UNSW AUSTRALIA

Never Stand Still | Science | School of Mathematics and Statistics

Course Outline

MATH1231 Mathematics 1B

School of Mathematics and Statistics

Faculty of Science

Summer Semester (U1), 2018

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1. Important

If you did not attempt the MATH1231 Mathematics 1B course in 2017 Semester 2, then you are strongly advised to consider buying the MATH1231/MATH1241 Course Pack. This Course Pack is available at the UNSW Bookshop. Individual parts are also available on Moodle but a printed copy is recommended.

The MATH1231/MATH1241 Course Pack *was prepared for use in Semester 2.* **To adapt the Course Pack for use in the summer 2018 semester, you should do the following:**

1. **DISCARD THE INFORMATION BOOKLET** from the Course Pack and replace it with this Booklet. This Booklet is available at the Mathematics School website; see below link, and from the MATH1231 Moodle site.

   Website link: http://www.maths.unsw.edu.au/courses/math1231-mathematics-1b

2. **DELETE ALL SCHEDULES** for lectures, problems and tests in the Algebra and Calculus Notes from MATH1231/MATH1241 Course Pack. The Schedules for problems and tests are different in the Summer Session and they **are given in this Booklet.**

2. Staff

MATH1231 – Mathematics 1B

Position	Name	Email	Office
Course Authority	Jonathan Kress	j.kress@unsw.edu.au	RC-3073
Algebra Lecturer	Dennis Trenerry	d.trenerry@unsw.edu.au	
Calculus Lecturer	William Ellis	wjellis@unsw.edu.au	
Lecturer-in-charge of Computing	Chi Mak	chi.mak@unsw.edu.au	RC-4073

Staff consultation times will be posted on Moodle and on the School of Mathematics and Statistics website on the *Current Students* > *Undergraduate* > *Student Services* > *Help for Students* page by the beginning of week 2 each semester.

3. Administrative matters

Contacting the Student Services Office

Please visit the School of Mathematics and Statistics web-site 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 web page is found: http://www.maths.unsw.edu.au

If you cannot find the answer to your queries on the web pages you are welcome to contact the Student Services Office directly. The First Year Advisor in the Student Services Office is Mrs Markie Lugton. All administrative enquiries concerning first year Mathematics courses should be sent to M Lugton, either:

- By email to fy.mathsstats@unsw.edu.au
- By phone: 9385 7011
- Or in person to the Red Centre building, level 3, room 3072 (between 9am to 12pm OR 2pm to 4pm)

Request to change tutorials, due to timetable clashes or work commitments, and/or permission to take class tests outside your scheduled tutorial, 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, Dr Jonathan Kress. Should we need to contact you, we will use your official UNSW email address of zstudentno@unsw.edu.au 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.**

4. Course information

Units of credit: 6

Pre-requisite(s): A Pass or better is required in MATH1131 or MATH1141.

Exclusions for MATH1231: MATH1021, MATH1031, MATH1241, MATH1251, ECON1202 and ECON2291

Teaching times and locations: see the link on the Handbook web pages:

Handbook entry for MATH1231:

http://www.handbook.unsw.edu.au/undergraduate/courses/2018/MATH1231.html

Course summary

This course will provide you with a good working knowledge of Calculus and Linear Algebra, and show, through the lectures, how this mathematics can be applied in interdisciplinary contexts. Your skills in analytical critical thinking and problem solving will improve because of the illustrative examples used in lectures and because of the problem based tutorials. These mathematical problem solving skills, which are based on logical arguments and specific techniques, are generic problem solving skills that can be applied in multidisciplinary work. You will be 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 MATH1231 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. Students who achieve good competence in this course should be well equipped both technically and psychologically to cope with the mathematics that they will meet later in their program.

It is expected that students will be able to use the symbolic computing package Maple as an aid to solve problems that were generally inaccessible just a generation ago.

Course learning outcomes (CLO)

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

- state definitions as specified in the syllabus,
- state and prove appropriate theorems,

- explain how a theorem relates to specific examples,
- apply the concepts and techniques of the syllabus to solve appropriate problems,
- prove specific and general results given specified assumptions,
- use mathematical and other terminology appropriately to communicate information and understanding,
- use the symbolic computing package Maple as an aid to solve appropriate problems.

5. Learning and teaching activities

Lecturers & Tutorial Schedule

<table>
<tr><th>MONDAY</th><th>TUESDAY</th><th>THURSDAY</th></tr>
<tr><td rowspan="3"></td><td>9am-10am Calculus Lecture
Central Lecture Block 7</td><td rowspan="3"></td></tr>
<tr><td>10am-11am OR
11am-12pm tutorial
(1 hour only)</td></tr>
<tr><td>12pm-1pm Algebra Lecture
Central Lecture Block 7</td></tr>
<tr><td>1pm-2pm Algebra Lecture
Central Lecture Block 7</td><td rowspan="3"></td><td>1pm-2pm Algebra Lecture
Central Lecture Block 7</td></tr>
<tr><td>2pm-3pm OR
3pm to 4pm tutorial
(1 hour only)</td><td>2pm-3pm OR
3pm to 4pm tutorial
(1 hour only)</td></tr>
<tr><td>4pm-5pm Calculus Lecture
Central Lecture Block 7</td><td>4pm-5pm Calculus Lecture
Central Lecture Block 7</td></tr>
</table>

Please note in Week 1 only;

- **All lectures will be in the Central Lecture Block 7.**
- The table above reflects the teaching pattern each week from week 2 to week 8 for Monday and Tuesday and week 1 to week 8 for Thursday.
- There are **no tutorials on Monday and Tuesday in week 1 and some other Mondays. Some tutorial times have class tests. See the schedule on the next page for details**.

