

# MATH 101 – Integral Calculus with Applications to Physical Sciences and Engineering

## Term 1, 2014

### General Information

**Instructor:** Anna Barry

**Course Dates:** MWF 14:00-15:00, September 2-November 28

**Exam Period:** December 2-17, exact date TBD

**Lecture Location:** Hennings 202

**Course Text (required):** *Calculus: Early Transcendentals* by James Stewart; (7th Edition)

**Course Webpage:** <http://www.math.ubc.ca/~annab/teaching.html>

**Instructor Office:** MATH 229A

**Office Hours:** W 15:00-16:00, F 10:00-11:00 or by appointment

**Instructor Email:** [annab@math.ubc.ca](mailto:annab@math.ubc.ca)

### Course Description

This is a course in integral calculus and sequences and series, with applications and examples drawn primarily from physical sciences and engineering. This course is equivalent in technical content to Math 103 and 105 and serves as a prerequisite for many second year math courses.

### Grading Scheme

Your grade will be based on the final exam (50%), two midterms (20% each), and WeBWorK homework assignments (10%). Additional homework will be suggested (and doing it is strongly recommended) but will not be collected.

### Homework

- WeBWorK Homework will be assigned every week and will be due the following week. You will need your CWL login and password to access your homework set. WebWork will automatically close at a previously announced time specified by the instructor, so it is important to finalize and submit your work by that deadline. It will not be possible to obtain extensions on WebWork assignments.
- In addition to WeBWorK homework, a list of suggested practice problems will appear on the course website each week. They will not be collected or graded. However, the best way to learn mathematics is to *do it yourself!* With this in mind, it is strongly recommended that you work through these problem sets. They are based on the syllabus for this course, and therefore omit problems that may be in the text but are unrelated to the course material. They also accurately reflect in terms of content and level of difficulty the problems you will encounter in midterms and the final.

### Lecture Attendance

If you must miss a class, it is your responsibility to learn the material and get the notes from another student. I will not repeat lectures during my office hours.

### Exams

- Two midterm exams will be held during normal lecture time. The dates and material you will be expected to know will be announced in class and posted on the course webpage.

- The final exam will be held during the exam period December 2-17 and covers the entire syllabus for the course. The specific date will be announced sometime in October by the university. Please do not make travel plans for any time during this period.
- **What to bring to exams:** **Do** bring your UBC ID and writing utensils. **Do not** bring anything else- this includes note sheets, calculators, cell phones, and any other electronic devices.
- **Missing a midterm:**
  - If a student misses a midterm, that student shall provide a documented excuse otherwise a mark of zero will be entered for that midterm.
  - Examples of valid excuses are an illness which has been documented by a physician and Student Health Services, or an absence to play a varsity sport (your coach will provide you with a letter).
  - A physician's note must specifically state that the student was medically unfit to write the missed exam on the date of the exam. Absence of this exact information will result in a mark of 0.
  - Your instructor should be notified within 48 hours of such an absence and appropriate documentation should be produced within 7 days. Failure to comply with these time limits will result in a mark of zero.
  - Otherwise there will be no make-up midterms, and the weight of the missed midterm will be transferred to the final examination.
  - Finally - Please note that a student may NOT have 100% of their assessment based on the final examination. A student who has not completed a substantial portion of the term work normally shall not be admitted to the final examination.
- **Missing the final:**
  - You will need to present your situation to your faculty's Advising Office to be considered for a deferred exam.
  - Your performance in a course up to the exam is taken into consideration in granting a deferred exam status (for instance, failing badly normally means you will not be granted a deferred exam).
  - For deferred exams in mathematics, students generally sit the next available exam for the course they are taking, which could be several months after the original exam was scheduled.

## Academic Conduct

- UBC takes cheating very seriously. Students found guilty of cheating on tests and examinations are usually given a final grade of 0 in the course and suspended from UBC for one year. More information can be found on the academic calendar.
- Academic misconduct includes misrepresenting a medical excuse or other personal situation for the purposes of postponing an examination or quiz or otherwise obtaining an academic concession.

## Resources for Students

There are a number of ways to get help outside of class. Students can

- Come to my **office hours**!
- **Piazza** is an online forum where you are encouraged to post questions and answers. A link to the course forum is on the course webpage.
- The **Math Learning Centre (MLC)** is a drop-in tutorial centre for undergraduates. The schedule and more information can be found at <http://www.math.ubc.ca/Ugrad/ugradTutorials.shtml>

## Course Outline

This outline is meant to give you a rough idea of the timeline of the course and may change as the term progresses.

- **Week 1** Areas and Distances (5.1) and the Definite Integral (5.2).
- **Week 2** The Fundamental Theorem of Calculus (5.3). Indefinite integrals and the Net Change Theorem (5.4). The Substitution Rule (5.5).
- **Week 3** Areas between curves (6.1). Volumes (6.2).
- **Week 4** Work (6.4). Average Value of a Function (6.5). Integration by Parts (7.1).
- **Week 5** Trigonometric Integrals (7.2). Trigonometric substitutions (7.3). Integration of rational functions by partial fractions (7.4).
- **Week 6** Strategy for integration (7.5). Approximate integration (7.7). Improper integrals (7.8).
- **Week 7** Applications to Physics and Engineering (8.3). Separable equations (9.3).
- **Week 8** Sequences (11.1). Series (11.2).
- **Week 9** The integral test (11.3). Comparison tests (11.4).
- **Week 10** Alternating series (11.5). Absolute convergence and the ratio test (11.6).
- **Week 11** Power series (11.8). Representations of functions as power series (11.9).
- **Week 12** Taylor and Maclaurin series (11.10).