
Information Sheet for **MATH1902 Linear Algebra (Advanced)**

Websites: It is important that you check both the Junior Mathematics website and the MATH1902 website regularly.

Junior Mathematics webpage: <http://sydney.edu.au/science/math/su/UG/JM/>
MATH1902 webpage: <http://sydney.edu.au/science/math/su/UG/JM/MATH1902>

Both sites may be accessed through the Learning Management System (Canvas):

<https://canvas.sydney.edu.au/courses/1934>.

Important announcements relating to Junior Mathematics are posted on the Junior Mathematics page. On the MATH1902 page you will find online resources and other useful links. Announcements regarding assessment tasks will be made on this page at various times throughout the semester.

Lectures: There is one lecture stream.

Times	Location	Lecturer
11 am Mon	Chemistry LT 3	Prof Holger Dullin
11 am Tue	New Law LT 101	Prof Holger Dullin

Lectures run for 13 weeks. The first lecture will be on Monday 5 March. The last lecture will be on Tuesday 5 June.

Consultation times: Consultation times will be posted on the MATH1902 webpage.

Tutorials: Tutorials (one per week) start in Week 1. You should attend the tutorial given on your personal timetable. Attendance at tutorials will be recorded.

Tutorial and exercise sheets: Pre-tutorial exercises, for you to do out of class time, will be posted on the MATH1902 webpage before each tutorial. The tutorial exercises will be handed out in your tutorial. Solutions will be posted once all the tutorials for the week are complete.

Textbook: *Linear Algebra: A Modern Introduction*, by David Poole, 4th edition. Available from the Co-op Bookshop: digital access available from the publisher www.cengage.com.

Assessment: Your final raw mark for this unit of study will be calculated as follows:

- 70%: Exam at end of Semester 1.
- 10%: Online Quizzes (best 10 out of 12, using the better mark principle).
- 5%: Assignment 1 mark.
- 2.5%: Assignment 2 mark (Computer Algebra Assignment).
- 5%: Assignment 3 mark.
- 7.5%: Assignment 4 mark (Computer Algebra Assignment).

The *better mark principle* means that for the total quiz mark, the quizzes count if and only if the total quiz mark is better than or equal to your exam mark. If your total quiz mark is less than your exam mark, the exam mark will be used for that portion of your assessment instead. The assignment marks count for 15% regardless of whether they are better than your exam mark or not.

Final grades are returned within one of the following bands:

High Distinction (HD), 85–100: representing complete or close to complete mastery of the material; **Distinction (D), 75–84:** representing excellence, but substantially less than complete mastery; **Credit (CR), 65–74:** representing a creditable performance that goes beyond routine knowledge and understanding, but less than excellence; **Pass (P), 50–64:** representing at least routine knowledge and understanding over a spectrum of topics and important ideas and concepts in the course.

A student with a passing or higher grade should be well prepared to undertake further studies in mathematics. Students intending to continue with further advanced units of study should be aiming to obtain a credit or higher.

Examination: There is one examination of 1.5 hours' duration during the examination period at the end of Semester 1. Further information about the exam will be made available at a later date on the website.

Online Quizzes: There are twelve weekly online quizzes. Each online quiz consists of a set of randomised questions. The best 10 of your 12 quizzes will count, making each worth 1%. You cannot apply for special consideration for the quizzes. The better mark principle will apply for the total 10% - i.e. if your overall exam mark is higher, then your 10% for quizzes will come from your exam.

The deadline for completion of each quiz is 11:59 pm Tuesday (starting in week 2). We recommend that you follow the due dates outlined below to gain the most benefit from these quizzes.

Assignments: There are four assignments: two written assignments and two computer algebra assignments. The written assignments must be submitted electronically, **as PDF files only**, in Turnitin (an internet-based plagiarism-prevention service), via the Learning Management System (Canvas) website by the deadline. Note that your assignment will not be marked if it is illegible or if it is submitted sideways or upside down. It is your responsibility to check that your assignment has been submitted correctly. The computer algebra assignment must be submitted within the Ed system, edstem.org.

