UNSW AUSTRALIA

COURSE OUTLINE

Never Stand Still | Science | School of Mathematics and Statistics

MATH1131 Mathematics 1A
MATH1141 Higher Mathematics 1A

INFORMATION BOOKLET

Semester 1, 2016

CONTENTS OF THE MATH1131/1141 COURSE PACK 2016

Your course pack should contain the following four items:

1. *Information Booklet*

   Information on administrative matters, lectures, tutorials, assessment, syllabuses, class tests, computing, special consideration and additional assessment

2. *Algebra Notes (for MATH1131/1141)*
3. *Calculus Notes (for MATH1131/1141)*
4. *Past Exam Papers Booklet*
5. *First Year Computing Notes*

Information booklet contents

GENERAL INFORMATION FOR MATH1131 and MATH1141

Background

MATH1131, Mathematics 1A, and MATH1141, Higher Mathematics 1A, are first year courses taught by the School of Mathematics and Statistics in semester 1, and are each worth six units of credit. MATH1131 is also taught in semester 2. Students who pass MATH1131 in semester 1 usually continue to study MATH1231, Mathematics 1B, in semester 2. Those students who pass MATH1141 with a Credit usually continue to study MATH1241, Higher Mathematics 1B, in semester 2. MATH1231 is also taught in Summer Session. MATH1131 and MATH1231 (or MATH1141 and MATH1241) are generally specified in Engineering programs, as well as many Science programs.

Students can only count one of MATH1131 and MATH1141 towards their degree. The excluded courses for MATH1131 are:

MATH1011, MATH1031, MATH1141, MATH1151, ECON1202 and ECON2291.

For the excluded courses for MATH1141 replace MATH1141 by MATH1131.

Assumed Knowledge

The assumed knowledge for MATH1131 is a mark of at least 100 on the NSW HSC Mathematics Extension 1 course. However, students with marks below 120 are advised that they will need work especially conscientiously. MATH1131 is also an appropriate course for those students who only attempted the NSW HSC 2 Unit Mathematics course (Calculus based) and who attained a mark of at least 90. Students who attained a mark below 80 in that course are likely to find MATH1131 very difficult.

Students with a Mathematics Extension 2 combined mark above 176 or an Extension 1 combined mark above 145 are encouraged to enrol in MATH1141, which is the higher version of MATH1131.

Please note that although some Distinctions and High Distinctions are awarded to MATH1131 students, if you satisfy the criteria above and are seeking very high grades you should consider taking MATH1141.

If you feel after two weeks of semester that MATH1131 is too demanding for you, then you should seek advice from the Student Services Office, RC-3088.

Contacting the Student Services Office

The School of Mathematics and Statistics web-site

`http://www.maths.unsw.edu.au`

contains many pages of useful information on mathematics courses, school policies and how to obtain help, both academic and administrative.

In particular, the URL

`http://www.maths.unsw.edu.au/currentstudents/student-services`

provides a range of menus to choose from.
The student administration officer for First Year in the Student Services Office of the School of Mathematics and Statistics is Ms Markie Lugton. All administrative enquiries concerning first year Mathematics courses should be sent to Ms Lugton, either:

- by email to fy.MathsStats@unsw.edu.au
- by phone to 9385 7011
- or in person in room RC-3088

Lecturers in charge

The course authority for MATH1131/1141 is the Director of First Year Studies, Peter Brown. He can be contacted via the Student Services Office. Other staff take responsibility for parts of the course as given below.
For the **Algebra** component:

Lecturer-in-charge M. Pahor Room RC-3091, Red Centre

For the **Calculus** component:

Lecturer-in-charge Dr. A. Coster Room 2086, Red Centre

For the **Computing** component:

Lecturer-in-charge Dr J. Kress Room 4102, Red Centre

Lectures

Students in MATH1131 and MATH1141 are generally enrolled in a lecture group, where a lecture group consists of a sequence of two Algebra lectures and two Calculus lectures each week. There are four lecture groups in MATH1131 and two in MATH1141. Lectures commence in week 1 and run until week 12 as indicated in your timetable on myUNSW.

MATH1141

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Lectures Group 2		4-5 Alg Phys Th. Grossman 5-6 Cal Phys Th. Sukochev	2-3 Cal Rex Vowels Sukochev 3-4 Alg Rex Vowels Grossman		
Lectures Group 1				11-12 Alg Phys Th. Chan 12-1 Calc Phys Th. Schief	2-3 Calc Phys Th. Schief 3-4 Alg Pys Th. Chan

MATH1131

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Lectures Group 1		4-5 Alg Mat A Ellis 5-6 Calc Mat A McDougall	2-3 Calc Mat A McDougall 3-4 Alg Mat A Ellis		
Lectures Group 2				11-12 Alg Mat A Kress 12-1 Calc Mat A Coster	2-3 Calc Mat A Coster 3-4 Alg Mat A Kress
Lectures Group 3			9-10 Alg Mat A Mansfield 10-11 Calc Mat A Angell		9-10 Calc CLB-7 Angell 10-11 Alg CLB-7 Mansfield
Lectures Group 4	9-10 Alg Phys Th. Pahor 10-11 Calc Phys Th. Brown		10-11 Calc KBT Brown 11-12 Alg KBT Pahor		

It is important to note that:

- **If your timetable requires it, it is possible to take the algebra lectures from one group and the calculus lectures from another group**, but it is **not** possible to mix calculus lectures from two different groups or algebra lectures from two different groups (because the lecture groups do not keep exactly in step with each other).

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

Classroom tutorials

Students in MATH1131 and MATH1141 are enrolled in two classroom tutorials, one for algebra and one for calculus. The algebra tutorial is timetabled for the second half of the week, whilst the calculus tutorial is scheduled for the first half of the week.

However, the classroom tutorials will only run every second week, except for Test Weeks as shown in the table below. Please note this table very carefully - especially the weeks when there is a class tests.

