Math 121: Honours Integral Calculus
Spring Term, 2012

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Course Website	http://www.math.ubc.ca/~lior/teaching/1112/121_W12/
Contact me at	MAT 229B — 604-827-3031 – lior@math.ubc.ca
My Website	http://www.math.ubc.ca/~lior/
Class	MTWF 14:00-15:00, MATH 104
Office Hours	M 15:00-16:00, F 10:00-11:00.
Required Textbook	Adams and Essex, *Calculus, Single Variable* (7th edition)
Course Prerequisites	One of: (a) score$\geq$ 68% in MATH 120 or (b) score$\geq$ 80% in Math 100, MATH 102, MATH 104, MATH 180, or MATH 184 or (c) score 5 in AP Calculus AB or (d) permission of the Undergraduate Chair.

About the course

We will discuss basic topics in mathematical analysis, primarily focusing on integration of functions of one variable. The list of topics is essentially the same as that of 101, but there will be an emphasis on solving conceptual problems and more discussion of foundations. The choice of material will follow the textbook, but the presentation may not; a rough course plan is as follows:

- The Definite Integral (2 weeks)

- Techniques of Integration (2 weeks)

- Applications of Integration (3 weeks)

- Parametric curves and polar curves (1 week)

- Infinite Sequences and Series (4 weeks)

Teaching and learning

Learning goals

- Computational skills: by the end of the course, you will be expected to set up and compute definite and indefinite integrals, and use these techniques to compute lengths, areas, volumes and other quantities using the idea of "summation of infinitesimal pieces".

- Foundational skills: by the end fo the course, you will be expected to state conceptual problems, recognize correct solutions, and find solutions on your own.

What you can expect from me

- Demanding homework and examinations.

- Various approaches to the material including lecturing, classroom discussion and in-class assignments.

- Responses to your questions and concerns: continuously in class and during my office hours, within reasonable time by e-mail outside class.

- Timely and clear explanations of what is correct in your work and what is not, and how you can improve.

What's expected from you

- Come prepared to class, having read the relevant material in the textbook. Information will be posted on the course website.

- Actively participate in the course: do the reading, think about the material, solve the problem sets, and ask questions.

  - Asking questions when you don't understand, or want to learn more, ensures that you get what you want out of the course. Ask me questions in class, by email, and during office hours. Also, ask your colleagues questions outside of class – you will both benefit from the discussion!

  - Working on the problem sets is *absolutely essential* for learning the material. **It is extremely rare for students who skip problem sets to do well on exams.**

  - I may call on you in class.

- Submit written work that is readable and communicates your ideas.

  - Reasoning needs to be conveyed in English sentences, not as a sequence of formulas.

Official Policies

General policies

- For every week after the first, there will be assigned reading (usually from the textbook). The discussions in class and the on-line homework will assume that you have read these chapters beforehand.

- **Late or missed exams and assignments will not be accepted for credit and will be given a grade of zero**. In exceptional circumstances (a proof of the emergency is required, and advance notification if possible will be required) the missed work will be registered (and not count toward the average of that part of the course) if you finish it and hand it in after the emergency has passed.

- All assertions require **proof** unless the problem states otherwise. No matter the operative word ("find", "solve", "establish", "calculate", "determine" ...), you must justify your answer.

- Written work should be presented carefully, in complete English sentences, and with sufficient detail. A "correct sequence of formulas" will only merit partial credit. Examples of the expectations will be distributed together with the first problem set.

Homework

- There will be up to twelve problem sets posted to the course website, due at the *beginning* of class on the day shown. I will drop the lowest score when calculating the homework grade.

  - Problems will focus on conceptual material.
  - You are encouraged to work on solving the problems together. However, each of you must write your solutions independently, in your own words. You may (and should) share your ideas but you may not share your written work.
  - It is possible that only certain problems from a problem set will be selected for grading. Complete solutions will be posted in any case.
  - Solutions will be posted on the secure (VISTA) website.

- There will be up to twelve exercise sets, to be completed online using the WebWork system by the deadline shown.

  - The problems will focus on technique.
  - Solutions may not be posted.

Exams

- There will be a midterm exam in class on Wednesday, Feb. 8th.

  - If you need special accommodations when taking written exams, please contact the Office of Access & Diversity (`access.diversity@ubc.ca`).
  - If the midterm (or final) exam conflicts with a religious observance, please contact me *at least two weeks ahead of time* so we can make appropriate arrangements..

- There will be a final exam during the usual exam period.

Final grade

- The final grade will be calculated as follows:

Problem sets: 20%
Exercise sets: 10%
Midterm: 20%
Final exam: 50%

- Roughly half the final exam will be shared with the non-honours course, MATH 101. Grades in MATH 121 will then be scaled in proportion to the ratio of the performance of MATH 121 and 101 students on the shared portion of the exam.

References

[Adams]   Adams and Essex: *Calculus, Single Variable*, 7th edition. Pearson Canada.

[Knopp]   Knopp, *Infinite Sequences and Series*

The material of the course is standard, and covered by many textbooks.