UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Mathematics & Statistics
MS 476
403 220-5210
math@ucalgary.ca

COURSE OUTLINE

1. **Course:** MATH 311, Linear Methods II - Spring 2021

   Lecture 01: MWF 10:00 - 11:50 - Online

Instructor	Email	Phone	Office	Hours
Dr Jerrod Smith	jerrod.smith@ucalgary.ca		MS 442	By appointment (via Zoom)

Email Policy:

- All **content** and **course-related** questions should be posted to the **D2L Discussion Boards**. The teaching team will strive to answer questions within 36 hours (except on weekends and holidays).
  - *Do not expect a response if you email your instructor with a content or course-related question.*
- All questions of a personal nature (e.g. accommodations, missed assessments) should be directed to your instructor (jerrod.smith@ucalgary.ca).

Online Delivery Details:

Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

This course has a registrar scheduled, synchronous final exam. The writing time is 1 hours + 50% buffer time.

Content Delivery

- All course material will be delivered via **D2L**
- The primary content delivery will be via (short) **pre-recorded videos**, accompanied by **lecture notes**, and **required active learning exercises** (via Top Hat)
- Students will work through this material independently following the **course schedule** (see D2L)
- **Non-credit worksheets** also form a key course component and learning opportunity

Synchronous Class Meetings (Group Discussion over Zoom; Optional; Not Recorded)

- **Monday** and **Wednesday** with **Instructor**
  - Instructor guided discussion with Q & A
  - Will often include Breakout room peer-discussions of non-credit worksheets
  - 10:00 – 11:00 AM (during Registrar scheduled lecture time)
- These meetings are **optional**, but **participation is encouraged!**
- Zoom meetings will **not** be recorded.

Additional Support "Zoom Office Hours"

- **Monday** and **Wednesday** with **Instructor**
  - Zoom Office Hour with "Waiting Room"
  - By Appointment (via email) or Drop-In
  - 11:10 – 11:50 AM (during Registrar scheduled lecture time)
- **Monday and Wednesday with Teaching Assistants**
  - Office Hour Q & A and Group Discussion with Teaching Assistants
  - 12:00 – 12:50 PM (during Registrar scheduled tutorial time)

Course Site:

D2L: MATH 311 L01-(Spring 2021)-Linear Methods II

Note: Students must use their U of C account for all course correspondence.

Outline of a Typical Week

You should expect to spend 15 - 20+ hours per week working on this course.

Where do these numbers come from?

- In person, our course would meet for 8 hours per week (6 hours of lecture + 2 hours of tutorial)
- Students would complete their typical independent studying, review, homework, etc.
  - A reasonable estimate for these activities is *one hour outside class for each hour in class*
- Include attending some office hours, etc.

Every Day (Monday - Friday) you should...

- Work through pre-recorded video content, Top Hat questions
- Work on Non-credit Worksheets (problem solving, and written communication focused)
- Work on Lyryx Homework (computational focus)
- Ask *and answer* questions on the D2L Discussion Boards

- **Mondays**
  - Optional Zoom meetings
    - Group Discussion / Office Hours to supplement independent study
  - **Lyryx Assignment Due at 11:59 PM MDT**
- **Tuesdays**
  - Independent study
- **Wednesdays**
  - Optional Zoom meetings
    - Group Discussion / Office Hours to supplement independent study
  - **Writing Assignment Original Post (D2L Discussion Post) Due at 11:59 PM MDT**
- **Thursdays**
  - **Writing Assignment Replies to *each group member* Due at 11:59 PM MDT**
- **Fridays**
  - **Written Quiz due via D2L Dropbox (10:00 AM MDT - 12:00 PM MDT)**
    - Note: The quiz takes place during the Registrar scheduled meeting time.

2. **Requisites:**

See section 3.5.C in the Faculty of Science section of the online Calendar.

Prerequisite(s):
Mathematics 211 or 213.

