McMaster University | SCIENCE Department of Mathematics & Statistics

We recognize and acknowledge that McMaster University meets and learns on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the "Dish With One Spoon" wampum, an agreement amongst all allied Nations to peaceably share and care for the resources around the Great Lakes.

Math 1AA3/1ZB3 – Calculus for Science II/Engineering Mathematics II-A

2022 Winter Term

(Updated Jan. 1, 2022)

Course Home Page:

The course home page is on Avenue to Learn

Class times and Locations:

Tentatively, all lectures and tutorials will be delivered in-person at the scheduled times and locations. Class time and location are available on Mosaic.

In the event circumstances prevent lectures being able to be held in-person, sessions will move online and be held through the Math 1AA3/1ZB3 Winter 2022 Team on Microsoft Teams

Instructors:

Lecture Sections:	**1AA3 – C01**	**1AA3 – C02**
Instructor	Sabrina Streipert	Jeremy Lane
Contact Information	streipes@mcmaster.ca	lanej5@mcmaster.ca
Office	HH409	HH407
Phone Ext.	27031	26079

Lecture Sections:	**1ZB3 – C01,C05**	**1ZB3 – C02,C06**	**1ZB3 – C03,C07**	**1ZB3 – C04**
Instructor	Chris McLean	Xinyu Zhao	Evan Mitchell	Jeremy Lane
Contact Info.	mcleac3@mcmaster.ca	zhaox171@mcmaster.ca	mitcheej@mcmaster.ca	lanej5@mcmaster.ca
Office	BSB/B124	HH/403A	HH/412	HH407
Phone Ext.	20142	27366	23413	26079

Teaching Assistants:

TA	TBA	TBA
Contact Information	TBA	TBA
Office	TBA	TBA

Office Hours:

Times of all office hours will be posted on the course web page during the first full week of lectures. Specific times will be announced in-lecture and posted on the course website.

Contacting the Instructor & TAs

E-mails are the preferred method of communication. All inquiries should either be done during the office hours, through Microsoft Teams Chat, or by an e-mail with the course code in the subject line.

COURSE DESCRIPTION

For students in science: additional techniques of integration, applications of definite integrals, differential equations, polar coordinates, parametrized curves. Sequences, infinite series, power series. Partial derivatives, double integrals.
Three lectures, one tutorial; one term
Prerequisite(s): One of MATH 1A03, 1X03, 1ZA3; or a grade of at least B- in MATH 1LS3 or 1M03
Antirequisite(s): ARTSSCI 1D06 A/B, MATH 1LT3, 1NN3, 1XX3, 1ZB3, 1ZZ5
Not open to students in Mathematics and Statistics I or with credit or registration in ISCI 1A24 A/B.

COURSE AND LEARNING OBJECTIVES

Upon completion of this course, the student will:

1. Know and understand techniques to compute both regular and improper
2. Calculate and Estimate the limits of Sequences and Series
3. Use an assortment of convergence tests to determine series convergence.
4. Know and understand power series, Taylor polynomials and their relation to functions.
5. Use integration techniques in various elementary applications.
6. Know and understand properties of basic types of differential equations.
7. Know and understand properties of alternate ways of describing graphs, parametric and polar functions.
8. Know and understand properties of diff. calculus with functions of several variables.
9. Know and understand techniques of definite multivariable integration.

MATERIALS & FEES

Required Materials / Resources

Required Text

- *Calculus, Early Transcendentals, 9th Edition*, Stewart, Clegg, and Watson, Cengage.
  (Note: Older (or newer) editions can be used, as long as you have access to the exercises in the 8th edition.)

Optional Text

- Student Solutions Manual for Single Variable Calculus, Early Transcendentals
- Student Solutions Manual for Multivariable Calculus

Calculators

- The McMaster standard calculators (the Casio fx 991 MS or fx 991 MS Plus), or the Casio fx 991 ES, or the Casio fx 991 CN are allowed on the tests and examination. No other versions of the Casio fx-991 are allowed.

VIRTUAL COURSE DELIVERY

To follow and participate in virtual classes it is expected that you have reliable access to the following:

- A computer that meets performance requirements found here.
- An internet connection that is fast enough to stream video.
- Computer accessories that enable class participation, such as a microphone, speakers and webcam when needed.

If you think that you will not be able to meet these requirements, please contact uts@mcmaster.ca as soon as you can. Please visit the Technology Resources for Students page for detailed requirements. If you use assistive technology or believe that our platforms might be a barrier to participating, please contact Student Accessibility Services, sas@mcmaster.ca, for support.

COURSE OVERVIEW AND ASSESSMENT

Tentative Course Schedule – Please note: Any changes to the schedule below will be posted on Avenue to Learn

Week	Dates	Topic
Week #1	January 10-14	Introduction - Who, What, Where, Why, When? 7.5 Integral review 7.8 Improper Integrals
Week #2	January 17-21	7.8 Improper Integrals (Continued) 11.1 Sequences (Omit Definition. 2) App. E Induction
Week #3	Jan. 24-28	11.2 Series 11.3 Integral Test & Sum Estimates
Week #4	Jan. 31 – Feb. 4	11.4 Comparison Tests (*Omit sum estimates*) 11.5 Alternating series 11.6 Absolute Convergence, Ratio & Root tests
Week #5	February 7-11	11.8 Power Series 11.9 Functions as Power Series (*Omit example 8b)*) 11.10 Taylor & MacLaurin (*Omit Mult. and Division of Series*)