Students are able to change their classroom tutorials, via myUNSW, until the end of week 1, and after that time, they can only change their classroom tutorials with the agreement of the Student Services Office, RC-3088. To change a classroom tutorial you will need to provide proof of a timetable clash or work commitments.

Note that

- **Classroom tutorials commence in week 2 and run until week 13**;
- attendance at classroom tutorials is compulsory and the roll will be called;
- the Class Tests will be held in your classroom tutorial room in the weeks when they are scheduled.

Week	Calculus	Algebra
2	Classroom tutorial	-
3	-	Classroom tutorial
4	Classroom tutorial	-
5	**CLASS TEST**	Classroom tutorial
6	Classroom tutorial	**CLASS TEST**
7	-	Classroom tutorial
8	Classroom tutorial	-
9	**CLASS TEST**	Classroom tutorial
10	Classroom tutorial	-
11	-	Classroom tutorial
12	Classroom tutorial	**CLASS TEST**
13	-	Classroom tutorial

Online tutorials

In the weeks you do not have a classroom tutorial you you will have an online tutorial. There are 6 for algebra, with work due at 23:59 on Sunday at the end of Weeks 2,4,6,8,10,12 and 6 for Calculus, due at 23:59 on Sunday at the end of Weeks 3,5,7,9,11,13. These tutorials cover topics listed later in this document. Your classroom tutorial room will be available to use if you wish (there will of course be no tutor there) in these weeks.

There is a detailed week-by-week roster in the Algebra Notes and Calculus Notes, on Moodle and later in this booklet.

Information on how to access the online tutorials is provided on UNSW Moodle.

UNSW Moodle

The School of Mathematics and Statistics uses the Learning Management System called Moodle. To log in to 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 slide, classroom tutorial and homework problems, links to online tutorials 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 algebra 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

Assessment overview

The final raw mark will be made up as follows:

Class tests	20%
Online tutorials	8%
Online Maple tests	4%
Maple lab test	8%
End of semester exam	60%

Note that:

- You will **not** be allowed to take a calculator into class tests.
- Tutors are expected to enter class test marks into the School's database within a fortnight of the test being sat. These marks are then available to you through the Student Web Portal accessed via the "Maths & Stats marks" link on the home page of MATH1131 or MATH1141 on the UNSW Moodle server. It is **your responsibility** to check that these marks are correct and you should **keep marked tests until the end of semester** in case an error has been made in recording the marks. If there is an error, either speak to your tutor or bring your test paper to the Student Services Office as soon as possible but no later than Friday Week 13.
- Once the UNSW examinations section finalises the examination timetable, you will be able to find out the time and place of the MATH1131/1141 examination from myUNSW. The web page

  `https://student.unsw.edu.au/exams`

  has many useful links related to the running of UNSW examinations.
- Please note that from 2016 there will be NO pass conceded grades. Hence a final mark less that 50 is a fail.
- **Medical certificates will generally not be accepted for missing the deadlines for the online sessions**. See the section on "Computing Information" for more details.

Class tests

Details of the dates and content of tests are given on pages 240 and 30 of this booklet. Sample copies of the tests are included in the Algebra and Calculus Notes. Note that

- You **MUST** be enrolled in an Algebra tutorial and a Calculus tutorial and

  YOU MUST TAKE EACH TEST IN THE TUTORIAL TO WHICH YOU HAVE BEEN OFFICIALLY ALLOCATED.

- To each test you must bring
  - your **Student ID** card
  - some blank A4 writing paper
  - a **stapler** (so that you can staple a cover sheet to your answers).
- Normal exam conditions apply in tests.
- You will **not** be allowed to use a calculator in class tests.
- Your **best three scores** in the four tests will be counted towards your final assessment mark.
- If you miss a class test due to illness please DO NOT apply for Special Consideration on-line. You should take the appropriate documentation explaining you absence to your tutor as soon as is practicable and an M will be recorded.

Online tutorials

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 8 of the 12 weeks of online tutorials will then be summed to give the online tutorial component of your final grade.

Maple Online tests

There will be two different forms of computing tests. An initial set of four small online tests will be run using Maple TA, followed by a laboratory based test in week 10. 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 probably the best place to attempt the tests. These online Maple computing tests should be attempted after completing the corresponding self-paced Maple lesson in UNSW Moodle. Details on using and accessing Maple TA for online tests are 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. Do **NOT** leave your attempts at these online tests until the last few days. Inability to complete these online tests due to issues that arise close to the deadline will **NOT** be accepted as an excuse for missing the deadlines.

The deadlines for completion of the online Maple tests for MATH1131/1141 are:

Tests	Due to be completed by
1, 2 and 3	4pm Friday of Week 5
4 and 5	4pm Friday of Week 7

The deadlines for completion of the online Maple tests for MATH1141 are:

Tests	Due to be completed by
1, 2 and 3	4pm Wednesday of Week 5
4 and 5	4pm Wednesday of Week 7

The additional Maple lessons 6 and 7 are designed to assist you with preparation for the Maple laboratory test in week 10. There are online tests within Maple TA corresponding to lessons 6 and 7, but these do not count towards your MATH1131/1141 assessment and are for self-testing purposes only.

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 a knowledge of Maple.

Maple Laboratory test

The second form of computing test will be run under exam conditions in the Red-Centre laboratory RC-G012. You must bring your UNSW Student ID card to the test.

Tests will be held in the Red-Centre computer lab G012 at various times during Week 10. You must make a booking to do the test at one of these times. Bookings must be made using the "Maple Lab Test booking" link on Moodle. This should be available by early in week 8 of semester. If you believe that all the proposed times will be impossible for you, inform the Lecturer in Charge of First Year Computing immediately.

The test will be on the features of Maple which are covered in Chapter 1 and sections 2.1 to 2.11 of the First Year Maple Notes 2016.

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 MATH1131 or MATH1141 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.

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, you are expected to have worked out exactly how to answer the questions before you attend the test.