  Week 1 only: Monday lecture will be held from 1pm to 2:30pm (90 mins Algebra lect.), with a 1 hour break, and then from 3pm to 5 pm (90 mins Calculus lect.).

  Week 1 only: Tuesday lecture will be held from 9am to10:30am (90 mins Calculus lect.), with a 1 hour break, and then from 11am to 1pm (90 mins Algebra lect.).

Summer session commences on Monday 27th November and continues until Thursday 14th December, 2017. Classes re-commence on Tuesday 2nd January, 2018 until Thursday 1st February, 2018 (week 8).

NB: Important announcements and handouts may be given out in lectures, so missing lectures (or arriving late) may cause significant difficulties for you.

Classroom Tutorials

Attendance is compulsory for all classroom tutorials and a roll will be called at all tutorial classes. Please carefully note the table shown below – especially where class tests are scheduled.

Students will be assigned to a single tutorial in each of the 2 hour blocks between lectures, which means that all students will have one free hour between lectures. Specifically, students will be assigned to a tutorial that either meets at the times:

1st tutorials: Monday 2-3pm / Tuesday 10-11am / Thursday 2-3pm

2nd tutorials: Monday 3-4pm / Tuesday 11-12pm / Thursday 3-4pm.

You will have the same tutor for all tutorials and there is not a fixed division into Algebra and Calculus tutorials.

The **first tutorial will be on Thursday 30th November**. All tutorial information is available via myUNSW and you should check this site regularly as we may need to amalgamate or stream the tutorials. You can refresh your timetable online for details regularly. Attendance at tutorials is compulsory and the roll will be called at all tutorial classes.

	Monday	**Tuesday**	**Thursday**
Week 1			2-3pm / 3-4pm
Week 2	2-3pm / 3-4pm	10-11am / 11-12pm	2-3pm / 3-4pm
Week 3	2-3pm / 3-4pm	10-11am / 11-12pm	2-3pm / 3-4pm *Class Test 1*
Week 4	*No lectures or classroom tutorials (public holiday)*	10-11am / 11-12pm (2nd January, 2018)	2-3pm / 3-4pm
Week 5	*No classroom tutorial*	10-11am / 11-12pm	2-3pm / 3-4pm
Week 6	*No classroom tutorial*	10-11am / 11-12pm *Tutorial and Maple Lab Test*	2-3pm / 3-4pm *Tutorial and Maple Lab Test*
Week 7	2-3pm / 3-4pm	10-11am / 11-12pm	2-3pm / 3-4pm *Class Test 2*
Week 8	*No classroom tutorial*	10-11am / 11-12pm	2-3pm / 3-4pm

Online Tutorials

As well as your classroom tutorials, each week you will have an online tutorial. Each one will be a mix of algebra and calculus with work due at 23:59 on Friday at the end of weeks 1, 2, 3, 4, 5, 6, 7 and 8. These tutorials cover topics listed below. There is a detailed week-by-week schedule on Moodle and later in this booklet. See below on how to access Moodle. Note that the schedule for these online tutorials is different from their schedule during semester 2.

The online tutorials are an integral part of this course. In recognition of this they will contribute 8% of your final grade. Each week's online tutorial marks will be summed to give a weekly mark out of 80. The best 6 of the 8 weeks of online tutorials will then be summed to give the online tutorial component of your final grade.

Week	Topics Covered in Online Tutorials	
	Algebra	**Calculus**
1	6.1 – Definitions and examples of vector spaces	1.4 – Total Differential Approximation 1.5 – Chain Rule
2	6.5 – Linear independence	2.2 – Trigonometric Integrals 2.3 – Reduction Formulae
3	7.1 – Introduction to linear maps 7.2 – Linear maps	2.3 – Trigonometric and hyperbolic subs. 2.4 – Integration of rational functions
4	7.3 – Geometric examples of linear maps	3.3 – Separable ODEs 3.4 – First order Linear ODEs 3.7 – Modelling with first order ODEs
5	8.1 – Introduction to eigenvectors 8.2 – Diagonalization	
6	9.1 – Inclusion exclusion principle 9.2 – The binomial distribution	4.1 – Taylor Polynomials 4.2 – Taylor's Theorem
7	9.4 – The sign test	4.5 – Tests for series convergence 4.6 – Taylor Series
8	9.4 – Continuous distributions	5 (all) – Applications of integration

Note:

- Your work on these must be your own work, but you are encouraged to discuss the methods required with other students in person or in the forum.
- Each version of an online tutorial will be slightly different.
- Only a limited number of users can have simultaneous access to Maple TA, so **do NOT** leave your work on these to the last day when the server may be busy.
- The online tutorials are available from the beginning of the semester so that you have an extended period to complete them and only your best 6 of 8 weeks will count so that technical or other problems will not have a significant impact on your final grade.
- **No deadline extensions will be granted.** You should attempt these tests with sufficient remaining time to allow for unplanned services interruptions or other unexpected events.

