Department of Mathematics and Statistics

MATH 2002: Intermediate Calculus II
Summer 2024

3:05PM—4:55PM (Atlantic Time), Online (Dates listed below)

Contents

COURSE INFORMATION

Instructor and TA Information

Instructor: Tom Potter (he/him)

Office Hours

- Student/office hours are online and can be accessed through the Brightspace page https://dal.brightspace.com/. I will post a link to them. Instructions are posted on Brightspace indicating how to access my help during these hours. Times are (in the Atlantic Time):

- Monday: 12pm to 3pm (Except for August 5: instead, the Aug 5 office hours will be moved until 12pm to 3pm on August 6)
- Tuesday: 8:00am to 9:00am
- Wednesday: 8:00am to 9:00am
- Thursday: 8:00am to 9:00am
- Also, **no** office hours on Aug. 19 (final exam).
- I am also available to meet by appointment.

Office

- On the Dal Brightspace Learning Platform (https://dal.brightspace.com/). If you are in Halifax, I may also be available to meet in-person, if you prefer. My office is Rm. 106 in the Chase building, on the Studley Campus.
- **Office Phone:** 902 478 2250
- **Email:** tom.potter@dal.ca. I will reply to your email within 24 hours on weekdays. Emails received on the weekend might not get answered until Monday.
- An additional resource is the Online Math Help Desk, which can be found here: https://tinyurl.com/b8xcx9nm During the Summer B term, this will be available Monday through Friday, 1pm to 5pm

Notes:

1. Email is a good way to reach me for general course-related questions, comments, requests. *For questions specific to the material/assignment/lectures, please use the Brightspace Discussion Board on the course page.* Either myself, or the course TA will answer your question here. *That way others with the same question may benefit from the answer as well.* If a material-related question is emailed to me, I may request that you ask the question on Discussion Board instead.
2. Missed synchronous lectures should not pose a major problem, as I plan to record lectures and post them on the course page. That being said, you are strongly encouraged to attend the synchronous sessions whenever possible. *Course notes will also be available.*

Teaching Philosophy

I think that a good teacher, like a good coach, works with a person's natural abilities, and helps them to achieve their personal best. I believe that mathematical talent is not the final word of one's ability to grasp mathematics. Rather, one can cultivate mathematical strength through consistent and thoughtful effort.

Course TA

TA : Mary Agboola
Email: tt867148@dal.ca
Office: Online (available through Brightspace)

Office Hours:

- TBA

Course Description

Topics include multiple integrals and changes of variables, and vector calculus, with an emphasis on Green's and Stokes' theorems. The course also includes a brief introduction to second order ordinary differential equations.

Description of Class Format

The course is offered fully online via the course space on the Brightspace platform. There will be synchronous lectures each on the dates indicated below, from 3:05PM to 4:55PM Atlantic Daylight Time. I will break this up a ten-minute break in the middle. I will post the recordings and notes from these lectures on Brightspace, where they will be available for the rest of the course. Most of the lecture content will be presented through a tablet or document camera, with discussion. This will be much like a traditional blackboard lecture, but with different technology, and hosted online, rather than in person. I may also use online interactive polls, via MathMatize, to promote an active learning environment.

Minimal Technical Requirements

Students will need a computer, phone, or tablet to view and participate in lectures. In addition, the written portion of the course midterm exam should be submitted in PDF format, which will require a scanner or software to convert pictures to PDF. Multi-page submissions should be submitted as a *single* PDF. A couple resources for converting and merging files are the following:

- https://smallpdf.com/jpg-to-pdf
- https://smallpdf.com/merge-pdf

Learning Management System Site Information

The course will be hosted through the Brightspace LMS, with the exception of the final exam, which is to be written in person. You can find the course by clicking on the waffle icon at the top right of the screen, and looking for the course Math 2002, Summer 2024. This will take you to the course page. There will be a table of contents on the left-hand side, and a menu at the top with links to the discussion board, grades, and other items. If you have any questions, feel free to reach out to me.