End of Semester Examination

The largest component of assessment in MATH1131/1141 is the end of semester examination which covers material from the whole of the algebra, calculus and computing (Maple) syllabuses. The exam is arranged and conducted centrally. You will find the time and location of your exams on myUNSW towards the end of the semester. General information on examinations at UNSW can be found at

`https://student.unsw.edu.au/exams`

The best guide to the style and level of difficulty of the final exam is the past exam papers. The course pack contains a book of past exam papers with worked solutions. To see the exam form of the past exam papers, including the instructions on the front cover and the tables of integrals and standard normal probabilities that are provided, search for "MATH1131" or "MATH1141" 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.

Important information on special consideration for the final exam can be found on page 16.

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. This list is similar to the list of calculators approved for HSC examinations.

BEFORE the exam period calculators must be given a "UNSW approved" sticker, obtainable 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`

COURSE MATERIALS

The course materials consist of the course pack, the online tutorials, the textbook and the online self-paced Maple lessons. In addition, lecturers may provide notes on UNSW Moodle to accompany their lectures.

Course Pack

Your course pack should contain the following four items:

1. *Information Booklet*

   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*
5. *First Year Computing Notes*

The *First Year Maple Notes* can also be downloaded from UNSW Moodle.

Online Tutorials

The online tutorials are describe earlier in this booklet. They are an important learning resources for this course.

Textbook

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

The latest edition of the textbook, Salas, Hille and Etgen *Calculus - One and Several Variables*, 10th Edition comes packaged with access to the electronic resources known as WileyPlus. This electronic version provides internet access to the textbook, problems, worked solutions, tests (for self-assessment) and other electronic resources related to the text material. The purchase of the text from the UNSW Bookshop gives web access to the WileyPlus server for one year; it is possible to renew the web access on a yearly basis at a fee determined by the publisher. It is also possible to purchase just the web access to the electronic version of the textbook for one year. This can also be done at the UNSW Bookshop. Note that these WileyPlus electronic resources are provided by the publisher John Wiley, and **not** by the School of Mathematics and Statistics. Any difficulties that you might have with access to WileyPlus must be resolved directly with the publisher.

Online Self-Paced Maple Lessons

In addition to the Calculus and Algebra components, there is a Computing component in MATH1131/1141. 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. These lessons guide students through the computing component of this course and are integrated with, and enhance the lecture and tutorial content presented in Calculus and Algebra.

Students are expected to work through and complete the specified online lessons according to the schedule given on page 8. Associated with each lesson is a graded quiz, done in Maple TA, and the completed quizzes contribute 4% to the final grade. 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 8.

More information about the Computing component is given later in this booklet (see page 31) and in the *First Year Maple Notes 2016.* These computing notes are freely available from the MATH1131/1141 page on UNSW Moodle, and also from the School's website.

GETTING HELP OUTSIDE TUTORIALS

Staff consultations

From week 3 there will be a roster which shows for each hour of the week a list of names of members of staff who are available at that time to help students in first year mathematics courses. This roster is displayed on the same noticeboard as timetables, near the School Office (Room 3070, Red Centre). It is also available from the web page

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

You can also avail yourself of the **Student Support Scheme**. This Scheme is financed by the School of Mathematics and Statistics and is staffed by later year mathematics students.

Student Support Scheme

The Student Support Scheme (SSS) is a drop-in consultation centre where students can come for free help with certain first- and second-year mathematics courses. The SSS office is located in **RC-3064**. During semester the SSS has opening times from **10am–12noon** and **1pm–3pm** from **Mondays to Fridays**. The First Year courses the SSS services in semester 2 will be MATH1011, MATH1041, MATH1131, and MATH1231. The schedule will be available on the SSS website at

`http://www.maths.unsw.edu.au/currentstudents/student-support-scheme`

by the end of Week 1. Please remember that there is no appointment needed. Just drop-in and you will be able to obtain one-on-one help from SSS 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 from 11am to 4pm each teaching day in weeks 1 to 9. For more details see

`http://www.maths.unsw.edu.au/currentstudents/maple-lab-consultants`

FURTHER INFORMATION

Academic misconduct

It is very important that you understand the University's Rules for the conduct of Examinations and the penalties for Academic Misconduct. This information can be accessed through myUNSW at:

`https://student.unsw.edu.au/exams`.

Illness and other problems

If you are ill for the final examination you can apply for Special Consideration and you may be offered the opportunity for Additional Assessment.

Please do NOT apply on-line for Special Consideration for class tests or on-line quizzes.

In order to be offered Additional Assessment it is essential that you

follow exactly the procedures set out in the document entitled "Application for Special Consideration in First Year Mathematics Courses Semester 1 2016."

A copy of this document is included in this booklet on page 16.

Take particular note that

- The School will **NOT** contact you to tell you that you have been granted Additional Assessment. It is **YOUR RESPONSIBILITY** to find this out by following the instructions in the document mentioned above.

- **If you have a poor record of attendance or performance during the semester you may be failed regardless of illness or compassionate grounds affecting the final exam.**

Note also that

- If illness affects your attendance at or performance in a **class test**, do **not** make an application for Special Consideration. Simply show the original medical certificate to your tutor and also give a copy of the medical certificate to your tutor. This information will be taken into account when calculating your final assessment mark, however it is unlikely that more than 2 medical certificates will be taken into account.

- Transport delays and oversleeping will **not** be accepted as reasons for missing class tests. (But note that only your best three test results are counted for assessment.)

- Because it is possible to sit the computing tests on many days, **medical certificates will generally not be accepted as excuses for not sitting the computing test**. Therefore, it is recommended that you book to sit at an early time.

- Because online Maple TA tests are available for an extended period, **medical certificates will generally not be accepted as excuses for not completing these tests**. Therefore, it is recommended that you complete these tests as early as possible.

- If you arrive too late to be admitted to the end of semester exam, go **immediately** to the Mathematics and Statistics Student Services Office, Room 3088, Red Centre.

Change of enrolment

Changes between the three levels of first year Mathematics can be made without penalty up to the census date, which is the 31st March.

School of Mathematics and Statistics Policies

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 MathsStats 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.

Course improvement

You will be invited to complete electronically a CATEI Student Subject Survey at the end of the semester.

