UNSW SYDNEY

Course Outline

MATH1131 Mathematics 1A

MATH1141 Higher Mathematics 1A

School of Mathematics and Statistics

Faculty of Science

Term 1, 2022

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1. Staff

MATH1131 Mathematics 1A and MATH1141 Higher Mathematics 1A

Roll	Name	Email	Room*
Director of First Year	A/Prof Jonathan Kress	j.kress@unsw.edu.au	RC-3073
Course Authority	A/Prof Jonathan Kress	j.kress@unsw.edu.au	RC-3073
MATH1131 Lecturers Algebra A Calculus A Algebra B Calculus B	 Prof Christopher Tisdell Dr John Steele Dr Mareike Dressler Dr Laure Helme-Guizon	 cct@unsw.edu.au j.steele@unsw.edu.au m.dressler@unsw.edu.au laure@unsw.edu.au	 RC-4079 RC-5103 TBA RC-3090
MATH1141 Lecturers Algebra A Calculus A Algebra B Calculus B	 A/Prof Daniel Chan Dr Alina Ostafe A/Prof David Harvey Prof Wolfgang Schief	 danielc@unsw.edu.au alina.ostafe@unsw.edu.au d.harvey@unsw.edu.au w.schief@unsw.edu.au	 RC-4104 RC-4078 RC-6108 RC-4069
Möbius contact	Dr Joshua Capel	j.capel@unsw.edu.au	RC-5107

*Note that the Red-Centre is closed at the time of production of this course outline and might remained closed throughout the term. Staff consultation will take place online and begin in Week 2. For details see Moodle.

2. Administrative matters

Contacting the Student Services Office

Please visit the School of Mathematics and Statistics website for a wide range of information on School Policies, Forms and Help for Students by visiting the "**Student Services"** page.
For information on Courses, please go to "Current Student", "Undergraduate and/or Postgraduate", "**Courses Homepage**" for information on all **course offerings.**
The "Student Notice Board" can be located by going to the "Current Students" page; Notices are posted regularly for your information here. Please familiarise yourself with the information found in these locations. The School website is: https://www.maths.unsw.edu.au
If you cannot find the answer to your queries on the web you are welcome to contact the Student Services Office directly. The First Year Advisor in the Student Services Officer is Ms Hilda Cahya. All administrative enquiries concerning first year Mathematics courses should be sent to H Cahya, either:

- By email to ug.mathsstats@unsw.edu.au
- By phone: 9385 7011 (leave a message with contact phone number for call to be returned).
- Or in person to the Red Centre building, level 3, room 3072. NB: There is no contact at the office without prior appointment, please email while working remotely.

Change of tutorials, due to timetable clashes or work commitments, advice on course selection and other administrative matters are handled in the Student Services Office. Constructive comments on course improvement may also be emailed to the Director of First Year Mathematics, A/Prof Jonathan Kress. Should we need to contact you, we will use your official UNSW email address in the first instance. **It is your responsibility to regularly check your university email account. Please state your student number in all emails to the Student Services Office.**

3. Course information

Units of credit: 6

Exclusions for MATH1131: MATH1011, MATH1031, MATH1141, MATH1151, ECON1202

Exclusions for MATH1141: MATH1011, MATH1031, MATH1131, MATH1151, ECON1202

Teaching times and locations: see the link on the central timetable web pages:

MATH1131 Timetable: http://timetable.unsw.edu.au/2022/MATH1131.html#S1S
Offered in: Terms 1, 2 and 3

MATH1141 Timetable: http://timetable.unsw.edu.au/2022/MATH1141.html#S1S
Offered in: Terms 1 and 3

Course summary

This course will provide you with a good working knowledge of Calculus and Linear Algebra and show how these topics can be applied in interdisciplinary contexts. Analytical thinking and problem solving are demonstrated in lecturers, and you will have an opportunity to develop your own analytical thinking and problem-solving skills in classroom tutorials and weekly Möbius lessons. This course enhances your ability to solve problems using logical arguments and techniques, which are generic skills that can be applied in multidisciplinary work. The course will also engage you in independent and reflective learning through your tutorial problems and the Maple computing package. You are encouraged to develop your communication skills through active participation in tutorials, and by writing clear, logical arguments when solving problems.

Course aims

The aim of MATH1131/1141 is that by the time you finish the course you should understand the concepts and techniques covered by the syllabus and have developed skills in applying those concepts and techniques to the solution of appropriate problems. You should be able to use technology to aid your mathematical problem solving and communication of mathematical ideas. Successful completion of this course, together with the courses MATH1231/1241 will enable you to understand the mathematics that you will meet in the later years of your program.

