

# MATH 110: DIFFERENTIAL CALCULUS

## 2013W Course Outline

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**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 Yuri Burda, Matthew Coles, Vanessa Radzimski and Thomas Wong. The head teaching assistant is Pamela Sargent. The Instructor-In-Charge is Fok-Shuen Leung.

**Resources:** The required textbook is *Contemporary Calculus* by Dale Hoffman. 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.

Homework assignments will be posted on your instructor's webpage. Each assignment will include a problem set on WeBWorK, an online homework system that allows you to receive immediate feedback. The link to your section's WeBWorK page is available on your instructor's webpage.

You are encouraged to post questions on Piazza, an online forum accessible to all students and instructors. The link to this course's Piazza page is available on your instructor's webpage.

**Assignments:** There will be 19 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. Homework assignments account for 15% of your final grade.

To achieve success in this course, assigned work is necessary but not sufficient. You must work through extra problems. *The expectation is that you will spend at least eight hours per week, not counting lectures and workshops, on this course.*

**Skills modules:** In addition to regular homework assignments, there will be three online "skills modules" in the first six weeks of the course. These are designed to review and improve your precalculus skills. The skills modules account for 5% of your final grade.

**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. Workshops account for 15% of your final grade.

**PASS:** Peer Assisted Study Sessions (PASS) are non-mandatory peer-led sessions designed to help improve study skills and mastery of course material. There are a number of specially trained PASS leaders assigned to MATH 110. More information on their sessions will be presented in class.

**Tests and exams:** There will be two 90-minute midterm tests, on October 16 and February 12, at 6:00 p.m. Each is worth 10% of your final grade.

Finally, there will be two 150-minute exams, one in December worth 20% of your final grade, and one in April worth 25% of your final grade. The dates of these exams are to be determined.

Calculators are not permitted on tests and exams.

**Grade summary:** Your final grade is based on assignments (15%), skills modules (5%), workshops (15%), midterm tests (10% each), the December exam (20%) and April exam (25%).

**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.

**Topics:** On the following page is an approximate schedule of topics. The section numbers refer to the textbook *Contemporary Calculus* by Dale Hoffman. Note that, in some cases, not every topic in a textbook section will be covered; and occasionally a topic will be introduced in class which is not covered in the textbook.

Week	Dates	Topic	Sections	Notes
1.1	Sept. 4 - 6	Lines and distances	0.2	No assignment No workshop
1.2	Sept. 9 - 13	Functions	0.3, 0.4	No assignment
1.3	Sept. 16 - 20	Velocity and the idea of limit	1.0	
1.4	Sept. 23 - 27	Evaluating limits	1.1, 1.2	
1.5	Sept. 30 - Oct. 4	Continuity	1.3	
1.6	Oct. 7 - 11	Velocity and the idea of derivative	2.0	
1.7	Oct. 14 - 18	The definition of derivative	2.1	No assignment No workshop No class Oct. 14 Midterm Oct. 16
1.8	Oct. 21 - 25	The Power, Product and Quotient Rules	2.2	
1.9	Oct. 28 - Nov. 1	Trigonometry	2.3	
1.10	Nov. 4 - 8	Exponentials	2.3	
1.11	Nov. 11 - 15	The Chain Rule	2.4	No class Nov. 11
1.12	Nov. 18 - 22	Implicit differentiation	2.9	
1.13	Nov. 25 - 29	Review	-	
				Exams and break
2.1	Jan. 6 - 10	Extrema	3.1	No assignment No workshop
2.2	Jan. 13 - 17	The Mean Value Theorem	3.2	
2.3	Jan. 20 - 24	The First and Second Derivative Tests	3.3	
2.4	Jan. 27 - 31	Concavity	3.4	
2.5	Feb. 3 - 7	Asymptotes	3.6, 3.7	
2.6	Feb. 10 - 14	Curve sketching	-	No assignment No workshop Midterm Feb. 12
				Reading Week
2.7	Feb. 24 - 28	Optimization I	3.5	No assignment No workshop
2.8	Mar. 3 - 7	Optimization II	3.5	
2.9	Mar. 10 - 14	Related rates I	2.6	
2.10	Mar. 17 - 21	Related rates II	2.6	
2.11	Mar. 24 - 28	Approximations I	2.8	
2.12	Mar. 31 - Apr. 4	Approximations II	-	
2.13	Apr. 7 - 8	Review	-	No assignment No workshop
				Exams