CONTENTS OF THE MATH1131 COURSE PACK 2014

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
3. Calculus Notes
4. Past Exam Papers Booklet

Information booklet contents

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GENERAL INFORMATION FOR MATH1131

Background

MATH1131, Mathematics 1A is a first year course taught by the School of Mathematics and Statistics in semester 2, and is worth six units of credit. MATH1131 is also taught in semester 1.

The higher version of this course, MATH1141, is not offered in Semester 2.

Students who pass MATH1131 in semester 2 may continue to study MATH1231, Mathematics 1B, 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.

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 Mathematics course and who attained a mark of 90. Students who attained a mark below 80 on that course are likely to find MATH1131 to be very difficult. If you feel after two weeks of semester that MATH1131 is too demanding for you, then you should seek advice from the Director of First Year, RC-3073.

Assumed Knowledge Quiz

There will be an online test on Assumed Knowledge in Week 2. This should give you some clear indication as to how prepared you are for this course. Revision problems for this quiz appear at the beginning of the Calculus Notes. You may care to work through these before attempting the online quiz. Students who only studied 2 Unit Mathematics at high school and who did not take the Bridging Course will find this test difficult since it contains material from the HSC Extension 1 course. There will be some brief notes available on Moodle to supplement the revision problems and you will need to learn this material independently. We will take the best 4 of 5 online tests.

See below under Online Algebra and Calculus Tests.

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-3090.
Aims

The aim of MATH1131 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 summer session course MATH1231, 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.

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.

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. 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 adviser in the Student Services Office of the School of Mathematics and Statistics is Ms F. Fan (Francy). All administrative enquiries concerning first year Mathematics courses should be sent to Ms Fan, either:

- by email to fy.MathsStats@unsw.edu.au
- by phone to 9385 7011
- or in person in room RC-3090 (between 9am to 12 noon or 2pm to 4pm)

Change of tutorials, due to timetable clashes or work commitments, 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. Should we need to contact you, we will use
your official UNSW email address of  
   zSTUDENTNO@student.unsw.edu.au

in the first instance.

There are two lecture streams for MATH1131. Each stream has two algebra lectures and two calculus lectures per week. Lectures commence in week 1 and run until week 12 as indicated in your timetable on myUNSW. 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.

### MATH1131

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<thead>
<tr>
<th>Lectures Group 1</th>
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<td>Lectures Group 2</td>
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The lecturers for MATH1131 are:

**Algebra**  
Peter Brown, Room 3073, Red Centre.

**Algebra**  
Milan Pahor, Room 3091, Red Centre.

**Calculus**  
Dr. Pinhas Grossman, Room 6112, Red Centre.

**Calculus**  
Dr. Bill Ellis.

The course authority for MATH1131 is the Director of First Year Studies, Peter Brown, who can be contacted via email.

The lecturer in charge of computing is Dr Jonathan Kress, Room 4102 in the Red Centre. Important announcements and handouts may be given out in lectures, so missing lectures (or even arriving late) may cause significant difficulties for you.
Tutorials

Students in MATH1131 are enrolled in two 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. Students are able to change their tutorials, via myUNSW, until the end of week 1, and after that time, they can only change their tutorials with the agreement of the Student Services Office, RC-3090. To change a tutorial you will need to provide proof of a timetable clash or work commitments.

Note that

• **ALL tutorials commence in week 2 and run until week 13**;

• attendance at tutorials is compulsory and the roll will be called in tutorials;

• some tutorial classes may have to be amalgamated or created after the start of semester to maintain efficient tutorial sizes. If you are affected by any tutorial room changes you will be notified by an email to your official UNSW email account. During week 1 and 2 it is good practice to check your timetable regularly on myUNSW.

The main purpose of tutorials is to provide you with an opportunity to get help with any problems which you find difficult and any parts of the lectures or textbook which you don’t understand. In order to get real benefit from tutorials you should

• Study your lecture notes and attempt relevant problems **before** the tutorial so that you can find out the areas in which you have difficulties.

• Make sure that your tutor is aware of the areas in which you need help.

• Be as specific as possible in describing your difficulties — don’t just say “could you explain about differentiation”.

• Be an active participant in tutorials, asking and answering questions rather than just sitting and watching.