Course learning outcomes (CLO)

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

1. State definitions and theorems in the syllabus and apply them to specific examples,
2. Apply the concepts and techniques of the syllabus to solve appropriate problems,
3. Use technology as an aid to solve appropriate problems and communicate mathematical ideas.
4. Communicate mathematical ideas effectively using correct terminology.
5. Apply ideas in the syllabus to unfamiliar contexts,
6. Recognise and create valid mathematical arguments.

4. Learning and teaching activities

Lecture & Tutorial Schedule

Note that some tutorials will be recorded, and this may include student comments. All lectures are recorded. When a tutorial is recorded, you will see a symbol on the screen to alert you to this.

Lectures and tutorials run in all weeks from 1 to 10, except for week 6 which will have no classes. In Term 1 2022 live lectures will be streamed online via Blackboard Collaborate. A link will be provided on Moodle. These lectures will also be recorded and available to watch at a later time, however, it is recommended that students attend the

lectures live online.

An alternative pre-recorded lecture option will also be available to all students. This is the primary set of lectures for students in the WEB stream, however, students in the WEB stream can also attend the live lectures or watch the live lecture recordings if they wish.

MATH1131 Mathematics 1A

	Monday	Tuesday	Wednesday	Thursday	Friday
Lecture (A)	**12 – 2pm (w1-5, 7-9)**		**10am – 12pm (w1-5, 7-10)**		**1 – 2pm (w1-5, 7-8, 10)**
Lecture (B)	**9 – 11am (w1-5, 7-9)**			**10 – 12pm (w1-5, 7-10)**	**11am – 12pm (w1-5, 7-8, 10)**
Tutorials and EXM	Refer to your online timetable for day and time details. MATH1131: http://timetable.unsw.edu.au/2022/MATH1131.html#S1S NB: EXM activity is for assessments (online) but will be organised separately in Term 1 2022 – refer to Moodle.				
Note: The lectures and tutorials on Friday 15 April (Week 9) and Monday 18 April (Week 10) will be cancelled due to a public holiday. Previous term lecture recording will be made available for these cancelled					

MATH1141 Higher Mathematics 1A

	Monday	Tuesday	Wednesday	Thursday	Friday
Lecture (A)	**12 – 2pm (w1-5, 7-9)**		**10am – 12pm (w1-5, 7-10)**		**1 – 2pm (w1-5, 7-8, 10)**
Lecture (B)	**9 – 11am (w1-5, 7-9)**			**10 – 12pm (w1-5, 7-10)**	**11am – 12pm (w1-5, 7-8, 10)**
Tutorials and EXM	Refer to your online timetable for day and time details. MATH1141: http://timetable.unsw.edu.au/2022/MATH1141.html#S1S NB: EXM activity is for assessments (online) but will be organised separately in Term 1 2022 – refer to Moodle.				
Note: The lecture and tutorial on Friday 15 April (Week 9) and Monday 18 April (Week 10) will be cancelled due to a public holiday. A previous term lecture recording will be made available for this cancelled lecture.					

Classroom Tutorials

In Term 1 2022, most classroom tutorials are scheduled to be held face-to-face. This is subject to change depending on conditions within NSW. The Online Classroom Tutorials will use Blackboard Collaborate, a virtual classroom system. This is the same system that is used for lectures. See Moodle for details. A laptop with internet access is recommended for attending live classes online.

Students are enrolled in one weekly Classroom Tutorial for weeks 1 to 5 and 7 to 10. The Classroom Tutorial will be a mix of Algebra and Calculus tutorials each week. Attendance is compulsory for all Classroom Tutorials and a roll will be taken by the tutor for face-to-face classes or automatically by Blackboard Collaborate for online classes. Selected tutorials may be recorded for students to review at a later time but this is not intended as a substitute for live attendance.

The time and location of your Classroom Tutorial can be found on myUNSW. Students can change their tutorial

time via myUNSW until the end of week 1. After that, they can only change tutorials by contacting the Mathematics and Statistics student services (see page 4) with evidence of a timetable clash or work commitments.

The main reason for having Classroom Tutorials is to give you a chance to tackle and discuss problems which you find difficult or do not fully understand, so it is important to try at least a selection of tutorial problems before attending your class so that you know the questions you would like to ask of your tutor. A schedule of suggested homework problems, to be attempted before your classroom tutorial, will be posted on Moodle. The Week 1 Classroom Tutorial will be an introductory tutorial.

If your tutorial falls on a public holiday, it will be cancelled for that week. You can optionally attend another tutorial class from the online options for that week only. You can find the times of tutorials on the central timetable, *links above in the Lecture & Tutorial Structure table*, or in the Blackboard Collaborate session list.