Computing and self-paced lessons

In addition to the calculus and algebra components, there is a computing component in MATH1231. This is partly interwoven with the calculus and algebra components and partly independent of them. To assist in the self-directed learning of this component of the course, online self-paced lessons are available in UNSW Moodle.

Students are expected to work through and complete the specified online lessons according to the schedule given on page 8. Learning content will be accessible at all times for learning and revision, but the online assessments will only be available for credit until the published deadlines, given on page 12.

More information about the Computing component is given later in this booklet (see pages 10 and 23) and in the booklets *Computing Laboratories Information* and *First Year Maple Notes 2017*. These notes are freely available from the MATH1231 page on UNSW Moodle, and also from the School's website.

Computing consultants are available in the laboratory RC-G012B during for the two hours between the lectures until Monday of week 6.

UNSW Moodle

The School of Mathematics and Statistics uses the Learning Management System called Moodle. To log into Moodle, use your zID and zPass at the following URL: http://moodle.telt.unsw.edu.au

Here you will find announcements, general information, notes, lecture slides, classroom tutorial and homework problems and links to online tutorial and assessments.

Maple TA

Online tutorials and online assessments in this course use a system called Maple TA. Information on how to access and use Maple TA is provided on UNSW Moodle. **Note that "Maple" and "Maple TA" are different.**

Maple is the computer software that you will learn how to use in the computing component of this course, and Maple TA is an online assessment system used in this course for the online tutorials and online assessments.

Assessment overview

The final mark will be made up as follows:

Algebra and Calculus class tests	20%
Online Algebra and Calculus tutorials	8%
Online Computing tests (Maple)	4%
Maple Laboratory Computing test	8%
End of semester exam	60%

Note:

- You will be able to view your final exam timetable once Exams Central has finalised the timetable. Please visit the web page: https://student.unsw.edu.au/exams for details.
- It is very important that you understand the University's rules for the conduct of Examinations and the penalties for **Academic Misconduct Guide**. This information can be accessed through myUNSW at: https://student.unsw.edu.au/conduct and https://student.unsw.edu.au/exam-rules NB: In recent years there have been cases where severe penalties have been imposed for misconduct in relation to tests and exams in Maths courses.
- Assessment criteria: 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 web site:

  http://www.maths.unsw.edu.au/currentstudents/assessment-policies
- If you are unwell / miss your **final examination**, please refer to the Special Consideration Policy by visiting the website: https://student.unsw.edu.au/special-consideration
- Students with a **final mark in the range of 45-49** will be permitted to take the Additional Assessment Exam as a Concessional Additional Assessment (AA). There will be no notification to the individual student of the right to take the Concessional AA, but the details of the courses AA exam schedule will be provided on the School's website Notice Board, after the Provisional Results are published (normally 1 week after the exam period ends).

  The final mark after completing the Concessional AA will not increase to a mark higher than 50. Website to School Notice Board: http://www.maths.unsw.edu.au/currentstudents/current-students

Algebra and Calculus Class Tests

Details of the dates and contents of tests are given below. When there is a class test scheduled, there is no tutorial lesson on that day. Sample copies of the tests are included in the Algebra and Calculus Notes. These sample tests come from previous years and were conducted separately. This year Algebra Test 1 and Calculus Test 1 will be conducted together with a combined time limit of 45 minutes.

Test date	Algebra	Calculus
Thursday – 14/12/2017	Algebra Test 1	Calculus Test 1
Thursday – 25/1/2018	Algebra Test 2	Calculus Test 2

Note:

- YOU MUST TAKE EACH TEST IN THE TUTORIAL TO WHICH YOU HAVE BEEN OFFICIALLY ALLOCATED.
- You must bring to each test your **Student ID card**, some **blank A4 writing paper** and **a stapler** (so that you can staple a cover sheet to your answers).
- Normal exam conditions apply in tests. In particular, during the test you must not have visible any material relevant to the test, and you must not try to give or receive assistance from any other person.
- **Your best three scores** in the four tests will be counted towards your final assessment mark.

Maple Online Tests

There will be two different forms of computing tests. An initial set of four small online tests will run using Maple TA, followed by a laboratory based test in week 6. The online tests may be completed on any suitable web browser in your own time, but as the Maple package will be needed to answer the questions, the School computing labs are the best place to attempt the tests. Alternatively, you can use Maple via the myAccess service from your own computer. These online Maple computing tests are linked to the self-paced Maple instruction modules in UNSW Moodle.

Details on using Maple TA for online tests can be found on UNSW Moodle. The deadlines for these tests are given below. After a test's deadline, a "revision only" version of the test (that does **not** count towards your final mark), will become available. These online Maple computing tests **must be passed in sequence**. For example, you must pass "Maple Online Test 1" or "Maple Online Test 1 (revision only)" to gain access to "Maple Online Test 2" and "Maple Online Test 2 (revision only)".

You will have an unlimited number of attempts at these online **computing** tests. Note that it is only your best mark on each test that counts towards your final grade but marks from the "revision only" versions do not count.

Note:

- Do not leave your online attempts until the last day! Your inability to complete the online tests due to congestion in the School computing labs or in Maple TA on the last day will **NOT** be accepted as an excuse for missing the deadlines.

The deadlines for completion of the **online Maple tests** for MATH1231 are shown in the Schedule of all class assessments on page 12.

