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Syllabus

- Due Sep 19 at 12a.m.
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- Due Oct 24 at 12a.m.
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- Due Nov 7 at 12a.m.
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- Due Nov 14 at 12a.m.
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- Due Nov 21 at 12a.m.
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- Due Nov 28 at 12a.m.
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- **Due Dec 5 at 12a.m.**
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- **Due Dec 30 at 12a.m.**
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Announcements

There are no announcements for this course.

Assignments

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Engagement

Spot attendance will be recorded here.

Due at: Dec 30 at 12a.m.

Unlock at: Sep 9 at 12a.m.

Grading Type: Points

Points: 5.0

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WeBWorK assignments

You can access all WeBWorK assignments through this link.

Due at: Dec 30 at 12a.m.

Grading Type: Points

Points: 5.0

Submitting: External Tool

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★ PP1

The Practice Problem for this assignment is 1.3.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Sep 19 at 12a.m.

Unlock at: Sep 10 at 12a.m.

Lock at: Sep 19 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP10

The Practice Problem for this assignment is 10.2.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Nov 21 at 12a.m.

Unlock at: Nov 10 at 12a.m.

Lock at: Nov 21 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP11

The Practice Problem for this assignment is 11.3.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Nov 28 at 12a.m.

Unlock at: Nov 17 at 12a.m.

Lock at: Nov 28 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP12

The Practice Problem for this assignment is 12.1.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Dec 5 at 12a.m.

Unlock at: Nov 24 at 12a.m.

Lock at: Dec 5 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP13

The Practice Problem for this assignment is 13.4.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Dec 12 at 12a.m.

Unlock at: Dec 1 at 12a.m.

Lock at: Dec 12 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP2

The Practice Problem for this assignment is 2.4.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Sep 19 at 12a.m.

Unlock at: Sep 15 at 12a.m.

Lock at: Sep 26 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP3

The Practice Problem for this assignment is 3.3.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Oct 3 at 12a.m.

Unlock at: Sep 22 at 12a.m.

Lock at: Oct 3 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP4

The Practice Problem for this assignment is 4.5.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Oct 10 at 12a.m.

Unlock at: Sep 29 at 12a.m.

Lock at: Oct 10 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP5

The Practice Problem for this assignment is 5.2.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Oct 17 at 12a.m.

Unlock at: Oct 6 at 12a.m.

Lock at: Oct 17 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP6

The Practice Problem for this assignment is 6.3.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Oct 24 at 12a.m.

Unlock at: Oct 13 at 12a.m.

Lock at: Oct 24 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP7

The Practice Problem for this assignment is 7.4.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Oct 31 at 12a.m.

Unlock at: Oct 20 at 12a.m.

Lock at: Oct 31 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP8

The Practice Problem for this assignment is 8.5.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Nov 7 at 12a.m.

Unlock at: Oct 27 at 12a.m.

Lock at: Nov 7 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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★ PP9

The Practice Problem for this assignment is 9.3.

All Practice Problems are File PP(norubrics).pdf could not be included in the ePub document. Please see separate zip file for access.. The versions with solutions and grading rubrics are File PP(rubrics).pdf could not be included in the ePub document. Please see separate zip file for access..

Submit a scan (PDF is the only supported format) of your self-graded Practice Problem. Your grade out of 10 should be indicated clearly at the top of the first page.

Remember that these assignments are assessed for completion (and may be assessed for the accuracy of your grading). **How you do on the problem itself is not assessed. Give your best honest effort.**

Due at: Nov 14 at 12a.m.

Unlock at: Nov 3 at 12a.m.

Lock at: Nov 14 at 12a.m.

Grading Type: Points

Points: 1.0

Submitting: Online Upload

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MATH 111/221

Basics

- [Contacts](#)
- [Expectations](#)
- [The ★ System](#)

For issues about mathematics and homework, use the Piazza forum (the link is on the sidebar) or attend office hours. Email your instructor only for personal or administrative issues. For all other issues, use Piazza.

There are two types of office hours for this course, offering a total of roughly four hours each week. Office hours run by the professor take place immediately following lectures in the professor's office, MATX 1215, on the second floor of the Math Annex building. Office hours run by an Honours Mathematics teaching assistant and veteran of this course, Ariadne Weber-Madison, take place from 4:00 to 6:00 on Thursday afternoons in MATX 1102, on the first floor of the Math Annex Building. *Office hours are an extremely valuable resource; use them!*

Questions on invigilated assessments (the two tests and the final exam) fall into two categories.

