Contents

1. Staff

Position	Name	Email	Room*
Directory of First Year	Assoc Prof Jonathan Kress	j.kress@unsw.edu.au	RC-3073
Course Convenor	Assoc Prof Jonathan Kress	j.kress@unsw.edu.au	RC-3073
Lecturer-in-charge of Mobius	Dr Joshua Capel	j.capel@unsw.edu.au	RC-5107
Lecturers	Dr Joshua Capel (Wk 1 - 5) Ms Karen Man (Wk 7 - 10)	j.capel@unsw.edu.au karen.i.man@unsw.edu.au	

Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Apply techniques and concepts from the syllabus to solve mathematical problems.
2. Formulate mathematical models from real world scenarios using techniques from the syllabus.
3. Recognise how mathematics is used to solve problems in other disciplines.
4. Use computer algebra as an aid to solve appropriate problems.
5. Communicate mathematical ideas, techniques and results effectively, using appropriate mathematical terminology.

4. Learning and teaching activities

Lectures

Lectures run in weeks 1 to 10 except for week 6 which will have no classes. You can find the lecture times on your myUNSW timetable. In Term 3 2022 live lectures given in a lecture theatre and live-streamed. A link will be provided on Moodle. These lectures will also be recorded and available to

- Check the availability of the online tests on the Möbius class for this course. There are an unlimited number of attempts in each test, but a new attempt must be started after 12 hours. You are strongly advised to complete the online tests as recommended in the Schedule of pre-exam assessments.
- All online tests will be closed by Friday Week 10. Although students can attempt any of the available online tests until they are closed, students are expected to take these tests in their designated weeks and failure to do so may result in rejection of applications for special consideration.
- Each online test contains a Mastery test component and a computing component. There will be six questions in the Mastery test component and two questions in the computing component. Make sure to review the gradebook after each attempt to better prepare yourself for the next attempt.
- Questions in the Mastery test component cover the materials from lectures.
- In MATH1031 you will learn how to use the computer algebra software called Maple. During on-campus teaching this software can be accessed on the computer Red-Centre labs, but at all other times you can Maple on your own computer via the myAccess service:

  https://www.myaccess.unsw.edu.au/

  Worksheets and notes are provided on Moodle for learning how to use software Maple. The questions in the computing component test your understanding of the worksheets and notes and the use of Maple.
  More details of the Computing Component of this course are provided later in this course outline.
- A passing student would be expected to score at least 80% in these tests. The best 6 of these 8 tests will count 10% towards your final grade.
- The Online Tests are available for an extended period so no medical certificates or other reasons will be accepted for missing these tests.

Mastery Tests

The largest component of the assessment in MATH1031 is the Mastery Tests (MTs, 15% each). The Mastery Tests will be in-person and taken place in weeks 4, 7 and 10. Information for about how the tests will be posted on Moodle. Make sure to read every announcement.

- The three Mastery Test 1, 2, 3 will contain a selection of questions from the Mastery Test components in OT1 to OT3, OT4 to OT5, OT6 to OT8, respectively.
- A mark of 80% in each of the Mastery Tests is considered to be a passing level.
- If you miss a Mastery Test due to illness or other misadventure, you must obtain a medical certificate, or other suitable documentation, for the day of y5.25 842 re8(t)s451( )-21(y5.25 842 re8(t)s451( )-2

Explanation of grade standards in MATH1031

The assessment structure in MATH1031 is designed so that a pass level is demonstrated in the pre-exam assessment which consists of the Online Tests, the Mastery Tests and the Assignment. The Online Test assesses basic skills and ability to use mathematical software. The Mastery Tests assess basic skills and the assignment assesses critical thinking, mathematical writing and applications of the basic skills to extended problems

To pass, a student must score 50/65 in the pre-exam assessment. There is no requirement to attend the final exam to pass the course.

To obtain a credit, a student is expected to easily meet the pass level and do well, but not perfectly, in about one third of the exam. For example, a raw exam mark of 10/40 would be moderated to 5/35 and combine with a pre-exam mark of 60/65 to give a final mark of 65.

To obtain a distinction, a student is expected to have a near perfect score in the pre-exam assessment and obtain about half of the exam marks. For example, a raw exam mark of 20/40 would be moderated to 10/35 and combine with 65/65 to give 75.