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. Successful completion of this course, together with the second semester course MATH1231/1241, should mean that you will be well equipped both technically and psychologically to cope with the mathematics that you will meet in the later years of your program. It is also 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.

Graduate Attributes

This course will provide you with an in-depth knowledge of topics in 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 tutorial classes. 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. The course will also engage you in independent and reflective learning through your independent mastery of tutorial problems and the Maple computing package. You will be encouraged to develop your communication skills through active participation in tutorials, and by writing clear, logical arguments when solving problems.

Learning Outcomes

A 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.

Peter Brown
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ADDITIONAL INFORMATION FOR MATH1141 HIGHER MATHEMATICS 1A

This additional information applies only to students enrolled in *Higher* Mathematics 1A.

Content

Higher Mathematics 1A includes everything which is in MATH1131 Mathematics 1A and this accounts for 85% of the content of the Higher course. The remaining time is spent treating some of the common topics in greater depth and covering some extra topics. This booklet contains separate Calculus syllabuses for MATH1131 and MATH1141. For Algebra there is a syllabus for MATH1131 and a list of extra topics for MATH1141.

Assessment

All grades from High Distinction to Fail are awarded in both MATH1131 and MATH1141. **Marks in Higher Mathematics 1A will be scaled so that students in the Higher course are not at any disadvantage compared to students in the ordinary course MATH1131.**

The class tests and computing tests for MATH1141 are the same as those for MATH1131. However, the MATH1141 end of semester exam will contain questions that are quite different from those in the MATH1131 exam. While the online tutorials will have some overlap, the MATH1141 online tutorials will emphasise more abstract concepts and less routine calculation.

APPLICATIONS FOR SPECIAL CONSIDERATION IN FIRST YEAR MATHEMATICS COURSES SEMESTER 1 2016

If you feel that your performance in, or attendance at, a final examination 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. Such an application **may** lead to the granting of additional assessment.

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

1. **Within 3 days** of the affected examination, or at least as soon as possible, you must **submit a request for special consideration to UNSW Student Central** ON-LINE.

   Please refer to link below for How to Apply for Special Consideration,

   https://my.unsw.edu.au/student/atoz/SpecialConsideration.html
   ApplyingforSpecialConsideration

2. **Please do not expect an immediate response from the School.** All applications will be considered together. See the information below.

3. **You 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 at least 40% on all assessment not affected by a request for special consideration will normally be regarded as the minimal standard for award of additional assessment as will at least 80% attendance at tutorial classes.

4. 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. **Do NOT wait to receive official results from the university**, as these results are not normally available until after the Mathematics additional assessment exams have started.

   a) A **provisional** list of results in all Mathematics courses and of grants of additional assessment will be available via the "Maths&Stats marks" link in the UNSW Moodle module of your course. The date for this will be announced later.

   b) Please read all announcements on Moodle. Failure to read announcements will not be accepted as a reason for missing supplementary exams and for not following the correct procedures.

5. The **timetables** for the additional assessment examinations will be available on the Mathematics website at the same time as the provisional list of results.

   The dates for the mid-year additional assessment examinations will be announced later in the Semester.

6. If you have two additional assessment examinations scheduled for the same time, please consult the School of Mathematics and Statistics Office as soon as possible so that special arrangements can be made.

7. You will need to produce your UNSW Student Card to gain entry to additional assessment examinations.

IMPORTANT NOTES

- The additional assessment examination may be of a different form from the original examination and must be expected to be at least as difficult.
- If you believe that your application for special consideration has not been processed, you should immediately consult the Director of First Year Studies of the School of Mathematics and Statistics (Room 3073 Red Centre).
- If you believe that the above arrangements put you at a substantial disadvantage, you should, at the earliest possible time, send full documentation of the circumstances to the Director of First Year Studies, School of Mathematics and Statistics, University of New South Wales, Sydney, 2052.

In particular, 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 Student Equity and Disabilities Unit (SEADU) who provide confidential support and advice. Their web site is

http://www.studentequity.unsw.edu.au

SEADU may determine that your condition requires special arrangements for assessment tasks. Once the First Year Office has been notified of these we will make every effort to meet the arrangements specified by SEADU.

Additionally, if you have suffered a serious misadventure during semester then you should provide full documentation to the Director of First Year Studies 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

Plagiarism is the presentation of the thoughts or work of another as one's own.[1] 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[2].

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:

www.lc.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.

[1] Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle.

[2] Adapted with kind permission from the University of Melbourne

ALGEBRA SYLLABUS AND LECTURE TIMETABLE

The algebra course for both MATH1131 and MATH1141 is based on the MATH1131/MATH1141 Algebra Notes that are included in the Course Pack.

Please note that the order of the syllabus changed in 2014, in accordance with requests from the Engineering Faculty and the School of Physics. It is important to note this in regard to the class tests from previous years.

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 2016*.

The lecture timetable is given below. Lecturers will try to follow this timetable, but some variations may be unavoidable, especially in MATH1141 classes and lecture groups affected by public holidays.

Chapter 1. Introduction to Vectors

Lecture 1. Vector quantities and $\mathbb{R}^n$. (Section 1.1, 1.2).
Lecture 2. $\mathbb{R}^2$ and analytic geometry. (Section 1.3).
Lecture 3. Points, line segments and lines. Parametric vector equations. Parallel lines.(Section 1.4).
Lecture 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. (Section 1.5).

Chapter 2. Vector Geometry

Lecture 5. Length, angles and dot product in $\mathbb{R}^2$, $\mathbb{R}^3$, $\mathbb{R}^n$. (Sections 2.1,2.2).
Lecture 6. Orthogonality and orthonormal basis, projection of one vector on another. Orthonormal basis vectors. Distance of a point to a line. (Section 2.3).
Lecture 7. Cross product: definition and arithmetic properties, geometric interpretation of cross product as perpendicular vector and area (Section 2.4).
Lecture 8. Scalar triple products, determinants and volumes (Section 2.5). 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 $\mathbb{R}^3$. (Section 2.6).

