

Science One: Mathematics

2014W Course Outline

Course content: Science One covers all material of a first year differential and integral calculus sequence (Math 100 and Math 101) with some additional topics. After finishing Science One, you can take any course with Math 100 or Math 101 as a prerequisite. You are also eligible to join the Honours program.

There are two main differences between Science One and the standard calculus sequence. The first is the emphasis in Science One on applications to other fields of sciences. For this reason we spend a considerable amount of time on differential equations, which are not usually covered in first year calculus. The second difference is in the use of rigorous definitions and proofs. Proof-type problems are especially common in the written homework assignments.

Instructors:

- Costanza Piccolo,
 - Office: MATH 229D
 - Office hours:
 - Email: costanza@math.ubc.ca

- Kalle Karu,
 - Office: MATH 213
 - Office hours:
 - Email: karu@math.ubc.ca

Textbook: *Calculus: Early Transcendentals* by Stewart is the required textbook.

Web site: www.math.ubc.ca/~karu/sci1. Check this site for homework assignments and other material.

Homework. There will be regular homework assignments. The assignments are of two type: written and online. Written assignments will be posted on the course website. Online assignments use WebWork. (Please look at the course website on how to get started with WebWork. You will need your CWL password to login to the WebWork site).

You are welcome to work together on the homework assignments. However, you have to write up your own solutions.

To do well in the course, it is not enough to complete the homeworks only. You must also work on extra problems from the textbook. We will post suggested problems. It is also a good idea to work through the textbook as the course progresses.

Exams. There will be one 80 minute midterm exam and one 150 minute final exam each term. The exact dates of the exams will be announced later.

Grades. Your final grade will be based on your performance on homework (20%), midterms (30%) and final exams (50%).

The average grades in Science One tend to be higher than in a regular calculus course. However, students also do much more work to achieve the higher grades. Expect to spend about 8 hours per week on mathematics in addition to lectures and workshops.

Academic integrity. UBC takes academic integrity very seriously. Please check the code of academic honesty and standards on UBC calendar.

Course outline. The following is an approximate week-by-week schedule:

Weeks	Dates	Textbook sections
1 - 3	Sept. 8 - 19	Limits, continuity, derivatives 2.2 - 2.8
5 - 6	Sept. 29 - Oct. 10	Techniques of differentiation 3.1 - 3.4 Differential equations 9.1 - 9.3
7	Oct. 14 - 17	Implicit differentiation 3.5
8	Oct. 20 - 24	Logarithmic and exponential functions 3.6 - 3.8
9 - 10	Oct. 27 - Nov. 7	Curve sketching 4.1 - 4.3, 4.5
11 - 12	Nov. 10 - Nov 21	Optimization and related rates 3.9, 4.7
13	Nov. 24 - 28	System of differential equations.
1 - 2	Jan. 5 - 16	Definite integral, Fundamental Theorem of Calculus 5.1 - 5.5
3 - 4	Jan. 19 - 30	Techniques of integration 7.1 - 7.4, 7.8
5 - 6	Feb. 2 - 13	Applications: area, volume, work, average value 6.1 - 6.4
7 - 8	Feb. 23 - Mar. 6	Separable differential equations 9.1 - 9.3, 9.5
9 - 12	Mar. 9 - Apr. 2	Sequences and series 11.1 - 11.10
13	Apr. 7 - 10	Review.