Weekly Möbius Lesson

There is a weekly Möbius lesson due on Tuesday of the following week at 11am for MATH1141 and 1pm for MATH1131. The first deadline would usually be on Tuesday of week 2. Note this deadline will remain the same even when it falls on a public holiday. Each Möbius lesson will consist of 6 topics. Each topic will consist of a short video or self-paced lesson and some corresponding exercises on Möbius. These will be mostly algebra and calculus topics but most weeks will also have a Maple topic and there may be other topics.

The weekly Möbius lessons are an integral part of this course. They will help you stay up-to-date with the course content and will give you an alternative view of the course materials. Note there are two Lab Tests based partly on the weekly Möbius lessons. These are described in the Assessment section below.
Note:

- Your work on this must be your own work, but you are encouraged to discuss the methods required with other students.
- Each version of a Möbius lesson will be slightly different.
- Your best grade from 6 of the 9 weeks will be counted towards your final grade.
- Only a limited number of users can have simultaneous access to Möbius, so **do NOT** leave your work on these to the last day when the server may be busy.
- **No deadline extensions will be granted.** You should attempt these tests with sufficient remaining time to allow for unplanned services interruptions

Moodle

Log in to Moodle to find announcements, general information, notes, lecture slides, classroom tutorials and homework problems and links to Möbius lessons and assessments.
https://moodle.telt.unsw.edu.au

Möbius

Weekly Möbius lessons and online assessments in this course use a system called Möbius. Information on how to access and use Möbius is provided on Moodle.

5. Assessment

Overview

In Term 1 2022 all assessments will be conducted online, including Lab Tests and the End of Term Exam.

The assessment structure of MATH1131/41 may be quite different to high school and other courses that you are used to. It is designed so that students should expect to be close to passing the course before taking the final exam with pre-exam assessment focusing on basic skills and the exam focusing on more advanced skills.

- The Möbius lessons allow answers to be checked while working on them, they are available for an extended period and students can work together, seek help and use any resources they wish. Most students gain a perfect score in these.
- The Lab Tests allow unlimited practice of questions from the actual question bank before the test.

Because of this, students should be aiming for a mark of 80% or greater in the Lab Tests. Marks less than 80% should be seen as a warning sign of possible failure in the course.

- The Assignment is available over an extended period and students can work on this with the benefit of all the course resources. Students who pass MATH1131/41 typically obtain a mark of at least 6 or 7 out of 10 for the Assignment.
- The average mark for pre-exam work is typically well over 40/50.
- The exam focuses on questions that require understanding rather than routine calculation. A student's pre-exam mark is not a good predictor of the exam mark. Past exams from 2020 or later are the best indication of what to expect in the exam.
- If your performance in or ability to complete any assessment is affected by illness or other reasons beyond your control, you may be eligible for special consideration. See Section 9 on page 13 for details.
- To pass MATH1131/41 you need 50% or greater overall. There is no requirement to gain any particular mark in any individual assessment items.

Weightings

The final mark will be made up as follows:

Assessment task	Weight	Course Learning Outcomes
Online		
Weekly Möbius Lessons	10%	1, 2, 3, 5, 6
Lab Tests	30%	1, 2, 3, 6
Assignment	10%	1, 2, 3, 4, 6
End of Term Exam	50%	All

In MATH1141 there will be greater emphasis on CLOs 5 and 6 than in MATH1131.

Each type of assessment is described below in detail.
Note:

- You will be able to view your final exam timetable on myUNSW. Details of when this timetable will be released is available on the university website.

https://student.unsw.edu.au/dates-and-timetables

- It is very important that you understand the University's rules for the conduct of Examinations and the penalties for **Academic Misconduct Guide**.

https://student.unsw.edu.au/conduct

- In recent years there have been cases where severe penalties have been imposed for misconduct in relation to tests and exams in Maths courses.
- UNSW assesses students under a standards-based assessment policy. For how this policy is applied within the School of Mathematics and Statistics, please visit the website:

https://www.maths.unsw.edu.au/currentstudents/assessment-policies

- For information on how the School implements special consideration policies for assessments during the term and the final examination, refer to the School's website:

https://www.maths.unsw.edu.au/currentstudents/special-consideration-illness-misadventure

Weekly Möbius lessons

Students are expected to complete all 9 Weeks of the weekly Möbius lessons, however, only the best 6 of the 9 weekly Möbius lessons will contribute 10% of your final mark. Special consideration will only be considered for students who have appropriate documentation to explain missing more than 3 weeks of the Möbius lessons.