Course Pre-requisites, Co-requisites, Exclusions and/or other Restrictions

- Pre-requisite: Math 2001, Intermediate Calculus I. In some cases this pre-requisite may be overridden, at the instructor's discretion.

Course Learning Outcomes

Mastery of the following concepts and techniques:

- Multiple integrals in Cartesian, Cylindrical, and Spherical coordinates
- Change of variables and the Jacobian
- Vector Calculus, including vector fields, line integrals, Green's Theorem, curl and divergence, surface integrals, Stokes' theorem, the Divergence theorem, and applications.
- Introduction to linear, 2nd-order, ordinary differential equations, the auxiliary equation, initial value problems, and boundary value problems.

Required Text(s)

There is no required text. If students wish for an additional resource besides the course notes, James Stewart's "Calculus: Early Transcendentals" is highly recommended. The practice problems in this book are excellent, and I will post some problems from here to give you extra practice. There is also a link to an open source calculus book you can use.

Course Schedule

Master Course Schedule		
Title	Date(s)	Description
Module 1	July 3, 5, and 8	Review of rectangular domains and iterated integrals, Double integrals in cartesian and polar coordinates, the Gaussian integral, surface area, triple integrals in cartesian coordinates, center of mass, applications to probability.
Important Date	July 10	Last day to add or change classes for registered students.
Module 1 Assignment Due	Friday, July 12, 7PM Atlantic Time	
Module 2	July 10, 12, and 15	Triple integrals in cylindrical and spherical coordinates, change of variables in multiple integrals, introduction to vector fields, gradient fields, and how to find potential functions.
Important Date	July 18	Last day to drop without a "W".

		Last day to change from Audit to Credit, and vice-versa.
Module 2 Assignment Due	Friday, July 19, 7PM Atlantic Time	
Module 3	July 17, 19 and 22	Line integrals, the fundamental theorem of line integrals, center of mass for curves of variable density, conservation of energy.
Module 3 Assignment Due	Friday, July 26, 7PM Atlantic Time	
Midterm Exam	Opens July 29 at 8AM Atlantic time. Due August 1 at Noon, Atlantic time	Midterm will consist of two parts, which will become available at 8AM Atlantic time on Thursday, and due at Noon Atlantic time on Monday.
Module 4	July 24, 26, 29, and 31	Green's theorem, orientation of a closed curve, curl, divergence, the Laplacian.
Module 4 Assignment Due	Monday, August 5, 7PM Atlantic Time	
Important Date	August 5	Natal Day Holiday: No lecture or office hours
Important Date	August 6	Last day to drop with "W"
Module 5	July 31 (start) August 2, 7, 9	Vector forms of Green's theorem, parametric equations, the tangent plane, parametric surfaces and their areas, surface integrals, orientable surfaces, surface integrals of vector fields and flux.
Module 5 Assignment Due	Monday, August 12, 7PM Atlantic Time	
Module 6	August 12, 14 and 16	Stokes' theorem, the Divergence theorem, applications of vector calculus, intro to linear, 2^{nd}-order, ordinary differential equations and the auxiliary equation, introduction to initial value problems and boundary value problems.
Module 6 Assignment Due	Monday, August 19, Noon Atlantic Time	
Exam date	August 19	Final Exam: 3:00—6:00PM, in the McCain Auditorium 1, (Scotiabank Auditorium)

Exam Make-up date	August 27	Make-up date for final exam. 9AM to 12PM Atlantic time, in the McCain Auditorium 1, (Scotiabank Auditorium)

Course Assessments

Final Exam: 60%, In-person

- This takes place on August 19, from 3pm to 6pm, in The McCain Auditorium 1 (Scotiabank Auditorium).
- There will also be an option to write the final exam on August 27, from 9am to 12pm, in The McCain Auditorium 1 (Scotiabank Auditorium).
- In either case, the exam must be written in person. *The final exam covers all material from the course, but with more emphasis on the material from Modules 4, 5, and 6.*
- The final exam is an individual work effort, and no collaboration or discussion is permitted, nor any use of outside materials. This will also be made clear on the exam instructions.

