

Math 1310-001: Engineering Calculus 1

Fall 2013

Instructor: Patrick Bardsley

Lectures: M,T,W,F 9:40-10:30AM WBB 207

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Lab instructor: Christopher Craft

Lab instructor e-mail: craft@math.utah.edu

Lab instructor office hours: M 10:30-11:30AM, T 12:00PM-1:00PM (located in WEB 1622)

Lab: Thursday- Section 002 - 9:40-10:30AM JWB 308
Section 003 - 8:35-9:25AM JWB 208

*****Announcements, assignments, files, and grades will be updated on Canvas (access through CIS)*****

Textbook: *Calculus: Concepts and Contexts* by James Stewart (ISBN-13: 978-0-495-56053-1)
(ISBN-10: 0-495-56053-7)

	Super Quiz 1	September 20, 2013
	Midterm Exam 1	October 4, 2013
Important Dates:	Super Quiz 2	November 1, 2013
	Midterm Exam 2	November 15, 2013
	Super Quiz 3	December 6, 2013
	Final Exam	December 18, 2013

Course description: This 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.

Calculus is a set of tools to analyze the behavior of functions, useful in modeling physical processes important in engineering applications. At the end of the course, students will understand the following: limiting behavior of functions, continuity, parametric curves, rates of change of functions, methods of function differentiation, inverse trigonometric and logarithm functions, approximation methods, related rates of change, maxima/minima of functions and system optimization, Newtons method, antidifferentiation, integration, the fundamental theorem of calculus and conservation principles, methods of integration, approximate integration, areas between curves. curve lengths, and volumes of solids. More information on specific learning outcomes of the course is found below.

The work you will complete in Math 1310 comprises weekly homework and quizzes, three super quizzes, two midterm exams, a comprehensive final exam, and lab participation. Homework will be turned in and quizzes will be given every Friday except during exam days and holidays. The three lowest homework scores will be dropped and the two lowest quiz scores will be dropped. Super quizzes and midterm exams will also be given on Fridays. Super quiz scores and exam scores will not be dropped under any circumstance. However, the comprehensive final exam score can replace one midterm score provided it is lower than the final exam. Finally, earning credit in the lab sections entails attendance points and participation points.

- **Homework:** (10%) Roughly three textbook sections are due every Friday at the end of class, based on lecture sections covering through the preceding Wednesday. In Canvas you will see listings of assigned

problems. The assignments will be updated dynamically through the course, so be sure to check Canvas often to see the specific problems due each week. About two problems per section will be randomly selected for grading. Three of a student's lowest homework scores will be dropped. *Only hardcopy assignments will be accepted in person - no digital copies - no late homework will be accepted.*

- **Quizzes (5%)** At the end of every Friday class, a short 1-2 problem quiz will be given, taking roughly 10 minutes to do. The quiz will cover relevant topics covered in the weeks lectures and in the lab section group work. Two of a student's lowest quiz scores will be dropped.
- **Super Quizzes (5%)** Two weeks prior to each exam, a more extensive quiz will be given on select Fridays, consisting of 3-5 problems and taking roughly 30 minutes to complete. The super quiz will cover material from the preceding weeks.
- **Midterm exams: (2×20%)** Two 55-minute midterm exams will be given on select Fridays. A practice exam will be posted a week prior to the midterm that will cover the same material. Review of the practice exam will occur both in lecture and in the lab section.
- **Final exam: (25%)** *Wednesday 12/18/2013, 8-10AM* A two-hour comprehensive exam will be given at the end of the semester. As with the midterms, a practice final will be posted a week prior.
- **Lab: (15%)** Every Thursday a TA-directed lab section will be held. Worksheets are given during these lab sections, designed to reinforce and extend material covered in lectures to help develop problem solving skills. Students will work in groups with guidance from the TA to solve “real world” application problems. Credit will be given for lab attendance and student participation.

Grading Policies: Grades are computed as a weighted average comprising 10% homework scores, 5% quiz scores, 5% super quiz scores, 15% for lab attendance and participation, 40% midterm exam scores, and 25% the final exam score. All students are required to take the final exam.

The grading scale will be as follows:

93-100	A	83-86	B	73-76	C	63-66	D
90-92	A-	80-82	B-	70-72	C-	60-62	D-
87-89	B+	77-79	C+	67-69	D+	<60	E

Engineering Tutoring Center: There will be tutoring available in the Warnock Engineering Building (WEB). Lab instructors from the various 1310 courses will be available to help with homework and lab worksheets. The lab instructor for this section will be holding office hours here and students are encouraged to use this valuable resource. Additional details for the Engineering Tutoring Center (including available hours) will be made available on Canvas.

Additional Tutoring: The Benny T. Rushing Math Center (located in the basement of LCB) offers free drop-in tutoring for students at the U. This is another great resource! The hours of operation are Monday-Thursday 8-8 and Friday 8-6. They can also give you information about private tutors.

