

MATH 110: Matrix Algebra For Engineers
Course Outline
Sections A01-A03, Fall 2013

Instructor: Adriana Wise **Phone:** (250) 721-7458
Office: DTB A533 **E-Mail:** awise at uvic dot ca
Office Hours: 9:30-10:30 Tuesday and Wednesday or by appointment
Lectures [A01, CRN 12119]: 8:30 – 9:20 Tuesday, Wednesday and Friday, location ECS 123

Instructor: Jing Huang **Phone:** (250) 721-7447
Office: DTB A549 **E-Mail:** huangj at uvic dot ca
Office Hours: 13:30 - 14:20 Tuesday, Wednesday and Thursday or by appointment
Lecture [A02, CRN 12120]: 12:30-13:20 Tuesday, Wednesday and Friday, location DTB A120

Instructor: Jason Siefken **Phone:** (250) 721-7465
Office: DTB A555 **E-Mail:** siefkenj at uvic dot ca
Office Hours: 13:30-14:30 Tuesday and Wednesday or by appointment
Lectures [A03, CRN 13949]: 12:30 – 13:20 Tuesday, Wednesday and Friday, location MAC D110

Tutorials (from Sep 11):

T01: 14:30 – 15:20 Wed, location ELL 160; T02: 14:30 – 15:20 Wed, location MAC D288
T03: 14:30 – 15:20 Wed, location COR B107; T04: 15:30 – 16:20 Wed, location ELL 160
T05: 15:30 – 16:20 Wed, location COR B111; T06: 15:30 – 16:20 Wed, location MAC D288
T07: 16:30 – 17:20 Wed, location COR B143; T08: 16:30 – 17:20 Wed, location ELL 61
T09: 16:30 – 17:20 Wed, location MAC D110

Course Contents and/or Objectives: Complex numbers; matrices and basic matrix operations; vectors; linear equations; determinants; eigenvalues and eigenvectors; linear dependence and independence; orthogonality.

Textbook: *Linear Algebra: A Modern Introduction*, 3rd edition 2010, by David Poole (2nd edition is fine)

Calculators: The department has adopted a standard calculator: the Sharp EL-510R or EL-510-RNB. This is the only calculator that will be permitted for use in any course offered by the department. It can be purchased at the UVic Bookstore, or elsewhere, for less than \$11.

Evaluation: There will be two take home projects due at the beginning of the tutorial (Oct 30 and Nov 29); nine weekly quizzes (10 minutes each in lecture) based on the homework assignments; two 50-minute midterms (in the evenings of Oct 4 and Nov 22), and Final Examination (3 hours) during the December examination period scheduled by Records Services.

COMPONENT	DATE	WEIGHT
Midterm 1	18:00-18:50, October 4	14%
Midterm 2	18:00-18:50, November 22	14%
Quizzes, based on the Homework Assignments 1-9 (in lectures)	13/09, 20/09, 27/09, 11/10, 18/10, 25/10, 1/11, 8/11, 29/11	2% each (best 8 total 16%)
MatLab projects 1-2 (due in tutorials)	due on 30/10, 27/11	3% each (total 6%)
Final Examination	To be announced	50%

Once marked, tests, quizzes and projects will be returned in class, or can be claimed during office hours. Any term work that is not collected by the end of the final examination will be recycled. In this Multi-section course all the tests will be set up by instructors in collaboration and marking will be monitored to ensure consistency across all sections.

Tutorials: Math 110 has a one-hour weekly tutorial component, which you should regard as a fourth hour of instruction. In the tutorials you will be introduced to examples which have crucial information for successfully completing the course. You should plan on 100% attendance at the lectures and the tutorials.

Homework: Each homework assignment will be available on the course webpage at least one week prior to the quiz. Suggested problems (all problems at the end of the chapters of the textbook) are for practice only and should not be submitted for marking. It would be a good idea to keep an organized notebook of full solutions to suggested problems and homework assignments for convenient review for tests. Course Web Page can be found at <http://www.math.uvic.ca> (look under Undergraduate, Courses Pages)

Computer Facilities: Locations of Computer Facilities and operating hours are posted on UVic's website under Computing Facilities. PC stations in these facilities are loaded with MatLab, the software package needed to complete two projects. To gain access to MatLab, you need a NetLink-ID and NetLink Password. Students who do not already have access can apply online at <https://netlink.uvic.ca>

Math & Stats Assistance: If you need assistance, you are encouraged to go to the Math & Stats Assistance Centre (locations and hours of operation are posted at <http://www.math.uvic.ca/~msassist/>). The Department of Mathematics and Statistics also maintains a list of private tutors. You can get a copy of this list from the department's main office in DTB A425.

