MATH 110: DIFFERENTIAL CALCULUS
Course Outline

Course description: MATH 110 is a two-term course in differential calculus. It covers the same calculus content as one-term differential calculus courses, but with additional material designed to strengthen essential precalculus topics. There is also an increased emphasis on proofs and problem solving.

Instructors: The instructors are Christina Koch, Fok-Shuen Leung and Mark Willoughby. The head teaching assistant is Kelly Paton. The Instructor-In-Charge is Fok-Shuen Leung.

Textbook: The required textbook is *Calculus: Early Transcendentals* by David Guichard. This is an online textbook available for free under the Creative Commons license. Links are available on your instructor's webpage. You are encouraged to download a copy; you may also print it out if you wish. A portion of each problem set will be posted on WebWork, an online homework system that allows you to receive immediate feedback. You will need a CWL account and password to access WebWork.

Course website: Course information, including assignments and solutions, will be posted on your instructor's webpage.

Workshops: In addition to regular lectures, you are assigned to a weekly problem-solving workshop run by teaching assistants. These workshops are an integral part of the course, and attendance is mandatory. Your workshop grade, which is worth 15% of your final grade, will be based on your submitted work and attendance.

Problem sets, quizzes and assignments: There will be 18 homework assignments. Each assignment comprises a written portion and an online portion. The written portion must be handed in at the beginning of class on the due date. Note that the written portion is generally at a more advanced level than the online portion; it is not unusual to spend several days working on it. Late assignments will not be accepted. Assignments are worth 15% of your final grade.

To achieve success in this course, assigned work is necessary but not sufficient. You must work through extra problems. A large number of extra WebWork questions will be made available throughout the year. It is strongly recommended that you do them all. The expectation is that you will spend at least eight hours per week, not counting lectures and workshops, on this course.

Tests and exams: On September 21, there will be an in-class Skills Test similar to the the Mathematics Department's Basic Skills Test. This is worth 5% of your final grade. If you pass, you will be granted the full 5%. If you fail, you will receive 0% but be given the opportunity to make up the 5% by doing remedial work throughout the year. This work is crucial. The mastery of basic skills is the most accurate predictor of success in this course.

There will be two 90-minute midterm tests, on October 17 and February 13, at 6:00 p.m. Each is worth 10% of your final grade.

Finally, there will be two 150-minute exams, one at the end of each term. The first is worth 20% of your final grade; and the second, 25%. The dates of these exams are to be determined.

Calculators will not be permitted on tests and exams.

Summary: Your final grade will be calculated based on the September 21 Skills Test (5%), assignments (15%), workshops (15%), midterm tests (10% each) and exams (20% for the first exam, 25% for the second).

Topics: The table on the following page is an approximate weekly schedule of topics.

Academic integrity: Information on academic integrity may be found in the UBC Calendar. You are responsible for understanding and following the code of academic honesty and standards.

Week	Dates	Topic	Sections	Notes
1.1	September 5 - 7	Lines and distances	1.1, 1.2	No workshop
1.2	September 10 - 14	Functions	1.3	Assignment due Friday
1.3	September 17 - 21	Transformations and Compositions	1.4	Skills Test on Wednesday
1.4	September 24 - 28	Velocity	2.1	Assignment due Friday
1.5	October 1 - 5	Limits	2.3	Assignment due Friday
1.6	October 8 - 12	Derivatives	2.2, 2.4, 3.2	Thanksgiving (October 8) Assignment due Friday
1.7	October 15 - 19	Continuity	2.5	No workshop Midterm on Wednesday
1.8	October 22 - 26	The Power Rule	3.1	Assignment due Friday
1.9	October 29 - November 2	The Product and Quotient Rules	3.3, 3.4	Assignment due Friday
1.10	November 5 - 9	The Chain Rule	3.5	Assignment due Friday
1.11	November 12 - 16	Trigonometry	4.1 - 4.5	Assignment due Friday
1.12	November 19 - 23	Exponentials	4.6, 4.7	Assignment due Friday
1.13	November 26 - 30	Review		
				Exams and break
2.1	January 2 - 4	The Mean Value Theorem	6.5	No workshop
2.2	January 7 - 11	Extrema	5.1	Assignment due Friday
2.3	January 14 - 18	The First and Second Derivative Tests	5.2, 5.3	Assignment due Friday
2.4	January 21 - 25	Concavity	5.4	Assignment due Friday
2.5	January 28 - February 1	Asymptotes	4.10, 5.5	Assignment due Friday
2.6	February 4 - 8	Curve sketching	5.1 - 5.5	Assignment due Friday
2.7	February 11 - 15	Implicit differentiation	4.8	No workshop Midterm on Wednesday
				Reading Week
2.8	February 25 - March 1	Optimization I	6.1	No workshop
2.9	March 4 - 8	Optimization II	6.1	Assignment due Friday
2.10	March 11 - 15	Related rates I	6.2	Assignment due Friday
2.11	March 18 - March 22	Related rates II	6.2	Assignment due Friday
2.12	March 25 - 29	Approximations	6.4	Assignment due Friday
2.13	April 1 - 5	Review		
				Exams