Lab Tests

As well as completing the weekly Möbius lessons, you will take two Lab Tests based on the same set of questions. These tests will be conducted online in week 4 (first test) and week 8 (second test) for MATH1141 and in week 5 (first test) and week 9 (second test) for MATH1131. The actual times of these tests will be announced on Moodle at least one week before the test. Each of the Lab Tests will contribute 15%. **Students will have a single**

attempt for each Lab Test.

The Lab Tests will be conducted online in Term 1 2022. For the first of these tests, you will not need to use software such as Maple. For the second test you will need to use Maple to answer some of the questions. The second test will consist of questions from the Maple coding topics of the weekly Möbius lessons in addition to some algebra and calculus questions.

The Maple coding component of this test will be on the features of Maple which are covered in Chapter 1 and all of Chapter 2 (only up to section 11 in Chapter 2) of the First Year Maple Notes and some algebra and calculus questions from the weekly Möbius lessons. These tests will be open book, but they must be your own work and you must not have outside help. You are expected to have worked out exactly how to answer the questions before you attend the tests because you are allowed unlimited practice at the actual test questions, and you can view your results for these tests in the Möbius gradebook.

Assignment

The purpose of the assignment is to improve your mathematical writing by providing feedback on your writing and helping you to recognise good mathematical writing. It will also give you practice at presenting solutions to exam style questions.
The questions will be presented to you on Möbius and you will write solutions to these questions. You will be able to check the correctness some parts of your answer using Möbius so your main task will be to present your answers well with good explanations of your working.

Your work will need to be typed (not handwritten and scanned) and you will submit your work online through links on Moodle. The assignment deadline will be 11:59pm on Tuesday of week 8. The assignment will have a maximum mark of 10. A penalty of 5% of the maximum mark will be deducted from the awarded mark per day late up to a maximum of 5 days late. **Submissions over 5 days late will receive a mark of zero**.
Complete details of the process for the assignment will be provided when the assignment is released. Note the marking criteria are focused on how you explain and present your answers.

End of Term Examination

In Term 1 2022 the End of Term Examination will be conducted online.

The final exam covers material from the whole of the algebra, calculus and computing (Maple) syllabi. The best guide to the style and level of difficulty is the past exam papers. Past exam papers will be provided on Moodle. Some have worked solutions and others do not. Examination questions are, by their nature, different from the short test questions. They may test a greater depth of understanding. The questions will be longer, and sections of the course not covered in other assessments will be examined. The end of term exam may contain some parts requiring knowledge of Maple.

This term's exam will be closest in format to the 2020 and 2021 exams, which are different to exams prior to 2020. The assessment tasks during the term allow repeated attempts over an extended period and focus more on basic skills. As a result, students should be aiming for a high mark in the pre-exam assessment, and this indicates significant progress towards achieving the learning outcomes of this course. The exam is time limited and has more complex questions. Therefore, a high mark in the pre-exam assessment is not always an accurate indication of the final course mark.

Schedule of all assessments

Lectures and tutorials run during weeks 1 to 5 and 7 to 10. The table below gives the schedule all assessments.

Week	Assignment/lab tests	Weekly Möbius Lessons (MATH1141: 11am; MATH1131: 1pm)
1		Start work on your first Möbius Lesson
2		Möbius Lesson 1 due Tuesday
3		Möbius Lesson 2 due Tuesday
4	MATH1141 Lab Test 1	Möbius Lesson 3 due Tuesday

	(**Wednesday 9am to Friday 11am)**	
5	MATH1131 Lab Test 1 (**Tuesday 9am to Thursday 1pm**)	Möbius Lesson 4 due Tuesday
6	Flexibility Week	
7		Möbius Lesson 5 due Tuesday
8	Assignment due Tuesday 11:59pm MATH1141 Lab Test 2 (**Wednesday 9am to Friday 11am**)	Möbius Lesson 6 due Tuesday
9	MATH1131 Lab Test 2 (**Tuesday 9am to Thursday 1pm**)	Möbius Lesson 7 due Tuesday
10		Möbius Lesson 8 due Tuesday Möbius Lesson 9 due Sunday*
11	Monday to Thursday: Study break Friday: Start of exams – Check myUNSW for exam timetable	

* The last Möbius Lesson will remain available until Week 11 Tuesday 11am for MATH1141 and Tuesday 1pm for MATH1131.

6. Expectations of students

School and UNSW Policies

The School of Mathematics and Statistics has adopted a number of policies relating to enrolment, attendance, assessment, plagiarism, cheating, special consideration etc. These are in addition to the Policies of The University of New South Wales. Individual courses may also adopt other policies in addition to or replacing some of the School ones. These will be clearly notified in the Course Initial Handout and on the Course Home Pages on the Maths Stats web site.