Missing Term Work: *There will be no extensions on the deadline for two projects and no make-up tests.* If you miss one midterm test or no more than three quizzes due to illness, accident, or family affliction, you must notify your lecturer as soon as possible, and provide a written request to be excused as well as supporting documentation within 7 days of the missed test or quiz. Your weighted score on the rest of the term's work will be used instead of excused missed course work.

Final Examination: Off-schedule final examinations (i.e., deferred examinations) are given only in accordance with the university policy as outlined in the Calendar. If you are unable to write a final examination due to illness, accident or family affliction, please refer to the following webpages for detailed instructions how to proceed: <http://web.uvic.ca/calendar2013/FACS/UnIn/UARe/AcCo.html> and <http://web.uvic.ca/calendar2013/FACS/UnIn/UARe/DeSt.html>

Students are strongly advised not to make plans for travel or employment during the final examination period as special arrangements will not be made for examinations that conflict with such plans. For more information on the Undergraduate Course Policies see:
<http://www.uvic.ca/science/math-statistics/undergraduate/course-policies/index.php>

The usual conversion of course percentage to letter grade is:

Letter Grade	A+	A	A-	B+	B	B-	C+	C	D
Lower Bound	90%	85%	80%	77%	73%	70%	65%	60%	50%

Commitment to Inclusivity and Diversity: The University of Victoria is committed to promoting, providing and protecting a positive, supportive and safe learning and working environment for all its members.

Guidelines on Religious Observances: Where classes or examinations are scheduled on the holy days of a religion, students may notify their instructors, at least two weeks in advance, of their intention to observe the holy day(s) by absenting themselves from classes or examinations. Instructors will provide reasonable opportunities for such students to make up work or missed examinations.

Academic Integrity:

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. The University's policy on academic integrity can be found at <http://web.uvic.ca/calendar2013/FACS/UnIn/UARe/PoAcI.html>

Math 110, Fall 2013
Tentative Schedule of Topics

	PLEASE READ EACH SECTION BEFORE CLASS
Week 1 Sept 4, 6	Introduction to the Course 1.1 The Geometry and Algebra of Vectors
Week 2 Sept 10, 11, <u>13</u>	1.2 Length and Angle: The Dot Product 1.3 Lines and Planes
Week 3 Sept 17, 18, <u>20</u>	2.1 Introduction to Systems of Linear Equations 2.2 Direct Methods for Solving Linear Systems
Week 4 Sept 24, 25, <u>27</u>	2.3 Spanning Sets and Linear Independence
Week 5, Oct 1, 2, <u>4</u>	3.1 Matrix Operations 3.2 Matrix Algebra Midterm Examination 1 (18:00-18:50, Friday, Oct 4)
Week 6 Oct 8, 9, <u>11</u>	3.3 The Inverse of a Matrix
Week 7 Oct 15, 16, <u>18</u>	3.5 Subspaces, Basis, Dimension, and Rank
Week 8 Oct 22, 23, <u>25</u>	3.6 Introduction to Linear Transformations App.C Algebra of Complex numbers
Week 9 Oct 29, <u>30*</u> Nov <u>1</u>	4.1 Introduction to Eigenvalues and Eigenvectors 4.2 Determinants
Week 10 Nov 5, 6, <u>8</u>	4.3 Eigenvalues & Eigenvectors of $n \times n$ Matrices 4.4 Similarity and Diagonalization
Week 11 Reading break Nov 15	Reading Break (Nov 11 – 13) 5.1 Orthogonality in \mathbb{R}^n
Week 12 Nov 19, 20, <u>22</u>	5.2 Orthogonal Complements and Orthogonal Projections 5.3 The Gram-Schmidt Process and the QR Factorization Midterm Examination 2 (18:00-18:50, Friday, Nov 22)
Week 13 Nov 26, <u>27*</u> , <u>29</u>	5.3 The Gram-Schmidt Process and the QR Factorization 5.4 Orthogonal Diagonalization of Symmetric Matrices
Week 14 Dec 3, 4	App.C De Moivre's and Euler's Formulae Final remarks

The dates of nine weekly quizzes and two midterms are underlined.

