

# Syllabus for Engineering Calculus – Math 1320-4 – Spring 2013

**Instructor:** Fernando Guevara Vasquez

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**Office hours:** (to be decided on first day of class) or by appointment. Please see the class website for the most up to date office hours.

**Class website:** check the Canvas website in CIS <https://cis.utah.edu/> or <https://utah.instructure.com/>

**Class schedule:**

**Lecture:** MTWF 9:40-10:30am, LCB 225

**Lab:** instructor is Bhargav Karamched (email: [Bhargav.Karamched@utah.edu](mailto:Bhargav.Karamched@utah.edu)).

Math 1310-5 (Thu 10:45am-11:35am in LCB 215)

Math 1310-6 (Thu 09:40am-10:30am in LCB 225)

**Final exam:** Wed May 1st 2013, 8:00 - 10:00 am, LCB 225

**Text book:** *Calculus: Concepts and Contexts*, by James Stewart (ISBN-13: 978-0-495-55742-5; ISBN-10: 0-495-55742-0)—price is about \$195. The textbook comes with an accompanying website with homework hints.

[http://www.stewartcalculus.com/media/9\\_home.php](http://www.stewartcalculus.com/media/9_home.php)

**Description:** The course will cover essential of 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 cover include integral expressions for moments and work; modeling with first order differential equations; infinite series and sequences; power series and Taylor series; vectors, dot and cross products, and the geometry of space; the calculus of vector functions and particle motion in space; differential calculus for functions of several variables, including partial and directional derivatives, and multi-variable optimization (Chapters 6-11).

The work you will complete in Math 1320 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.

- **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, however attendance will not be checked in lectures. Remember that homework, quizzes, super quizzes and exams happen during lectures on Fridays.
- **Homework:** (10%) Roughly three textbook sections are due every Friday from lectures covering through the preceding Wednesday. If you click on a homework assignment (in CANVAS), you will see listings of recommended problems; however, there will be about two highlighted problems per section that will be graded—**students only turn in the graded problems**. The problems are also available at the end of this syllabus. Three of a student's lowest homework scores will be dropped. **Homework is due in class. No late homework will be accepted.** You are **encouraged** to solve all the assigned problems as they are part of the quiz and exam material. To succeed in this class, you'll need to invest time in solving problems from very simple problems letting you practice just one specific technique to quite sophisticated questions. Feel free to do as many problems as necessary and to ask us for help. Solutions to odd problems are provided at the end of the textbook. Keep in mind that it is more useful to do a few involved exercises carefully and thoroughly than rushing through a large number of simple problems.
- **Quizzes:** (7.5%) 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 week's lectures and in the lab section group work. Two of a student's lowest quiz scores will be dropped. No make-up quiz will be given.
- **Super Quizzes:** (7.5%) 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. None of the super quizzes can be dropped. The tentative dates are **February 1, March 8, April 19**, check Canvas for the actual dates.

- **Midterm exams:** ( $2 \times 20\%$ ) Two 55-minute midterm exams will be given (tentative dates are **February 15 and March 29**, check Canvas for the actual dates). A practice exam will be posted a week prior to the midterm. Practice exams cover the same material as the actual exam and have a similar structure. Review of the practice exam will occur both in lecture and in the lab section. None of the midterm exams can be dropped. However the lowest midterm grade can be replaced by the final exam grade, if it helps you. No books, notes, formula sheets, calculators (scientific or not), computers, phones (smart or not) or electronic device will be allowed.
- **Final exam:** (25%) A two-hour comprehensive exam will be given. A practice final will be posted a week prior. Our final exam is on **May 1st at 8am** in the usual classroom. No books, notes, formula sheets, calculators (scientific or not), computers, phones (smart or not) or electronic device will be allowed.
- **Lab:** (10%) Every Thursday a teaching assistant-directed lab section will be held. These lab sections will have smaller class sizes allowing the TA to more closely monitor student learning. The Thursday directed group work will help the students prepare for the homework, quizzes, and exams given the subsequent Friday. Credit will be given for lab attendance and student presentations. Additionally, you will have until Tuesday following the lab session to turn in your completed lab worksheet for credit. These lab sections will be a helpful and supportive environment where everyone should feel able to present some of the time. Please attend the lab session you registered for.
- **Extra Lab:** The extra lab time is designed to provide an extra hour to work problems with the TA. After the first quiz, you will get the opportunity to sign up for this extra lab hour. An announcement will be sent on CANVAS on the sign-up and scheduling process. The extra lab hour is voluntary, but once you elect to attend it, it will count toward your attendance points and it becomes mandatory.
- **Pop-quizzes:** Unannounced and extra credit 10 min quizzes will be administered during lectures.
- **Letter grades:** If  $X$  is your percentage grade, then  $\{X \geq 93\% \Rightarrow A, X \geq 90\% \Rightarrow A-, X \geq 87\% \Rightarrow B+, X \geq 83\% \Rightarrow B, X \geq 80\% \Rightarrow B-, X \geq 77\% \Rightarrow C+, X \geq 73\% \Rightarrow C, X \geq 70\% \Rightarrow C-, X \geq 67\% \Rightarrow D+, X \geq 63\% \Rightarrow D, X \geq 60\% \Rightarrow D-, X < 60\% \Rightarrow E\}$ . Letter grade assignments can be changed at the discretion of the instructor.
- **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 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.
- **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.
- **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.
- **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>