		Test #1 - Friday, February 11th: (Tentative date)
Week #6	February 14-18	11.10 Taylor & MacLaurin (*Continued*) 11.11 Taylor Polynomials and Error (*Omit other applications*) 8.2 Surface Area of Revolution
Week #7	February 21-25	**READING WEEK, NO CLASSES**
Week #8	Feb. 28-Mar. 4	8.3 Hydrostatic Force and Pressure (*Omit other applications*) 9.1 Intro. to ODE & Modeling 9.3 Separable ODE
Week #9	March 7-11	3.8 Exponential Growth and Decay 9.5 Linear ODE 10.1 Parametric Equations
Week #10	March 14-18	10.2 Calculus of Parametric Curves 10.3 Polar Functions
Week #11	March 21-25	14.1 Multivariate Functions 2.3 Squeeze Theorem 14.2 Limits/Continuity in Three Dimensions
Week #12	March 28-April 1	**Test #2 - Tuesday, March 29th: (Tentative date)** 14.3 Partial Derivatives (*Omit Cobb-Douglas Production Function*) 14.4 Tangent Planes and Linear Approx. 14.5 Multivariate Chain Rule
Week #13	April 4-8	14.6 Gradient and $D_u f$ (*Omit 'Tangent Planes and Gradients'*) 15.1 Multivariate Riemann Sums and Double Integrals 15.2 Integrals on General Regions (Type I and II)
Week #14	April 11-12	15.2 Integrals on General Regions (*Continued*) Catch up and review

Lectures

- There will be two sections of 1AA3 and seven sections of 1ZB3 section, each with three, 50-minute lectures per week. The times and locations of these lectures can be found on Mosaic.
- **Tentatively, the course is planned to be live lectures. In the event lectures will no longer be able to be held in-person, sessions will move online and be held through Microsoft Teams.**

Homework

- Approximately weekly a problem set will be assigned. These problems will be both assigned and completed through our online assignment system. Questions will be very similar to the practice problems from the chapter end questions in the course textbook, and the question types that will be appearing on your tests.
- Availability, due date, and the exact assignment questions will all be posted on the course website, so please make sure you read the announcements regularly.
- Note that these problem sets are MANDATORY (and excellent practice) and will be used as part of the course grade for ALL students. So do NOT forget to complete an assignment.

Supplemental Problems

- Practice problems for each section of the course are posted on the course website. These materials pertain to the chapters covered. Note that these questions are ***not*** assignments, and thus will neither be asked to be handed in, nor graded. Nevertheless, it is ***very important*** that you at least attempt these problems as they are assigned to assist your familiarization with the course material.

Tests

- There will be TWO (2) term tests, each approximately 90 minutes in length. They have **tentatively** been scheduled to take place on the dates of **Friday, Feb. 11th**, and **Tuesday Mar. 29th**. *Please note that all tests are scheduled to be held during the evenings outside of class time. Any changes to the dates, as well as the times, locations, and test content will be announced in lecture and posted on the course website at least one week before the actual test date.*

EVALUATION

Students will be graded according to the following scheme:

Item	Weight
Approximately 9 Online Assignments (combined)	20%
Term Test #1	20%
Term Test #2	20%
Final Examination	40%
Total	**100%**

Note: The instructor reserves the right to change the weight of any portion of this marking scheme.

At the end of the course the grades may be adjusted but this will be done uniformly. We will use the grade equivalence chart published in the Undergraduate Calendar to convert between percentages and letter grades.

Final Examination

- There will be an April Final Examination. This will be a cumulative final exam, two and a half (2.5) hours in duration and covering all materials from the term.
- Date, time, and location will all be available from the McMaster registrar's office through MOSAIC in the weeks leading up to the examinations.
- Remember: You are responsible for bringing your student ID to all tests and exams.

"Make-up" Work/Assignments

- **There are no "make-up assignments"** or similar projects available in the course. All contribution to the grades will come only from the tests, assignments, laboratories and the examination: no other sources will be considered.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

Excused Absences & Course Missed Work Policy:

If you are absent from the university for a minor medical reason, lasting fewer than 3 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. Please note that the MSAF may not be used for term work worth 25% or more, nor can it be used for the final examination. Additional information can be found here.

Please note: when using the McMaster Student Absence Form (MSAF) for this course, please report your absence immediately to Chris McLean, at mcleac3@mcmaster.ca (normally within 2 working days) to confirm the absence.

In the event of such an absence, no makeup test will be given, but your course grade will be re-weighted by increasing the weight of the final examination to compensate for the missed test.

Missed Final Exam

Students who miss the Final Exam for a valid reason may apply to the Office of their Associate Dean of their respective faculty for permission to write a Deferred Final Exam. The student must submit a completed McMaster University Medical Certificate and the completed application for the deferred Final Exam to the Office of the Associate Dean within one week of the Final Examination period.

Marks and Mark Corrections:

As the term progresses, all test marks will be posted on the course website. It is your responsibility to check for errors in the grades before the day of the final exam, and to report any discrepancies to your instructor. *No errors will be corrected unless reported by this time.*

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy.

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, Capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their

browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the *Academic Integrity Policy*, located at https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

Additional information about the Code and netiquette can be found here.

Online Conduct

McMaster is committed to an inclusive and respectful community. These principles and expectations extend to online activities including electronic chat groups, video calls and other learning platforms. If you are concerned about your virtual classroom experiences, the Equity and Inclusion Office (EIO) is available to advise and assist students who may be experiencing any equity, accessibility, inclusion, harassment, discrimination or sexual violence concerns. You can reach the EIO at equity@mcmaster.ca. Thank you for joining us in ensuring that our McMaster online communities are spaces where no one feels excluded and everyone is able to enjoy learning together.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

RESEARCH ETHICS - NA

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.