MATH 110 Differential Calculus

Course Information

MATH 110 covers the same topics as MATH 100 (Derivatives of elementary functions; Applications and modeling: graphing, optimization), but including relevant topics from algebra, geometry, functions, trigonometry, logarithms, and exponentials.

Prerequisite: BC Principles of Mathematics 12 or Pre-calculus 12 (or equivalent), plus permission of the Mathematics Department; permission will normally be based on a low grade in BC Principles of Mathematics 12 or Pre-calculus 12 (or equivalent) and a low score in the optional UBC Mathematics Basic Skills Test if taken.

MATH 110 is a year-long course, with three hours of lecture and a 1.5-hour workshop every week. There are weekly online assignments (common to all sections), and biweekly written assignments and quizzes (section specific).

There will be two midterm exams (in October and February) and two end-of-term examinations (in December and April). Both end-of-term examinations follow the UBC exam guidelines and policies. All exams are common to all sections of the course. The dates of the midterm exams are

- October midterm: October 24th, 6pm
- February midterm: February 27th, 6pm

Course website

Information about the course and other resources are available on the course website, link provided below. This is a website common to all sections, links to section-specific websites are listed on the Sections page.

http://www.math.ubc.ca/~costanza/math110.html

Textbook

The required textbook is *Contemporary Calculus* by Dale Hoffman. This is an online textbook available for free under the Creative Commons license. The link is available on the course website on the Resources page.

Workshops

MATH 110 includes weekly problem-solving workshops, where students have the opportunity to work in groups on challenging math problems. Each workshop focuses on calculus concepts and techniques discussed in lectures the previous week. Attendance to workshops is *mandatory*. More details are provided on the Workshop page on the course website.

Weekly schedule

Here is an approximate weekly schedule of the topics covered in each term. The section numbers refer to the course textbook. Extra notes may be used during the course. The schedule below is subject to changes.

Week	Topics	Sections	Notes
1.1	Introduction	0.2	No workshops
1.2	Lines on plane; Functions	0.2-0.4	No written homework
1.3	Tangent lines and velocity	1.0	Quiz
1.4	Evaluating limits	1.1,1.2	Written Homework
1.5	Continuity	1.3	Quiz
1.6	The definition of derivative	2.0, 2.1	
1.7	Differentiation rules – part I	2.2	Quiz
1.8	Exponentials	TBA	Midterm exam, no workshops, no written homework
1.9	Trigonometry	TBA	Quiz
1.10	Differentiation rules – Part II (The chain rule)	2.4	Written Homework
1.11	More on the chain rule	2.0	Quiz
1.12	Exponential growth and decay	TBA	Written Homework
1.13	The second derivative	TBA	Quiz
2.1	Implicit differentiation	2.9	No workshops
2.2	Related rates problems	2.6	Written Homework
2.3	More examples of related rates	2.6	Quiz
2.4	Extrema and the Mean Value Theorem	3.1, 3.2	Written Homework
2.5	The first derivative test	3.3	Quiz
2.6	Concavity	3.3	Homework
2.7	Asymptotic behaviour	3.3, 3.4	Quiz
2.8	Curve sketching	3.6, 3.7	Midterm exam, no workshops, no written homework
2.9	Applied Optimization	TBA	Quiz
2.10	More examples of Optimization	3.5	Written homework
2.11	Approximations	3.5	Quiz
2.12	More examples on Approximations	TBA	Written homework
2.13	Antiderivatives	TBA	Quiz

Grading scheme

Course component	% of final grade
Section specific	
Quizzes	4%
Written homework	4%
WeBWorK (online homework)	9%
Workshops	13%
October midterm	10%
February midterm	10%
December Exam	20%
April Exam	30%

Course Policies

1. **Final exams**: Both the December and the April exams are considered "final exams" and follow the UBC exam guidelines; in particular, students must write both exams in order to pass the course, exemptions are granted for special cases (exam hardships, health issues, extenuating circumstances, etc.) as per UBC exam policies. Note that travelling is not considered a valuable reason for requesting a deferred exam.
2. **No unauthorized electronic devices** will be allowed at the midterms or the final exams. This includes cell phones, smart phones, etc.
3. **No calculators** will be allowed during exams and quizzes.
4. **No notes, textbooks, formula sheets**, or other written material other that the one handed out by invigilators will be allowed during exams and quizzes.
5. **Missed quizzes:** There will be **no make-up quizzes** in this course; if a quiz is missed for a documented reason, it will be ignored. Documented reasons for missing a quiz are: (a) prior notice of a valid, documented absence (e.g. out-of-town varsity athletic commitment accompanied by a letter from a coach) on the scheduled date; or (b) notification to the instructor within 48 hours of absence due to medical condition or other extenuating circumstances. Original written documentation, for example a doctor's note, is required; otherwise, a score of 0 will be given for the missed quiz.
6. **Missed midterms:** Permission to write a make-up midterm exam will be granted only for scheduling conflicts with other courses or important out-of-school commitments (e.g. work). In these cases, a make-up exam will be scheduled in consultation with the instructor. If a midterm exam is missed for other documented reasons (see list above), no make-up exam will be offered, instead the weight of the exam will be moved to the end-of-term exam.
7. **Scaling**: The final mark distribution of the quizzes and written homework of each section may be scaled based on the April exam mark distribution of that section. This is to ensure fairness in assessment across sections.