To obtain a high distinction, a student is expected to have a near perfect score in the pre-exam assessment and obtain about 3 quarters of the exam marks. For example, a raw exam mark of 30/40 would be moderated 20/35 and combine with 65/65 to give 85.

6. Computing in MATH1031

Why computing?

MATH1031 covers many mathematical techniques that are useful in understanding and predicting the behaviour of biological and other real-world systems. In order for you to become comfortable with these techniques, the problems presented in lectures and tutorials often involve only small data sets, few variables or simple functions.

The aim of the computing component of this course is to show you how you can use **computer algebra software** to apply the mathematics you have learnt to solve problems that would be very cumbersome to tackle by hand. In MATH1031, the software we will be using is called Maple. Even for relatively simple problems Maple can be useful as it does not make simple arithmetic errors!

Whether you continue with mathematics after first year or not, the computing skills you learn with us should still be useful in your university studies and beyond because:

- Your experience with Maple will make it easier to learn other software packages.
- Many other disciplines use packages like Maple.
- Symbolic computing techniques will be useful when you use mathematics in your future career.

UNSW has a policy that all students (no matter what program they are in) should be introduced to the basic techniques of computer use. For students in science and engineering programs, part of this requirement is met by the computing included in first year mathematics.

What sort of computer or applications do I need?

The School of Mathematics and Statistics provides computing labs in Red Centre with everything you will need for computing in MATH1031. This term, the Labs will be open, but you can use Maple on your own computer via the myAccess web service.

https://www.myaccess.unsw.edu.au/

What will I have to do and when?

You will learn how to use the application Maple via working through a set of Maple worksheets. There will be questions that require the use of Maple in the weekly Online Tests.

You use Maple via myAccess, you should follow the instruction on the myAccess web page to install Citrix Receiver and access your applications. You then should watch the introductory videos for Maple provided on Moodle.

You can continue to work through the Maple worksheets and notes. Information about which worksheet is relevant to which online test will be provided on Moodle.

Getting help

There is a wide range of self-help material in the computing pages of our School web site and in

- ¶ copying of assignments (by email or any other means).

Electronic mail (email) facilities are provided by the University so that you can communicate with lecturers and tutors. All use of email is monitored, and action will be taken against anyone who makes excessive use of email or uses it to send annoying, obscene, sexist or racist messages to other users or to engage in academic misconduct. Internet and other electronic communication services are provided to allow you to access our computers from other parts of the campus and from home and to transfer assignments which have been completed on other computers. These services are NOT provided so that you can play games, watch videos, or indulge in other activities not related to university studies. All electronic communications using the School's facilities are monitored to ensure that these facilities are being used in a responsible manner. Likewise, the disk space allocated to your account should be used only for keeping files related to your course, and the system administrator may remove any files which are not associated with University work.

These restrictions are imposed because computing resources are limited and there are thousands of other users of the system (over 4000 students with logins for the Red Centre labs). We all have to live and work together and you are expected to be considerate to other users. This is the bottom line when it comes to acceptable behaviour. If you have any doubts about whether an action is acceptable, don't do it.

Health and Safety Issues

Students should be aware that using a keyboard or performing any repetitive task for a long uninterrupted period may be associated with physical discomfort and/or muscular or other injury. To lessen the risk of such problems, a break from typing should be taken at regular intervals, a good body position adopted, wrists should be kept straight as much as possible and not rested on a sharp edge.

If you feel pain, numbness, tingling, weakness, cramping, or stiffness in your hands, wrists, arms, shoulder, neck, or back, see a qualified health professional. For further information contact the School of Mathematics and Statistics General Office.

7. Expectations of students

School and UNSW Policies

The School of Mathematics and Statistics has adopted a number of policies relating to enrolment,

Academic Integrity and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

The **UNSW Student Code** provides a framework for the standard of conduct expected of UNSW

use and manage information effectively to accomplish a specific purpose
better manage your time
understand your rights and responsibilities as a student at UNSW
be aware of plagiarism, copyright, UNSW Student Code of Conduct and Acceptable Use of UNSW ICT Resources Policy
be aware of the standards of behaviour expected of everyone in the UNSW community
locate services and information about UNSW and UNSW Library

Some of these areas will be familiar to you, others will be new. Gaining a solid understanding of all the related aspects of ELISE will help you make the most of your studies at UNSW.