The due dates of the MatLab projects' (in tutorials) are underlined and marked by the star *.

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Recommended Problems

Chap	Poole, Linear Algebra, Third Edition	Poole, Linear Algebra, Second Edition
1.1	1,3,5(a,b), 7, 13, 15, 17, 19, 21	1,3,5(a,b), 7, 13, 15, 17, 19, 21
1.2	5, 11, 15, 17, 19, 23, 25, 31, 41, 47, 59, 65	5, 11, 15, 17, 19, 23, 25, 31, 35, 41, 53, 59
1.3	1, 5, 7, 9, 13, 15, 18, 19, 23, 27, 29, 35, 37, 43	1, 5, 7, 9, 13, 15, 18, 19, 23, 27, 29, 35, 37, 43
2.1	1, 2, 3, 5, 8, 15, 17, 21, 24, 27, 29, 33, 35, 39	1, 2, 3, 5, 8, 15, 17, 21, 24, 27, 29, 33, 35, 39
2.2	1, 3, 7, 13, 19, 21, 23, 25, 27, 29, 33, 43, 47, 49	1, 3, 7, 13, 19, 21, 23, 25, 27, 29, 33, 43, 47, 49
2.3	1, 3, 5, 7, 11, 15, 23, 27, 29, 33, 37, 39, 43, 47	1, 3, 5, 7, 11, 15, 23, 27, 29, 33, 37, 39, 43, 47
3.1	1,5,9,13,15,18,19,20,21,23,24,25,29,32,35,37,38,40	1,5,9,13,15,18,19,20,21,23,24,25,29,32,35,37,38,40
3.2	1,3,5, 7, 9, 11, 13, 15, 17, 21, 25, 27, 35, 37, 39, 47	1,3,5, 7, 9, 11, 13, 15, 17, 21, 25, 27, 35, 37, 39, 47
3.3	1, 5, 7, 9, 11, 13, 17, 19, 23, 27, 34, 39, 43, 53, 59	1, 5, 7, 9, 11, 13, 17, 19, 23, 27, 34, 39, 43, 53, 59
3.4	1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 23, 25, 27, 31	1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 23, 25, 27, 31
3.5	1,3,5,7,9,11,13,15,17,18,21,23,25,29,31,35,39,40,41,42, 46,51	1,3,5,7,9,11,13,15,17,18,21,23,25,29,31,35,39,40,41,42, 46,51
3.6	1, 5, 7, 9, 11, 13, 15, 21, 23, 25, 33, 37, 45, 47	1, 5, 7, 9, 11, 13, 15, 21, 23, 25, 33, 37, 45, 47
4.1	1, 3, 5, 7, 11, 13, 15, 17, 19, 23, 25, 35, 37	1, 3, 5, 7, 11, 13, 15, 17, 19, 23, 25, 35, 37
4.2	1,3,10,11,15,17, 23, 27, 32, 33, 35, 39, 45, 55, 59, 63	1,3,10,11,15,17, 23, 27, 32, 33, 35, 39, 45, 55, 59, 63
4.3	1, 5, 9, 11, 13, 15, 19, 21, 23, 25	1, 5, 9, 11, 13, 15, 19, 21, 23, 25
4.4	3, 5, 7, 9, 13, 15, 17, 19, 23, 25, 27, 29, 33, 39, 47	3, 5, 7, 9, 13, 15, 17, 19, 23, 25, 27, 29, 33, 39, 47
5.1	1, 3, 5, 7, 9, 15, 19, 27, 29, 31, 37	1, 3, 5, 7, 9, 15, 19, 27, 29, 31, 37
5.2	1, 3, 5, 7, 9, 13, 17, 21, 25	1, 3, 5, 7, 9, 13, 17, 21, 25
5.3	1, 3, 5, 7, 9, 10, 11, 12, 14, 15, 16, 17, 18, 21	1, 3, 5, 7, 9, 10, 11, 12, 14, 15, 16, 17, 18, 21
5.4	1, 3, 5, 7, 9, 11, 13, 14, 17, 19, 21, 23, 24	1, 3, 5, 7, 9, 11, 13, 14, 17, 19, 21, 23, 24
App.C	See practice problems posted on the course webpage	See practice problems posted on the course webpage

Note that it is possible, but unlikely, that unforeseen circumstances may cause some alteration of the information in the document. Any such alterations will be announced in class. If you miss any announcement because of inattention or absence from class, then you must accept the consequences of missing it.