The Maple TA computing tests numbered 1, 2, 3 and 4 correspond to the Moodle self-paced lessons 8, 9, 10 and 11 respectively. The tests 1 to 4 counts towards your final mark, while the tests associated with Maple module 12 are for further preparation for the Maple lab test in week 6, and do not explicitly count towards your final mark.

All computing tests are linked to the Algebra and Calculus material, so you should make sure you understand the course work before trying them. The end of semester exam may contain one or two sub-questions requiring knowledge of Maple.

The online self-paced lessons 1 to 7 from MATH1131 and MATH1141 are provided as a revision resource in Moodle.

Maple Laboratory Test

The Maple Lab Test will run under exam conditions in the Red Centre lab RC-G012. You must bring your UNSW Student ID card to the test.

Tests will be held at various times during week 6. Based on your tutorial timetable, you will be allocated a time slot in week 6. **Information on your test time will be posted on Moodle.** If the allocated lab test time is unsuitable, you need to contact the lecturer in charge of computing immediately, to see if another time is available. In general you will need a very strong reason to change your allocated test time, as it is expected that all students are on campus for the whole teaching hours of summer session.

The test will be on the features of Maple which are covered in Chapter 1 and all of Chapter 2 of the First Year Maple Notes 2017.

You will NOT need to remember the exact syntax of each command because you will have access to the following resources during the test:

- a PDF electronic copy of the First Year Maple Notes;
- the self-paced lessons from Moodle; and,
- Maple's in built help pages.

You will not have access to the internet during the test and are NOT allowed to bring any calculators, notes or writing materials (pens, pencils, paper) into the test.

All of the possible test problems are provided in your MATH1231 Maple TA class. There you will also find a practice test with the same format as the actual Maple Lab Test. You are allowed an unlimited number of attempts at the practice tests.

You are expected to have worked out exactly how to answer the questions before you attend the test because you are allowed unlimited practice at the actual test questions, and you can view your results for these tests in the Maple TA gradebook.

End of Semester Examination

The final exam covers material from the whole of the algebra, calculus and computing (Maple) syllabuses. The best guide to the style and level of difficulty is the past exam papers. The course pack contains a book of past exam papers with worked solutions. To see the exact form of the past exam papers, including instructions on the front cover and the tables of integrals and standard normal probabilities that are provided, search for "MATH1231" on the library website. Examination questions are, by their nature, different from short test questions. They may test a greater depth of understanding. The questions will be longer, and sections of the course not covered in the class tests will be examined.

Please note that the Algebra Syllabus changed in 2012. Chapter 9, on Statistics and Probability was rewritten and contains some material that is different from previous years. Please note this carefully when you look at past exams and revising.

Revision videos and some additional past exam papers without solutions will be provided on Moodle. Some past exam papers will be provided without solutions to encourage students to think more deeply about how they can check their own answers.

The end of semester exam may contain one or two sub-questions requiring knowledge of Maple.

Schedule of all class assessments

Lectures run during weeks 1 to 8, and tutorials run during weeks 1 to 8. The table below gives the schedule of class tests and computing assessments.

Week	Algebra	Calculus	Maple Computing
1			
2			
3	Algebra Test 1 (14/12/17)	Calculus Test 1 (14/12/17)	Maple test 1 and 2 due by 23:59 Friday of week 3
Christmas and New Year break			
4			
5			Maple test 3 and 4 due by 23:59 Friday of week 5
6			Test in Laboratory (Tuesday/Thursday)
7	Algebra Test 2 (25/1/18)	Calculus Test 2 (25/1/18)	
8			

Calculator Information

For end of semester UNSW exams, students must supply their own calculator. Only calculators on the UNSW list of approved calculators may be used in the end of semester exams. Before the exam period, calculators must be given a "UNSW approved" sticker, obtained from the School of Mathematics and Statistics Office, and other student or Faculty centres. The UNSW list of calculators approved for use in end of semester exams is available at: https://student.unsw.edu.au/exams

6. Expectations of students

School 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:

http://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.

7. Academic integrity, referencing and plagiarism

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits**:** honesty, trust, fairness, respect, responsibility and courage.[1] At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and **plagiarism** can be located at:

- The *Current Students* site https://student.unsw.edu.au/plagiarism**,** and
- The *ELISE* training site http://subjectguides.library.unsw.edu.au/elise/presenting

The *Conduct and Integrity Unit* provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct.

8. Readings and resources

Course Pack

Your course pack should contain the following four items:

1. *Course Outline*

   Information on administrative matters, lectures, tutorials, assessment, syllabuses, class tests, computing, special consideration and additional assessment.
2. *Algebra Notes (for MATH1231/1241)*
3. *Calculus Notes (for MATH1231/1241)*
4. *Past Exam Papers Booklet*

You should also have the *First Year Maple Notes* from the MATH1131/MATH1141 course pack. This can also be downloaded from UNSW Moodle.

Text Book

S.L. Salas, E. Hille and G.J. Etgen, *Calculus – One and Several Variables,* any recent edition, Wiley.

Note, the 10h Edition of the text book 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.

Getting help outside tutorials

Staff Consultations

Details of staff consultations will be posted on Moodle by the beginning of week 2.

Mathematics drop-in centre

The Maths drop-in centre provides free help to students. The Maths drop-in centre office is in RC-3064, and opening times the summer course is from 3pm to 5pm on Mondays and Thursdays and 10am to 12noon on

[1] International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

Tuesdays for weeks 2 to 8. The Maths drop-in centre schedule will be available on the Schools website: https://www.maths.unsw.edu.au/currentstudents/Mathematics-Drop-in-Centre 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.