Antirequisite(s):
Credit for Mathematics 311 and 313 will not be allowed.

3. **Grading:**

The University policy on grading and related matters is described in F.1 and F.2 of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %	Dates
Lyryx Online Homework* (6; weighted by question)	12 %	May 17, 25, 31, June 7, 14, 17
Quizzes** (6, equal weight, best 5 of 6)	60 %	May 14, 21, 28, June 4, 11 and the last quiz will be held during the Final Exam period.
Writing Assignments*** (6 discussion posts and replies, equal weight)	18 %	May 12, 19, 26, June 2, 9, 16 (Response posts to each group member are due **24 hours after original post**)
Top Hat**** (active learning exercises)	10 %	At students' pace (Deadline: June 17 at 11:59 PM)

** Quizzes are synchronous and take place during the Registrar scheduled meeting time on Fridays. See below for more information.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	76%	72 %	68 %	64%	60%	55 %	50 %

This course will have a final exam that will be scheduled by the Registrar. The Final Examination Schedule will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 1 hours.

The final exam will be administered using an on-line platform. Per section G.5 of the online Academic Calendar, timed final exams administered using an on-line platform, such as D2L, will be available on the platform. Due to the scheduling of the final exams, the additional time will be added to **the end** of the registrar scheduled **synchronous** exam to support students. This way, your exam schedule accurately reflects the **start time** of the exam for any **synchronous** exams. E.g. If a **synchronous** exam is designed for 2 hours and the final exam is scheduled from 9-11am in your student centre, the additional time will be added to the **end** time of the **synchronous** exam. This means that if the exam has a 1 hour buffer time, a synchronous exam would start at 9 am and finish at 12pm.

See D2L > Course Information for a detailed schedule of topics and assessments deadlines.

*** Lyryx Online Homework**

- All questions are equally weighted; assignments are weighted by question
- **Lyryx assignments have a computational focus**

**** Quizzes**

- The lowest single quiz score will be dropped from final grade calculations.
  - If a student misses a Quiz, then this is the score that will be dropped.
- Quizzes are **50 minutes** consisting of written-answer questions
  - Students will have **2 hours** (120 minutes) for each Quiz to allow time for scanning and uploading of the submissions, and in case of any technical issues.
- Available to be completed between **10:00 AM MDT** and **12:00 PM MDT** on **Fridays**
  - **Note:** this synchronous assessment takes place during Registrar scheduled meeting times.
- Submissions must be a **single PDF file** uploaded to the appropriate **D2L Dropbox**
- **Quizzes have a conceptual focus. Quizzes will assess problem solving and mathematical writing.**

Students with SAS accommodations should contact their instructor to discuss the time allowed. All other accommodations will be done on a case-by-case basis.

Note: Quiz #6 will take place during the final examination period, and will be scheduled by the Registrar.

***** Writing Assignments**

Students will be placed into randomized groups via D2L for each Writing Assignment discussion activity.

- **Original Posts** due Wednesdays at 11:59 PM MDT
  - Assessed as "acceptable (2 pts.)", "needs improvement (1 pt.)" or "unacceptable (0 pts.)" based on the following:
    - At a minimum: "acceptable" posts will be submitted by the deadline, within the indicated word counts AND/OR include attachments if required, and address the discussion prompt. Writing will be of good quality, with correct spelling and grammar.
    - At a minimum "needs improvement" posts will be submitted by the deadline, within the indicated word counts AND/OR include attachments if required, and address the discussion prompt.
- **Replies to each group member** (usually 2-3 replies) are due Thursday following original post at 11:59 PM MDT Assessed as "complete (1 pt.)" or "incomplete". Completeness also includes using a rubric if instructed to do so.

****** Top Hat**

- Students will complete Top Hat questions at their own pace each week; there is no weekly deadline
- It is **highly recommended** that students complete Top Hat questions while watching content videos and reading course lecture notes
- Top Hat questions are graded as 1/2 participation + 1/2 correctness
- The deadline for completing all Top Hat questions is Thursday, June 17 at 11:59 PM

4. **Missed Components Of Term Work:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

The lowest single quiz score will be dropped from final grade calculations.