☆	These questions assess core techniques. ☆ questions account for two-thirds of the marks on each invigilated assessment. <i>The majority of those questions will be taken directly from WeBWorK assignments.</i> Approximately two-thirds of class time will be spent on the theoretical underpinnings and direct practice of ☆ questions. To pass the course, aim for success on ☆ questions.
★	These questions extend core techniques to new contexts. <i>It is normal to look at these questions and initially not know what to do.</i> ★ questions account for one-third of the marks on each invigilated assessment. Approximately one-third of class time will be spent on direct practice of ★ questions. In most classes, the end of the lecture will be spent introducing and starting work on a ★ question. Each week you will also be given a ★ question as a Practice Problem, along with a grading scheme. With the exception of the last week, every due date for a WeBWorK assignment is also the due date to submit a scan of the self-graded Practice Problem. This will be assessed for completion only, and is to encourage you to take the Practice Problems seriously. There is no advantage to looking at the grading scheme in advance. <i>Some Practice Problems may reappear on invigilated assessments.</i> If you want to get an A in the course, aim for success on ☆ and ★ questions.

Attendance in this course is mandatory, and necessary for success. Do not attend lectures passively. Instead, prepare for each lecture by skimming the relevant section(s) of the textbook. Take every opportunity during a lecture to do the presented work yourself. *If you have a question, ask.*

In addition to attending lectures, schedule at least one hour per day, six days of the week, for uninterrupted, distraction-free *deliberate practice*. Deliberate practice consists of turning off your phone, working on WeBWorK problems and

Practice Problems (not reading notes or watching videos), and reflecting on your work. What "unlocked" the problem for you? How would you describe the main moves in your solution to a classmate? If the numbers or parameters of the problem were different, how would your solution change?

The use of generative artificial intelligence on WeBWorK problems and Practice Problems is strongly discouraged, and also disadvantageous to you. Using generative AI confers almost no grade advantage for WeBWorK problems, where full marks are easily attainable without it; and literally no grade advantage for Practice Problems, which are graded for completion only. Moreover, failing to engage properly with the work will put you at an enormous disadvantage when you write the invigilated tests and exams that make up the vast majority of your grade. You can succeed in this course! But it requires substantial effort sustained over time.

Calendar and resources

- [Calendar](#)
- [Textbook](#)
- [Piazza](#)
- [Math Learning Centre](#)

The content covered week by week can be found below:

This course uses the UBC edition of [Interactive Linear Algebra](#). This is a free online textbook adapted by UBC professors for UBC students; there are no physical copies available but the PDF file is easily printable.

The link to Piazza can be found on the sidebar.

Piazza is a discussion board where you can ask questions or talk with your classmates, professors, and TAs. If you have general questions about the course (*e.g.* where to hand in assignments) or technical questions (*e.g.* how to format a WeBWorK answer), post them on Piazza instead of emailing the professor, as other students almost certainly have the same question.

Feel free to ask questions about WeBWorK assignments and Practice Problems. However, you must try the question first, and in your post, describe the work you have done so far. It is a good idea to include a screenshot of your work. If you respond to a question, you must not give away the answer. Bonus engagement marks may be given for especially insightful questions and responses.

The [Math Learning Centre \(MLC\)](#) is a drop-in study space, open to all students, where you can get help from Math graduate students.

Grades and assessments

-

- [Summary](#)
- [WeBWorK](#)
- [Engagement and Practice Problems](#)
- [Tests](#)
- [Final exam](#)
- [Regrading](#)

Your final grade will be calculated using the chart below.

Week	Dates	Topics and <i>one sentence summaries</i>	Textbook sections	Comments	Notes
1	September 9-11	Systems of linear equations, vectors <i>This course is about systems of linear equations</i>	2.1, 1.1		File Week1notes.pdf could not be included in the ePub document. Please see separate zip file for access.
2	September 14-18	Vector equations and spans, row reduction <i>We can describe systems of linear equations as vector equations</i>	1.2, 2.2		
3	September 21-25	Parametric form, matrix equations, solution sets <i>We can describe vector equations as matrix equations, including the two fundamental equations $Ax=0$ and $Ax=b$</i>	2.3, 2.4, 3.1		
4	September 28-29, October 1-2	Linear independence, subspaces <i>We can describe solutions to matrix equations in terms of subspaces</i>	3.2, 3.3	September 30 is a statutory holiday	
5	October 5-9	Bases, dimension <i>We can describe subspaces in terms of bases</i>	3.4	Test 1 takes place in your second class this week	
6	October 13-16	Coordinate systems, the Rank Theorem <i>There is a relationship between the solution subspaces for the fundamental equations $Ax=0$ and $Ax=b$</i>	3.5, 3.6	October 12 is a statutory holiday	
7	October 19-23	Transformations <i>We can describe matrices as functions</i>	4.1, 4.2, 4.3		
8	October 26-30	Matrix multiplication, inverses, the Invertible Matrix Theorem <i>As functions, matrices can be composed and inverted</i>	4.4, 4.5, 4.6		
9	November 2-6	Determinants <i>Whether a matrix can be inverted is indicated by its determinant</i>	5.1, 5.2	Test 2 takes place in your second class this week	
10	November 12-13	Eigenvalues and eigenvectors <i>There is a third fundamental matrix equation: $Ax=\lambda x$</i>	6.1	The Midterm Break is November 9-11	