Maple Lab Consultants

For help with the Maple computing component of this course, consultants will be available in the Red Centre lab RC-G012B between the two lectures on Monday, Tuesday and Thursday beginning with Thursday of week 1 and continuing until Monday of week 6. For more details, visit website: http://www.maths.unsw.edu.au/currentstudents/maple-lab-consultants

9. Additional support for students

- 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
- Disability Support Services: https://student.unsw.edu.au/disability-services
- UNSW IT Service Centre: https://www.it.unsw.edu.au/students/index.html

Applications for Special Consideration

If you feel that your performance in, or attendance at a final examination or another assessment scheduled has been affected by illness or circumstances beyond your control, or if you missed the examination because of illness or other compelling reasons, you may apply for special consideration.

It is essential that you take note of the rules listed below which apply to applications for special consideration in all first year Mathematics courses.

1. Applications must be submitted online within 3 working days of the assessment to which it refers to. In exceptional circumstances, an application may be accepted outside the 3-day limit. Please ensure you contact the Course Authority with advice if your application cannot be submitted within the 3-day limit.

Visit website for further information on how to Apply for Special Consideration, and important things to note:
https://student.unsw.edu.au/special-consideration

2. If your course involves a Maple/Matlab lab test which you missed, you should contact the lecturer in charge of computing as soon as possible. A resit will be organised for later in the session.

3. If your application for Special Consideration refers to a missed class test, the School will provide advice of your application through your Moodle course website or by email on the next scheduled class test.

4. With regards to the final examination application for Special Consideration to sit an "Additional Assessment", please do not expect an immediate response from the School. All applications will be considered together. See the information below.

5. Please note that y**ou will NOT be granted Additional Assessment in a course if your performance in the course** (judged by attendance, class tests, assignments and examinations) **does not meet a minimal standard**. A total mark of greater than 40% on all assessment not affected by a request for Special Consideration will normally be regarded as the minimal standard to allow an Additional Assessment.

6. It is YOUR RESPONSIBILITY to find out from the School of Mathematics and Statistics, whether you have been granted Additional Assessment and when and where the additional assessment examinations will be held. Please visit the School's Notice Board for information:
http://www.maths.unsw.edu.au/currentstudents/current-students

Information about award of Additional Assessment and a provisional list of results will be made available on the Maths & Stats Marks page later in the semester. A link to the Maths & Stats Marks page is provided on Moodle.

7. **The Additional Assessment exams for MATH1231 will be held on Wednesday 21st February.** A link to the Additional Assessment timetable, including locations, will be placed on the Current Students Notice Board under heading "Special Consideration and Additional Assessment" information.
Web link: http://www.maths.unsw.edu.au/currentstudents/current-students

8. If you have two Additional Assessment examinations scheduled for the same time, please consult the Student Services Office either by email or phone (fy.mathsstats@unsw.edu.au or 9385 7011), so that special arrangements can be made.

9. You will need to produce your UNSW Student Card to gain entry to the Additional Assessment examination.

Important Notes

- The Additional Assessment exam may be of a different form to the original exam and must be expected to be at least as difficult.

- If you believe your application for Special Consideration has not been processed, you should immediately consult the Director for First Year Mathematics, Dr Jonathan Kress (Room 3073, Red Centre).

- If you believe that the above arrangements put you at a substantial disadvantage, you should send full documentation of the circumstances to: Director of First Year Mathematics, School of Mathematics and Statistics, University of NSW, Sydney NSW 2052, at the earliest possible time.

- 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 Disability Support Services who provide confidential support and advice. Their web site is: https://student.unsw.edu.au/disability

  Disability Support Services (DSS) 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 DSS.

- Additionally, if you have suffered misadventure during semester then you should provide full documentation to the Director of First Year Mathematics as soon as possible. In these circumstances, it may be possible to arrange discontinuation without failure or to make special examination arrangements.

  Professor B Henry
  Head, School of Mathematics and Statistics

University Statement on Plagiarism

This statement has been adapted from statements by the St James Ethics Centre, the University of Newcastle, and the University of Melbourne.

Plagiarism is the presentation of the thoughts or work of another as one's own. Examples include:

- Direct duplication of the thoughts or work of another, including by copying work, or knowingly permitting it to be copied. This includes copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement
- Paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- Piecing together sections of the work of others into a new whole;
- Presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and,
- Claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.
- Submitting an assessment item that has already been submitted for academic credit elsewhere may also be considered plagiarism.
- The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

Students are reminded of their Rights and Responsibilities in respect of plagiarism, as set out in the University Undergraduate and Postgraduate Handbooks, and are encouraged to seek advice from academic staff whenever necessary to ensure they avoid plagiarism in all its forms.

The Learning Centre website is the central University online resource for staff and student information on plagiarism and academic honesty. It can be located at: https://student.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- Correct referencing practices;
- Paraphrasing, summarising, essay writing, and time management;
- Appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

10. Algebra Syllabus and Lecture timetable

The algebra course for both MATH1231 is based on chapters 6 to 9 of the Algebra Notes. Lecturers will not cover all of the material in these notes in their lectures as some sections of the notes are intended for reference and for background reading.