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 Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

Week-by-week guide

- Week 1:** 1.3, 1.5, 1.6 – Functions, Compositions, Exponential Function, Logarithms, Inverse Functions
HW 1: 1.3: 4, 5, 26, 27, 31, 32, 35, 36, 37, 38, 53, 54, 57, 58
1.5: 1-4, 13-16, 17-18, 21-22, 31, 32
- Week 2:** 1.7-2.1, 2.2 – Parametric Curves, Velocity, Limits, Limit Laws
HW 2: 1.6: 7-12, 19-26, 29-30, 40-41, 51-52, 55-56 —
1.7: 3-6, 22
2.1: 1-4, 7-8
- Week 3:** 2.3-2.5 – Continuity, Derivatives, Rate of Change.
HW 3: 2.2: 3-4, 7-8, 12, 19-20, 21-22
2.3: 1-2, 11-16, 23-24, 29-30, 37-38, 46-47
2.4: 4, 7-10, 25-30, 33-34, 39-40, 51-52
- Week 4:** 2.5-2.7 – Relationship between a Function and its Derivative; Super quiz.
HW 4: 2.5: 3-4, 8-9, 12-13, 17-20, 27-28, 54-55
2.6: 5-8, 13-14, 15-20, 41-42, 45-46
- Week 5:** 2.8-3.2 – Derivatives of Polynomials and Exponential, Product and Quotient Rules.
HW 5: 2.7: 1-8, 12, 14-16, 35-38, 49-50
2.8: 1-6, 7, 10, 13-14, 15-16, 27-28, 29-30
3.1: 3-14, 15-26, 45-48, 61-62
- Week 6:** 3.3-3.5 – Derivatives of Trig Functions, Chain Rule, Implicit Differentiation; Midterm exam 1 covering material from weeks 1-5.
HW 6: 3.2: 3-28, 39-40, 45-46
3.3: 3, 4, 5, 7, 15, 16, 21, 22, 31, 39
3.4: 5, 6, 11, 13, 23, 37, 41, 42, 59, 60, 79
- Week 7:** 3.6-3.8 – Inverse Trig Functions, Log Functions, and their Derivatives, Applications.
HW 7: 3.5: 3, 4, 5, 11, 17, 18, 21, 23, 24
3.6: 1, 2, 3, 4, 10, 11, 17, 18, 19, 20, 31
3.7: 3, 4, 19, 33, 34, 37, 38, 39, 45
- Week 8:** 3.9-4.2 – Linear Approximation, Differentials, Related Rates, Max and Min Values.
HW 8: 3.8: 5, 6, 9, 13, 14, 17, 18, 19, 23
3.9: 2, 5, 6, 15, 16, 19, 23, 24, 27, 28
4.1: 5, 6, 11, 12, 17, 23, 26, 29, 35
- Week 9:** 4.3-4.5 – Derivatives and Shapes of Curves, Graphing, l'Hopitals Rule; Super Quiz.
HW 9: 4.2: 7, 8, 25, 31, 34, 43, 44, 46, 49, 55
4.3: 1, 2, 3, 4, 7, 9, 11, 21, 22, 27, 33, 34, 35, 41, 61
4.4: 1, 2, 3, 23, 24, 27, 29, 35
- Week 10:** 4.6-4.8 – Optimization, Newtons Method, Antiderivatives.
HW 10: 4.5: 1, 3, 5, 8, 9, 11, 27, 29, 35, 37, 38, 41, 43
4.6: 3, 4, 5, 7, 11, 13, 27, 45, 51, 56
4.7: 1, 2, 4, 5, 6, 13, 14, 15, 23
- Week 11:** 5.1-5.3 – Areas, Distances, The Definite Integral, Evaluating Definite Integrals; Midterm exam 2 covering week 6-10 material.
HW 11: 4.8: 1, 2, 3, 4, 9, 11, 13, 23, 29, 35, 39, 41, 50
5.1: 1, 2, 11, 12, 13
5.2: 7, 8, 9, 10, 11, 12

Week 12: 5.4-5.6 – Fundamental Theorem of Calculus, Substitution Rule, Integration by Parts.

HW 12: 5.3: 1-30 (evaluate the integral), 26, 39, 40, 43, 44, 49, 50

5.4: 5, 6, 7, 8, 19, 20, 30

5.5: 1-36 (evaluate the integral), 14, 44, 47, 53, 55, 63

Week 13: 5.7-5.9 – Integration Techniques, Approximate Integration.

HW 13: 5.6: 1-24 (evaluate the integral), 22, 26, 28, 35, 36, 44

5.7: 1-6 (evaluate the integral), 6, 19, 20, 21-28 (evaluate the integral), 28

5.8: 2, 3, 4, 6, 8, 12, 15, 16, 18

Week 14: 5.10, 6.1-6.2 – Improper Integrals, Areas Between Curves, Volumes; Super Quiz.

HW 14: 5.9: 1, 5, 6, 17, 18

5.10: 3, 5-34, 14, 43-48, 44

6.1: 1, 2, 3, 4, 5, 6, 7, 8, 9, 13, 15, 17, 23, 24

Week 15: 6.3-6.4 – Volumes of Shells, Arc Length, Review.

HW 15: 6.2: 1, 2, 3, 4, 5, 6, 9, 10, 14, 17, 31, 32, 33, 35, 46

6.3: 3, 4, 9, 10, 13, 14, 29, 30

6.4: 7, 8, 9, 20

Week 16: Finals week — comprehensive final exam, with greater emphasis on week 11-15 material.