

Western University
Course Outline Calculus 2503b
Winter 2021, Advanced Calculus II

Instructor: Greg Reid

Email: reid@uwo.ca

Course Web Site: <http://owl.uwo.ca>

Instructor's Office Hour: Private Zoom* (1 on 1 by appointment) Mon 2:40 - 3:40 pm

Note I will usually be available at the end of class, for chat by Zoom*. Note that Zoom* means Zoom, or e-alternatives.

It is your responsibility to regularly check the course web site daily for emails, grades, announcements, assignments, important dates etc. Note however that some announcements will be made only in class.

Always include CA2503 in the subject line of emails.

Lectures: MWF 1:30 - 2:20 pm via Zoom* in real time, i.e. synchronous. For course Zoom* links check OWL.

First lecture: Mon Jan 11. Lectures will be recorded and posted via links announced in OWL.

Required Text: Openstax Calculus, Vol 3. A free online version, downloadable pdf & many resources are available at:

<https://openstax.org/details/books/calculus-volume-3>

A main secondary source is: e-book (available for purchase for about \$20):

<https://www.maplesoft.com/products/studyguides/multivariatecalculus/index.aspx>

You will also require a license for **DigitalEd** software. A link for purchase for about \$30 should be supplied in the first week of classes by arrangement between UWO and **DigitalEd**.

Note that the textbook for this course has been changed this year. In previous years we used: *Multivariable Calculus* by James Stewart (8th edition, published by Cengage).

Official Description: Integral calculus of functions of several variables: multiple integrals; Leibnitz rule; arc length; surface area; Greens theorem; independence of path; simply connected and multiply connected domains; 3-dimensional theory and applications; divergence theorem; Stokes' theorem.

Prerequisites: minimum mark of 60% in Calculus 2502A.

Contents of course: Much of the material in the course circulates around generalizing differential and integral calculus into higher dimensions. Since we live in 3-dimensional space with an additional time dimension, this higher dimensional calculus is more natural, than its lower dimensional relatives and more central for the many applications of calculus.

We will cover most of the material from Chapter 5 (Multiple Integration) in the Text, starting with double integrals, surface area and triple integrals, then changes of variables, including integrals in cylindrical and spherical coordinates.

We also cover much of the material in Chapter 6 (Vector Calculus). Vector fields as flows (of air, of water, insects, magnetic force, etc) and their related vector integrals are fundamental in applications. Vector versions of the fundamental theorem of calculus are given in this Chapter.

Time permitting, we will occasionally introduce topics outside the Text to help to motivate further studies in the mathematics and applied mathematics.

Course level learning outcomes: By the end of this course, you will be able to

1. Execute accurately the computations of higher dimensional differential and integral calculus. This includes integrating real-valued and vector-valued functions of multiple variables in Cartesian, polar, cylindrical polar, spherical polar coordinates and general coordinates as needed.
2. Be able to build some elementary models involving higher dimensional calculus. Apply the integration techniques you encounter to solve problems in other branches of mathematics and the natural sciences.

3. At this second-year level, you should become more adept at extending Calculus to new situations, being able to define appropriate limits and derive results based on those definitions from an applied perspective. The beauty of Calculus – its big (rather very small) idea – is that it extends the simple linear math of the very small to the global nonlinear case.
4. There will be some more challenging problems labeled Applied or Theoretical on some Quizzes, Midterm, Final and some Problem Sets (you will have a choice).

Attention should be paid to material from lectures, text and web site, to gain a complete view of expectations for course. Our goal is to find an understandable path through the material. Some material will be omitted from the text and some material and methods when more efficient, will be given from outside the text. Over-reliance on one source is unwise. For example, some material will be covered in the lectures that is not in the text, and in particular in a manner sometimes different to the text. As a second-year student, you should also actively seek some information/ research sources outside the provided ones.

Computers: Where indicated the computer package Maple will be used via myvlab for some assigned problems (see <http://myvlab.uwo.ca> for the links for Windows 10 and Mac setup). It looks likely that Maple may grant individual licenses so you can install Maple on your own machines. I will keep you updated.

Evaluation:

Regular Assigned Problems (not graded): see owl in Lessons/AssignedProblems

20% – 3 quizzes (Q1, Q2, Q3) and 2 problem sets (PS1, PS2).

