Department of Mathematics
MATH 1500, Introductory Calculus I, January 2011
Course Outline

TEXT: James Stewart, Early Transcendentals Single Variable Calculus vol. 1, 6th Edition, Brooks/ Cole
or if you will be continuing to MATH 1700: James Stewart, Early Transcendentals Single Variable Calculus combined vol. 1 & 2 6th Edition, Brooks/ Cole; or if you will also be continuing to MATH 2720 or MATH 2730: James Stewart, Full Version Calculus, 6th Edition, Brooks/ Cole

Ch., Sec.	Title	Page Numbers	Suggested Homework (Odd Numbers)
1.1	Four Ways to Represent a Function	11 – 23	1, 5-11, 17-41, 45-53, 57-65
1.3	New Functions from Old Functions	37 – 45	31, 35, 39, 41, 45, 49, 55, 57
1.5	Exponential Functions	52 – 59	5, 7, 9, 11
2.2	Limit of a Function	88 – 99	1-9, 12, 13, 15, 21-29
2.3	Limit Laws	99 – 108	1-29, 35-47
2.5	Continuity	119 – 130	1-7, 11, 15-23, 31-49, 42
2.6	Limits at Infinity: Horizontal Asymptotes	130– 143	1-7, 11-33, 37-53
2.7	Derivatives & Rates of Change	143 – 153	1-19
2.8	The Derivative as a Function	154 – 165	1-9, 13-25, 45, 47
3.1	Derivatives of Polynomials & Exponential Functions	173 – 183	1-35, 45-57
3.2	Product & Quotient Rules	183 – 189	1-33, 41-45
3.3	Derivatives of Trigonometric Functions	189 – 197	1-23, 29, 33, 35-47
3.4	The Chain Rule	197 – 207	1-45, 51-57
3.5	Implicit Differentiation (omit inverse trig. functions)	207 – 215	1-27
3.9	Related Rates	241 – 247	1-25, 31

MID TERM EXAM (1 hour) = 30% March 3, 2011 at 5:30 p.m.

1.6	Inverse & Logarithmic Functions	59 – 72	1-13, 17-27, 31-43, 47-51
3.6	Derivatives of Logarithmic Functions	215 – 220	1-49, 48
4.1	Max. & Min. Values	271 – 280	1-25, 31-61, 45
4.2	Mean Value Theorem	280 – 286	11-15
4.3	How Derivatives Affect the Shape of a Graph	287 – 298	1-29, 33-53, 67
4.5	Curve Sketching (omit oblique asymptotes)	307 – 315	1-23, 31, 33, 43-49
4.7	Optimization Problems	322 – 334	1-19, 29, 31, 33
4.9	Antiderivatives	340 – 347	1-49, 61, 63, 69, 75
5.1	Areas and Distances	355 – 366	3, 5, 11
5.2	Definite Integral	366 – 379	1-7, 29-45
5.3	Fundamental Theorem of Calculus	379 – 390	1-11, 15-35, 39, 41, 49, 51

FINAL EXAM (2 hours) = 60%

Required Theorems:

2.8	*differentiable* $\Rightarrow$ *continuous*	3.3	$(\sin x)' = \cos x$
3.1	$(cf)' = cf'$	4.2	$f' = 0$ *on* $I \Rightarrow f$ constant on I
3.1	$(f+g)' = f'+g'$	4.3	$f' > 0$ on I $\Rightarrow$ f increasing on I
3.2	$(fg)' = f'g + fg'$	4.3	$f' < 0$ on I $\Rightarrow$ f decreasing on I

LIVING WITH MATHEMATICS – January 2011 - MATH 1500

Learning mathematics is a lot like building a house. A strong foundation is needed to produce a sturdy structure while a weak foundation will quickly expose any structural deficiencies. In much the same way you will require a good grounding in your high school mathematics if your study of Calculus 1500 is to be successful.

The last page of this handout gives information about an online diagnostic test that the Department has prepared. **You are urged to take this test.** Based on the results you will be advised whether or not you are prepared for Calculus. The resources available for any needed remedial work are also described.

You can't learn calculus by cramming at the end of term. It just isn't that kind of subject; it involves ideas and computational methods, which can't be learned without practice. By way of an analogy, how many athletes do you know of who do well in contests by training for only a few days in advance?

These notes attempt to provide some hints about how to get the most out of the teaching system used for this course (**lectures and tutorials**), and other useful information (**Help Centre, marks**). First, here are a couple of **regulations** about lectures and tutorials of which you should be aware.

- You must **take and also attend** one of the tutorials **associated with the lecture section in which you are registered**. Consult the Registration Guide for the times of these tutorials.
- There will be marks associated with your tutorial work (**this is explained later**). If you change tutorial sections, it is **your responsibility** to make sure that a correct record of any marks accumulated up to the time of the change is passed on to the instructor of your new tutorial section.

LECTURES: During lecture periods professors present the course material to you. Because of the relatively large numbers of students in a lecture section and the necessity of presenting a certain amount of new material each day, lectures may seem rather formal. Almost certainly they will be quite different from your previous classroom experience.

No teaching system can be effective without work: Do not expect to learn calculus simply by listening to lectures (or even taking notes). Here are a couple of ways to increase the effectiveness of the lecture system. (The first is particularly important, but both are useful).

1. **Review** the lecture material as soon as possible, preferably the same day. Use the text during this review, and understand the material as completely as you can. Do as many textbook problems as you can; mathematics is a problem solving discipline. You can't learn by watching other people solve problems - you have to solve them yourself. (See comments on tutorials as well).
2. **Refer to the course outline**, and try to read through the material before it is covered in lectures. When working ahead, it is not necessary to completely understand; if you have even a vague notion about what is going on in advance, the lectures will be easier to follow.

TUTORIALS: Each lecture section is divided into a number of tutorial sections. A tutorial section involves a smaller number of students, and is the place where you get a chance to see more examples worked and to work problems under the supervision of an instructor who knows the subject. There will also be short tests given regularly in the tutorials. As with the lectures, you can greatly increase the effectiveness of the tutorials by preparing for them: if you are aware of specific questions and difficulties before you go into the tutorial, you are more likely to get them solved.

TUTORIALS BEGIN Monday, January 10, 2011.

MARKS: Your final grade in this course will be determined by the marks you earn on a final exam, a midterm exam and a series of tutorial tests. The relative weightings of these components towards your final grade are as follows.

FINAL EXAMINATION	**= 60 PERCENT**
MIDTERM EXAMINATION	**= 30 PERCENT**
TUTORIAL TESTS	**= 10 PERCENT**

TEST AND EXAMS:

Midterm examination: The midterm examination will be held on **Thursday March 3, 2011 at 5:30 p.m.** It will be one hour long. Its location will be announced later. Deferments of this test will be granted only on medical or compassionate grounds.

Tutorial tests: There will be five tutorial tests, given approximately every second week in your tutorial periods. Precise dates of these will be announced in your lecture sections. Your tutorial grade will be calculated by discarding your worst test mark (including absences) and averaging the remainder. "Make up tests" for missed tests *are not* normally available.

Calculators: Calculators or other electronic or mechanical aids are not allowed at tests, at the midterm exam or at the final exam.

QUESTIONS: Don't be bothered by having questions, because everyone does. Some have less, some have more. In any case you can bet that if you have a question, someone else probably has the same one. Because of the relatively large number of students involved and the pace of the course material, general discussion in lecture periods must be limited. There is a little more time available for questions in tutorials, but even with this you may find that you can't get all your difficulties settled in the scheduled teaching periods. So here are some ways to get answers to questions.

1. **Study your textbook** (This may seem pretty obvious, but people don't always think of it).
2. **Talk** the problem out with **another student**. In this sort of exchange, both parties usually benefit. So, if someone asks you a question, don't brush them off because it might waste your time. If you can solve the problem, you may well learn in the process.
3. **Go** to the **Mathematics Help Centre**, located in Room 318 Machray Hall. Its purpose is precisely to provide a place where students can get answers to specific mathematical problems related to their course. The Help Centre will open on **Monday, January 10, 2011**, and the hours of operation will be posted on the door of Room 318.
4. **Go** to **your professor** or possibly your tutorial instructor. You'll find them quite willing to help.

ONE CAUTION: DON'T EXPECT ANYONE TO RE-TEACH LARGE CHUNKS OF THE COURSE. It is **your responsibility** to keep up with course material.

VOLUNTARY WITHDRAWAL DEADLINE: March 18, 2011

ACADEMIC DISHONESTY: The Department of Mathematics, the Faculty of Science and the University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations or assignments as serious offenses and may assess a variety of penalties depending on the nature of the offense.

Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personation. Students are advised to read section 7 (Academic Integrity) and section 4.2.8 (Examinations: Personations) in the "General Academic Regulations and Requirements" of the current Undergraduate Calendar. ***Note, in particular that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.***

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (*Student Discipline Bylaw*) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

The *Student Discipline Bylaw* is printed in its entirety in the Student Guide, and is also available on-line or through the Office of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web page.

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report incidents of academic dishonesty to the Head of the Department.