The *ELISE* training webpages:

https://subjectguides.library.unsw.edu.au/elise/aboutelise

Equitable Learning Services (ELS)

If you suffer from a chronic or ongoing illness that has, or is likely to, put you at a serious disadvantage, then you should contact the Equitable Learning Services (previously known as SEADU) who provide confidential support and advice.

They assist students:

- living with disabilities
- with long- or short-term health concerns and/or mental health issues
- who are primary carers
- from low SES backgrounds
- of diverse genders, sexes and sexualities
- from refugee and refugee-like backgrounds
- from rural and remote backgrounds
- who are the first in their family to undertake a bachelor-level degree.

Their web site is: https://student.unsw.edu.au/els/services

Equitable Learning Services (ELS) may determine that your condition requires special arrangements for assessment tasks. Once the School has been notified of these, we will make every effort to meet the arrangements specified by ELS.

Additionally, if you have suffered significant misadventure that affects your ability to complete the course, please contact your Lecturer-in-charge in the first instance.

Academic Skills Support and the Learning Centre

The Learning Centre offers academic support programs to all students at UNSW Australia. We assist students to develop approaches to learning that will enable them to succeed in their academic study. For further information on these programs please go to:

http://www.lc.unsw.edu.au/services-programs

8. Readings and resources

Text Book

There is no set textbook for MATH1031. All topics listed in the syllabus will be comprehensively covered by the lecturers at the appropriate times. The syllabus and lecture schedule at the end of this document contains references for each topic.

10. Special Consideration

Please adhere to the Special Consideration Policy and Procedures provided on the web page below when applying for special consideration.

https://student.unsw.edu.au/special-consideration

Please note that the application is not considered by the Course Convenor, it is considered by a centralised team of staff at the Nucleus Student Hub.

The School will contact you (via student email account) after special consideration has been granted to reschedule your missed assessment.

For applications for special consideration for *assignment extensions*, please note that the new submission date and/or outcome will be communicated through the special consideration web site only, no communication will be received from the School.

For *final exams* with special consideration granted, the Exams Unit will email the rescheduled "supplementary exam" date, time and location to your student zID email account directly. Please ensure you regularly check your student email account (zID account) for this information.

The supplementary exam period/dates can be found at this web site:

https://student.unsw.edu.au/exam-dates

Please ensure you are aware of these dates and that you are available during this time.

11. Syllabus, Lecture Schedule and References

Week	Topics To Be Covered	References
1	Introduction	
	Matrix algebra	(4): 2.1
	Matrix applications	(4): 2.1
	Inverse, identity and zero matrices	(4): 2.2, 2.3
	Matrix equations	(4): 2.3
2	Functions	(1): 1.4
	Further trigonometry	(1): 8.1, 8.2
	Special functions	(1): 4.1, 4.3, 8.3
	Limits and continuity	(1): 1.5, 1.6
	Differentiation	(1): 2.1, 2.2, 2.4, 2.5, 3.1
3	Calculus of the special functions	(1): 4.2, 4.4, 6.4

Week	Topics To Be Covered	References
9	Linear first order differential equations	(1): App D3
	Modelling with first order differential equations	(1): App D3
	Homogeneous second order differential equations	(3): 2.2, 2.3
	Non-homogeneous second order differential equations	(2): 10.7
	Systems of differential equations - competing species	(3): 2.2, 2.3
10	Newton's method - bisection of the interval	(1): 10.6
	Maclaurin series	(1): 10.5
	Partial differentiation	(1): 7.3, 7.4
	Local maxima and minima in space	(1): 7.5
	Revision	

1. Calculus an Applied Approach by Larson and Edwards
2. Mathematics for the Biological Sciences by Arya and Lardner
3. Advanced Engineering Mathematics by Erwin Kreyszig, 7th edition.
4. Elementary Linear Algebra by Larson and Edwards, 4th edition
Copies of the above four books can be found in the LIBRARY

12. Tutorial Schedule

Week	Topics To Be Covered
1	Welcome to MATH1031 Tutorials Revision on basic algebra and trigonometry
	About online tests Matrix algebra