

MATH*1210 Calculus II

Winter 2022



(Revision 3: January 19, 2022)

DISCLAIMER:

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email. This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

1 INSTRUCTIONAL SUPPORT

1.1 Instructor

Kimberly M. Levere, Ph.D.

Office: MacN 539, ext. 56908

Email: klevere@uoguelph.ca

Office hours: Upon the recommendation of the University of Guelph, all office hours will be delivered remotely via Zoom (listed below and on Courselink).

Mondays 3:00pm-4:30pm (Matt) (<https://zoom.us/j/99439478336>)

Tuesdays 9:30am-11:00am (Rocky) (<https://zoom.us/j/99439478336>)

Wednesdays 3:00pm-4:00pm (Kim) (<https://zoom.us/j/95181750387>)

Thursdays 2:30pm-3:30pm (Kim) (<https://zoom.us/j/95181750387>)

Due to large class size, office hours are held in a group setting. I have found this to be a very productive and supportive learning environment in the past. Should you require an individual, private appointment with me, please contact me by email to set up a meeting.

1.2 Teaching Assistants

Michael Dube
David Lyver
Matthew Kreitzer
Rocky Narang
Hema Hemraj

Michael Pupulin
Sarah Smook
Zackary Kanmacher
Keval Shah

LEARNING RESOURCES

1.1 Course Website

Course material, news, announcements, and grades will be regularly posted to the MATH*1210 Course site. You are responsible for keeping up-to-date on this site.

1.2 Required Resources

M. Demers and K. Levere, *MATH*1210 – Calculus II Course Manual-8th Edition*, available at the MacNaughton Book Store. This is the primary resource for the course and functions both as the textbook, and as a notebook that we will complete together in class as the course progresses. This is not available as a pdf, only as a hardcopy. Please be sure that you have the current version, the 8th edition, (only available in the MacNaughton bookstore) as a number of changes have been made to last year's manual. Remember that this resource is protected by copyright and is not to be sold or redistributed in any form.

1.3 Recommended Resources

Not applicable

1.4 Additional Resources

Past tests, supplementary questions, and other resources may be posted on the Course website as needed. Again, it is important that you check regularly to keep up-to-date.

Lecture Information: Completed lecture notes will be uploaded to the Course website at the end of every week. This is not a substitute for lecture attendance! I strongly recommend that you attend every class.

Lab Tutorial Information: A weekly lab session will give you the opportunity to tackle tougher problems or extra practice questions. I may also use this time to cover course material directly from the Course Manual. It is your responsibility to obtain completed notes from lab tutorials if you cannot attend as these will not be posted online unless otherwise specified.

Communication & Email Policy

Major announcements will be posted to the course website. **It is your responsibility to check the course website regularly.** As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its student.

2.6 Getting Help

My number one priority is to ensure that you are supported and have lots of opportunities to ask questions and get help! Here are some options for getting help in this course:

- Come office hours (either mine or a TAs). Don't ever hesitate to drop in, even if you think you are behind in your studying. Getting you caught up is **exactly** what those opportunities are there for!
- Post to the discussion board on Courselink. This is a great place to post your questions! I will check this often and respond as soon as I am able. I have even given you the option to post anonymously in case you are shy ☺ It is also a great way for you to help others if you see a question that someone else posts that you can help out with! This is one of the best ways to master a concept: by explaining it to someone else!
- Send me an email (klevere@uoguelph.ca). Since there are over 500 of you and only ONE of me, I would prefer to answer questions in a group forum (so that I can help more of you at once), but certainly for more personal queries, this is a great option. If you ask questions by email (or even in Courselink!), it would be extremely helpful for you to attach a picture of your work, so I can easily see where you might be stuck and be able to help you more quickly. I usually try to respond within a few hours. However, I get a lot of email from students and I need to make sure that I have the chance to help as many people as I can in the time I have! So be warned that if you send me many emails with various questions, it may take a day or two to get back to you.
- Talk to a TA in the Mathematics Learning Centre. This is a place where TAs are paid to work daily (Monday-Friday) helping students with their math or statistics courses. These

TAs can help to explain course content and work through practice questions from your textbook! Note that the learning center is virtual this semester and can be accessed via Courselink

- Monday, Wednesday 9:30am-3:30pm
- Tuesday, Thursday 10:00am-4:00pm
- Friday 9:30am-2:30pm

2 ASSESSMENT

2.1 Dates and Distribution

Assessment	Scheme #1	Scheme #2
Academic Misconduct Quiz	1%	1%
Warm up Test	5%	0%
Term Test 1	15%	15%
Term Test 2	20%	20%
Quizzes	20% (5% each)	20% (5% each)
Final Exam	39%	44%

****** You must pass at least one of Term Test 1, Term Test 2, or the Final Exam in order to be eligible to pass this course. Failure to do so will result in a final grade that is capped at 48%. Considerations may be made according to the policies listed in Section 3.2.

