

# Teaching Portfolio

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## CONTENTS

1. Teaching statement and philosophy	2
2. Teaching experience	3
3. Evidence of teaching effectiveness	8
4. Professional development	9
5. Teaching materials	9

## 1. TEACHING STATEMENT AND PHILOSOPHY

I am profoundly committed to a career of effective teaching and fostering scholarly activity. I am an organized, flexible and open-minded educator. I do believe that one of my greatest strengths as a teacher is my willingness to learn from my students.

I am conscientious, motivated, and hard-working; I am also very sensitive to my students' needs. I am an individual who combines expertise in mathematics with a strong commitment to enhancing the quality of mathematics education. Furthermore, my mathematical maturity, strong verbal and written communication skills and commitment to academic excellence have all strongly influenced my decision to become a teacher.

I believe that my effectiveness as a teacher is due in large part to my excitement about curricula, and my ability to convey this enthusiasm to students. I have also brought my excitement about mathematics to a wider mathematical community in several ways: I have given talks at seminars and organized problem sessions, pitched at faculty, and students across a wide range of levels, from elementary school to graduate school.

Those of us who are faced with the duty of imparting mathematics to others share an awesome responsibility. My teaching strategy has been to deliver clear and concise ideas, mainly with the average student in mind. I do, however, keep my eyes open for those students who feel the need for challenging problems, and I see to it that such problems are always available. This has the advantage of cultivating an air of mathematical sophistication and it provides inspiration for further study and collaboration, so crucial to the discovery process in mathematics.

I am also willing to try new teaching strategies to better meet the needs of students. In particular, I am gradually incorporating more cooperative learning activities into the classroom to provide a greater and more timely interaction with students.

I am fiercely committed to enhancing the quality of mathematics education at the post-secondary level by understanding the challenges of mathematics for students with varying backgrounds, levels of knowledge and learning abilities; having a talent for tutoring one-on-one; and incorporating useful pedagogical strategies to promote a more active learning environment in the classroom.

In my mind, the one test for successful mathematics instruction is a student's feeling of pride, enjoyment and sense of mastery of a mathematical idea!

## 2. TEACHING EXPERIENCE

- 10/2007 – 4/2008: Sessional Instructional Assistant, Department of Computer and Mathematical Sciences; Teaching and Learning Services, University of Toronto at Scarborough

Provided on-line homework/exam help for first-year students enrolled in all calculus/linear algebra courses, via the Blackboard Academic Suite. Posted problems and solutions for, and proofreading submissions to, 'Problems of the Week', a contest I organized which was geared towards exceptional undergraduate students in mathematics. Organized and ran the first-year reading group designed for students enrolled in the introductory analysis course (MAT A37).

Courses: MAT A23, A30, A32, A35, A36, A37

- **Summer 2004:** Lecturer in Mathematics, Dawson College, Montréal

Full responsibility for course: preparing and delivering lectures and tutorials; setting midterm and final examinations; invigilation; grading; contact through office hours and email; maintaining course website (posting lecture notes, exams and their solutions).

Course: Calculus I (NYA)

Syllabus: review of algebra and functions; limits, continuity, differentiation; applications to curve sketching, related rates and optimization; the intermediate value theorem, mean value theorem; Newton's method; the definite integral; areas and volumes; techniques of integration; exponential and logarithmic functions; linear differential equations.

Text: Larson et al., *Calculus of a single variable*, 7e

- Winter 2005: Tutor, McGill University Tutorial Services

Private instruction in calculus I-III, undergraduate algebra and analysis.

- 2/2005 – 3/2008: Mathematics Tutor, [tutor.com](http://tutor.com)

Conducted one-on-one mathematics tutoring sessions online (using a chat applet and whiteboard), ranging from elementary to undergraduate levels.

- 7/2005 – present: OTA, [brainmass.com](http://brainmass.com)

Duties and expectations include prompt response to homework-help postings and commitment to submissions to the solution library for almost all undergraduate and beginning graduate-level courses in pure mathematics.

- Summer 2003: Teaching Assistant, McGill University

Course: Calculus II (MATH 141)

Syllabus: the Riemann integral, fundamental theorems of calculus, techniques of integration and applications to the evaluation of surface area, volume and arc length; calculus in polar coordinates; sequences and series, tests for convergence.

Duties: conducting bi-weekly three-hour recitations, administering and marking quizzes; office hours.

Text: Stewart, *Single-variable calculus*

- Winter 2003: Teaching Assistant, McGill University

Course: Complex variables and transform methods (MATH 381)

Syllabus: analytic functions, Cauchy-Riemann equations, simple mappings, Cauchy's theorem, Cauchy's integral formula, Taylor and Laurent expansions, residue calculus. Fourier and Laplace transforms, the complex inversion integral, relation between the Fourier and Laplace transforms, application of transform techniques to the solution of differential equations. The Z-transform and applications to difference equations.

Duties: conducting weekly two-hour recitations, marking class tests and final examination; office hours.

Text: Wunsch, *Complex variables with applications*

- Fall 2002: Teaching Assistant, McGill University

Course: Calculus I (MATH 140)

Syllabus: Review of elementary functions and graphs, limits, continuity, definition of the derivative, differentiation of elementary functions, higher derivatives, antidifferentiation; applications to physics and economics.

Duties: conducting weekly one-hour tutorials, administering and marking quizzes; office hours.