Assessment and feedback schedule:

Task	Available	Deadline/date	Latest extension*	Feedback
Online quiz 1	Wed 7 Mar	11:59 pm Tue 13 Mar		
Online quiz 2	Wed 14 Mar	11:59 pm Tue 20 Mar		
Online quiz 3	Wed 21 Mar	11:59 pm Tue 27 Mar		
Online quiz 4	Wed 28 Mar	11:59 pm Tue 10 Apr		
Online quiz 5	Wed 11 Apr	11:59 pm Tue 17 Apr		
Online quiz 6	Wed 18 Apr	11:59 pm Tue 24 Apr		
Online quiz 7	Wed 25 Apr	11:59 pm Tue 1 May		
Online quiz 8	Wed 2 May	11:59 pm Tue 8 May		
Online quiz 9	Wed 9 May	11:59 pm Tue 15 May		
Online quiz 10	Wed 16 May	11:59 pm Tue 22 May		
Online quiz 11	Wed 23 May	11:59 pm Tue 29 May		
Online quiz 12	Wed 30 May	11:59 pm Tue 5 June		
Assignment 1	Fri 16 Mar	11:59 pm Mon 26 Mar	11:59 pm Wed 4 Apr	9 am Wed 11 Apr
Assignment 2	Fri 13 Apr	11:59 pm Mon 23 Apr	11:59 pm Mon 30 Apr	9 am Wed 2 May
Assignment 3	Fri 27 Apr	11:59 pm Mon 7 May	11:59 pm Mon 14 May	9 am Wed 16 May
Assignment 4	Fri 11 May	11:59 pm Mon 21 May	11:59 pm Mon 28 May	9 am Wed 30 May

* Extensions for assignments are only possible for students registered with Disability Services or applying for Special Consideration or Special Arrangements.

Any questions? Before you contact us with any enquiry, please check the FAQ page:

<http://sydney.edu.au/science/math/su/UG/JM/FAQ.html>.

Where to go for help: For administrative matters, go to the *Student Services Office, Carslaw 520*. For help with mathematics, see your lecturer, your tutor, or use the Ed discussion forum (<https://edstem.org>). Lecturers guarantee to be available during their indicated office hours, but may be available at other times as well. You may also email questions about the subject to MATH1902@sydney.edu.au. Ensure that any emails that you send to this address contain your name and SID, because anonymous emails will be ignored.

Aims and learning outcomes: Advanced units of study (MATH1921 and MATH1902) in mathematics in Semester 1 build on the broad foundations of calculus and precalculus learnt at school, integrating them with new and novel concepts in linear algebra. Students should start to gain an appreciation of the power and beauty of mathematics that evolved over 2000 years yet is indispensable to our modern way of life. Calculus and linear algebra are two cornerstones of mathematics, and over the course of one semester students taking both units start to see these subjects intertwine to form the backbone of almost all applications of mathematics to physical and biological sciences and engineering. (The first continuation is in Semester 2 of the junior year, studying multivariable calculus and modelling in MATH1923, and then, subsequently, a spectacular explosion of ideas coming together in the first semester of the intermediate year, studying vector calculus in MATH2921.)

By the end of the semester, students should be able to:

- apply mathematical logic and rigour to solving problems;
- express mathematical ideas coherently in written and oral form;
- demonstrate fluency in vector and matrix arithmetic, and their applications to solving systems of equations;
- solve routine problems of linear algebra with the help of a computer algebra system.

In particular, students taking MATH1902 should be able to:

- perform arithmetic of geometric vectors in the plane and in space, and in n -dimensional space;
- perform and manipulate dot, cross and triple products and vector projections, with applications to lines and planes in space;
- develop fluency with systems of equations and the methods of Gaussian and Gauss-Jordan elimination;
- perform matrix arithmetic, calculate matrix inverses, determinants, eigenvalues and eigenvectors;
- develop fluency with methods of diagonalisation and applications.

Proposed week-by-week outline:

Week	Topics
1	Introduction to linear algebra. Vector space. Vector addition and scalar multiplication.
2	Length and angle: the dot product, orthogonal vectors, projections, cross product.
3	Line in the plane and space, planes in space.
4	Systems of linear equations. Matrices, row operations, echelon form, Gaussian elimination.
5	Reduced row-echelon form and Gauss-Jordan elimination. Homogeneous systems, spans and linear independence.
6	Applications. Matrix operations and properties.
7	Matrix algebra, inverse of a matrix.
8	Elementary matrices. Subspaces. Row, column and null space.
9	Basis, dimension, rank theorem. Introduction to linear transformations.
10	Markov chains. Introduction to eigenvalues and eigenvectors.
11	Determinants, Eigenvalues and eigenvectors.
12	Similarity and diagonalisation. Applications e.g. to population growth.
13	Revision.

ADDITIONAL INFORMATION

Attendance: Unless otherwise indicated, students are expected to attend a minimum of 80% of timetabled activities for a unit of study, unless granted exemption by the Associate Dean.

For some units of study the minimum attendance requirement, as specified in the relevant table of units or the unit of study outline, may be greater than 80%.

The Associate Dean may determine that a student has failed a unit of study because of inadequate attendance.

Further details are available from the Science Undergraduate Handbook 2018: http://sydney.edu.au/handbooks/science/coursework/faculty_resolutions.shtml and the Science Postgraduate Handbook 2018: http://sydney.edu.au/handbooks/science_PG.