All the tests and assignments which you submit (except formal examination scripts) will be marked by your tutor and returned through tutorials. In the rare event that your tutor has not arrived at your tutorial by 10 minutes past the hour a student in the tutorial class should contact the Student Services Office, by phone if the class is not in the Red Centre, so that a replacement tutor can be arranged.

Computing and Online Self-Paced Maple Lessons

In addition to the Calculus and Algebra components, there is a Computing component in MATH1131. 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 Maple 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.

**There will be introductory instructional videos available in UNSW Moodle.**

Students are then expected to work through and complete the specified online lessons as detailed on page 11. Associated with each lesson is a graded quiz and the completed quizzes contribute 4% to the final grade. These lessons are integrated with, and enhance the lecture
and tutorial content presented in Calculus and Algebra. 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 11.

More information about the Computing component is given later in this booklet and in the booklet *First Year Maple Notes 2014*. These computing notes are freely available from the MATH1131 module on UNSW Moodle, and also on the computers in the mathematics computing laboratories.

**Computing consultants are available in laboratory RC-G012 from 11am to 4pm every weekday during weeks 1 to 9.**

**UNSW Moodle**

The School of Mathematics and Statistics makes extensive use of the centrally provided electronic learning environment known as “UNSW Moodle”. This information booklet, the algebra and calculus problems sets and computing information are all available via the appropriate course module on the UNSW Moodle server. Access to this server is via any suitably configured web browser from any computer with an internet connection. The URL for UNSW Moodle is

http://moodle.telt.unsw.edu.au

For UNSW Moodle your “Username” is z immediately followed by your student number and your “Password” is your zPass. The Moodle login page has information on how to activate your zPass in order to login and various warnings about difficulties you may encounter with your zPass. There is also a link to the IDM Self Service page where you can reset or “unlock” your zPass if needed. Help for using Moodle is available via links from the UNSW Moodle login page or directly via the URL

https://student.unsw.edu.au/moodle-support

Once logged in to UNSW Moodle you will have a choice of modules for all your courses, including your current mathematics course.

**Course Materials**

The course materials for MATH1131 are:

- **MATH1131 Course Pack 2014.**
- **Computing Laboratories Information and First Year Maple Notes 2014.**

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.

Salas, Hille & Etgen is sold at the UNSW Bookshop. Course Packs and computing notes are also sold through the UNSW Bookshop.

The Course Pack contains the following items:

- Information Booklet that you are now reading;
- Algebra Notes (for MATH1131);
- Calculus Notes (for MATH1131);
- Past Exam Papers Booklet.

Booklets contained in the Course Pack will not be available separately from the School of Mathematics and Statistics. However the information in this booklet and the algebra and calculus problems can be accessed through the web from the MATH1131 modules on the UNSW Moodle server. Information on accessing the UNSW Moodle server is given above.

**Getting help outside tutorials**

If you are having difficulty understanding the lectures or doing the suggested problems, always try to get help through your tutorials. In most cases there will be other students who are having the same difficulties and it is better to provide help to all at once rather than giving the same explanation to ten or twenty students individually outside class.

However, there may be occasions when there is not enough time to get your questions answered in a tutorial. In these cases you should be able to get some help outside tutorials. If your tutor is a full-time member of staff you can ask them for their room number and times when they are available to see students (many members of staff put a notice on their office door showing the times when they are available). Tutors who are not full-time members of staff are not required to be available outside tutorial class times and may not have offices in the School of Mathematics and Statistics. To cover students whose tutor is not available, from week 3 there is 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 type of help offered by the tutors of the SSS is either one-on-one assistance, or, at busier times, assistance in small groups. Students typically bring their partial solutions of mathematics coursepack questions to the SSS office. An SSS tutor then provides guidance and advice. 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 schedule will be available on the SSS website at
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.

**Problem sets**

Problems for Algebra are included in the Algebra Notes and similarly, problems for Calculus are included in the Calculus Notes. These problem sets are also available in the algebra component and calculus component folders of the Course Materials folder for MATH1131 in UNSW Moodle. Problems for the Maple computing component are available online in the Maple self-paced lessons folder on UNSW Moodle.

Remember that Mathematics, like tennis, can’t be learnt just by watching someone else do it. **The key to success is to work through all the problem sets in your own time.** To get the most out of tutorials, you should attempt the relevant problems (as indicated in the problem schedules) **before** the tutorial so that you know which problems you find difficult.

**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


**Assessment**

The final raw mark will be made up as follows:

- Algebra and Calculus class tests 20%
- Online Algebra and Calculus tests 4%
- Online Computing tests (Maple) 4%
- Laboratory Computing test (Maple) 8%
- End of semester exam 64%

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 and stats marks” link on the home page of MATH1131 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 the date of the final examination.
• Your final raw mark is scaled by the School of Mathematics and Statistics to produce your final mark. This is done so that the final distribution of marks is consistent with general university guidelines regarding the percentages of students with various grades, and to maintain consistent standards from year to year. A small committee of the teaching staff determines this final scaling.

• Once the UNSW examinations section finalises the examination timetable, you will be able to find out the time and place of the MATH1131 examination from myUNSW. The web page


   has many useful links related to the running of UNSW examinations.

• Be aware that a final mark of 49 often means that the course has been failed and has to be repeated. Therefore, it is very important that you attempt all assessment tasks.

• If your final mark is in the range 46–49 then you may be awarded the grade of “Pass Conceded” (PC) provided your average mark for all your courses is sufficiently high. This decision is not made by the School of Mathematics and Statistics. The rules governing the granting of the grade of PC are on the web page


• Medical certificates will generally not be accepted for missing the deadlines for the online tests. See the section on “Computing Information” for more details.

Online Algebra and Calculus tests

Before each algebra and calculus tutorial class tests you must complete a simple online test that is designed to help you prepare for the tutorial tests. You should do this in Week 1. Instructions for accessing and using Maple TA are provided on UNSW Moodle.

You will also be required to do an Assumed Knowledge Quiz (AKQ) which will count as part of the online tests. This test will be based on the revision problems in the Calculus Problem booklet. If you do not score at least 6 out 10 on this quiz you should speak to the Director of First Year about your options. The quiz will be available in Week 1 and will need to be completed by Wednesday of Week 3.

The best 4 of 5 online tests will count.

For MATH1131 in semester 2 the due dates for these online tests are
The material covered by these tests is the same as for the algebra and calculus class tests, as given on page 21 and 26.

Detailed information on how to use the online testing system is available on UNSW Moodle.

To give you some familiarity with the online testing system a practice test called “Using Maple TA” will be available from week 1. You must pass this test before you will be allowed access to algebra and calculus online tests.

You will be allowed 5 attempts at each online algebra and calculus test but only your best mark for each test will count. Then, the best 4 of the 5 marks from TP1, TP2, TP3, TP4 and AKQ, will contribute up to 4% of your final grade.

Note:

• the first test becomes available on Wednesday of week 3;

• each attempt at these tests must be your own work, but you are encouraged to discuss the methods required with other students;

• each version of a test will be slightly different, so don’t just copy answers from one attempt to the next;

• only a limited numbers of users can have simultaneous access to Maple TA, so do NOT leave your attempts at these tests to the last day;

• no additional attempts will be granted. You have 5 attempts at these tests to allow for technical or other problems that may result in one or more attempts being lost;

• no deadline extensions will be granted. You should attempt these tests with sufficient remaining time to allow for unplanned service interuptions.

Class tests

Details of the dates and content of tests are given on pages 21 and 26 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. In particular, during the test you must not have visible any material relevant to the test and you must not try to get assistance from (or give assistance to) any other person.

• You will not be allowed to use a calculator in class tests.

• When your test answers have been marked and handed back to you by your tutor, don’t try to change your answers or falsify the marks awarded — a student who tried to do this recently was penalised by being given a failure in the course.

• Your best three scores in the four tests will be counted towards your final assessment mark.

**Interpretation of class test results**

The average mark for tests in MATH1131 is between 6 and 7 out of 10. Past experience is that students are likely to have difficulty passing this course if their average test mark is less than 5. If you find that your average after the first two tests is less than 5, you should talk to your tutors about your situation and what you can do about it. Further, past records indicate that about 80% of students whose best three class tests totalled to 15 or less did not get an overall pass in MATH1131.

**Computing tests**

There will be two different forms of computing tests. An initial set of five small online tests will be run using Maple TA, followed by a laboratory based test in week 10 or 11. 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 are linked to the self-paced Maple lessons in UNSW Moodle. Details on using and accessing Maple TA for online tests are on UNSW Moodle. These online Maple computing tests will be available (almost) continuously, as they must be completed in sequence, but to gain marks for the computing component of the course the tests must be completed before the deadlines indicated below.

You will have an unlimited number of attempts at these online computing tests, both before and after the deadlines in the following table. Note that it is only your best mark on each test that counts towards your final grade. Again, do NOT leave your attempts at these online tests until the last day. Inability to complete these 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.

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<td>4pm Wednesday of week 5</td>
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<td>4 and 5</td>
<td>4pm Wednesday of week 7</td>
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The additional Maple lessons 6 and 7 are designed to assist you with preparation for the Maple laboratory test in week 10 or 11. There are online tests within Maple TA corresponding to
lessons 6 and 7, but these do not count towards your MATH1131 assessment and are for self-testing purposes only.

The second form of computing test will be run under exam conditions in the School’s laboratories. You must book for the test using the link on UNSW Moodle and you must bring your UNSW Student ID card to the test. Details of the laboratory test are given on page 33. A practice version of the Maple Lab Test will be available on Maple TA by not later than the start of week 8.

All computing 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.

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.

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:


In recent years there have been cases where severe penalties have been imposed for misconduct in relation to tests and exams in Mathematics courses.

Illness and other problems

If your performance in this course is affected by illness or other serious difficulties which are beyond your control, you can apply for Special Consideration and you may be offered the opportunity for Additional Assessment. See also the sub-section Getting advice on page 15.

PLEASE DO NOT APPLY ONLINE FOR SPECIAL CONSIDERATION FOR CLASS TESTS OR ONLINE TESTS. If you are ill for a test, bring the necessary documentation to your tutor in the following tutorial or as soon as practicable thereafter. In regard to the School of Mathematics and Statistics the online system is only for long-term illness or illness at the time of the final examination.

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 MATH1131 Semester 2 2014.” A copy of this document is included in this booklet on
page 16. You should read it carefully now and keep it for reference at the time when you actually need it. Each year there are some students who fail a course because they didn’t follow these instructions. 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.

- 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, except in very unusual circumstances, medical certificates will not be accepted as excuses for not sitting the computing test. Therefore, it is recommended that you book to sit at an early time.

- 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 3090, Red Centre.

**Past examinations**

Recent exam papers, with their solutions, are included in a separate booklet in the Course Pack.

**Change of enrolment**

You may feel, after some weeks of semester have passed, that you have not made the right choice between Mathematics 1 and Fundamentals of Mathematics B. If so, you should discuss the situation with your tutors or with me (Director of First Year Studies in Mathematics, Room 3073, Red Centre).

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

**Information and handouts**

Important announcements may be made in lectures. If you miss a lecture or tutorial, or arrive late for it, it is essential that you check whether you have missed any announcements or handouts. All important administrative announcements, especially those indicating a change to information contained in this booklet, are repeated as announcements on UNSW Moodle. Further, notices of an urgent nature may be emailed to students at their official UNSW email address.
School of Mathematics and Statistics 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. 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 Page on the MathsStats 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 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. Lack of knowledge about a policy will not be an excuse for failing to follow the procedures in it.

Summer session MATH1231

Summer session MATH1231 commences on Monday 1st December.

If MATH1231 is compulsory for your program and you wish to complete your degree in minimum time, you are advised to enrol before the end of semester 2 in summer session MATH1231.

Course improvement

The School of Mathematics and Statistics has several mechanisms in place for regular review and improvement of First Year courses. One component of the review process is student feedback, generated either by the CATEI surveys or by direct contact from individual students or groups of students. Other elements of our course review processes include:

- feedback on program requirements from academics in other Schools and Faculties;
- regular rotation of lecturing staff teaching First Year courses to generate fresh and innovative approaches to the course content and structure;
- regular review of the quality of the tutors and tutorial problems.

A recent change, requested in several CATEI surveys, is the expansion of the previous “Outline calculus lecture notes” for MATH1131 and MATH1231 to a complete set of calculus notes, comparable to the well liked algebra lecture notes. Another recent change has been the introduction of short, online tests for Maple associated with the redesigned self-paced Maple lessons. These changes were again in response to CATEI requests to provide more assistance with learning Maple. Even more recent has been the introduction of short, screen-capture videos to provide instruction on various aspects of the use of the computing facilities within the school. Further, a collection of short videos demonstrating solution techniques in key topic areas is being produced, again in response to requests for more online support in the course.
Getting advice

Your Algebra and Calculus tutors should be able to give you most of the advice you need on mathematical and administrative matters concerning MATH1131. If they cannot help you, try your lecturers (their names and room numbers are shown on page 4 of this booklet). If your problems are more serious, or haven’t been resolved to your satisfaction, come to see me (Peter Brown) in Room 3073, Red Centre. I am happy to see you.

If you have general study problems or personal problems, don’t just hope that they will go away — take advantage of the free and confidential help which is available within the university. The Learning Centre (currently on the lower ground floor of the north wing of the Chancellery Building) provides individual consultations and workshops on study skills, time management, stress management, English language, etc. The Counselling Service (2nd Floor, East Wing, Quadrangle Building) offers the opportunity to discuss any issue which concerns you including academic problems, personal relationships, administrative hassles, vocational uncertainty, sexual identity and financial hardship. For more details, see the Student Information web page, available from the home page of myUNSW.

Peter Brown
Director of First Year Studies
School of Mathematics and Statistics
fy.MathsStats@unsw.edu.au
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 rules 1, 2, 5 and 6, which apply to applications for special consideration in all first year Mathematics courses. Rules 3 and 4 apply to the above courses only.

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. If you miss a **class test** due to illness or other problems, then you should provide the appropriate documentation to your **tutor** who will record an M. **DO NOT** apply on-line for special consideration for class tests or for on-line or computing tests.

4. If your course involves a MAPLE/MATLAB lab test which you miss, you should contact the lecturer in charge of computing as soon as possible. A resit will be organised for later in the session.

5. **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 greater than 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.

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. **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. Information about award of additional assessment is available from the School of Mathematics and Statistics in the following ways:

   a) A **provisional** list of results in all Mathematics courses and and final list of grants of additional assessment will be available via the “Maths and stats marks)” link in the UNSW Moodle module for your course late on **Thursday 27th November**.

   b) On **Monday 1nd December ONLY**, you may telephone the School Office (9385 7111) to find out whether you have been granted additional assessment and where and when it will be held. **Note that examination results will not be given over the phone.** The deferred exam will most likely be on Tuesday 2nd December.

7. **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 Semester 2 additional assessment examinations for MATH1131 will be announced later in the session.
8. 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.

9. 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 contributed².

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.

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

²Adapted with kind permission from the University of Melbourne
ALGEBRA SYLLABUS AND LECTURE TIMETABLE

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 \( 2 \times 2 \) and \( 2 \times 3 \) 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 \( Ax = b \). (Section 4.7). Applications. (Section 4.8) or Matrix operations (start Section 5.1)

Chapter 5. Matrices
Lecture 22. Inverses and definition of determinants. (Section 5.3 and start Section 5.4).
Lecture 23. Properties of determinants. (Section 5.4).

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. 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] or an [H]. 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.

There are a number of questions marked [M], indicating that Maple is required in the solution of the problem.
The main purpose of tutorials is to give you an opportunity to get help with problems which you have found difficult and with parts of the lectures or the Algebra Notes which you don’t understand. In order to get real benefit from tutorials, it is essential that you try to do relevant problems before the tutorial, so that you can find out the areas where you need help. The following table lists the complete set of problems relevant to each tutorial and a suggested (minimal) set of homework problems for MATH1131 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. You may also be asked to present solutions to these homework questions to the rest of the class. Tutors may need to vary a little from this suggested problem schedule.

<table>
<thead>
<tr>
<th>For tutorial in week</th>
<th>Try to do up to chapter</th>
<th>Homework Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No tutorial, but start learning how to use Maple and Maple TA</td>
<td>1, 4, 5, 6(a), 16(a), 18, 21</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>17 (Test 1)</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
<td>82</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
<td>43</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td>53</td>
</tr>
</tbody>
</table>

Questions for the class tests in MATH1131 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.

<table>
<thead>
<tr>
<th>Test</th>
<th>Week</th>
<th>Topics covered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>chapter sections</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>1 All</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>2 Up to and including §2.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 All</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 All</td>
</tr>
</tbody>
</table>
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.

1. **Sets, inequalities and functions.** (2.5 hours)
   - \( \mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R} \). Open and closed intervals. Inequalities. Functions: sums, products, quotients composites. Polynomials, rational functions, trig functions as examples of continuous functions.
   - Implicitly defined functions.
   - SH10: 1.2, 1.3
   - SH9: 1.2, 1.3
   - SH10: 1.6-1.7
   - SH9: 1.6-1.7

2. **Limits.** (2 hours)
   - Informal definition of limit as \( x \to a \) (a finite).
   - Formal definition of limit as \( x \to \infty \).
   - Limit rules. The pinching theorem.
   - SH10: 2.1, 2.2
   - SH9: 2.1, 2.2
   - SH10: pp177-178
   - SH9: pp222-224
   - SH10: pp195-198
   - SH9: pp243-246
   - SH10: 2.3, 2.5
   - SH9: 2.3, 2.5

3. **Properties of continuous functions.** (1.5 hours)
   - Combinations of continuous functions.
   - Intermediate value and min-max theorems.
   - Relative and absolute maxima and minima.
   - SH10: 2.4
   - SH9: 2.4
   - SH10: 2.6, B1, B2
   - SH9: 2.6, B1, B2
   - SH10: 4.3-4.5
   - SH9: 4.3-4.5

4. **Differentiable functions.** (2 hours)
   - Definition of derivative via tangents.
   - Derivatives of polynomial, rational and trig functions.
   - Implicit differentiation, fractional powers.
   - SH10: 3.1
   - SH9: 3.1
   - SH10: 3.2-3.5
   - SH9: 3.2-3.5
   - SH10: 3.5,3.6
   - SH9: 3.5,3.6
   - SH10: 3.7
   - SH9: 3.7

5. **The mean value theorem and applications.** (2 hours)
   - Mean value theorem and applications.
   - L’Hôpital’s rule.
   - SH10: 4.1, 4.2
   - SH9: 4.1, 4.2
   - SH10: 11.5, 11.6
   - SH9: 10.5, 10.6
6. **Inverse functions.** (1.5 hours)
   Domain, range, inverse functions,
   the inverse function theorem.  
   Inverse trig functions, their derivatives and graphs.
   7.1, B3   7.1, B3

7. **Curve sketching.** (3 hours)
   Use of domain, range, intercepts, asymptotes,
   even or odd, calculus.
   Parametrically defined curves.
   Relation between polar and Cartesian coordinates.
   Sketching curves in polar coordinates.
   4.7, 4.8   4.7, 4.8  10.2   9.3  10.3   9.4

8. **Integration.** (5 hours)
   Riemann sums, the definite integral and its
   algebraic properties.
   Indefinite integrals, primitives and the
   two fundamental theorems of calculus.
   Integration by substitution and by parts.
   Integrals on unbounded domains, limit form of
   comparison test.
   5.1, B5   5.1, B5  5.2-5.5   5.2-5.5  5.6, 8.2   5.6, 8.2  11.7   10.7

9. **Logarithms and exponentials.** (2 hours)
   \( \ln \) as primitive of \( 1/x \), basic properties,
   logarithmic differentiation.
   Exponential function as inverse of \( \ln \), basic properties.
   \( a^x \), logs to other bases.
   7.2, 7.3   7.2, 7.3  7.4-7.6   7.4-7.6

10. **Hyperbolic functions** (1.5 hours)
    Definitions, identities, derivatives, integrals
    and graphs.
    Inverse hyperbolic functions.
    Integrals involving hyperbolic or trig substitution.
    7.8   7.8  7.9   7.9

11. **Review.** (1 hour)
**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]. 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. Remember that working through a wide range of problems is the key to success in mathematics.

**PROBLEM SCHEDULE**

The main reason for having tutorials is to give you a chance to get help with problems which you find difficult and with parts of the lectures or textbook which you don’t understand. To get real benefit from tutorials, you need to try the relevant problems before the tutorial so that you can find out the areas in which you need help. The following table lists the complete set of problems relevant to each tutorial and a suggested (minimal) set of homework problems for MATH1131 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. You may also be asked to present solutions to these homework questions to the rest of the class. Tutors may need to vary a little from this suggested problem schedule.

<table>
<thead>
<tr>
<th>Week</th>
<th>Calculus problems</th>
<th>Homework Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chapter</td>
<td>Problems up to</td>
</tr>
<tr>
<td>1</td>
<td>No tutorial, but do the Revision problems.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>15</td>
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<tr>
<td>4</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>17 (Test 1)</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>27</td>
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<td></td>
<td>6</td>
<td>7</td>
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<td>8</td>
<td>6</td>
<td>17</td>
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<tr>
<td></td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>7</td>
<td>19 (Test 2)</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>18</td>
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<tr>
<td>11</td>
<td>8</td>
<td>29</td>
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<tr>
<td>12</td>
<td>9</td>
<td>10</td>
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<tr>
<td>13</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>
CLASS TESTS AND EXAMS

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

Test 1  Week 5.
Test 2  Week 9.

Test 1 may include revision of some topics from the Extension 1, or 3 Unit Mathematics, syllabus of the NSW HSC examination. These questions will be a similar level of difficulty to the questions in the Revision Questions section of the Calculus Notes booklet.

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. The table shows which problems are relevant to each test.

<table>
<thead>
<tr>
<th>Test</th>
<th>Syllabus sections</th>
<th>[R] and [H] problems in</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1, 2 and 3</td>
<td>Chapters 1–3</td>
</tr>
<tr>
<td>2</td>
<td>4, 5 and 6</td>
<td>Chapters 4–6</td>
</tr>
</tbody>
</table>

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.
SCHEDULE OF ALL CLASS ASSESSMENTS

Lectures run in weeks 1–12 and tutorials run weeks 2–13. The table below gives the schedule of class tests, online tutorial preparation tests and computing assessments.

<table>
<thead>
<tr>
<th>Week</th>
<th>Algebra</th>
<th>Calculus</th>
<th>Maple Computing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<td>3</td>
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<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
<td></td>
<td>TP1</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Test 1</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>TP2, Test 1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>TP3</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>Test 2</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>Test in Laboratory (Monday)</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Examples of class tests are contained in the Algebra Notes booklet and the Calculus Notes booklet.

TP1, TP2, etc denote the weeks when the online tutorial preparation tests are due for completion. The precise availability of these tests is given on page 9 and also in Maple TA. Similarly, the precise deadlines for the online computing tests are given on page 11 and again in Maple TA.
Advice to students

Students are advised to take particular note of the detailed syllabus and notes provided later in this document.

The level of depth of understanding required in this course is best understood by considering the exercises, the sample class tests and the past examination papers that are included in the MATH1131 Course pack.

Teaching Strategies

MATH1131 is taught through carefully planned lectures that logically develop the concepts and techniques specified in the course. Examples are emphasised as they provide the underlying motivation for the course, and because students best understand the general theory when it is developed from simple, and then more complex, examples.

Small group tutorials allow students to apply the material introduced in the lectures. These tutorials provide the opportunity for individual assistance. Students are expected to work conscientiously at understanding the solutions to the exercises.

Self-paced online lessons develop independent learning skills, introduce basic computing skills using a symbolic computing package and provide an opportunity to extend and enhance understanding of mathematical concepts by using computing power to enable attempts at more complex problems. Students are expected to work through the lessons systematically in accordance with the published schedule. Consultants are available should assistance be required.

Students are encouraged to give constructive feedback to the teaching staff during the teaching semester. They are also encouraged to work collaboratively with other students in the course to develop their understanding and their problem solving skills.

Statement on Assessment

The School of Mathematics has responded to student and staff concerns about plagiarism in assignments. Consequently, all First Year Mathematics courses are assessed by randomly generated online tests, short class tests and a written examination. The online tests and short class tests provide regular feedback to students and allow the course to be broken into smaller segments to facilitate learning.

It is unusual for questions on class tests to be marked out of more than 3 or 4 marks, and advice is given to tutors as to how those marks are to be awarded. Generally part-marks are awarded according to the number of correct steps made in answering the question. Students should raise any concerns that they have regarding their marks with their tutor when their papers are returned. If their concerns are not satisfactorily resolved, they may speak to the First Year Director.

Detailed marking schemes are prepared for the marking of the end of semester examination and check marking is generally used for quality assurance. Marks will only be changed if the mark is inconsistent with the marking scheme.

At the end of the marking process a committee of staff determines the pass mark and produces the final (scaled) marks.
COMPUTING INFORMATION

Background

The University of New South Wales has a policy that all its students should be introduced to the basics of computer use during their course. For students in Business, Biological and Physical Sciences and Engineering, part of that requirement is met by the Computing component of First Year Mathematics. Most of you will also need to use computers in other courses within your program.