Your final grade will be calculated using the most favourable of the above grading schemes.

As the structure of delivery this semester is still not fully known, it is possible that the pandemic

Schedule of Dates

At the moment, the pandemic has forced us to deliver courses remotely until (at least) January 30th. Depending on public health regulations at that time, we may be forced to complete additional weeks remotely. This wasn't my original plan, obviously, so with great optimism I shall include the locations that were scheduled for your assessments in the table below. Should the pandemic force us to remain remote beyond January 30th, some of these assessments may need to be completed remotely. I will provide regular updates on Courselink as details become available regarding the location of each of the above assessments as the situation unfolds.

****Note that you must attend the scheduled lab that you are registered for on quiz days. I will only print enough quizzes for the students registered in a given time slot. Attending a lab section in which you are not registered is academic misconduct.**

Assessment	Date/Time	Content Coverage (subject to change)
Warm Up Test (0% or 5%)	Friday, January 21, 2022 6:00pm-7:30pm Remote, Crowdmark. Upload to Crowdmark by 8:00pm	Calculus I content: functions (exponentials, logarithms, trig, etc) limits, derivatives, basics of integration and chain rule in reverse/u-sub, etc.
***The Warm Up Test must be completed independently WITHOUT the use of any resources beyond a non-programmable scientific calculator. No websites, no peers, no notes of any kind. This should be treated as if you were writing in a proctored room. If you wouldn't have access to a particular resource in a proctored test, you shouldn't be using it when completing this test. This assessment is meant to help you figure out your level of preparedness for this course. Please do this honestly: it isn't worth much (in fact, if it doesn't go well, it doesn't even have to count!!!), but the knowledge you stand to gain from doing this assessment honestly will set you up for success and improvement throughout the course.		
Academic Misconduct Quiz (1%)	Opens on Courselink: Monday, January 10, 2022 Due: Friday, January 21, 2022 @5:00pm	https://www.uoguelph.ca/registrar/calendars/undergraduate/2020-2021/c08/c08-amisconduct.shtml Including all sections listed on this page.
Quiz 1 (5%) (Week 3)	Friday, January 28, 2022 during YOUR scheduled lab*** Remote (Crowdmark): closed book, closed resource. 3:30 section upload by 4:20 4:30 section upload by 5:20	Content covered in weeks 1 and 2 inclusive.
Term Test 1 (15%) (Week 5)	Friday, February 11, 2022 6:00pm-7:30pm ROZH*101 ROZH*103	Chapters 1–3 inclusive.
Quiz 2 (5%) (Week 7)	Friday, March 4, 2022 in YOUR	L'Hopital's rule (Chapter 4) and Integration by Parts (Section 5.1)

	scheduled lab*** 3:30pm-3:55pm in ROZH*104 OR 4:30pm-4:55pm in ROZH*101	
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Quiz 3 (5%) (Week 9)	Friday, March 18, 2022 in YOUR scheduled lab*** 3:30pm-3:55pm in ROZH*104 OR 4:30pm-4:55pm in ROZH*101	Integrals of Trig products (Section 5.2), Trigonometric substitution (Section 5.3)
Term Test 2 (20%) (Week 10)	Friday, March 25, 2022 6:00pm-7:30pm ROZH*101 ROZH*103	Chapter 4 –7 inclusive
Quiz 4 (5%) (Week 11)	Friday, April 1, 2022 in YOUR scheduled lab*** 3:30pm-3:55pm in ROZH*104 OR 4:30pm-4:55pm in ROZH*101	Improper integrals (Chapter 8) plus content covered in week 10 inclusive.
Final Exam (39% or 44%)	Saturday, April 23, 2022 8:30am – 10:30am Location: TBA	Cumulative

*You must obtain at least an 80% on the Academic Misconduct Quiz in order for it to be considered complete.

**For online assessments: I reserve the right to institute proctoring software at any time if cases of academic misconduct arise.

2.2 Course Grading Policies

Academic Consideration: 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.shtm>

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor at the start of the semester to make alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml>

Missed term tests or quizzes: Missed term tests or quizzes will receive a grade of 0%, unless you miss an assessment due to any of the above reasons and **bring it to the attention of the course instructor within 1 week of the assessment date in a written email (with appropriate documentation if required)**, in which case the weight of the missed assessment will be added to the final exam. There will be no makeup tests or quizzes.

Illness: Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

Covid-19 Safety Protocols: For information on current safety protocols, follow these links:

<https://news.uoguelph.ca/return-to-campus/how-u-of-g-is-preparing-for-yoursafe-return>

<https://news.uoguelph.ca/return-to-campus/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.