Online Components: This unit of study requires regular use of the University's Learning Management System (LMS). This could be either Blackboard or Canvas. Internet access is required to use the LMS.

Assessment Submission: Assessment tasks must be submitted by the due date. Submission will be online through the LMS unless instructed otherwise.

Compliance Statement All students must submit a signed statement of compliance with each piece of work submitted to the University for assessment, presentation or publication. A statement of compliance certifies that no part of the work constitutes a breach of the Academic Honesty in Coursework Policy 2015: <https://sydney.edu.au/policies/showdoc.aspx?recnum=PD0C2012/254&RendNum=0>.

This will be completed as part of the Turnitin assignment submission.

Late Submissions Work not submitted by the due date is not accepted.

Academic Dishonesty and Plagiarism Academic honesty is a core value of the University. Therefore, all students are required to act honestly, ethically and with integrity. Academic dishonesty is defined as any dishonest or unfair action taken in order to gain academic advantage. It also includes knowingly assisting another student to do this.

The University will not tolerate academic dishonesty or plagiarism, and will treat all allegations of academic dishonesty and plagiarism seriously.

Plagiarism is defined as presenting another persons work as ones own by presenting, copying or reproducing it without appropriate acknowledgement of the source.

Plagiarism includes presenting work for assessment, publication, or otherwise, that includes:

- a. phrases, clauses, sentences, paragraphs or longer extracts from published or unpublished work (including from the internet) without appropriate acknowledgement of the source; or
- b. the work of another person, without appropriate acknowledgement of the source and in a way that exceeds the boundaries of legitimate co-operation.

Further information is available in the Academic Honesty in Coursework Policy 2015: <https://sydney.edu.au/policies/showdoc.aspx?recnum=PD0C2012/254&RendNum=0>.

Similarity Detection Software Students should be aware that the University has authorised and mandated the use of the text-based similarity detecting software called Turnitin for all text-based written assignments. Turnitin searches for matches between text in your written assessment task and text sourced from the Internet, published works, and assignments that have previously been submitted for analysis. Further information regarding plagiarism detection is available in the Academic Honesty in Coursework Policy 2015: <https://sydney.edu.au/policies/showdoc.aspx?recnum=PD0C2012/254&RendNum=0>.

Academic Honesty Education Module (AHM) All students commencing their study at the University of Sydney are required to complete the Academic Honesty Education Module. You will find the AHM in your Learning Management System.

Special Consideration In the event of serious illness or misadventure which affects your preparation or performance in an assessment task, you may be eligible for Special Consideration. Further information is available at: <https://sydney.edu.au/students/special-consideration-and-arrangements.html>. You should *not* submit an application for Special Consideration or Special Arrangements for this unit of study

- if you are absent from a tutorial and there is no assessment associated with the missed tutorial, or
- if you miss a quiz, since the better mark principle applies.

The assessment category for the assignments is “Submitted Work”.

Student Feedback: The Unit of Study Survey

At the completion of each Unit of Study, students are asked via email to complete an online survey to provide feedback on their experiences in that Unit of Study. This feedback is invaluable when reviewing curriculum design and implementation styles.

University Work, Health and Safety Policy: We are governed by the Work Health and Safety Act 2011, Work Health and Safety Regulation 2011 and Codes of Practice. Penalties for non-compliance have increased. Everyone has a responsibility for health and safety at work. The University’s Work Health and Safety policy explains the responsibilities and expectations of workers and others, and the procedures for managing WHS risks associated with University activities.

General Laboratory Safety Rules

- No eating or drinking is allowed in any laboratory under any circumstances
- A laboratory coat and closed-toe shoes are mandatory
- Follow safety instructions in your manual and posted in laboratories
- In case of fire, follow instructions posted outside the laboratory door
- First aid kits, eye wash and fire extinguishers are located in or immediately outside each laboratory

As a precautionary measure, it is recommended that you have a current tetanus immunisation. This can be obtained from University Health Service (<http://www.unihealth.usyd.edu.au/>).

For more details please refer to Emergencies and safety on campus: <https://sydney.edu.au/students/emergencies-and-safety-on-campus.html>

Student Support Services:

A guide for new students:

<https://sydney.edu.au/students/browse.html?category=new-students&topic=getting-started>

Counselling and mental health support:

<https://sydney.edu.au/students/counselling-and-mental-health-support.html>

Disability Support:

<https://sydney.edu.au/students/disability-support.html>

International Student Support:

<https://sydney.edu.au/students/support-for-international-students.html>

Learning Services / Study Skills Support:

<https://sydney.edu.au/students/learning-services.html>

Student IT and online learning:

<https://sydney.edu.au/students/browse.html?category=student-it-and-online-learning&topic=online-learning>

Academic Writing:

<https://sydney.edu.au/students/writing.html>