35% – Midterm: Sun Feb 28, 7 – 10 PM (tentative, to be finalized)

45% – Final Exam (time TBA)

Comments:

Graded problems sets (PS1, PS2) and quizzes (Q1, Q2, Q3) will all be equally weighted. A makeup is offered for the final exam and midterm and only with the appropriate documentation and approvals. For consideration of a prorated grade, notification of valid reasons, together with appropriate documentation, for missed quizzes, problem sets or midterm should be given at the time of the event, via the official UWO process below. If approval is granted based on the documentation, then the grade will be calculated as

- (1) final Gr = 65% final exam + 35% quiz & problem sets (in case of dropped mid)
- (2) final Gr = 55% final Ex + 45% midterm (in case of dropped quiz & problem sets)

Dates	Description
1: Jan 11 - 17	Mon Jan 11 first lecture
2: Jan 18 - 24	PS1 Due Sun Jan 25 at 11:59 PM. Tues Jan 19 last day to add a 2 nd term course.
3: Jan 25 - 31	Sun Jan 31: Deadline to apply for relief against a final grade in a first term course.
4: Feb 1 - 7	Q1 Wed Feb 3
5: Feb 8 - 14	PS2 Due Wed Feb 10 at 11:59 PM
Feb 15 - 21	Spring Reading Week

6: Feb 22 - 28	Midterm Sun Feb 28, 7 – 10 PM (to be finalized)
7: Mar 1 - 7	
8: Mar 8 - 14	Sun Mar 14 Last day to drop a course.
9: Mar 15 - 21	Q2 Mon Mar 15
10: Mar 22 - 28	Q3 Frid Mar 27
11: Mar 29 – Apr 4	Friday, April 2, 2021, Easter Friday (Holiday)
12: Apr 5 – 11	
13: Apr 12 – 18	Mon Apr 12 (last lecture), Tues Apr 13 (Study day), Wed Apr 14 – Apr 30 Final Exams

Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). The University of Western Ontario uses software for plagiarism checking. Students may be required to submit their written work and programs in electronic form for plagiarism checking.

1. Western Academic Policies and Statements

Absence from Course Commitments

[Policy on Academic Consideration for Student Absences](#)

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the term, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

Accommodation for Religious Holidays

The policy on Accommodation for Religious Holidays can be viewed [here](#).

Special Examinations

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found [here](#).

Academic Offenses

“Scholastic offences are taken seriously, and students are directed [here](#) to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education (AE) at 661-2111 x 82147 for any specific question regarding an accommodation or review [The policy on Accommodation for Students with Disabilities](#).

Correspondence Statement

The centrally administered **e-mail account** provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts [here](#).

2. BMSUE Academic Policies and Statements

Copyright and Audio/Video Recording Statement

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

Rounding of Marks Statement

Across Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark “bumping” will be denied.

Proctortrack and Zoom

Tests and examinations in this course will be conducted using the remote proctoring service, Proctortrack and Zoom. Note that Proctortrack and Zoom may not be simultaneously used for the same assessment.

By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. More information about these remote proctoring services are available at:

<https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf> <https://support.zoom.us/hc/en-us>

Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for these services. Information about the technical requirements are available at the following link and the zoom link above:

<https://www.proctortrack.com/tech-requirements/>

When Zoom is used for test/exam invigilation, you will be required to keep your camera on for the entire session, hold up your student card for identification purposes, and share your screen with the invigilator if asked to do so at any time during the exam. The exam session using Zoom will not be recorded. Please note that Zoom servers are located outside Canada. If you would prefer to use only your first name or a nickname to login to Zoom, please provide this information to the instructor in advance of the test or examination.

Use of Recordings

Some remote learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals under special circumstances. Please contact the instructor if you have any concerns related to session recordings.

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

3. Support Services

The following links provide information about support services at Western University.

[Academic Counselling \(Science and Basic Medical Sciences\)](#)

[Appeal Procedures](#)

[Registrarial Services](#)

[Student Development Services](#)

[Student Health Services](#)

4. Addendum to all Applied Mathematics Course Outlines

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

For multiple-choice tests and/or exams: Use may be made of software to check for unusual coincidences in answer patterns that may indicate cheating.

5. Accreditation (AU) Breakdown: Engineering Science = 100%