Passing grade: In order to pass the course, you must receive a final grade of at least 50%. Additionally, you must pass at least one of Term Test 1, Term Test 2, or the Final Exam in order to be eligible to pass this course. Failure to do so will result in a final grade that is capped at 48%.

Group Work: You are encouraged to work together to learn the course material and complete For You to Try exercises. The warm up assignment, as well as all quizzes, term tests and the final exam are individual assessments and must be completed independently.

3 AIMS, OBJECTIVES & GRADUATE ATTRIBUTES

3.1 Calendar Description

This course is a continuation of MATH*1200. It is a theoretical course intended primarily for students who need or expect to pursue further studies in mathematics, physics, chemistry, engineering and computer science. Topics include inverse functions, inverse trigonometric functions, hyperbolic functions, indeterminate forms and l'Hopital's rule, techniques of integration, parametric equations, polar coordinates, Taylor and Maclaurin series; functions of two or more variables, partial derivatives, and if time permits, an introduction to multiple integration.

Credit Weight: 0.5 **Department:** Mathematics & Statistics **Campus:** Guelph

Prerequisite: One of MATH*1000, MATH*1080, or MATH*1200

Restrictions: MATH*1090, IPS*1510, MATH*2080

3.2 Course Aims

This course extends the ideas and concepts covered in a first Calculus course. The objective of the course is to broaden your mathematical background to explore more advanced topics. The main goals of the course are (1) to teach students the Calculus concepts listed in section 4.1 at a level that promotes a deep understanding and (2) to explain how such concepts are applicable in their various degrees by exploring real-world problems.

3.3 Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

1. Understand fundamentals of complex numbers in various forms.
2. Understand inverse functions (including inverse trig), domains, ranges, and graphs.
3. Define and graph hyperbolic functions and their inverses.
4. Identify indeterminate forms and effectively use L'Hopital's rule to evaluate limits.
5. Utilize various advanced integration techniques to find antiderivatives.
6. Evaluate improper integrals.
7. Calculate volumes of revolution using definite integrals.
8. Calculate the arclength of a curve using integral formulas.
9. Work with parametric curves and polar coordinates.
10. Derive Taylor and MacLaurin series for a variety of functions.
11. Extend concepts to multivariable functions, including partial derivatives.

3.4 Learning Attributes

Upon the successful completion of this course, the student will have demonstrated the ability to:

1. Manipulate expressions involving complex numbers
2. Show knowledge and understanding of inverse functions, in particular the arctrig functions, their domain, range, basic graphs, and arithmetic involving these functions.
3. Know the derivatives and antiderivatives of the arctrig functions.
4. Understand hyperbolic functions and their inverses their domain, range, basic graphs, and arithmetic involving these functions.
5. Know the derivatives and antiderivatives of hyperbolic and archyperbolic functions.
6. Understand the concept of an indeterminate form.
7. Use L'Hopital's rule to handle some indeterminate form limit problems of different varieties.
8. Apply the integration by parts formula and have a strong feel for when to use it.

9. Solve integration problems involving trigonometric products either via chain rule in reverse (perhaps using trig identities) or using integration by parts.
10. Solve integration problems requiring trigonometric substitution.
11. Understand the set up and use of partial fractions decomposition and Heaviside cover up.
12. Find the arclength of a single-variable function $y=f(x)$.
13. Use parameteric equations to parametrize a curve.
14. Find derivatives of parametric equations and use them to sketch parametric curves.
15. Understand the development of polar coordinates and how to plot a polar curve.
16. How to find a Taylor or MacLaurin series using Taylor's formula.
17. How to determine new Taylor or MacLaurin series from existing series.
18. Understand the basics of domain and range for simple multi-variable functions.
19. Find the partial derivatives of a multi-variable function.
20. Find the antiderivative of a multi-variable function.

3.5 Instructor's Role and Responsibility to Students

As your instructor, I must:

1. Develop and deliver course material in a professional way that facilitates learning for a variety of students and learning styles;
2. Attend all lectures, filling in the Course Manual as we proceed in each lecture. We will provide completed course notes online regularly, but we strongly urge you to come to class. Bear in mind that most Tutorials will not use the Course Manual and these completed notes might not be provided to you.
3. Respond to you. This includes, as time permits, questions in lectures and lab tutorials, after classes, during office hours, or through email (where we reserve the right to reply within a timeframe of 1-2 days). You are more than welcome to contact either of us at any time through these means if you have questions or concerns about the course or the course material.
4. Evaluate you fairly, and fairly as compared to your peers, providing prompt feedback on your performance and justification for your grade. We must provide academic consideration, where appropriate, as described in Section 3.

