MATH*2210 Advanced Calculus II

Winter 2020
Section(s): C01

Department of Mathematics & Statistics
Credit Weight: 0.50
Version 1.00 - January 03, 2020

---

1 Course Details

1.1 Calendar Description

This course continues the study of multiple integrals, introducing spherical and cylindrical polar coordinates. The course also covers vector and scalar fields, including the gradient, divergence, curl and directional derivative, and their physical interpretation, as well as line integrals and the theorems of Green and Stokes.

Pre-Requisites: MATH*2200

1.2 Course Description

This is the last course in the Calculus sequence. It is primarily concerned with multi-variable integration which is important, for example, in the modeling and analysis of spatial and spatio-temporal phenomena, and as basis for more advanced mathematical topics, such as partial differential equations, analysis, measure and integration theory. Time permitting, at the end of the semester some advanced applications of multi-variable calculus in science and engineering will be discussed in depth. The course directly builds on, and continues MATH*2200.

1.3 Timetable

TUE, THU -- 08:30AM - 09:50AM -- ANNU, Room 156

Timetable is subject to change. Please see WebAdvisor for the latest information.

1.4 Final Exam

TUE Apr 14, 2020, 02:30PM - 04:30PM (2020/04/14), Room TBA

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

---

2 Instructional Support

2.1 Instructional Support Team

Instructor: Hermann Eberl
Email: heberl@uoguelph.ca
Telephone: +1-519-824-4120 x52622
Office: MACN 508
Office Hours: TUE 15:45-16:45

For questions on course content and assignments, please visit our office hours. Email is a good tool for inquiries concerning course logistics, etc, but it is not an efficient vehicle to discuss mathematics. Also keep in mind that email is a means of asynchronous communication, and that immediate replies cannot be expected.

2.2 Teaching Assistants

Teaching Assistant: Lucy Tran
Email: ltran07@uoguelph.ca
Office Hours: t.b.a

---

3 Learning Resources

3.1 Recommended Resources

students are encouraged to take their own notes during lectures (Notes)

No lecture notes will be distributed. Weekly assignments will form an important part of the course that contain practice exercises and a more in depth treatment of some material. Assignments will be posted on course link. An important resource will be be solutions to the assignment, which also will be posted there.

3.2 Textbooks

Many textbooks cover the material of our course, but they differ in the way they present it. Here is a list of free online texts that students might find helpful:

Hartman et al, “APEX Calculus”, Version 4.0, sections 13.6, 13.7, and chapter 14, http://apexcalculus.com

Guichard et al, “Calculus: early transcendentals”, sections 15.5-15.7, chapters 16 https://www.whitman.edu/mathematics/calculus_online/

Strang, “Calculus”, sections 14.3-14.4, Chapter 15, https://ocw.mit.edu/resources/res-18-001-calculus-online-textbook-spring-2005/textbook/

Another recommended textbooks (although it is not free) is

Salas et al, Calculus: One and several variables, Wiley & Sons, 10^{th} ed

---

4 Learning Outcomes

This course is foundational for several higher level mathematics courses, and fundamental in establishing connections between mathematics and some of the physical and life sciences.

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Apply and use the principles of integral calculus of several variables to study a broad range of phenomena in science and engineering, and as a basis of further studies in advanced mathematics.
2. Precisely formulate and carry out mathematical arguments based on logical assessment.
3. Improve your skills in logical reasoning.

4.2 B.Sc. Honours Degree

Successfully completing this course will contribute to the following:

#	Outcome	Learning Outcome
1	Problem Solving & Critical Thinking	1
1.1	Critically evaluate ideas and arguments by gathering and integrating relevant information, assessing its credibility, and synthesizing evidence to formulate a position.	1
1.3	Accurately interpret and use numerical information to evaluate and formulate a position.	1
3	Professional and Ethical Behaviour	1
3.2	Collaborate effectively as part of a team by demonstrating mutual respect, leadership, and an ability to set goals and manage tasks and timelines.	1
4	Scientific Method	1
4.1	Apply scientific methods and processes by formulating questions, designing investigations and synthesizing data to draw conclusions and make scientifically-based decisions.	1
4.2	Generate and interpret scientific data using quantitative, qualitative and analytical methodologies and techniques.	1
5	Breadth & Depth of Understanding in a Particular Scientific Discipline	1
5.1	Apply the core concepts of math, physics, chemistry and biology to a chosen scientific discipline.	1

5 Teaching and Learning Activities

The course follows a traditional lecture model. Further important learning activities are weekly assignments, which accompany the lectures. Assignments can be submitted individually or in groups. They also are an important part of the assessment.

5.1 Lecture

Topics:

Topic 1: Triple Integrals

Topic 2: Line and Surface Integrals

Topic 3: Vector Calculus

Topic 4: Integral Theorems

Topic 5: Selected Applications (time permitting)

---

6 Assessments

6.1 Marking Schemes & Distributions

Assignments are due weekly (late assignments will not be accepted), solutions will be posted shortly thereafter. The best 9 assignments will be used to determine the assignment average, which will enter the final course grade at a weight of 60%. In case of group submissions, all group members will receive the same marks on an assignment.

The final exam (which will be individual work only) will account for 40% of the overall course grade.

6.2 Assessment Details

weekly assignments (best 9 out of 11 count) (60%)

Assignment 1	due Jan 16
Assignment 2	due Jan 23
Assignment 3	due Jan 30
Assignment 4	due Feb 6
Assignment 5	due Feb 13
Assignment 6	due Feb 27
Assignment 7	due Mar 5
Assignment 8	due Mar 12

Assignment 9	due Mar 19
Assignment 10	due Mar 26
Assignment 11	due Apr 2

Final Exam (40%)
Date: room TBA
April 14, 2020

---

7 University Statements

7.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

7.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions
https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml

7.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml

Associate Diploma Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml

7.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

7.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website
https://www.uoguelph.ca/sas

For Ridgetown students, information can be found on the Ridgetown SAS website
https://www.ridgetownc.com/services/accessibilityservices.cfm

7.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before

submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

7.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

7.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars
