assignments will be posted on CANVAS. You are responsible for checking it periodically.

http://utah.instructure.com/courses/392763

Mathematics Tutoring Center: Free tutorial is available in room 155 of the T. Benny Rushing Mathematics Center (adjacent to the LCB and JWB). Hours are 8am-8pm Monday-Thursday and 8am-6pm on Friday. For more information consult the website.

http://www.math.utah.edu/ugrad/mathcenter.html

You might find the videos and problems from the website of the Khan Academy helpful.

https://www.khanacademy.org/

The math department has videos available online of the regular calculus classes from Intermediate Algebra to Calculus III.

http://www.math.utah.edu/lectures/

College of Engineering Tutoring Lab: Additional office hours held by the TAs for the engineering calculus sequence (MATH 1310, MATH 1311, MATH 1320, MATH 1321, MATH 3140) and MATH 2250 will be scheduled in WEB 1622. Hours are 8am-5pm Monday-Thursday. TAs hours will be posted once the schedule is determined.
Prerequisites: "C" or better in MATH 1050 AND MATH 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+, or Departmental Consent.


Description: The course will cover essential knowledge of Calculus used for engineering applications. The course is structured into four lecture hours per week, and one lab hour per week. The lecture class will incorporate instructor lectures, including content on the applications of calculus to Engineering, weekly short quizzes and random pop quizzes. Lab sections will comprise group problem solving sessions led by the teaching assistant, weekly homework discussion and students participation. Topics covered include functions and models; rates of change, limits and derivatives; related rates; derivatives and shapes of graphs; optimization; Newton’s method; definite integrals, anti-differentiation and Fundamental Theorem of Calculus; techniques of integration; numerical and symbolic integration with software; arc length, area and volumes via integration (Chapters 1-6.4).

The work you will complete in Math 1310 comprises weekly homework and quizzes, three super quizzes, two midterm exams, and a comprehensive final exam. Homework will be turned in and quizzes will be given every Friday except during exam days and holidays.

Learning Outcomes: Upon completion of this course, you should be able to:

- Understand how to transform functions into other functions through $x$- and $y$-translations and rescaling, re-parameterizations, and function composition.
- Know the properties of special classes of functions including logarithms, exponential functions, polynomials, and rational functions and know how to obtain function inverses when they exist.
- Master the concept of a limiting value of a function $f(x) = y$ when $x$ approaches a value $c$, know when limits exist, utilize limit laws, know how the property of continuity of a function at $c$ relates to its limiting value, know how asymptotic behavior can be described by limits, and how limiting values can be specified even when the function is not defined at $c$.
- Understand how to use limits to compute the derivative of a function that describes rate of change of a function.
- Utilize derivatives to model how two related quantities change with respect to each other, including motion of objects in terms of velocity and acceleration.
- Know the methods of differentiation for different classes of functions including exponential, logarithmic, trigonometric, inverse trigonometric, power functions, and compositions, sums, products, quotients of functions, as well as knowing the how to differentiate functions that are only implicitly defined by an equation.
- Utilize the derivative in applied contexts, including function approximation, and how the average slope of a function relates to the derivative through the mean value theorem.
• Obtain the derivative of one quantity by knowing the derivative of the other, if two quantities are related by an equation.
• Use linear approximations to perform numerical/algorithmic equation solving via Newton’s method.
• Utilize the derivative to find maximum, minimum, or otherwise "optimal" input values for equations important in science, business and engineering.
• Understand the definition of the integral of a function as the limiting value of an increasingly large average of function values.
• Relate the integral to the area under the function’s curve, know how to approximate the integral by a finite sum, and how to integrate over infinite-length domains.
• Master specific integration techniques, including substitution, integration by parts, and partial fractions.
• Understand the key concept underlying definite integration, that it computes the net accumulation of a quantity through summation of the change in the quantity amount per unit of time or space, over a specified interval of time or space.
• Read and understand problem descriptions, then be able to formulate equations modeling the problem usually by applying geometric or physical principles.
• Select the appropriate calculus operations to apply to a given problem, execute them accurately, and interpret the results using numerical and graphical computational aids.
• Gain experience with problem solving in groups, be able to communicate effectively about problem objectives and the use of solving methods with peers, and solve problems in a team fashion. You will also learn how to articulate questions effectively with both the instructor and TA, and be able to effectively communicate problem solutions.

Reading: You are expected to have read the corresponding section prior to each class. We will cover about three sections per week. Even if you spend as little as ten minutes on this, it will make the discussion in class much clearer, and overall you will save time.

Attendance to the lab is mandatory and will be recorded. You should attend all the lectures and attendance will be checked randomly. Quizzes, super quizzes and exams take place in lecture, while homework and lab worksheets are due in your respective lab section. Please attend the lab session you are registered for.