Chapter 3. Complex Numbers

Lecture 9. Development of number systems and closure. Definition of complex numbers and of complex number addition, subtraction and multiplication. (Sections 3.1, 3.2, start Section 3.3).
Lecture 10. Division, equality, real and imaginary parts, complex conjugates. (Finish 3.3, 3.4).
Lecture 11. Argand diagram, polar form, modulus, argument. (Sections 3.5, 3.6).
Lecture 12. De Moivre's Theorem and Euler's Formula. Arithmetic of polar forms. (Section 3.7, 3.7.1).
Lecture 13. Powers and roots of complex numbers. Binomial theorem and Pascal's triangle. (Sections 3.7.2, 3.7.3, start Section 3.8).
Lecture 14. Trigonometry and geometry. (Finish 3.8, 3.9).
Lecture 15. Complex polynomials. Fundamental theorem of algebra, factorization theorem, factorization of complex polynomials of form $z^n - z_0$, real linear and quadratic factors of real polynomials. (Section 3.10).

Chapter 4. Linear Equations and Matrices

Lecture 16. Introduction to systems of linear equations. Solution of 2×2 and 2×3 systems and geometrical interpretations. (Section 4.1).
Lecture 17. Matrix notation. Elementary row operations. (Sections 4.2, 4.3).
Lecture 18. Solving systems of equations via Gaussian elimination. (Section 4.4)
Lecture 19. Deducing solubility from row-echelon form. Solving systems with indeterminate right hand side. (Section 4.5, 4.6).
Lecture 20. General properties of solutions to $A\mathbf{x} = \mathbf{b}$. (Section 4.7). Applications. (Section 4.8) or Matrix operations (start Section 5.1)

Chapter 5. Matrices

Lecture 21. Operations on matrices. Transposes. (Sections 5.1, 5.2).
Lecture 22. Inverses and definition of determinants. (Section 5.3 and start Section 5.4).
Lecture 23. Properties of determinants. (Section 5.4).

EXTRA ALGEBRA TOPICS FOR MATH1141

Extra topics for MATH1141 in semester 1 may be selected from the following:

Introduction to Vectors. Use of vectors to prove geometric theorems; parametric vector equations for rays, line segments, parallelograms, triangles; elements of vector calculus.

Vector Geometry. Use of vectors to prove geometric theorems, further applications of vectors to physics and engineering.
Complex Numbers. Cardan's formula for roots of cubics, applications of complex numbers to vibrating systems.

Linear Equations. Elementary matrices and elementary row operations, applications of linear equations and matrices to electrical engineering (Kirchhoff's Laws), economics (Leontief model).

Matrices and Determinants. Rotations of Cartesian coordinate systems and orthogonal matrices, evaluation of special determinants and connections with areas.

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. The problems marked [**X**] are intended for students in MATH1141 – they relate to topics which are only covered in MATH1141. Extra problem sheets for MATH1141 may be issued in lectures.

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

WEEKLY ALGEBRA SCHEDULES

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 your classroom tutorials.

The Online Tutorials will develop your problem solving skills, and give you examples of mathematical writing. Because this overlaps with the skills developed through homework, there are fewer recommended homework in Online Tutorial weeks.

WEEKLY ALGEBRA HOMEWORK SCHEDULE

Week	**Try to do up to**		**Recommended Homework Problems**
	Chapter	**Problem**	
1	No tutorial, but start learning how to use Maple and Maple TA		
2	1	30	1,4, 5, 6(a), 16(a), 18, 21
3	1	50	31(d), 33(b), 34(b), 41(b), 41(d), 46
4	2	17	1(b), 3, 8, 9(b)
5	2	32	14(b), 17(b), 25(a), 27(a), 29(a), 30(b)
6	3	17 (Test 1)	1(b), 5, 8(c), 10
7	3	49	18, 21(a)-21(d), 26, 27, 33(a), 34(a), 40
8	3	82	51, 54, 60(a), 61(b), 68(b), 72
9	3	91	84
	4	11	5,7,10
10	4	24	12(g), 13(b), 14(c), 16(e), 17, 22(a)
11	4	45	26, 27, 31, 40
12	5	18 (Test 2)	1, 7,13, 15
13	5	57	19(a), 19(c),20, 23, 26, 35, 39

WEEKLY MATH1131 ALGEBRA TUTORIAL SCHEDULE

The main reason for having tutorials is to give you a chance to tackle and discuss problems which you find difficult or don't fully understand.

There are two kinds of tutorials: Online and Classroom. Algebra Online Tutorials are delivered using MapleTA. These can be completed from home, are available for a two week period, and are due on Sunday night in weeks 2,4,6,8,10 and 12. Algebra Classroom tutorials are delivered in a classroom by an algebra tutor. The topics covered in a classroom tutorial are flexible, and you can (and should) ask your tutor to cover any homework topics you find difficult. You may also be asked to present solutions to homework questions to the rest of the class.

The following table lists the topics covered in each tutorial.

Week	**Location**	**Topics Covered**
1	None	
2	Online	1.1 : Vector quantities 1.2 : Vector quantities and $\mathbb{R}^n$ 1.3 : $\mathbb{R}^n$ and analytic geometry
3	Classroom	1.4 : Lines 1.5 : Planes
4	Online	2.1 : Lengths 2.2 : The dot product 2.3 : Applications: orthogonality and projection 2.4 : The cross product, up to question 17
5	Classroom	2.4 : The cross product, from question 18 2.5 : Scalar triple product and volume 2.6 : Planes in $\mathbb{R}^3$
6	Online	3.1 : A review of number systems 3.2 : Introduction to complex numbers 3.3 : The rules of arithmetic for complex numbers 3.4 : Real parts, imaginary parts and complex conjugates
7	Classroom	3.5 : The Argand diagram 3.6 : Polar form, modulus and argument 3.7 : Properties and applications of the polar form
8	Online	3.8 : Trigonometric applications of complex numbers 3.9 : Geometric applications of complex numbers 3.10 : Complex polynomials
9	Classroom	3.11 : Appendix: A note on proof by induction 4.1 : Introduction to linear equations 4.2 : Systems of linear equations and matrix notation 4.3 : Elementary row operations
10	Online	4.4 : Solving systems of equations 4.5 : Deducing solubility from row-echelon form 4.6 : Solving $A\mathbf{x} = \mathbf{b}$ for indeterminate $\mathbf{b}$
11	Classroom	4.7 : General properties of the solution of $A\mathbf{x} = \mathbf{b}$ 4.8 : Applications
12	Online	5.1 : Matrix arithmetic and algebra 5.2 : The transpose of a matrix
13	Classroom	5.3 : The inverse of a matrix 5.4 : Determinants

