

Faculty of Science  
DEPARTMENT OF MATHEMATICS AND STATISTICS  
UNIVERSITY OF CALGARY  
Course Information Sheet

Linear Algebra for Science and Engineering  
MATH221 L02  
Fall Term 2007

Table 1: **Labs, lectures and continuous tutorials**

Monday	Tuesday	Wednesday	Thursday	Friday
		Labs: B08 09:00–09:50 B07 09:00–09:50 B06 10:00–10:50 B05 10:00–10:50		
	Lecture: 14:00–15:15 in ST145		Lecture: 14:00–15:15 in ST145	
	Coffee time: 15:15–15:45 First Cup		Coffee time: 15:15–15:45 First Cup	
Continuous Tutorial: 13:00–15:00 in MS569	Continuous Tutorial: 12:00–15:00 in MS569	Continuous Tutorial: 13:00–15:00 in MS569	Continuous Tutorial: 12:00–15:00 in MS569	Continuous Tutorial: 13:00–15:00 in MS569

1. **Instructor:** Dr. Clifton Cunningham

- **Contact info:** [cunning@math.ucalgary.ca](mailto:cunning@math.ucalgary.ca)
- **Office:** Mathematical Sciences Building, Room 528.
- **Coffee time (office hour):** Tuesday and Thursday, 15:15–15:45 by the First Cup Café (near Social Sciences Tower), *by appointment only*.

**Course website:** go to <http://blackboard.ucalgary.ca>

2. **Pre-requisite:** 70% or higher in Pure Math 30 or equivalent. The Faculty of Science policy on pre- and co-requisite checking is outlined in the current University Calendar (see [www.ucalgary.ca/pubs/calendar](http://www.ucalgary.ca/pubs/calendar)) Faculty of Science, section 5C. It is your responsibility to ensure that you have the pre- and co-requisites for the course; you may be withdrawn from the course without notice if you do not have the course pre-requisite.
3. **Fee policy:** Fee policy: After the last day to drop/add courses, there will be no refund of tuition fees if a student withdraws from a course, courses or the session.

4. **Academic Accommodations:** It is the student's responsibility to request academic accommodations. A student with a documented disability who may require academic accommodation must register with the Disability Resource Centre to be eligible for formal academic accommodation. DRC registered students are required to discuss their needs with the instructor no later than fourteen (14) days after the start of this course.
5. **Evaluation:** The University policy on grading and related matters is described in the current University Calendar, Academic Standings. In determining the overall grade in the course, the following weights will be used:
  - **ten homework assignments:**  $10 \times 1\% = 10\%$ , posted each Thursday morning and due the following Tuesday morning (see Table 2);
  - **five quizzes:**  $5 \times 8\% = 40\%$ , written in your lab section every second Wednesday (see Table3);
  - **one mid-term test:** 10%, written in your lab section on 2007.10.31, location to be announced (see Tables 2 and 3);
  - **one final exam:** 40%, to be held during the period 2007.12.10–2007.12.19, as scheduled by the Registrar.
6. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are outlined in the current University Calendar, Faculty of Science, section 6A. It is the student's responsibility to familiarize herself/himself with these regulations.
7. **Academic misconduct** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the current University Calendar. See: <http://www.ucalgary.ca/honesty/>
8. There will be no out-of-class-time activity for this course. Regularly scheduled classes have precedence over any out-of-class-time activity.

Department Authorization:

Date:

- **Continuous Tutorial:** The ‘Continuous Tutorial’, held in MS569, is one of your most important resources for this course, since it offers on-demand help specifically for linear algebra, five days per week! You should think of the Continuous Tutorial as a drop-in tutorial to which you can bring all your linear algebra questions.
- **Recommended Reading:** *Linear Algebra with Applications* by W. Keith Nicholson. Please note that this book is recommended reading, not a required purchase. For the most part I will use the notation from this book, but you can survive the course perfectly well without buying your own copy. I will also be happy to lend you a copy of the book for short periods during the course. My treatment of some topics is different than that found in *Linear Algebra with Applications*, and some important topics will not be found in the book at all, so it is important to take good lecture notes during this course.