### Some useful links

- The class website: <https://utah.instructure.com/courses/222101>
- This syllabus: [http://www.math.utah.edu/~fguevara/math1320s13\\_syllabus.pdf](http://www.math.utah.edu/~fguevara/math1320s13_syllabus.pdf)
- The textbook comes with an accompanying website with homework hints:  
[http://www.stewartcalculus.com/media/9\\_home.php](http://www.stewartcalculus.com/media/9_home.php)
- You might find the videos and problems from the website of the Khan Academy helpful  
<https://www.khanacademy.org/>

### Strategies for Success

- Attend class and lab. Being engaged everyday helps you learn, of course.
- Read the relevant text book sections *before* you attend class.
- Plan to do homework daily, this way when you come to class or lab, you can quickly address learning gaps in the homework.
- Know how grades are computed *before* its too late.
- Form study groups with other students. Working in groups helps students self-evaluate what they know and what they don't know better than students working by themselves.

## Week-by-week guide

**Week 1:** 6.2-6.4—Volumes, shells, cylinders, arc length

**HW 1:** 6.2: 1, 2, 3, 4, 5, 6, 9, 10, 14, 17, 31, 32, 33, 35, 46—4, 46 *graded*  
6.3: 3, 4, 9, 10, 13, 14, 29, 30—14, 30 *graded*

**Quiz 1:** 6.2-6.3

**Week 2:** 6.5-6.6—Average Values, Applications of Integration to Engineering;  
7.1—Modeling with Differential Equations

**HW 2:** 6.4: 7, 8, 9, 20—8, 20 *graded*  
6.5: 1-3, 7-8, 12—2, 8 *graded*  
6.6: 1-2, 5-6, 8, 29-30, 42-44, 49-50—2, 44 *graded*

**Quiz 2:** 6.4-6.6

**Week 3:** 7.2-7.4—Direction Fields, Differential Equations, Exponential Growth and Decay

**HW 3:** 7.1: 1-5, 7, 9, 10, 12—3, 10 *graded*  
7.2: 3-6, 9-14, 21, 22—14, 22 *graded*  
7.3: 1-6, 11-14, 19-22, 43-48—14, 46 *graded*

**Quiz 3:** 7.1-7.3

**Week 4:** 8.1-8.3—Sequences, Series, Convergence Tests for Series

**HW 4:** 7.4: 3, 4, 7-11, 13-16, 18, 19—10, 14 *graded*  
8.1: 2-6, 8, 11-14, 27-28, 31, 43-44, 47-48—28, 48 *graded*  
8.2: 9, 11-12, 15-16, 19-20, 23-24, 36, 44—16, 24, 44 *graded*

**Super Quiz 4:** 6.2-6.6, 7.1-7.4, 8.1-8.2

**Week 5:** 8.4-8.6—Sums, Power Series, Representing Functions with Power Series

**HW 5:** 8.3: 3-4, 6-7, 9-10, 25-28—10, 28 *graded*  
8.4: 1, 3-10, 13, 21-34, 35-36, 38-39—24, 32 *graded*  
8.5: 1-2, 3-24—4, 18 *graded*