Midterm Test: 20%, Remote/Online

- **This will open on Monday July 29, at 8AM Atlantic time, and close at noon Atlantic on August 1.** *This midterm covers all material from modules 1 to 3, inclusive.* This midterm consists of two parts:
    - an Online part that is completed via the WeBWorK assessment tool (a link to this tool will be provided in Brightspace). This is designed to take 60 minutes. **You have only one attempt at this, so please do not click the link until you are ready to begin.**
    - a written, take-home part, for which you write down your solution and upload your answers in a photo/scan. To facilitate grading, please follow to following guidelines:
        - It is best if work is submitted in PDF format: a couple resources for converting and merging files are the following:
            - https://smallpdf.com/jpg-to-pdf
            - https://smallpdf.com/merge-pdf
        - Work should be upright (not rotated, or sideways). Marks may be taken off if work is submitted sideways or upside-down.
        - Please submit the exam in one file (the link above allows you to merge multiple PDF files into one).
    - You will have from Monday morning (July 29) until Thursday noon (August 1) to access and complete the written part, but it is designed to take 120 minutes. Please ensure that your uploaded solutions are clear and legible.

During this time window, you may upload multiple versions of your work, in case you wish to make a change, but **only one version is graded,** so please indicate clearly which attempt you want to have graded.

To Reiterate: The midterm will open at 8am Atlantic on July 29, and close at 12pm (noon hour) Atlantic on August 1. **Both parts of the midterm must be completed within this window of time,** unless we have made another arrangement.
Note*: Please allow yourself 30 minutes to upload your file to the Brightspace platform (including time to photograph or scan the pages).*

- **Important Note: The midterm is open book,** including the lecture videos, the notes you take from the lecture videos, and any notes that I provide. You may also use a **non-graphing** scientific calculator. You may not use any other resources.

You may not use facts from textbooks or course notes from other courses, or from courses previously taken, with the following exceptions: the material included in James Stewart's Calculus Book or the Open Source Textbook linked in the Brightspace page. All other books or course materials from concurrent or past courses are prohibited. This policy may seem strict, but past iterations of the course have demonstrated the need for a blanket policy regarding resources.

- **Collaboration on the midterm is not permitted.** By accessing the online midterm, you effectively promise that what you submit is the product solely of your own efforts, and that you have not collaborated with anyone else, have not received help from anyone else, and have not resorted to any resources besides those that are permitted. **This includes online services, such as Chegg. I may check Chegg to monitor potential misuse.** You are not allowed to post questions from course assessments on any website, including Chegg. **Moreover, you are not allowed to even consult/read answers to questions posted on websites such as Chegg. You may not use YouTube videos, or any other online resources, when writing the midterm.**

WeBWorK Assignments: 20%, Online

- There is an assignment via WeBWorK for each module, which can be accessed through the Brightspace system. In the end, I will choose the best 5 out of 6 assignment grades in the final grade calculation. Assignment due dates are as follows:
  - July 12, at 7pm Atlantic time
  - July 19, at 7pm Atlantic time
  - July 26, at 7pm Atlantic time
  - August 5, at 7pm Atlantic time
  - August 12, at 7pm Atlantic time
  - August 19, at 12pm Atlantic time

  You may discuss assignment problems with each other. You may also discuss them with me during office hours, or with the Course TA. I strongly recommend doing all assignments and utilizing them as a practice opportunity for the other assessments.