Technologies: Please refrain from using your phones, tablets and laptops to check your emails or your social media accounts, to chat with your friends, to play games, or to surf the web unless absolutely necessary. You are welcome to use technologies to take notes.

Lab: Every Thursday, a Teaching Assistant-directed lab section will be held. These lab sections, which have smaller class sizes, consist of working on lab worksheet-reports. The worksheet tend to cover longer, more in-depth problems than those found in homework and exams, and will sometimes require use of Maple or Matlab software to complete. The
TA will be there to help guide you through the problems and help with any computer challenges. Completion of worksheet-reports will require work outside of the lab hour. The group work will also help you prepare for the quizzes, and exams given the next day. Credit will be given for both lab attendance and completed worksheets. Lab worksheets will be turned in during the following lab. The lowest two worksheet scores will be dropped. Acceptance of late homework is at the discretion of the TA.

**Quizzes:** At the beginning of every Friday class (except when an exam or super quiz is scheduled), a short 1-2 problem quiz will be given, taking roughly 10 minutes. The quiz will cover relevant topics covered in the week’s lectures and in the lab section. The two lowest score will be dropped. No make-up quiz will be given.

**Super Quizzes:** Two weeks prior to each exam, a more extensive quiz will be given at the beginning of class, consisting of 2-3 problems and taking roughly 30 minutes to complete. The super quiz will cover material from the preceding weeks. None of the super quizzes can be dropped. Check with the up-to-date CANVAS schedule for the dates of the super quizzes. The tentative dates are **September 16 and October 28**.

**Homework:** Roughly three textbook sections are due on most Thursdays at the beginning of your lab section from lectures covering material through the preceding week. The lowest three homework scores will be dropped. Only hardcopy and stapled assignments will be accepted (no digital copies) and no late homework (past the first fifteen minutes of lab) will be accepted. If you click on a homework assignment on CANVAS, you will see a listing of problems. The grading will be based on completion of all listed problems and correctness of the graded (highlighted) problems. The assignments may be updated dynamically through the course, so be sure to check CANVAS regularly.

**Midterm exams:** There will be two in-class exams. No books, notes, formula sheets, calculators (scientific or not), computers, phones (smart or not) or electronic devices will be allowed. The tentative dates are: **September 30, November 11**. Always consult CANVAS to confirm those dates. None of the exams can be dropped. You can replace the score of your lowest exam by the score of the final exam (if better).

**Final Exam:** The final exam covers all the material presented during the semester. It will be held on **Thursday, December 15, 2016 8:00am-10:00am**.

**Review and practice:** A list of practice problems will be posted a week prior to the midterms and final exam with problems drawn from the same material. Review for the exams will occur both in an extra review session (TBD) and in the lab.

**Make-up and regrading:** Any conflict leading to missed exams or super quizzes are your responsibility and must be arranged ahead of time or within a week past the test. Failure to do so may result in a zero for the corresponding test. Regrading inquiries must be submitted in writing within a week of the test being returned.
**Students with Disabilities:** The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020. CDS will work with you and us to make arrangements for accommodations.

**Grading:** Grades are determined as a weighted average as follows

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Letter grades A/B/C/D are determined as follows 100/88/76/64. I reserve the right to modify these in special cases and to decide if a curve is needed.

**Honor Code:** You are expected to abide by the University of Utah Honor Code and to avoid any instances of academic misconduct, including but not limited to: (1) possessing, using, or exchanging improperly acquired written or oral information during an exam, (2) substitution of material that is wholly or substantially identical to that created or published by another individual(s), and (3) false claims of performance or work.

**Strategies for success:**

- Attend class and lab. Being engaged helps you learn.
- Plan to do homework daily.
- Missing quizzes and homework will affect your grade. Know when the super quizzes and exams are. Know how grades are computed before it is too late.
- Form study groups with other students. Working in groups helps students self-evaluate what they know and what they do not know.
- Cramming does not work. Instead study steadily during the semester. Focus on understanding the material rather than memorizing formulae.
- Read all the problems before you start working on any of them. Check your answers and make sure they are correct and well presented.
- Ask for help either during office hours, at the during center or from your classmates.

We want you to be successful, not only in this class, but in your entire undergraduate career and we are here to help you achieve this goal. Do not be shy to ask questions during and after lectures, to come by office hours or to email us with any concerns.
Important Dates:

Class begins ................................................. August 22
Labor Day holiday ........................................ September 5
Super quiz 1 .................................................. September 16
Exam 1 ......................................................... September 30
Fall break ...................................................... October 9-16
Super quiz 2 .................................................. October 28
Exam 2 ......................................................... November 11
Thanksgiving break ........................................ November 24-25
Class ends ....................................................... December 8
Reading day ................................................... December 9
Final exam ..................................................... December 15, 8-10am

Have a great semester!