**Quiz 5:** 8.3-8.5

**Week 6:** 8.7-8.8 Taylor and Maclaurin Series, Applications of Taylor Polynomials, Review.

**HW 6:** 8.6: 3-10, 11-12, 13-18, 23-26, 32, 38—18, 24 *graded*  
8.7: 5-8, 11-16, 21-28, 39, 40, 47-52, 59-62—16, 24 *graded*  
8.8: 11-14, 23-24, 27-28—16, 28 *graded*

**Midterm 1: Week 1 to 5.**

**Week 7:** 9.1-9.3 Three Dimensional Coordinates, Vectors, Dot Product

**HW 7:** 9.1: 3-4, 9-10, 38—10, 38 *graded*  
9.2: 5-8, 15-16, 22, 30—8, 22, 30 *graded*

**Quiz 7:** 9.1-9.2

**Week 8:** 9.4-9.5 Cross Product, Equations of Lines and Planes

**HW 8:** 9.3: 1-4, 11-12, 15-16, 21-22—16, 22 *graded*  
9.4: 1, 2-3, 4, 7-13, 19-20, 21-22, 23-24, 27-28, 31, 39—10, 24 *graded*

**Quiz 8:** 9.3-9.4

**Week 9:** 9.6-10.1 Functions and Surfaces, Vector Functions, Space Curves

**HW 9:** 9.5: 1, 2-5, 6-10, 11-12, 15-16, 17-20, 21-32, 37, 39-42, 45, 55-56—8, 28 *graded*  
9.6: 9-13, 16-24, 32-34—18, 24 *graded*  
9.7: 3-10, 15-18, 21-24—18, 22 *graded*

**Super Quiz 9:** 9.1-9.7

**Week 10:** 10.2-10.4 Derivatives and Integrals of Vector Functions, Arc Length, Curvature

**HW 10:** 10.1: 1-4, 5-8, 15-18, 36-40 — 8, 36 *graded*

10.2: 1-2, 5-6, 13-14, 17-18, 19-20, 33-34, 51-52 — 14, 20, 52 *graded*

10.3: 1-2, 15-18, 21-22, 30 — 16, 18 *graded*

**Quiz 10:** 10.1-10.3

**Week 11:** 10.4, 10.5 Velocity, Acceleration, Parametric Surfaces, Review.

**Hw 11:** 10.4: 3-8, 9-12, 13-14, 21-22, 33-36 — 10, 34 *graded*

10.5: 1-2, 3-6, 19-26 — 2, 24 *graded*

**Midterm 2: Week 6-10.**

**Week 12:** 11.1-11.3 Functions of Several Variables, Limits, Partial Derivatives

**HW 12:** 11.1: 9-18, 19-22, 35-40, 41-44 — 10, 18 *graded*

11.2: 5-16, 27-30, 33-36 — 14, 28 *graded*

**Quiz 12:** 11.1-11.2

**Week 13:** 11.4-11.5 Tangent Planes, Linear Approximation, Chain Rule

**HW 13:** 11.3: 3-4, 10, 15-32, 45-46, 57-58, 69-72 — 32, 72 (*a, c only*) *graded*

11.4: 3-4, 17-18, 22, 29-32 — 4, 22, 32 *graded*

**Quiz 13:** 11.3-11.4

**Week 14:** 11.6-11.7 Directional Derivative, Gradient Vector, Maximum and Minimum Values

**HW 14:** 11.5: 1-4, 7-8, 13-14, 34 — 8, 34 *graded*

11.6: 1-2, 4-6, 7-10, 11-17, 21-24, 28-32, 39-44, 47-48 — 24, 40 *graded*

**Super Quiz 14:** 11.1-11.6

**Week 15:** 11.8 Lagrange Multipliers, Review

**HW 15:** 11.7: 1, 3-4, 5-16, 17, 27-32, 35-36, 39-40, 43, 44 — 10, 30 *graded*

11.8: 3-14, 25-26 — 10, 16 *graded*

**Final Exam: Wed May 1st: Comprehensive.**