Table 2: Lecture topics and homework assignments

	Date	Topics	Rec'd reading	Home'k (posted) due	
1	2007.09.11	introduction to the course			
2	2007.09.13	linear transformations and matrices		(1)	
3	2007.09.18	systems of linear equations	§1.1	1	
4	2007.09.20	Gaussian elimination	§1.2	(2)	
5	2007.09.25	homogeneous equations	§1.3	2	
6	2007.09.27	matrix operations	§2.1	(3)	
7	2007.10.02	matrix multiplication	§2.2	3	
8	2007.10.04	matrix inverses	§2.3	(4)	
9	2007.10.09	elementary matrices	§2.4	4	
10	2007.10.11	matrix transformations	§2.5	(5)	
11	2007.10.16	cofactor expansion	§3.1	5	
12	2007.10.18	determinants	§3.2	(6)	
13	2007.10.23	matrix inversion re-visited	§3.2	6	
14	2007.10.25	eigenvalues and eigenvectors	§3.3	(review)	
15	2007.10.30	diagonalization and mid-term review		review	
16	2007.11.01	complex numbers	App'x A	(7)	
17	2007.11.06	complex eigenvalues and eigenvectors		7	
18	2007.11.08	complex diagonalization			
19	2007.11.15	projection, reflection and rotation in 2D	§4.1	(8)	
20	2007.11.20	projection and reflection in 3D	§4.2	8	
21	2007.11.22	vector product (‘cross’ product) in 3D	§4.3	(9)	
22	2007.11.27	rotation in 3D	§4.4	9	
23	2007.11.29	orthogonal and unitary matrices		(10)	
24	2007.12.04	quaternions and rotation in 3D		10	
25	2007.12.06	$SU(2) \xrightarrow{2:1} SO(3)$		(review)	
	2007.12.09	exam review		review	

Table 3: **Lab and quiz schedule**

<b>Date and time</b>	<b>lab, location (quiz)</b>	<b>lab, location (quiz)</b>
2007.09.12 at 09:00	B07: no lab this week	B08: no lab this week
2007.09.12 at 10:00	B05: no lab this week	B06: no lab this week
2007.09.19 at 09:00	B07 in MS317 (Quiz 1a)	B08 in MS569
2007.09.19 at 10:00	B05 in MS317 (Quiz 1b)	B06 in MS325
2007.09.26 at 09:00	B07 in MS569	B08 in MS317 (Quiz 1c)
2007.09.26 at 10:00	B05 in MS325	B06 in MS317 (Quiz 1d)
2007.10.03 at 09:00	B07 in MS317 (Quiz 2a)	B08 in MS569
2007.10.03 at 10:00	B05 in MS317 (Quiz 2b)	B06 in MS325
2007.10.10 at 09:00	B07 in MS569	B08 in MS317 (Quiz 2c)
2007.10.10 at 10:00	B05 in MS325	B06 in MS317 (Quiz 2d)
2007.10.17 at 09:00	B07 in MS317 (Quiz 3a)	B08 in MS569
2007.10.17 at 10:00	B05 in MS317 (Quiz 3b)	B06 in MS325
2007.10.24 at 09:00	B07 in MS569	B08 in MS317 (Quiz 3c)
2007.10.24 at 10:00	B05 in MS325	B06 in MS317 (Quiz 3d)
2007.10.31 at 09:00	B07: <b>mid-term test</b>	B08: <b>mid-term test</b>
2007.10.31 at 10:00	B05: <b>mid-term test</b>	B06: <b>mid-term test</b>
2007.11.07 at 09:00	B07 in MS317 (Quiz 4a)	B08 in MS569
2007.11.07 at 10:00	B05 in MS317 (Quiz 4b)	B06 in MS325
2007.11.14 at 09:00	B07 in MS569	B08 in MS317 (Quiz 4c)
2007.11.14 at 10:00	B05 in MS325	B06 in MS317 (Quiz 4d)
2007.11.21 at 09:00	B07 in MS317 (Quiz 5a)	B08 in MS569
2007.11.21 at 10:00	B05 in MS317 (Quiz 5b)	B06 in MS325
2007.11.28 at 09:00	B07 in MS569	B08 in MS317 (Quiz 5c)
2007.11.28 at 10:00	B05 in MS325	B06 in MS317 (Quiz 5d)
2007.12.05 at 09:00	B07: no lab this week	B08: no lab this week
2007.12.05 at 10:00	B05: no lab this week	B06: no lab this week