Students in courses run by the School of Mathematics and Statistics should be aware of the School and Course policies by reading the appropriate pages on the Maths Stats web site starting at:
https://www.maths.unsw.edu.au/currentstudents/assessment-policies

The School of Mathematics and Statistics will assume that all its students have read and understood the School policies on the above pages and any individual course policies on the Course Initial Handout and Course Home Page. Lack of knowledge about a policy will not be an excuse for failing to follow the procedure in it.

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 students with respect to their academic integrity and behaviour. It outlines the primary obligations of students and directs staff and students to the Code and related procedures.

In addition, it is important that students understand that it is not permissible to buy essay/writing services from third parties as the use of such services constitutes plagiarism because it involves using the words or ideas of others and passing them off as your own. Nor is it permissible to sell copies of lecture or tutorial notes as students do not own the rights to this intellectual property.

If a student breaches the Student Code with respect to academic integrity, the University may take disciplinary action under the **Student Misconduct Procedure**.

The UNSW Student Code and the Student Misconduct Procedure can be found at:
https://student.unsw.edu.au/plagiarism

An online Module "Working with Academic Integrity" (https://student.unsw.edu.au/aim) is a six-lesson interactive self-paced Moodle module exploring and explaining all of these terms and placing them into your learning context.

It will be the best one-hour investment you've ever made.

Plagiarism

Plagiarism is presenting another person's work or ideas as your own. Plagiarism is a serious breach of ethics at UNSW and is not taken lightly. So how do you avoid it? A one-minute video for an overview of how you can avoid plagiarism can be found https://student.unsw.edu.au/plagiarism.

Detection of academic misconduct

The School of Mathematics and Statistics uses a variety of means to detect and investigate potential academic misconduct in assessments, including the use of data from University systems and websites.

7. Readings and resources

Course Pack

Your course pack should contain the following five items:

- Algebra Notes (for MATH1131/1141)
- Calculus Notes (for MATH1131/1141)
- Past Exam Papers Booklet
- First Year Maple Notes

A printed version of the course pack can be purchased from the bookshop. These items can also be downloaded from UNSW Moodle, but many students find the hardcopy more efficient for study.
NB: The Course Outline can be downloaded from Moodle or the School website only.
Information on administrative matters, lectures, tutorials, assessment, syllabuses, class tests, computing, special consideration and additional assessment.

Textbook

S.L. Salas, E. Hille and G.J. Etgen, *Calculus – One and Several Variables,* any recent edition, Wiley.
Note, the 10h Edition of the textbook above comes with access to the electronic resources known as WileyPlus. This electronic version provides internet access to the textbook, problems, worked solutions, test (for self-assessment) and other electronic resources related to the text material. If purchased from the UNSW Bookshop, you will have access to the WileyPlus server for one year; it is possible to renew the web access on a yearly basis or for one year, at a fee determined by the publisher.
Note that these WileyPlus electronic resources are provided by the publisher John Wiley, and **not** by the School of Mathematics and Statistics. Any difficulty that you might experience with WileyPlus must be resolved with the publisher.

8. Getting help outside tutorials

Staff Consultations

From week 2 there will be a roster which shows for each hour of the week a list of names of members of staff who are available to help students in the first-year mathematics courses, no appointment is necessary. This roster will be announced on the Moodle course page at the end of week 2 and can be located by visiting webpage:

http://www.maths.unsw.edu.au/currentstudents/consultation-mathematics-staff

Mathematics Drop-in Centre and Lab Consultants

The Maths Drop-in centre provides free help to students with certain first and second year mathematics courses. All first year MATH courses are supported. The Maths Drop-in centre operates online via Moodle, opening times are from 10am to 3pm from Mondays to Thursday, 10am to 1pm on Fridays.

The Maths Drop-in Centre schedule will be available on the School's website and Moodle page below by the end

of week 1. Please note that no appointment is necessary, this is a drop-in arrangement to obtain one-on-one help from tutors. The Drop-in Centre includes Lab Consultants who can help with Maple.

https://www.maths.unsw.edu.au/currentstudents/Mathematics-Drop-in-Centre
https://www.maths.unsw.edu.au/currentstudents/maple-lab-consultants

Additional support for students

ELISE (Enabling Library and Information Skills for Everyone)

ELISE is designed to introduce new students to studying at UNSW.

Completing the ELISE tutorial and quiz will enable you to:

- analyse topics, plan responses and organise research for academic writing and other assessment tasks
- effectively and efficiently find appropriate information sources and evaluate relevance to your needs
- 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

Other Supports

- The Current Students Gateway: https://student.unsw.edu.au/
- Academic Skills and Support: https://student.unsw.edu.au/academic-skills
- Student Wellbeing, Health and Safety: https://student.unsw.edu.au/wellbeing
- UNSW IT Service Centre: https://www.it.unsw.edu.au/students/index.html

9. Applications for 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 Authority, 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 a *lab test or paper-based test* only.
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.