The following timetable is the basic timetable and syllabus which will be followed by MATH1231 algebra lecturers.

Chapter 6. Vector Spaces

The aim of this section of the course is to introduce the general theory of vector spaces and to give some basic examples. The majority of examples will be for the real vector space $\mathbb{R}^n$, but occasional examples may be given for complex vector space $\mathbb{C}^n$, as well as from vector spaces of polynomials.

Lectures 1 and 2. Introduction to vector spaces and examples of vector spaces (6.1).

Properties of vector arithmetic (6.2).

Lecture 3. Subspaces (6.3).

Lectures 4 and 5. Linear combinations and spans (6.4). Linear independence (6.5).

Lectures 6 and 7. Basis and dimension (6.6).

Chapter 7. Linear Transformations

The basic aims of this section are to introduce the general theory of linear transformations, to give some geometric applications of linear transformations and to establish the close relationship between linear functions and matrices.

Lecture 8. Introduction to linear maps (7.1). Linear maps and the matrix equation (7.2).

Lecture 9. Geometrical examples (7.3).

Lecture 10. Subspaces associated with linear maps (7.4).

Lecture 11. Rank, nullity and solutions of $A\mathbf{x} = \mathbf{b}$ (7.4.3). Further applications (7.5).

Chapter 8. Eigenvalues and Eigenvectors

The aims of this section are to introduce the ideas of eigenvalue and eigenvector and to show some applications of these ideas to diagonalization of matrices, evaluation of powers of matrices and solution of simple systems of linear differential equations. Examples will be restricted to 2×2 matrices and very simple 3×3 matrices.

Lecture 12. Definition, examples and geometric interpretation of eigenvalues and eigenvectors (8.1).

Lecture 13. Eigenvectors, bases and diagonalization of matrices (8.2).

Lecture 14 and 15. Applications to powers of matrices and solution of systems of linear differential equations (8.3).

Chapter 9. Probability and Statistics

The main objective of this section is to introduce some of the ideas in mathematical probability and apply these concepts to discrete and continuous valued random variables and their associated probability distributions. The main distributions studied are the binomial and geometric in the discrete case and the normal distribution in the continuous case. These are applied to solving a range of problems.

Lecture 16. Revision of set theory (9.1), Mathematical probability (9.2.1, 9.2.2).

Lecture 17. Conditional probability, Bayes' rule, statistical independence (9.2.3, 9.2.4).

Lecture 18. Random variables, discrete random variables, mean of a discrete random variable (9.3.1, 9.3.2).

Lecture 19. Variance of discrete random variable (9.3.2), special distributions, the binomial distribution (9.4.1).

Lecture 20. Geometric distribution, sign test (9.4.2, 9.4.3).

Lecture 21. Continuous random variables (9.5).

Lecture 22. The Normal distribution, approximations to the binomial distribution. (9.6).

Lecture 23. Review.

Problem Sets

At the end of each chapter there is a set of problems. 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],** and **[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 with **[V]** have a video solution available via 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.

The problems marked **[X]** are intended for students in MATH1241 – they relate to topics which are only covered in MATH1241.

There are a number of questions marked **[M],** indicating that Maple is required in the solution of the problem.

Problem Schedule

The main purpose of tutorials is to give you an opportunity to get help with problems that you have found difficult, and with parts of the lectures or the Algebra Notes which you don't understand. It is essential that you try to do the relevant problems *before* the tutorial, so that you find out the areas you need help with.

The following table lists the complete set of problems relevant to each week of the course and a suggested (minimal) set of homework problems for MATH1231 that you should complete BEFORE the tutorial. Your tutor will only cover these in class if you have already tried them, and were unable to do them.

Week	Algebra problems		Recommended Homework Problems
	Chapter	Problems up to	
1	6	15	2, 3, 10, 11
2	6	35	16, 18, 22, 24, 28, 34
3	6	60	38,40,43, 47, 49, 50, 55, 59
	7	4	2(c), 4
	Algebra and Calculus Class Test 1		
4	7	12	7, 8, 11 (for 2(b))
5	7	60	13(c), 15, 16, 19, 26(b), 31(b), 33 (for 25(a)), 37, 38, 49, 56
6	8	23	2, 4, 7(d), 11 (for 7(a)), 12, 16, 18 (for 7(a)), 20, 21(a)
7	9	26	3, 6, 7, 8, 10, 12, 18(a), 19, 25, 26
	Algebra and Calculus Class Test 2		
8	9	56	29, 30, 37, 41(b), 44, 45, 47, 50(b), 53

Class tests

Algebra class test 1 will be on Thursday in week 3 covering all of chapter 6 and chapter 7 section 7.1.

Algebra class test 2 will be on Thursday in week 7 covering chapters 7.3, 7.4, 7.5, 8 (all), 9.1, 9.2 and 9.3.

Theory in the Algebra Course

The theory is regarded as an essential part of this course and it will be examined both in class tests and in the end of year examination.

You should make sure that you can give **DEFINITIONS** of the following ideas:

Chapter 6. Subspace of a vector space, linear combination of a set of vectors, span of a set of vectors, linear independence of a set of vectors, spanning set for a vector space, basis for a vector space, dimension of a vector space.

Chapter 7. Linear function, kernel and nullity of a linear function, image and rank of a linear function.

Chapter 8. Eigenvalue and eigenvector, diagonalizable matrix.