Text: Stewart, *Single-variable calculus*

- 2001-2002: Teaching Assistant, University of Toronto at Scarborough

Courses: Calculus (MATA26, A25), in seven sections

Duties: conducting weekly one-hour tutorials, administering and marking quizzes, proctoring and marking midterm and final examinations; tutoring lab

Syllabus: Elementary and transcendental functions; a theoretical approach to: limits, continuity and differentiation; curve sketching; definition of the Riemann integral, fundamental theorems, techniques of integration, calculating (surface) areas and volumes; Taylor polynomials and error estimates; infinite sequences and series, tests for convergence; Taylor's theorem.

Text: Edwards and Penny, *Calculus with analytic geometry: early transcendentals*

During the summer term, I was given the opportunity to prepare weekly problem sets for the (accelerated) summer course, which constituted 20% of the final grade. Over the course of the year, I was invited to give lectures on curve sketching, techniques of integration, infinite series and tests for convergence. I took the liberty of posting review materials and other useful links for students on my website.

- Fall 2002: Teaching Assistant, University of Toronto at Scarborough

Course: Introduction to Mathematical Modeling (MAT A29).

Duties: conducting weekly one-hour tutorials, administering and marking quizzes, proctoring midterm and final examinations; tutoring lab

Syllabus: Elementary and transcendental functions, systems of linear equations, linear programming, limits, continuity, differentiation, curve sketching; the Riemann integral, techniques of integration, Taylor approximations, linear first- and second-order differential equations, numerical and approximation methods, modeling with differential equations in a variety of contexts (biological, ecological, medical), functions of several real variables and extrema, elementary regression models; discrete random variables and distributions.

Text: Neuhauser, *Calculus for biology and medicine*

- Fall/Winter 1999-2000 & 2000-2001: Teaching Assistant, University of Toronto

Course: Calculus (MAT135Y)

Duties: conducting weekly one-hour tutorials, administering and marking quizzes, proctoring and marking midterm examinations

Syllabus: Review of differential calculus with applications, integration and the fundamental theorems, techniques of integration, series and tests for convergence, introduction to linear differential equations.

Text: Stewart, *Single-variable calculus*

- Fall/Winter 2000-2001: Teaching Assistant, University of Toronto

Course: Calculus of Several Variables (MAT235Y).

Duties: Proctoring and grading midterm and final examinations; tutoring lab (in the Math Aid Center).

Text: Repka, *Calculus with analytic geometry*

- Winter 2001: Teaching Assistant, University of Toronto at Scarborough

Course: Techniques of the calculus of several variables II (MATH B42) [two sections].

Duties: conducting weekly one-hour tutorials, grading assignments, marking midterm examinations.

Syllabus: Line and surface integrals, the divergence theorem, Stokes' theorem; sequences and series, Fourier series; PDEs of mathematical physics, separation of variables, calculus of variations.

Text: Marsden and Tromba, *Vector calculus*

### 3. EVIDENCE OF TEACHING EFFECTIVENESS

I received positive feedback from the students in my recitations at Dawson and the University of Toronto and McGill University. Overall, the majority of students said that they agree that I am an effective teacher.

In the space reserved for personal comments, one student wrote: “Alex is an enthusiastic teacher. He always made himself available outside of class. Thanks for a good year!”

Another calculus student commented (private communication): “The class was of great assistance to me, and I couldn’t tell you how many fewer grades I might have received on the exam, had it not been for your thorough and rigorous review of the material!”

Some comments left by my students at [tutor.com](http://tutor.com) (communicated to me by my mentor):

- (1) My tutor made me feel incredibly confident in my work. Thank you so much. Excellent session. Tutor was fun to work with too!
- (2) The person I just had was an amazing teacher. I learned a lot.
- (3) This was an excellent session! Thank you for helping me out!
- (4) This teacher was the best so far!
- (5) Alex was definitely the best tutor that I have been given throughout all my sessions. Great job and a great helper!

Finally, a student’s feedback on a posting from [brainmass.com](http://brainmass.com) (on group theory):

- (1) I could not be happier! I’m studying for an advanced mathematics exam and Mr. Markos is just incredible at explaining the problems I could not understand before! He is very clear and explains things in a way that makes a super-hard subject seem easy.

Student evaluations should set out to provide a reliable, *honest* assessment of an instructor’s teaching effectiveness in order to identify those aspects of their teaching which have the greatest impact on his/her students’ learning. Feedback from my students is always appreciated and I look forward to their comments and suggestions for the improvement of the quality of my recitations.

#### 4. PROFESSIONAL DEVELOPMENT

I have taken advantage of a variety of classes, seminars and workshops to analyze and improve my approach to teaching. Participating in such activities has encouraged me to think seriously about my teaching, and how students learn in various settings.

- Teaching Large Mathematics Courses, University of Toronto, 2001  
Goals: Acquiring techniques for teaching large classes; sensitivity to possible problems; developing an ability to criticize ones own teaching and correct problems; identifying and dealing with various types of problems (administrative requirements, etc.). [not for credit]
- Teaching assistant training sessions, University of Toronto and McGill University (1999-2003)
- PHY1600: Effective communication for physicists, University of Toronto (Winter 2010)

#### 5. TEACHING MATERIALS

I have posted problems and solutions covering almost all the core aspects of undergraduate/graduate-level mathematics on my personal webpage. These are aimed at students who like to relish their mathematics; a kind of ‘tour de force’, spurring them to greater efforts to promote their problem-solving skills and allowing them to think seriously about their subject.

Ideally, students are expected to make a selective survey of the problems, take a do-it-yourself approach and arrive at their own solutions which they can check against those already provided.