10. Algebra Syllabus

The algebra course for MATH1131 is based on the MATH1131 Algebra Notes that are included in the Course Pack. The computer package Maple will be used in the algebra course. An introduction to Maple is included in the booklet *Computing Laboratories Information and First Year Maple Notes.*

The lecture timetable is given below. Lecturers will try to follow this timetable, but some variations may be unavoidable.

Lecture	Topics	Algebra Notes
Chapter 1: Introduction to Vectors		
1	Vector quantities and $\mathbb{R}^n$.	1.1, 1.2
2	$\mathbb{R}^2$ and analytic geometry.	1.3
3	Points, line segments and lines. Parametric vector equations. Parallel lines.	1.4
4	Planes. Linear combinations and the span of two vectors. Planes though the origin. Parametric vector equations for planes in $\mathbb{R}^n$. The linear equation form of a plane.	1.5

Lecture	Topics	Algebra Notes
Chapter 2. Vector geometry		
5	Lengths, angles and the dot product in $\mathbb{R}^2$, $\mathbb{R}^3$, $\mathbb{R}^n$.	2.1, 2.2
6	Orthogonality and orthonormal basis, projection of one vector on another. Orthonormal basis vectors. Distance of a point to a line.	2.3
7	Cross product: definition and arithmetic properties, geometric interpretation of cross product as perpendicular vector and area.	2.4
8	Scalar triple products, determinants and volumes. Equations of planes in $\mathbb{R}^3$ the parametric vector form, linear equation (Cartesian) form and point-normal form of equations, the geometric interpretations of the forms and conversions from one form to another. Distance of a point to a plane in $\mathbb{R}^3$.	2.5, 2.6
Chapter 3: Complex Numbers		
9	Development of number systems and closure. Definition of complex numbers and of complex number addition, subtraction and multiplication.	3.1, 3.2, start 3.3
10	Division, equality, real and imaginary parts, complex conjugates. Argand diagram, polar form, modulus, argument.	Finish 3.3, 3.4 3.5, 3.6
11	De Moivre's Theorem and Euler's Formula. Arithmetic of polar forms.	3.7, 3.7.1
12	Powers and roots of complex numbers. Binomial theorem and Pascal's triangle.	3.72, 3.73 start 3.8
13	Complex polynomials. Fundamental theorem of algebra, factorization theorem, factorization of complex polynomials of the form $z^n - z_0$, real linear and quadratic factors of real polynomials.	3.10
Chapter 4: Linear Equations and Matrices		
14	Introduction to systems of linear equations. Solution of 2 × 2 and 3 × 3 systems and geometrical interpretations.	4.1
15	Matrix notation. Elementary row operations	4.2, 4.3
16	Solving systems of equations by Gaussian elimination	4.4
17	Deducing solubility from row-echelon form. Solving systems with indeterminate right hand side.	4.5, 4.6
18	General properties of solutions of $A\boldsymbol{x} = \boldsymbol{b}$	4.7, 4.8
Chapter 5: Matrices		
19	Operations on matrices. Transposes.	5.1, 5.2
20	Inverses and definition of determinants.	5.3, 5.4

Lecture	Topics	Algebra Notes
21	Properties of determinants.	5.4
22	Review	

Algebra Problem Sets

The Algebra problems are located at the end of each chapter of the Algebra Notes booklet. They are also available from the course module on the UNSW Moodle server. The problems marked [R] form a basic set of problems which you should try first. Problems marked [H] are harder and can be left until you have done the problems marked [R]. You do need to make an attempt at the [H] problems because problems of this type will occur on tests and in the exam. If you have difficulty with the [H] problems, ask for help in your tutorial.

Questions marked with a [V] have a video solution available from the course page for this subject on Moodle. There are a number of questions marked [M], indicating that Maple is required in the solution of the problem.

11. Calculus Syllabus

The Calculus textbook is S.L. Salas & E. Hille and G.J. Etgen *Calculus - One and Several Variables,* any recent edition, Wiley. References to the 10th edition are shown as SH10. To improve your understanding of definitions, theorems and proofs, the following book is recommended: Introduction to Proofs in Mathematics, J. Franklin & A. Daoud, Prentice-Hall.

In addition, for MATH1141, for help with understanding the foundations of calculus you will find the following book readable and useful: Calculus by M. Spivak (there are multiple copies in the library). References to Spivak are in the column headed SP.

In this syllabus, the references to the textbook are *not* intended as a definition of what you will be expected to know. They are just a guide to finding relevant material. Some parts of the course are not covered in the textbook and some parts of the textbook (even in the sections mentioned in the references below) are not included in the course. The scope of the course is defined by the content of the lectures and problem sheets. The approximate lecture time for
each section is given below.