Chapter 9. Probability, statistical independence, conditional probability, discret random variable, expected value (mean) of a random variable, variance of a random variable, binomial distribution, geometric distribution.

You should be able to give **STATEMENTS** of the following theorems and propositions:

Chapter 6. Theorem 1 of §6.3, Propositions 1 and 3 and Theorem 2 of §6.4, Proposition 1 and Theorems 2, 3, 4, 5 and 6 of §6.6.

Chapter 7. Theorem 2, 3, and 4 of §7.1, Theorem 1 and 2 of §7.2, Proposition 7 and Theorems 1, 5, 8, 9 and 10 of §7.4.

Chapter 8. Theorems 1, 2 and 3 of §8.1, Theorem 1 and 2 of §8.2.

You should be able to give **PROOFS** of the following theorems and propositions:

Chapter 6. Theorem 2 of §6.4, Theorems 2 and 3 of §6.5, Theorem 2 of §6.6.

Chapter 7. Theorem 2 of §7.1, Theorem 1 of §7.2, Theorems 1, 5 and 8 of §7.4.

Chapter 8. Theorem 1 of §8.1.

11. Calculus Syllabus

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 the relevant material. Some parts of the subject 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 subject. 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. References to the 8th and 10th editions of Salas & Hills are shown as SH8 and SH10.

	SH8	**SH10**
1. **Functions of several variables**. (3 hours)	14.1-14.4	15.1-15.4
Contours and level curves, partial derivatives.	14.6	15.6
Mixed derivative theorem, increment estimation.		
Chain rules, tangent planes.		
2. **Integration techniques**. (4 hours)		
Trigonometric integrals and reduction formulae.	8.3	8.3
Trigonometric and hyperbolic substitutions.	8.4	8.4
Rational functions and partial fractions.	8.5	8.5
Further substitutions.	8.6	8.6
3. **Ordinary differential equations**. (6 hours)		
Particular, general, explicit and implicit solutions.	18.1	
1st order equations; separable, linear, exact.	8.9, 18.2, 15.9	9.1, 9.2, 19.1, 19.2,
Modelling with odes		9.1, 9.2
2nd order linear equations with constant coeffts:		
Homogeneous, non-homogeneous (undetermined coeffts).	18.3, 18.4	9.3, 19.4
4. **Taylor series**. (7 hours)		
Taylor polynomials, Taylor's theorem.	11.5	12.6, 12.7
Application to stationary points.		
Sequences: convergence and divergence;	10.2, 10.3	11.2-11.4
combination of sequences.		
Series: partial sums; convergence;	11.1, 11.2	12.1, 12.2
*k*th term test for divergence;		
integral, comparison and ratio tests;	11.1-11.3	12.3, 12.4
alternating series (Leibniz' test);		
absolute and conditional convergence;	11.4	12.5
rearrangement of series.		
Taylor and Maclaurin series.	11.6	12.7
Power series: radius and interval	11.7, 11.8	12.8, 12.9
of convergence; operations on power series.		
5. **Application of integration**. (3 hours)		
Average value of a function.	5.8	5.9
Arc length.	9.8	10.7
Arc length in polar coordinates.	9.5, 9.8	10.7
Area of surfaces of revolution.	9.9	10.8

Problem Sets

The Calculus problems are located at the end of each chapter in the Calculus Notes Booklet. To help you decide which problems to try first, each problem is marked with an **[R],** and **[H]** or a **[HH].**

All students should make sure that they attempt the questions marked **[R].** The problems marked **[H]** or **[HH]** are intended as a challenge for students. Some harder parts of **[R]** problems are marked with a star. Problems marked with **[V]** have a video solution available on Moodle.

Weekly Calculus Homework Schedule

Solving problems and writing mathematics clearly are two separate skills that need to be developed through practice. We recommend that you keep a workbook to practice *writing* solutions to mathematical problems. The following table gives the range of questions suitable for each week. In addition it suggests specific recommended problems to do before classroom tutorials.

Week	Calculus problems		Recommended Homework Problems
	Chapter	Problems up to	
1	1	4	1(c), 2(c), 3(d), 4(d)
2	1	18	7,10
	2	16	1(e), 1(f), 1(k), 2(c), 3(b), 3(e), 7, 15(a), 15(d)
3	2	22	17(b), 17(e), 18(c), 22(b), 22(c), 22(i)
	Algebra and Calculus Class Test 1		
4	3	17	1(h), 4(d), 6, 8(a), 9(c)
5	3	44	20, 23, 30(a), 31(b), 32(c), 33(a), 37
6	4	18	4, 6, 10, 12(c), 12(e)
7	4	42	19, 20, 23, 25(b), 26(a), 27(b), 28(c), 34(c), 35, 41(d), 42(a)
	Algebra and Calculus Class Test 2		
8	4	49	44(a), 45, 46, 48
	5	13	2, 3(c), 5, 7, 10(a), 13

Class tests and exams

Questions for class tests in MATH1231 will be similar to the questions marks [R] and [H] in the problem sets. Since each class test is only twenty minutes in length only shorter straight forward tests of theory and practice will be set. As a guide, see the recent past class test papers (at the end of the Calculus Notes).

The Calculus class tests will take place in the tutorials in the following weeks:

Calculus class test 1 will be on Thursday in week 3 covering Chapters 1 (all), 2.1, 2.2 and 2.3.