WEEKLY MATH1141 ALGEBRA TUTORIAL SCHEDULE

MATH1141 Tutorials cover the same material as MATH1131, only in greater detail. The tutorial structure is more flexible, which is designed to allow for classroom discussion. Only a subset of the recommended discussion questions will be discussed in your classroom tutorial, which are held every odd week starting in week 3. Online Tutorial questions for algebra are due at Sunday 23:59 every even week.

weeks	**Chapter**	**Online Tutorial**	**Recommended Classroom Discussion Questions**
2 and 3	1	1,5, 18,41(d)	4, 6(a), 16(a), 21 31(d), 33(b), 34(b), 41(b), 46
4 and 5	2	3,9(a), 17(b),27(a)	1(b), 8, 9(b) 14(b), 25(a), 29(a), 30(b)
6 and 7	3	5,8(b), 17, 22	1(b), 10 21(a-d), 26, 27, 31, 33(a), 34(a), 41
8 and 9	3 4	40, 60(b),74, 3	51, 54, 61(b),68(b), 72 5,7,10
10 and 11	4	14(e),17, 21,34	12(g), 13(b), 16(e), 22(a) 26, 27, 31, 40
12 and 13	5	7,15, 28,38	1, 13,19(a), 19(c) 20, 23, 26, 35, 39

ALGEBRA CLASS TESTS

Questions for the class tests in MATH1131 and MATH1141 will be similar to the questions marked [**R**] and [**H**] in the problem sets. Since each class test is only twenty or twenty-five 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 Algebra notes).
The following table shows the week in which each test will be held and the topics covered.

		Topics covered	
Test	Week	**chapter**	**sections**
1	6	1	All
		2	Up to and including §2.4
2	12	3	All
		4	All

Please note that the order of the syllabus has changed in 2014. The SAMPLE TESTS contained in the Algebra Notes are based on this new syllabus, but please be aware that Sample Tests from previous years may not be relevant.

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. As a guide, see the recent past exam papers in the separate past exam papers booklet.

CALCULUS SYLLABUS FOR MATH1131 MATHEMATICS 1A

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 and 9th editions are shown as SH10 and SH9. 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 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. References to the 9th and 10th editions of Salas & Hille are shown as SH9 and SH10.

	SH10	**SH9**
1. **Sets, inequalities and functions.** (2.5 hours)		
$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$. Open and closed intervals. Inequalities.	1.2, 1.3	1.2, 1.3
Functions: sums, products, quotients composites. Polynomials, rational functions, trig functions as examples of continuous functions.		
Implicitly defined functions.	1.6-1.7	1.6-1.7
2. **Limits.** (2 hours)		
Informal definition of limit as $x \to a$ (a finite).	2.1, 2.2	2.1, 2.2
Formal definition of limit as $x \to \infty$.	pp177-178 pp195-198	pp222-224 pp243-246
Limit rules. The pinching theorem.	2.3, 2.5	2.3, 2.5
3. **Properties of continuous functions.** (1.5 hours)		
Combinations of continuous functions.	2.4	2.4
Intermediate value and min-max theorems.	2.6, B1, B2	2.6, B1, B2
Relative and absolute maxima and minima.	4.3-4.5	4.3-4.5
4. **Differentiable functions.** (2 hours)		
Definition of derivative via tangents.	3.1	3.1
Derivatives of sums, products, quotients and composites. Rates of change. Higher derivatives.	3.2-3.5	3.2-3.5
Derivatives of polynomial, rational and trig functions.	3.5,3.6	3.5,3.6
Implicit differentiation, fractional powers.	3.7	3.7
5. **The mean value theorem and applications**. (2 hours)		
Mean value theorem and applications.	4.1, 4.2	4.1, 4.2
L'Hôpital's rule.	11.5, 11.6,	10.5, 10.6

	SH10	SH9
6. **Inverse functions.** (1.5 hours)		
Domain, range, inverse functions,		
the inverse function theorem.	7.1, B3	7.1, B3
Inverse trig functions, their derivatives and graphs.	7.7	7.7
7. **Curve sketching.** (3 hours)		
Use of domain, range, intercepts, asymptotes,		
even or odd, calculus.	4.7, 4.8	4.7, 4.8
Parametrically defined curves.		
Relation between polar and Cartesian coordinates.	10.2	9.3
Sketching curves in polar coordinates.	10.3	9.4
8. **Integration.** (5 hours)		
Riemann sums, the definite integral and its		
algebraic properties.	5.1, B5	5.1, B5
Indefinite integrals, primitives and the		
two fundamental theorems of calculus.	5.2-5.5	5.2-5.5
Integration by substitution and by parts.	5.6, 8.2	5.6, 8.2
Integrals on unbounded domains, limit form of		
comparison test.	11.7	10.7
9. **Logarithms and exponentials.** (2 hours)		
ln as primitive of $1/x$, basic properties,		
logarithmic differentiation.	7.2, 7.3	7.2, 7.3
Exponential function as inverse of ln, basic properties.		
a^x, logs to other bases.	7.4-7.6	7.4-7.6
10. **Hyperbolic functions** (1.5 hours)		
Definitions, identities, derivatives, integrals		
and graphs.	7.8	7.8
Inverse hyperbolic functions.	7.9	7.9
Integrals involving hyperbolic or trig substitution.		
11. **Review.** (1 hour)		

CALCULUS SYLLABUS FOR MATH1141 HIGHER MATHEMATICS 1A

This is the syllabus for *Higher* Mathematics 1.
The Calculus textbook is S.L. Salas & E. Hille *Calculus - One and Several Variables,* any recent edition, Wiley. References to the 10th and 9th editions are shown as SH10 and SH9. 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.