3.6 Students' Learning Responsibilities

As a member of this class, you are expected to:

1. Take advantage of the learning opportunities provided during lectures and tutorials;
2. Treat others with respect and dignity whenever you address them, in-class or online.
3. Genuinely try all For You To Try homework in a timely manner, on your own time;
4. Seek help if you have tried the homework and are still having difficulty with the course content. This means contacting us (*not* just at the last minute!) and possibly considering other resources as we recommend them to you;

5. Check all grades against tests that have been returned to you, once they are posted to the Course website, to verify that the correct mark has been recorded.
6. Notify us, as described in Section 3, in the case that there are missed tests or academic conflicts that are known in advance. If illness, work, or extra-curricular activities are causing you to struggle, you are advised to keep us up-to-date on your progress, so that we can be more helpful to you.

4 TEACHING AND LEARNING ACTIVITIES

4.1 Timetable

Lectures	Monday, Wednesday, Friday	11:30am-12:20pm	ALEX*200
	Monday, Wednesday, Friday	1:30pm-2:20pm	ALEX*200
Labs	Friday	3:30pm-4:20pm	ROZH*104
	Friday	4:30pm-5:20pm	ROZH*101

You should be registered in ONE of the lecture times and ONE of the lab times listed above. The same content will be delivered regardless of section.

****In response to public health measures, the University of Guelph has asked that we deliver the first two weeks of lectures and labs remotely. For the period from January 10 – January 30 inclusive, all lectures will be delivered asynchronously. Lecture recordings may be found on Courselink, organized by week. Labs will run synchronously via Zoom, (<https://zoom.us/j/95181750387>) In this period it is extremely important that you ask questions and attend office hours to ensure that you are getting the help that you need to learn effectively. We will return to in-class instruction starting January 31st, 2022, or as soon as it is deemed safe enough to do so by public health and the University.**

4.2 Lecture Schedule

(schedule is approximate and subject to change depending on time constraints)

Lectures (Week)	Lecture Topics	References
1	Complex Numbers	Chapter 1
1-2	Inverse Functions	Chapter 2
3	Hyperbolic Functions	Chapter 3
4	L'Hôpital's Rule	Chapter 4
4-5	Advanced Integration Techniques	Chapter 5
6	The Method of Partial Fractions	Chapter 6
6-7	Volumes of Revolution	Chapter 7
7-8	Improper Integrals	Chapter 8
8-9	Arclength of a Curve and Parametric Equations	Chapter 9

10	Polar Coordinates	Chapter 10
11	Taylor & MacLaurin Series	Chapter 11
12	Introduction to Multivariable Functions	Chapter 12

4.3 Lab Schedule

Weekly lab sessions will give you the opportunity to tackle tougher problems, extra practice questions or even brand new, related concepts. I may also use this time to cover course material directly from the Course Manual. It is your responsibility to obtain completed notes from lab tutorials if you cannot attend as these will not be posted online unless otherwise specified. Material covered is fair game for testing. Your quizzes will take place during these lab times as well (week 3,7 and 11).

Other Important Dates

First day of classes: Monday, January 10th, 2022.

Reading Week: Monday, February 21st, 2022-Friday, February 25th, 2022. (no classes)

Good Friday: Friday, April 15th, 2022. (no exams)

Last day of classes: Friday, April 8th, 2022.

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>

Student Feedback Questionnaires: Near the end of the term, you will be given the opportunity to evaluate your instructor and the course by providing comments regarding your experience. The questionnaires for this class will be done online. I will inform you of when these are to take place. I appreciate your participation on this 😊

5 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

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

6 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 14 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>

7 RECORDING OF MATERIALS

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

Posted online videos and course notes are the property of the instructor and are not to be otherwise disseminated beyond this course.

8 RESOURCES

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

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>

9 MENTAL HEALTH RESOURCES

One out of every five students in Canada experiences some sort of mental health issue at some point in their academic career. If you find yourself facing a mental health crisis, or just need to talk to someone, please consider taking advantage of one of the following resources available to University of Guelph students:

Counselling Services: Visit the Counselling Services website (<https://wellness.uoguelph.ca/counselling>) to get information on resources available to you, both online and in-person. You can also visit them at Health Services (J.T. Powell Building, ext 53244) where they offer individual and group counselling sessions by appointment or walk-in.

Student Support Network: is located in the Wellness & Education Promotion Centre in the J.T. Powell Building and offers confidential, peer-based, drop-in support.

Good2Talk: ([1-866-925-5454](tel:1-866-925-5454)) is a free, 24/7 student hotline that provides professional counselling and referrals for mental health, addictions and well-being.

Here 24/7: ([1-844-437-3247](tel:1-844-437-3247)) specializes in assessment, referral and appointment booking and is available 24/7 for crisis support.

You are not alone and you will not be judged for asking for help.