

University of Manitoba
Department of Mathematics, Faculty of Science
January–April 2017

Course Number and Title: MATH 1710 Applied Calculus 2

Number of Credit Hours: 3

Pre-requisites: MATH 1510

Class Times and Location: Tuesday and Thursday, 1:00-2:15 in HE 206

Tutorial Times and Location: **B05 Thursday** – 11:30-12:20 in Allen 330

B06 Thursday – 11:30-12:20 in Hellen Glass 370

B07 Thursday – 9:00-9:50 in Machray Hall 124

B08 Thursday – 9:00-9:50 in Biological Sci 301

Instructor information: D. Trim, Office MH 522, Telephone 474-8760,

Email- Donald.Trim@umanitoba.ca

Office hours: Posted on office door

I will endeavour to be in my office at these times, but unforeseen circumstances may sometimes prevent me from being there, and I apologize for this. If these hours do not fit your schedule, I am willing to discuss an alternative time for an appointment. If my door is open at any time outside official office hours, feel free to ask me any questions concerning the course. If the door is closed, I am either not in, or prefer not to be disturbed. When you have difficulty with a certain exercise, and you wish to discuss it with me, bring whatever attempts you have made to solve the problem. This makes it much easier for me to diagnose what is troubling you. It is my practice to read my email first thing each morning (and sometimes at other times during the day). I will endeavour to answer any inquiries within 24 hours.

Web Page: The web page for the course can be found at home.cc.umanitoba.ca/~dtrim/

Follow the links to this course.

Web Page for Old Tests and Exams: www.math.umanitoba.ca/courses

Past examinations are for practice only. There is no guarantee that your examinations in this course will be similar to examinations from previous years.

Calendar Description of Course:

Applications of integration to volumes, centres of mass, moments of inertia, work and fluid pressure; differentiation of trigonometric, inverse trigonometric, exponential and logarithm functions; techniques of integration; polar coordinates

A more Detailed Description of the Course

1. brief review of indefinite and definite integrals.
2. applications of integration including area, volumes of solids of revolution, arc length, work, fluid pressure, centres of mass, and moments of inertia
3. application of inverse trigonometric functions and their derivatives to related rate and applied extrema problems
4. techniques of integration including substitutions, integration by parts, trigonometric integrals, trigonometric substitutions, and partial fractions
5. parametric equations of curves, parametric differentiation, arc length of parametric curves; polar coordinates and curve sketching in polar coordinates, slopes and lengths of curves in polar coordinates
6. indeterminate forms and L'Hopital's rule (time permitting)

Goals: The course has five main goals:

1. explore the multitude of applications for integration
2. discuss inverse trigonometric functions and their derivatives
3. learn the various techniques for evaluating integrals

4. discuss the various aspects of representing curves parametrically and in polar coordinates
5. show how to use L'Hopital's rule to evaluate indeterminate forms

Instructional Objectives: At the completion of the course, the student is expected to be able to:

1. use definite integrals to evaluate area bounded by curves, volumes of solids of revolution, arc length, work, fluid pressure, centres of mass, and moments of inertia
2. apply inverse trigonometric functions and their derivatives to related rate and applied extrema problems
3. evaluate integrals using substitutions, integration by parts, trigonometric integrals, trigonometric substitutions, and partial fractions
4. sketch curves and find their slopes and lengths using parametric and polar representations
5. use L'Hopital's rule to evaluate indeterminate forms

Textbook and Notes: Calculus for Engineers (fourth edition) by Donald Trim, Prentice-Hall

Information about which sections are required material will be given in lectures.

Evaluation: There are two components contributing to the final grade in the course.

1. Two 50-minute tests each counting 25% of the final grade in the course. They will be conducted on February 15 and March 30. Material that you will be responsible for on the tests will be announced in class. There are no make-up tests if you miss one. If you miss a test and can provide an acceptable reason for doing so, accompanied by supporting evidence, marks will be redistributed between the other test and the final examination.

2. A two-hour final exam counting 50% scheduled by Student Records.

Notes, books, calculators or other computing devices are not allowed on the tests or the final exam.

Grading: Each of the grades below has a numerical mark attached to it. Achieving the mark guarantees at least the attached grade. For example, achieving a final mark of 70 in the course guarantees at least a B in the course.

A+(90), A(80), B+(75), B(70), C+(63), C(55), D(50), F(0)

Voluntary Withdrawal Date: Voluntary withdrawal date is **March 31, 2017.**

Academic Dishonesty:

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

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.

All students are advised to familiarize themselves with the Student Discipline Bylaw, which 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.

Tutorials:

Worksheets for tutorials are posted on the web page for the course on the Friday preceding the tutorial. You are expected to solve the worksheet problems before the tutorial. Teaching assistants will help you with difficulties you have with worksheet problems or any other problems related to the course.

This is what you can expect of me:

- make every effort to plan the course and each class so that learning will be maximized
- arrive five minutes early and begin class at precisely the appointed time
- conduct classes, and not give lectures. I will explain this under my expectations of you.
- be patient when you struggle with ideas (most of us struggle with new ideas in mathematics)
- be open to suggestions (they can often lead to improvements in a course)
- treat you as adult learners, with related respect
- provide you with plenty of office hours for consultations. See me during office hours as soon as you encounter difficulties. Do not delay.

This is what I expect of you:

- be punctual. The first few moments of a class are the most important. There is often a quick review of the main ideas from the last class and how they lead into the present class. General ideas and the “big picture” are often discussed in the first few moments. You are doing yourself a disservice by missing these discussions (as well as perhaps disturbing me and the rest of the class by being tardy).
- participate in class, which includes both speaking up and listening. Learning begins in class but most of it takes place when you study. Learning will begin here only if you contribute to the class; what you put into a class is directly related to what you get out. I will ask you many questions in the

course of a class and for many different reasons. Your learning is substantially enhanced if you offer an answer, or at least formulate one. Do not come to class for the sole purpose of taking notes; that does not contribute to your learning. In order to answer many of the questions that I will pose, it is necessary for you to be familiar with what has transpired in recent classes. Try to keep up.

- be courteous when others are speaking. Only one person should be speaking at any given time during class. If you repeatedly have conversations with your neighbour while others are discussing course material, I will ask you to leave the room.
- complete all requirements of the course.
- use college-level, mathematical writing, legible and with correct format. There are many worked out examples in the notes and solutions manual; these should guide you on how to write solutions to problems on tests.
- be honest. Test and examination submissions must be your own work.
- have the courage to ask questions in class if something is not clear. If you have a problem, it is quite possible that someone else has the same problem. I will attempt to clear the difficulty immediately. Should I not be able to do so, I may ask you to see me after class for further clarification.
- discuss difficulties that you are having with course material as quickly as possible. The longer you leave a difficulty unresolved, the more unbearable it becomes, and the further and further behind you become. I have plenty of office hours, or you can see me immediately before or after class to set up a special appointment.
- turn off cell phones when entering class.