	SH10	**SH9**	**Sp**
1. **Sets, inequalities and functions.** (2 hours)			
$\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}$. Open and closed intervals. Inequalities.	1.2, 1.3	1.2, 1.3	1, 2
Functions: sums, products, quotients, composites.			3, 4
Polynomials, rational functions, trig functions, as examples of continuous functions. Implicitly defined functions.	1.5-1.7	1.5-1.7	
2. **Limits.** (2.5 hours)			
Formal definition of limits as $x \to a$ (a finite) and as $x \to \infty$	2.1, 2.2 pp177-178 pp195-198	2.1, 2.2 pp222-224 pp243-245	5
Limit rules. The pinching theorem.	2.3, 2.5	2.3, 2.5	
3. **Properties of continuous functions.** (1.5 hours)			
Combinations of continuous functions.	2.4	2.4	
Intermediate value and min-max theorem.	2.6, B1, B2	2.6, B1, B2	
Relative and absolute maxima and minima.	4.3-4.5	4.3-4.5	
4. **Differentiable functions.** (1.5 hours)			
Definition of derivatives via tangents. Derivatives of sums, products, quotients and composites.	3.1	3.5	
Rates of change. Higher derivatives.	3.2-3.5	3.4, 3.7	
Derivatives of polynomial, rational and trig functions.	3.5, 3.6	3.6	
Implicit differentiation, fractional powers.	3.7	3.7	

	SH10	SH9	Sp
5. **The mean value theorem and applications.** (2 hours)			
Rolle and mean value theorems (with proof).			
Applications of the mean value theorem.	4.1, 4.2	4.1, 4.2	11
L'Hôpital's rule.	11.5, 11.6	10.5, 10.6	11
6. **Inverse functions.** (2 hours)			
Domain, range.			
Inverse functions, injective functions,	7.1, B3	7.1, B3	12
the inverse function theorem.			
Inverse trig functions, their derivatives and graphs.	7.7	7.7	
7. **Curve sketching.** (3 hour)			
Odd and even functions, periodicity, calculus.			
Use of domain, range, intercepts, asymptotes, periodicity,	4.7, 4.8	4.7, 4.8	
symmetry and calculus.			
Parametrically defined curves.			
Relation between polar and Cartesian coordinates.	10.2	9.3	
Sketching curves in polar coordinates.	10.3	9.4	
8. **Integration.** (5 hours)			
Riemann sums, the definite integral and its			
algebraic properties.	5.1, B5	5.1, B5	13
Indefinite integrals, primitives and the			
two fundamental theorems of calculus.	5.2-5.5	5.2-5.6	14
Integration by substitution and by parts.	5.6, 8.2	5.6, 8.2	18
Improper integrals, limit form of comparison test.	11.7	10.7	
9. **Logarithms and exponentials.** (2 hours)			
ln as primitive of $1/x$, basic properties,			
logarithmic differentiation.	7.2, 7.3	7.2-7.6	
Exponential function as the inverse of ln			
basic properties.			
a^x, logs to other bases.	7.4-7.6		
10. **Hyperbolic functions** (1.5 hours)			
Definitions, identities, derivatives, integrals			
and graphs.	7.8	7.9, 7.10	
Inverse hyperbolic functions.	7.9	7.9	
11. **Review.** (1 hour)			

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. The problems marked [**X**] are intended for students in MATH1141 – they relate to topics which are only covered in MATH1141. Extra problem sheets for MATH1141 may be issued in lectures.

Remember that working through a wide range of problems is the key to success in mathematics.

WEEKLY CALCULUS 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 your classroom tutorials.

The Online Tutorials will develop your problem solving skills, and give you examples of mathematical writing. Because this overlaps with the skills developed through homework, there are fewer recommended homework in Online Tutorial weeks.

WEEKLY CALCULUS HOMEWORK SCHEDULE

Week	**Try to do up to**		**Recommended Homework Problems**
	Chapter	**Problem**	
1	No tutorial, but do the Revision problems.		
2	1	19	4(e), 5(d), 10(h), 12, 13(e), 15, 17
3	2	15	2(b), 3(b), 5, 12(b)
4	3	10	3, 6, 9(a), 9(c), 10(a), 10(b)
5	4	18 (Test 1)	2(d), 8(d), 9(b), 12(a), 17
6	5	15	1(b), 3, 4(b), 7(a), 10(b)
7	5	27	16, 20(c), 21(d), 26
8	6	18	1, 5,8(b), 8(d), 8(f), 11(b)
9	7	20 (Test 2)	2(b), 7(c), 8(b), 14(c), 17(c)
10	8	17	5(a), 12(a), 12(b), 15(d), 16(d)
11	8	29	18(b), 19(d), 22(b), 24(a)
12	9	10	2(a), 3(b), 4(e), 5(a), 8(c), 9(e), 9(h)
13	10	13	2(b), 3(a), 7(c), 8

The main reason for having tutorials is to give you a chance to tackle and discuss problems which you find difficult or don't fully understand.

There are two kinds of tutorials: Online and Classroom. Calculus Online Tutorials are delivered using MapleTA. These can be completed from home, are available for a two week period, and are due on Sunday night in weeks 3,5,7,9,11 and 13. Calculus Classroom Tutorials are delivered in a classroom by a calculus tutor. The topics covered in a classroom tutorial are flexible, and you can (and should) ask your tutor to cover any topics you find difficult. You may also be asked to present solutions to homework questions to the rest of the class.

The following table lists the topics covered in each tutorial.