Bonus Diversity Assignment: 1.5%, Online

- To encourage recognition of under-represented groups in Mathematics, you are encouraged to write a short biography (1-2 paragraphs) about a mathematician from a group that is generally not seen or recognized much in math. The BIPOC community and women are especially under-represented in Math, although this is starting to change, gradually. It's important to realize that even though Mathematics has been for the most part dominated by men of European descent in the last five or six centuries, it has diverse roots, and may have a have a very diverse future.
- This assignment need not be long or difficult and need not be a perfectly crafted essay. Anyone who makes a decent effort will get the points. I will post an example write-up*. I will also post all submissions on the Brightspace for others to read and learn from!*
- While this assignment is optional, I strongly encourage you to participate.

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	**B+** (77-79)	**C+** (65-69)	**D** (50-54)
A (85-89)	**B** (73-76)	**C** (60-64)	**F** (<50)
A- (80-84)	**B-** (70-72)	**C-** (55-59)	

Course-specific policies

- Please plan to be available to write the midterm during the period specified. If you miss the midterm, the weight will be shifted to the final exam.
- For missed assignments, the grade will be 0; however, if you need an extension, let me know beforehand. As mentioned in the Course Assessments section, the lowest assignment grade will be dropped: this will allow you to miss one of the six assignments without your grade being affected.
- Academic Integrity is to be taken seriously. Details about what is permitted can be found in the Course Assessments section, together with regulations outlined on the assessments themselves.
- There are two dates available to write the final exam. Please make sure that you can be available to write the exam on one of these dates. You must write on one of these two dates, unless we have made a different arrangement. Any other arrangements are at the instructor's discretion but will only be granted in the most extenuating circumstances.
- Synchronous lectures will be recorded. If you wish to ask a question, but do not wish to be recorded, please write down your question and ask it by email.
- During live lectures you may ask questions by un-muting yourself and speaking, or by typing your question in the chat section.

UNIVERSITY STATEMENTS

Territorial Acknowledgement:

The Dalhousie University Senate acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.[1]
The Dalhousie University Senate also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Internationalization

At Dalhousie, "thinking and acting globally" enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders."

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect. As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation.

If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion please contact:

- the Student Accessibility Centre (for all courses offered by Dalhousie with the exception of Truro)

[1] For more information about the purpose of territorial acknowledgements, or information about alternative territorial acknowledgements if your class is offered outside of Nova Scotia, please visit https://native-land.ca/.

- the Student Success Centre in Truro for courses offered by the Faculty of Agriculture

Your classrooms may contain accessible furniture and equipment. It is important that these items remain in place, undisturbed, so that students who require their use will be able to fully participate.

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2).

Code of Student Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Fair Dealing policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie.

Student Use of Course Materials

UNIVERSITY POLICIES, GUIDELINES, AND RESOURCES FOR SUPPORT

Dalhousie courses are governed by the academic rules and regulations set forth in the Academic Calendar and the Senate.

Important student information, services and resources are available as follows:

University Policies and Programs

- Important Dates in the Academic Year (including add/drop dates)
- Classroom Recording Protocol
- Dalhousie Grading Practices Policy
- Grade Appeal Process
- Sexualized Violence Policy
- Scent-Free Program

Learning and Support Resources

- Academic Support - Advising Halifax, Truro
- Student Health & Wellness Centre
- On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond)
- Indigenous Student Centre. See also: Indigenous Connection.
- Elders-in-Residence: The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803.
- Black Student Advising Centre
- International Centre
- South House Sexual and Gender Resource Centre
- LGBTQ2SIA+ Collaborative
- Dalhousie Libraries
- Copyright Office
- Dalhousie Student Advocacy Service (DSAS)
- Dalhousie Ombudsperson
- Human Rights & Equity Services
- Writing Centre
- Study Skills/Tutoring
- The Undergraduate Advisor for Math is Dr. Julien Ross: mathadvisor@mathstat.dal.ca
- An additional resource is the Online Math Help Desk, which can be found here: https://tinyurl.com/b8xcx9nm During the Summer B term, this will be available Monday through Friday, 1pm to 5pm