If a student misses one Quiz, then this is the score that will be dropped.

All other instances of missed work will be handled on a case-by-case basis.

5. **Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

6. **Course Materials:**

Required Textbook(s):

W. K. Nicholson, *Linear Algebra with Applications*: Open text available through Lyryx or https://lila1.lyryx.com/textbooks/OPEN_LAWA_1/marketing/Nicholson-OpenLAWA-2019A.pdf.

Recommended Textbook(s):

Richard Hammack, *Book of Proof*: Richard Hammack, available at https://www.people.vcu.edu/~rhammack/BookOfProof/.

We will be using the Lyryx system for online assignment purposes, offering formative online assessment in an effort to support student learning. The student license is normally $39.95+GST payable upon registration on the Lyryx system. **Lyryx is able to provide complimentary individual licenses to students who have a financial concern, as students should not be coming to campus to utilize the free access that is available. Please contact the Associate Head, Teaching & Learning bauerm@ucalgary.ca for more information.** Any communication about this will remain strictly confidential.

We will be using **Top Hat** for asynchronous **active learning exercises**. University of Calgary students may access Top Hat **at no cost**. **Students must use their @ucalgary email address for their Top Hat account**.

Students must ensure that their **UCID** is entered in their **Top Hat account** information. You can access our Top Hat course MATH 311 Linear Methods II P2021 via:

- A web browser on your computer** at http://app-tophat.com, or
- The Top Hat smartphone/tablet app

** **Recommended Top Hat option**: Using a web browser on a computer is the best option for viewing mathematics in Top Hat.

Technology Requirements

In addition, students **must** be able to **scan/photograph written work** and convert the images to **PDF files**.

- For iPhone / iPad try the *free* Adobe Scan Digital PDF Scanner https://tinyurl.com/tlhhkj3
- On Google Play try the *free* Adobe Scan Digital PDF Scanner https://tinyurl.com/v7csw88

Alternative to scanning; students may create PDF files of written work by:

- writing with tablet app and saving to a PDF file
- students will NOT be permitted to submit typed work for Quizzes (without approved SAS accommodation)

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;

- Stable internet connection.

For more information please refer to the UofC ELearning online website.

7. **Examination Policy:**

Students must submit quizzes as **single PDF files**. This may be done by:

- Printing a copy of the quiz, writing on the quiz pages, and scanning your solutions (with a scanner or smartphone application).
- Using a tablet app to write your solution on a copy of the quiz pages.
- Alternatively, if you are unable to print and do not have access to a tablet, then you may complete the quiz on two (2) single-sided pages of 8.5" by 11" paper and then scanning your solutions.
- Students will **NOT** be permitted to submit typed work for Quizzes without SAS approved accommodations

How to scan written work with a smartphone:

- For iPhone / iPad try the *free* Adobe Scan Digital PDF Scanner https://tinyurl.com/tlhhkj3
- On Google Play try the *free* Adobe Scan Digital PDF Scanner https://tinyurl.com/v7csw88

Writing Assignment (Discussion Post) Expectations

- Discussion posts are intended to help you practice problem solving and mathematical writing.
- You should use your notes, the topic videos, and the course text(s) to help you complete the posts.
- You should complete the initial posts on your own to ensure that you receivemaximum benefit from reading your peer's posts and receiving feedback on your posts from your peers.
- **You may NOT use**: homework answer services, like Chegg.com, Slader, etc.
- **You may NOT use**: mathematics question & answer forums like Mathematics Stack Exchange or MathOverflow

Lyryx Assignment and Top Hat Expectations

- Lyryx Assignments and Top Hat questions are intended to help you **practice computational skills** and problem solving, and to check your theoretical understanding.
- You should use your notes, the topic videos, and the course text(s) & lecture notes to help you complete the assignments.
- You may discuss assignment problems with your peers on the D2L discussion boards; however, you should complete your assignments on your own (i.e., independently).
- **You may NOT use**: homework answer services, like Chegg.com, Slader, etc.
- **You may NOT use**: mathematics question & answer forums like Mathematics Stack Exchange
- We recommend that you do NOT use (online) computer algebra systems like Wolfram Alpha, Mathematica, etc.