WEEKLY MATH1131 CALCULUS TUTORIAL SCHEDULE

Week	**Location**	**Topics Covered**
1	None	
2	Classroom	Chapter 1 : Sets, inequalities and functions
3	Online	Chapter 2 : Limits
4	Classroom	Chapter 3 : Properties of continuous functions
5	Online	Chapter 4 : Differentiable functions
6	Classroom	Chapter 5 : The mean value theorem and applications, up to 5.7 : Critical points, maxima and minima
7	Online	5.8 : Counting zeros 5.9 : Antiderivatives 5.10 : L'Hôpital's rule
8	Classroom	Chapter 6 : Inverse functions
9	Online	Chapter 7 : Curve sketching
10	Classroom	Chapter 8 : Integration, up to 8.8 : Integration by substitution
11	Online	8.9 : Integration by parts 8.10 : Improper integrals 8.11 : Comparison tests for improper integrals 8.12 : Functions defined by an integral
12	Classroom	Chapter 9 : The logarithmic and exponential functions
13	Online	Chapter 10 : The hyperbolic functions

WEEKLY MATH1141 CALCULUS TUTORIAL SCHEDULE

MATH1141 Tutorials cover the same material as MATH1131, only in greater detail. The tutorial structure is more flexible, which is designed to allow for classroom discussion. Only a subset of the recommended discussion questions will be discussed in your classroom tutorial, which are held every even week. Online Tutorial questions for calculus are due at Sunday 23:59 every odd week (except week 1).

weeks	**Chapter**	**Online Tutorial**	**Recommended Classroom Discussion Questions**
2	1	-	4(e), 5(d), 10(h), 12, 13(e), 15, 17
3 and 4	2	1(e),14	2(b), 3(b), 5, 12(b), 13(a)
	3	6, 10(a)	3, 9(a), 9(c), 10(b)
5 and 6	4	6, 11, 16	2(d), 8(d), 9(b), 12(a), 17
	5	4(c)	1(b), 3, 7(a), 10(b)
7 and 8	5	17, 25	16, 19, 20(c), 21(d), 26
	6	1, 13	5, 8(b), 8(d), 8(f), 11(b)
9 and 10	7	5(b), 18	2(b), 7(c), 8(b), 14(c), 16(a), 17(c)
	8	1, 12(a)	5(a), 12(b), 15(d), 16(d)
11 and 12	8	22(a), 28	18(b), 18(e), 19(c), 19(d), 22(b), 24(a)
	9	7, 9(a)	2(a), 3(b), 4(e), 5(a), 8(c), 9(e), 9(h)
13	10	1(b), 6, 10(b), 12(a)	

CALCULUS CLASS TESTS

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

Test 1 Week 5.
Test 2 Week 9.

Test 1 and Test 2 will cover sections of the syllabus as shown in the table below. The test questions will be similar to the questions marked [R] and [H] in the Calculus Problems booklet.

Test	Syllabus sections	[R] and [H] problems in
1	1, 2 and 3	Chapters 1–3
2	4, 5 and 6	Chapters 4–6

It is important to note that:

- The class tests do not cover the whole syllabus.
- Questions in the exams may be very different from those in the class tests.

COMPUTING INFORMATION

How much?

In MATH1131/1141 there are online computing tests worth 4% of your final mark and **there will be a laboratory test, in week 10 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 dervied from the computing component of the course. The Computing component depends on the other components and will require a 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 experence 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 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.

The laboratories will normally be open as follows:

		M020	**G012**
During semester:	Monday to Friday	9 am to 9 pm	9 am to 9 pm
Week 10:		9 am to 9 pm	**Closed**
	Saturdays, Sundays	Closed	Closed
During holidays:	Monday to Friday	9 am to 9 pm	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

All of the software that you need for this course is installed on the computers in the Red-Centre labs. This software can also be accessed from your own computer. For information on accessing Mathematical and Statistical software from outside the Red-Centre labs, please see the information provided on this course's page in UNSW Moodle.

How to start

The MATH1131/1141 module in UNSW Moodle has several short instructional videos illustrating how to access and use all the computing related components of MATH1131/1141. The general introductory videos are located in the Course Materials folder, with videos related to Maple located in the Computing component folder and those related to Maple TA in the Online Assessment in Algebra, Calculus and Computing folder.

Following this you should use some of your free time in week 1 go to the Red Centre lab G012 and complete the Maple introductory module and in Maple TA you should complete the assignment "Using Maple TA". Consultants will be on duty from 12noon to 4pm each day to help you get started with these tasks.

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 "newuser" and password "newuser" 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.

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 Room G012 from 12noon to 4pm each weekday of weeks 1 to 9.

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 explained in detail in the section on Computing tests on page 8 and is clearly visible in Maple TA.

The online teaching package consists of the following modules:

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, substituing 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.

Using other computers

Maple is available for Windows, Mac and Linux and your own copy of Maple may well be of great use to you throughout your studies at university. However, it is not necessary for you to buy Maple at any stage to complete any of your mathematics courses at UNSW. You are permitted to do the online Maple test from home or anywhere else that you have access to Maple TA and Maple. However the School is not able to provide technical help with external equipment and cannot be responsible for the reliability of your network connection and computer.

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 8.

The second form of computing test will be run under exam conditions in the School's computing laboratories during week 10. You must book for the test through the School's Student Web Portal, accessible via the "Maths & Stats marks" link in the course menu of MATH1131/1141 on UNSW Moodle, and bring your UNSW Student ID card to the test.
All tests are linked to the Algebra and Calculus material, so you should make sure you understand the course work before trying them.
Finally, the end of semester exam may contain one or two sub-questions requiring a knowledge of Maple.

Special consideration for the laboratory test

Because the computing tests can be sat at many different times, medical, or other, reasons for missing the test will generally not be accepted. For this reason you are advised to choose an early time to sit the test. If you consider that you have an exceptional reason for missing the test then you must speak to Dr Kress, 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 of preparation 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 SEADU. If you wish to exercise this option, you must contact Dr Kress before the laboratory tests have commenced so that any needed special facilities can be implemented.

Dr Jonathan Kress (Room: Red Centre 4102)
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				