Calculus class test 2 will be on Thursday in week 7 covering Chapters 2.4, 2.5 and Chapter 3 (all).

12. Computing Information

How much?

In MATH1231/1241 there are online computing tests worth 4% of your final mark and **there will be a laboratory test, in week 6 worth 8% of your final mark**. Further, there will be exam questions worth at least another 3% of your final mark so in total 15% of your final mark is derived from the computing component of the course. The Computing component depends on the other components and will require knowledge of the appropriate Algebra and Calculus.

Aims

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 sophisticated computing package. This is a skill that will be needed in other courses at UNSW and in the workforce.

Computing lab

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 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://idm.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.

The laboratories will normally be open as follows:

	Days	**M020**	**G012**
Weeks 1 to 5 and 7 and 8	Monday to Friday	8am to 9pm	9am to 9pm
Week 6	Monday to Friday	8am to 9pm	**9am to 9pm except closed Tuesday 9 am to 12 noon Thursday 1pm to 4pm**
20/12/2017 to 1/1/2018		Closed	Closed
Public holidays and weekends		Closed	Closed

Any changes to these times will be posted on the door of Room M020.

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.

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/

How to start

If you had an account for computers in the Mathematics Labs in either semester 1 or 2, you will continue to use the same account with the same password in summer session. Remember that 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. 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 at https://idm.unsw.edu.au If you have forgotten how to log in and use the lab computers, help can be found in the booklet Computing Laboratories Information.

If you have problems with your account, you should go to Room M022 on the Mezzanine Level of the Red. You will need to show your student card.

The computing (Maple) component of MATH1231 follows on from the computing component in MATH1131/1141. The introductory materials from MATH1131/1141 will be provided on Moodle for revision if you need them.

You must complete the Declaration on Maple TA before you can access the Maple Online Tests.

From week 1 onwards, you are expected to master Chapter 1 and all of the remaining sections of Chapter 2 in the First Year Maple Notes 2017 by completing the self-contained Maple learning modules and by obtaining help, if necessary, from the Consultants who will be available in Room G012B between the lecture times on Monday, Tuesday and Thursday.

Computing Syllabus

The Maple computing component is taught via a series of self-paced modules located in UNSW Moodle You are expected to work steadily through these modules, completing the quiz at the end of each module before moving on to the next module. The timetable for the completion of these small tests is shown on page 12 and is clearly visible in Maple TA.

The online teaching package consists of the following modules:

Module 8 Functions of two or more variable: defining functions, partial derivatives, mixed derivatives and plotting functions of two variables.

Module 9 Further calculus: partial fractions, ordinary differential equations, initial conditions, sequences, series and Taylor series.

Module 10 Further linear algebra: matrix operations and properties, nullspace, kernel, rank, nullity, eigenvalues and eigenvectors.

Module 11 Geometry: dot and cross products, the geom3d package and its use.

Module 12 Programming in Maple: Maple procedures, Booleans, loops and conditionals.

WARNINGS

Misuse of computers is treated as Academic Misconduct and is a serious offence. Guidelines for acceptable conduct are in the Computing Notes.

Problems with your own (home) computer, internet service or the UNSW IT systems are not considered to be an excuse for missing tests or test deadlines. So you should PLAN AHEAD and not leave online assessments until the last few hours.

You should not use Maple to do your Algebra and Calculus tutorial problems (unless it is explicitly indicated) until you have understood the material thoroughly, as working through the problems is important for learning

the material. Once the material is understood you can then use Maple to check your answers. You may also use Maple for other subjects.

It is academic misconduct to do other people's tests or to allow others to do your test. Please refer to the Policy on Integrity and Plagiarism – or visit the website: https://student.unsw.edu.au/plagiarism

Assessment

There will be two different forms of computing tests. The details of the online Maple tests have been described previously in the section on computing tests on page 10.

The second form of computing test will be run under exam conditions in the School's computing laboratories during week 6. Information of your test time will be posted on Moodle.

All tests are linked to the Algebra and Calculus material, so you should make sure you under- stand the course work before trying them.

Finally, the end of semester exam may contain one or two sub-questions requiring knowledge of Maple.

Special consideration for the laboratory test

Because the computing tests can be sat at different times, medical, or other, reasons for missing the test will generally not be accepted. If you consider that you have an exceptional reason for missing the test then you must speak to Dr Mak, Lecturer in Charge of First Year Computing, as soon as possible after the tests have been completed.

Note that a medical or similar resit may be denied if there is insufficient evidence supporting your reason for the missed test. Tutors do not have permission to accept medical certificates for the computing test.

If possible, special arrangements for the computing laboratory test will be made for students with supporting documentation from Disability Services (SEADU). If you wish to exercise this option, you must contact Dr Mak at least one week before the laboratory tests have commenced so that any needed special facilities can be implemented.

Dr Chi Mak (Room: Red Centre 4073)
Lecturer-in-Charge, First Year Computing

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 in order to undertake any Mathematics course. Nevertheless, the following information is provided for the benefit of those who may wish to use their own computer for work associated with Mathematics courses.

All of our courses have a UNSW Moodle presence, and it is there you should look for course materials or links unless your lecturer tells you otherwise. UNSW Moodle may be accessed from any computer with internet access; see their help files and pages for technical requirements and how to check whether your web browser is supported.

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.

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		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				