Lecture	Topics	SH10	SP
Chapter 1: Sets, inequalities and functions			
1	$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$. Open and closed intervals. Inequalities.	1.2, 1.3	1, 2
2	Functions: sums, products, quotients, composites. Polynomials, rational functions, trig functions as examples of continuous functions. Implicitly defined functions.	1.6-1.7	3, 4
Chapter 2: Limits			
3	MATH1131: Informal definition of limit as $x \to a$ (a finite). MATH1141: Formal definition of limit as $x \to a$ (a finite).	2.1, 2.2 pp177-178 & 195-198	5
4	Formal definition of limit as $x \to \infty$. Limit rules. The pinching theorem.	2.3, 2.5	

Chapter 3: Properties of continuous functions

5	Combinations of continuous functions. Intermediate Value Theorem.	2.4	
6	Min-max Theorem. Relative and absolute maxima and minima	2.6, B1, B2, 4.3-4.5	

Chapter 4: Differentiable functions

7	Definition of derivatives via tangents. Derivatives of sums, products, quotients and composites. Rates of change. Higher derivatives.	3.1 3.2-3.5	
8	Derivatives of polynomial, rational and trigonometric functions. Implicit differentiation. Fractional powers.	3.6, 3.6 3.7	

Chapter 5: The Mean Value Theorem and applications

9	Mean Value Theorem and applications. MATH1141: Proof of Mean Value Theorem	4.1, 4.2	11
10	L'Hôpital's rule.	11.5, 11.6	11

Chapter 6: Inverse functions

11	Domain, range, inverse functions. The Inverse Function Theorem.	7.1, B3	12
12	Inverse trig functions, their derivatives and graphs.	7.7	

Chapter 7: Curve sketching

13	Odd and even functions, periodicity, calculus. Use of domain, range, intercepts, asymptotes, periodicity, symmetry and calculus. Parametrically defined curves.	4.7, 4.8	
14	Relationship between polar and Cartesian coordinates. Sketching curves in polar coordinates.	10.2 10.3	

Chapter 8: Integration

15	Riemann sums, the definite integral and its algebraic properties	5.1, B2	13
16	Indefinite integrals, primitives and the two fundamental theorems of calculus.	5.2-5.5	14
17	Integration by substitution and by parts	5.6, 8.2	18
18	Integrals on unbounded domains.		
19	Limit form of the comparison test. MATH1141: Proof of limit for of comparison test.	11.7	

Chapter 9: Logarithms and exponentials

20	Ln as primitive of $1/x$, basic properties, logarithmic	7.2, 7.3	

	Differentiation.	
21	Exponential function as the inverse of ln, basic properties. a^x, logs to other bases.	7.4-7.6

Chapter 10: Hyperbolic functions

22	Definitions, identities, derivatives, integrals and graphs.	7.8
	Inverse hyperbolic functions.	7.9

Calculus Problem Sets

The Calculus problems are located at the end of each chapter of the Calculus Notes booklet. They are also available from the course module on the UNSW Moodle server. Some of the problems are very easy, some are less easy but still routine and some are quite hard. To help you decide which problems to try first, each problem is marked with an [**R**], an [**H**] or an [**X**]. The problems marked [**R**] form a basic set of problems which you should try first. Problems marked [**H**] are harder and can be left until you have done the problems marked [**R**]. Problems marked [**V**] have a video solution available on Moodle.

You *do* need to make an attempt at the [**H**] problems because problems of this type will occur on tests and in the exam. If you have difficulty with the [**H**] problems, ask for help in your tutorial. Remember that working through a wide range of problems is the key to success in mathematics.

12. Computing Information

How much?

In MATH1131, online self-paced lessons on Maple coding are available in the weekly Möbius lessons. These Maple coding topics contribute part of the 10% for weekly Möbius lessons. There will be at least 8 weekly Möbius lesson topics on Maple and the second Lab Test allows the use of Maple and contain questions that will require the use of Maple.

Knowledge of Maple will be necessary in some general questions in the end of term exam. The Computing component depends on the other components and will require knowledge of the appropriate Algebra and Calculus.

Aim

The aim of the Computing component is twofold.

- Firstly, you will use the Symbolic Computing Package called Maple to do some mathematics on the computer. This use of Maple is integrated with the Algebra and Calculus and is designed to enhance your understanding of the mathematics involved, as well as letting you use Maple as a tool to do the mathematics. You will find the skills you acquire and things you learn useful in many other subjects you study, both within and outside the School of Mathematics. Maple enables you to tackle larger, harder and more realistic mathematical problems as it can handle all the difficult algebra and calculus for you. Furthermore, learning some Maple introduces you to some of the basic ideas in computer programming.
- Secondly, you will gain some experience in teaching yourself how to use a complicated computing package. This is a skill that will be needed in other courses at UNSW and in the workforce.