11	November 16-20	The characteristic polynomial <i>We can describe solutions to the fundamental matrix equation $Ax=\lambda x$ in terms of the characteristic polynomial</i>	6.2		
12	November 23-27	Similarity, diagonalization, complex eigenvalues <i>Solutions to the fundamental matrix equation $Ax=\lambda x$ determine whether the matrix is diagonalizable, which makes it easier to work with</i>	6.3, 6.4, 6.5		
13	November 30-December 4	Dot products and orthogonality, orthogonal complements <i>We can extend concepts of length and perpendicularity to higher dimensions</i>	7.1, 7.2		

Assessment	Percent
WeBWork assignments	5%
Engagement and Practice Problems	5%
Tests	30%
Final exam	60%

WeBWork assignments are posted approximately weekly. WeBWork assignments make up **5%** of your final grade. WeBWork assignments are used to assess core techniques. Calculation-based questions on WeBWork assignments are exclusively at the ☆ level. ☆ questions account for two-thirds of the marks on each invigilated assessment. *The majority of those questions **will** be taken directly from WeBWork assignments.*

Your lowest WeBWork assignment grade will be ignored. This is intended to account for technical difficulties, illness, and other personal situations.

You can access WeBWork by clicking on "Assignments" on the sidebar.

Engagement and self-graded Practice Problems are worth **5%** of your final grade.

Attendance: Attendance is mandatory, and may be checked. If you cannot attend a particular class, email the instructor in advance.

Self-graded Practice Problems: Every week, you will be given a ★ question as a Practice Problem, along with a grading scheme. With the exception of the last week, every due date for a WeBWork assignment is also the due date to submit a scan of the self-graded Practice Problem. This will be assessed for completion only, and is to encourage you to take the Practice Problems seriously. There is no advantage to looking at the grading scheme in advance.

Additional Engagement: On occasion, you may be asked to complete additional mandatory engagement work (for example, surveys).

Each instance of missed attendance, of incomplete Practice Problems, or of missed engagement work, will result in a deduction of **1%** of your final grade (to a maximum of 5%). You may, however, skip one Practice Problem without penalty. This is intended to account for technical difficulties, illness, and other personal situations. *Some Practice Problems **may** reappear on invigilated assessments.*

Bonus marks may be awarded for extra, voluntary engagement. For example, there may be occasions in the course where graduate student instructors will teach under the supervision of the professor. After each such instance, there will be an opportunity for feedback. Providing feedback may result in a bonus engagement mark.

There are two tests. Each test is worth **15%** of your final grade. Each test consists of ten ☆ questions worth a total of 20 marks, and one ★ question worth 10 marks.

The final exam is worth **60%** of your final grade. The exam consists of twenty ☆ questions worth a total of 40 marks, and two ★ questions worth a total of 20 marks.

If you find a marking error on returned work, you can request a regrade within 48 hours of the assessment being returned. All regrade requests must be submitted via email and include details of where you think the grading rubric has been applied incorrectly to your work. Requests that refer to how the rubric was applied to someone else's work will be ignored. Do not include a scan of your assessment; instructors have access to your graded work.

Your work may be regraded in part or in full. Your mark may be adjusted downward as well as upward. Note that WeBWorK marks answers wrong if they are entered with incorrect syntax; this is not a grading error.

Frequently Asked Questions

This section will be updated throughout the term with common questions and problems.

Will lectures be recorded?

No, lectures will not be recorded.

On written assignments and exams, is it necessary to simplify answers?

Yes. You must simplify your answers.

Are calculators allowed?

Unless specifically stated otherwise, notes, calculators, cell phones and other electronic devices are strictly prohibited from use during tests and the final exam. Use of electronic devices is discouraged during lectures.

Will final grades be scaled?

Final grades are subject to minor adjustments at the discretion of the teaching team. Individual members of the teaching team are not responsible for adjustments.

What happens if I miss an assessment?

You may miss one WeBWorK assignment and one Practice Problem without penalty, as described above. If you miss a test, you will be given a grade of zero on the test unless you provide justification acceptable to the teaching team, in which case the weight of the test will be shifted to the final exam. If you miss the final exam, you will be given a grade of zero, and you must consult with Faculty Advising (likely Science Advising or Arts Advising) regarding your options.

What happens to class in the event of bad weather?

[If class cancellations are announced by the university at ubc.ca](#), class for that day will not take place. If a test is scheduled for that day, the test will be either rescheduled, or cancelled and the weight of the test shifted to the final exam.

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