Quiz Expectations

- The Quizzes are intended to help you **assess your understanding of fundamental concepts**, definitions and theorems, as well as to assess your **problem solving skills** and **mathematical writing**.
- You should complete quizzes on your own, and without help from your peers
- You may re-watch the topic videos as you complete the quiz
- You may refer to the notes you've taken on the fill-in-the-blank notes
- **You may NOT use**: homework answer services, like Chegg.com, Slader, etc.
- **You may NOT use**: mathematics question & answer forums like Mathematics Stack Exchange
- We recommend that you do NOT refer to the course text book(s) as you complete the quiz
- We recommend that you do NOT use: (online) computer algebra systems likeWolfram Alpha, Mathematica, etc.

On all assessments, be wary of using external internet resources (course notes, You Tube videos, etc.); you will be expected to use the standard notation, definitions, and constructions used in the videos and fill-in-the- blank notes. Outside resources may usedifferent conventions for notation, definitions, and standard constructions.

Students should also read the Calendar, Section G, on Examinations.

8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

9. **Writing Across The Curriculum Statement:**

   For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:**

    If you agree, your course work may be used for research purposes. Your responses will remain anonymous and confidential. Grouped data (no individual responses) may be used in academic presentations and publications. Participation in such research is voluntary and will not influence grades in this course. Students' signed consent forms will be withheld from instructors until after final grades are submitted. More information will be provided at the time student participation is requested.

    See also Section E.5 of the University Calendar.

11. **Reappraisal Of Grades:**

    A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

    a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections I.1 and I.2 of the University Calendar

    b. **Final Exam:** The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

12. **Other Important Information For Students:**

    a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, Mental Health Services Website) and the Campus Mental Health Strategy website (Mental Health).

    b. **SU Wellness Services:** For more information, see www.ucalgary.ca/wellnesscentre or call 403-210-9355.

    c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at 403-220-2208. The complete University of Calgary policy on sexual violence can be viewed at (https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf)

    d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional Code of Conduct and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

       Student Handbook on Academic Integrity
       Student Academic Misconduct Policy and Procedure
       Research Integrity Policy

       Additional information is available on the Student Success Centre Academic Integrity page

e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at procedure-for-accommodations-for-students-with-disabilities.pdf.

   Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Mathematics & Statistics, Mark Bauer by email bauerm@ucalgary.ca or phone 403-220-4189. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See Section E.4 of the University Calendar.

f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see Legal Services website.

g. **Student Union Information:** VP Academic, Phone: 403-220-3911 Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: 403-220-3913 Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: ombuds@ucalgary.ca.

h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

Course Outcomes:

- Explore the relationship between key linear algebra concepts and their geometric representation.
- Seek to apply linear algebra techniques to a variety of practical problems.
- Read and create proofs of mathematical statements about topics covered in the course.
- State all of the technical definitions covered in the course (such as a vector space, span, independence, dimension, linear transformation, kernel, image, and other terms)
- State all of the relevant theorems covered in the course
- Use these definitions and theorems from memory to construct solutions to problems and/or proofs.
- Verify that an abstract mathematical object satisfies a given definition, or is a counterexample
- Analyze a finite dimensional vector space and its properties, including the basis structure of vector spaces
- Understand the concept of a linear transformation as a map from one vector space to another, and to be able to construct such maps given a basis of the domain
- Use the Gram-Schmidt process to produce an orthonormal basis

Electronically Approved - May 04 2021 11:42

Department Approval