

**Western University**  
**Course Outline Calculus 2503b**  
**Winter 2020, Advanced Calculus II**

**Instructor:** Greg Reid

**Email:** reid@uwo.ca

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

**Office:** MC 281

**Tel:** 679-2111 Ext. 88793

**Instructor's Office Hour:** Mon 2:40 - 3:40 pm

Note I will usually be available at the end of class on Wednesdays and Fridays. Just approach me (individually or as a group) at the end of class, and we can meet at one of the tables near the class room in SSC.

*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:** Mon: 1:30 pm – 2:30 pm (SSC 2028)    Wed & Frid: 1:30 pm – 2:30 pm (SSC 2024)

**Required Text:** *Multivariable Calculus* by James Stewart (8th edition, published by Cengage). The corresponding Student Solutions Manual is recommended. You will also require a license for **DigitalEd** software. A link for purchase should be supplied in the first week of classes by arrangement between UWO and **DigitalEd**.

**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; three 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 actually live in 3 dimensional space with an additional time dimension, this higher dimensional calculus is in many ways more natural, and central for the many applications of calculus.

We will cover most of the material from Chapter 15 (Multiple Integrals) in the Text. Starting with double integrals, the surface area, triple integrals. Changes of variables, including integrals in cylindrical and spherical coordinates.

We also cover much of the material in Chapter 16 (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.

**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.

Attention should be paid to material from lectures, text and web site, to gain a complete view of expectations for course. Our goal is find an understandable path through the material. So 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 and calculators:** Only the Sharp EL510RTB calculator will be allowed on quizzes, midterm and final (available through Staples). The computer package Maple will be used via myvlab for some assigned problems (see <http://myvlab.uwo.ca> to get access).

**Evaluation:**

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

**20% – 2 quizzes (Q1 and Q2) and 3 problem sets (PS1, PS2, PS3).**

**35% – Midterm:** Sunday March 1, 7 - 9 pm (location TBA)

**45% – Final Exam (time/location TBA)**

**Comments:**

Graded problems sets (PS1, PS2, PS3) and quizzes (Q1, Q2) 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 process described below in [\*\*\*].

If approval is granted based on the documentation, then the grade will be calculated as:

final grade = 65% final exam + 35% quiz & problem sets (in case of dropped midterm)

final grade = 55% final exam + 45% midterm (in case of dropped quiz & problem sets)

## Schedule (tentative)

Week 1 .....  
Week 2 ..... PS1 Due Sun Jan 19 at 11:59 PM  
Week 3 .....  
Week 4 ..... Q1 Wed Jan 29  
Week 5 .....  
Week 6 ..... PS2 Due Sun Feb 16 at 11:59 PM  
Reading Week ..... Feb. 17 – Feb. 21  
Week 7 ..... Midterm Sun Mar 1  
Week 8 ..... Last day to drop course Sat Mar 7  
Week 9 ..... Q2 Mon Mar 9  
Week 10 ..... PS3 Due Sun Mar 22 at 11:59 PM  
Week 11 .....  
Week 12 ..... Classes End Frid April 3

## Currently-Required Language for Course Outlines

The following is a collection of course-outline excerpts currently (as of September 2019) required by the University and/or recommended by the Faculty of Science.

- 1. Responsibility for checking prerequisites:** Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may 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.
- 2. Statement on academic offences:** Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: UWO Academic Discipline site

3. **Use of plagiarism-checking software:** All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and <http://www.turnitin.com>
4. **Use of cheating-analysis software:** Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.
5. **Statement on services for students in emotional/mental health distress:** Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

[\*] **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 Student Accessibility Services (SAS) at 661-2147 if you have any questions regarding accommodations. Also see the link Registrarial Services.

[\*\*] **Acknowledgment of the Science Student Donation Fund:** This course is supported by the Science Student Donation Fund. If you are a BSc or BMSc student registered in the Faculty of Science or Schulich School of Medicine and Dentistry, you pay the Science Student Donation Fee. This fee contributes to the Science Student Donation Fund, which is administered by the Science Students Council (SSC). One or more grants from the Fund have allowed for the purchase of equipment integral to teaching this course. You may opt out of the Fee by the end of September of each academic year by completing the online form linked from the Faculty of Sciences Academic Counselling site. For further information on the process of awarding grants from the Fund or how these grants have benefitted undergraduate education in this course, consult the Chair of the Department or email the Science Students Council at [ssc@uwo.ca](mailto:ssc@uwo.ca).

[\*\*\*] If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your faculty Dean's Office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from your faculty Dean's Office immediately. For further information please see: [Link for Medical Appeals](#) Also see the [Link to policy on Accommodation Consideration for Student Absences](#)

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Records Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: [Online Form for Medical accommodation](#) .