Computing lab

The Red-Centre labs are closed at the time of production. This information is included in case they are re-opened during the term.

The main computing laboratory is Room G012 of the Red Centre. You can get to this lab by entering the building through the main entrance to the School of Mathematics (on the Mezzanine Level) and then going down the stairs to the Ground Level. A second smaller lab is Room M020, on the mezzanine level of the Red Centre.

For more information, including opening hours, see the computing facilities webpage:
https://www.maths.unsw.edu.au/currentstudents/computing-facilities

Remember that there will always be unscheduled periods when the computers are not working because of equipment problems and that this is not a valid excuse for not completing tests on time.

How to start

The MATH1131 module in UNSW Moodle has several short instructional videos illustrating how to access and use all the computing related components of MATH1131. The general introductory videos are in the Course Materials folder, with videos related to Maple located in the Computing component folder and those related to Möbius in the Online Assessment in Algebra, Calculus and Computing folder.

Following this you should use some of your free time in week 1 to complete the Maple introductory module in Möbius as part of the week 1 Möbius lesson. During a face-to-face teaching mode, you can go to the Red Centre lab G012 to access Maple on the School's lab computers, but for an online teaching mode you can access Maple via myAccess (see the section 'Remote access to Maple' below). For Term 1 2022, lab consultations are available from Monday to Thursday 3pm-5pm and on Friday 1pm-5pm in the same room as Drop-in Centre.

For the computers in the school laboratories, your login ID is "z" followed immediately by your seven-digit student number and your password is your zPass, issued to you at enrolment. If you have difficulties logging in, the computers will allow a five minute login with ID "new user" and password "new user" where you can access https://iam.unsw.edu.au and reset or unlock your zPass. Be aware that two consecutive failed login attempts will lock you out of the computing system for 30 minutes, or until you reset or unlock your zPass.

From week 1 onwards, you are expected to master Chapter 1 and sections 2.1 to 2.11 in the First Year Maple Notes 2016 by completing the self-contained Maple learning modules and by obtaining help, if necessary, from the Consultants who will be available in Drop-in Centre.

Computing syllabus

The Maple computing component is taught via a series of self-paced lessons on Moodle, that are assessed as part of the Weekly Möbius Lessons.
The lessons consist of:
Module 0 Getting Started: starting Maple, the Maple worksheet, new user tour, common mistakes.
Module 1 The Basics: arithmetic operations, brackets, constants and variables.
Module 2 Functions: expressions vs functions, Maple's functions, substituting in an expression, piecewise-defined functions, simplifying an expression.
Module 3 Basic Calculus: limits, differentiation, maxima and minima, integration.
Module 4 Collections of Expressions: Maple sequences, sets and lists, sums and products, manipulating Maple structures.
Module 5 Complex Numbers and Equations: complex numbers, equations, exact and approximate solutions.
Module 6 Plotting: plotting functions of one variable, parametric plots, polar plots, implicit plots, data plots.
Module 7 Linear Algebra: creating and manipulating vectors and matrices, vector and matrix operations, Gaussian elimination.

Remote access to Maple

Maple is available for Windows, Mac and Linux however, these are not free. UNSW provides a cloud based virtual version of Maple that students in first year mathematics courses can access on their laptop. For details see the myAccess website:
https://www.myaccess.unsw.edu.au/

Student-owned Computers for Mathematics Courses

The School of Mathematics and Statistics is committed to providing, through its own laboratories, all the computing facilities which students need for courses taught by the School. No student should feel the need to buy their own computer to undertake any Mathematics course. The School of Mathematics and Statistics provides assistance to students using teaching software in its laboratories. It does not have the resources to advise or assist students in the use of home computers or in communication between home computers and university facilities.

13. Some Greek Characters

Listed below are the Greek characters most commonly used in Mathematics.

Name	Lower case	Upper case	Name	Lower case	Upper case
Alpha	α		Nu	ν	
Beta	β		Xi	ξ	
Gamma	γ	Γ	Pi	π	Π
Delta	δ	Δ	Rho	ρ	
Epsilon	ϵ or ε		Sigma	σ	Σ
Zeta	ζ		Tau	τ	
Eta	η		Phi	ϕ or φ	Φ
Theta	θ	Θ	Chi	χ	
Kappa	κ		Psi	ψ	Ψ
Lambda	λ	Λ	Omega	ω	Ω
Mu	μ				