Students in most first year mathematics courses are introduced to the symbolic computing package known as Maple which is now a well established tool that continues to influence the application of mathematics in the real world, as well as how mathematics is taught. Learning to use Maple will enhance your understanding of the mathematics involved in the algebra and calculus sections of this course. Maple also enables you to tackle larger, harder and more realistic mathematical problems as it can handle all the difficult or tedious algebraic manipulations present in the problems. Furthermore, learning some Maple introduces you to some of the basic ideas and structures in computer programming. You will find the skills you acquire and the techniques you learn useful in many other courses you study, both within and outside the School of Mathematics and Statistics.

All Mathematics and Statistics majors should consider doing further computing courses, such as MATH2301 Mathematical Computing, in their degree program.

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 and Statistics (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:

<table>
<thead>
<tr>
<th>M020</th>
<th>G012</th>
</tr>
</thead>
<tbody>
<tr>
<td>During semester: Monday to Friday</td>
<td>9 am to 9 pm</td>
</tr>
<tr>
<td><strong>Week 10 and Monday of Week 11:</strong></td>
<td>9 am to 9 pm</td>
</tr>
<tr>
<td>Saturdays, Sundays</td>
<td>Closed</td>
</tr>
<tr>
<td>During holidays: Monday to Friday</td>
<td>9 am to 9 pm</td>
</tr>
<tr>
<td>Public holidays and Weekends</td>
<td>Closed</td>
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</tbody>
</table>

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

All the information and course materials that you need can be found by following the “Maple notes, lessons, assessments” link in the “Computing component (Maple)” section on the MATH1131 module in UNSW Moodle. After following that link, use the menu on the left to find the information you are looking for. The best place to start is with the short instructional videos illustrating how to access and use all the computing related components of MATH1131.

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 2014 by completing the self-contained Maple lessons and by obtaining help, if necessary, from the Consultants who will be available in Room G012 from 12noon to 4pm each weekday until the end of week 9.

Computing syllabus

The Maple computing component is taught via a series of self-paced lessons. These lessons can be found by following the link called “Maple notes, lessons, assessments” in the “Computing component (Maple)” section of the class homepage on UNSW Moodle. For each lesson, there is a corresponding Online Maple Test on Maple TA.

You are expected to work steadily through these lessons, completing the associated online tests at the end of each lesson before moving on to the next lesson. Although these tests will be available for the whole semester, only marks gained before their deadlines will be counted towards your final grade. The deadlines and further details are given on page 11.

The online lessons cover the following topics:

Lesson 0 Getting Started: starting Maple, the Maple worksheet, new user tour, common mistakes.

Lesson 1 The Basics: arithmetic operations, brackets, constants and variables.

Lesson 2 Functions: expressions vs functions, Maple’s functions, substituing in an expression, piecewise defined functions, simplifying an expression.

Lesson 3 Basic Calculus: limits, differentiation, maxima and minima, integration.

Lesson 4 Collections of Expressions: Maple sequences, sets and lists, sums and products, manipulating Maple structures.

Lesson 5 Complex Numbers and Equations: complex numbers, equations, exact and approximate solutions.

Lesson 6 Plotting: plotting functions of one variable, parametric plots, polar plots, implicit plots, data plots.

Lesson 7 Linear Algebra: creating and manipulating vectors and matrices, vector and matrix operations, Gaussian elimination.
Using other computers

Maple is available for PCs and Macs and a home computer 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 tests from home or anywhere else that you have access to UNSW Moodle, Maple and Maple TA. 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 PC.

WARNINGS

Misuse of computers is treated as Academic Misconduct and is a serious offence. Guidelines for acceptable conduct are in the Computing Laboratories Information for Students 2014 booklet.

The Mathematics Computer Labs will be heavily used this year as there are about 4000 students with accounts. Queues will develop at peak times such as when assignments or tests are due. Plan what you are going to do on the computer BEFORE you sit down at a PC — don’t waste your time and other people’s. 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 things until the last minute.

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 courses.

It is academic misconduct to do other people’s tests or to allow others to do your test.

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 11.

The second form of computing test will be run under exam conditions in the School’s computing laboratories during week 10 or 11. You must book for the test through the School’s Student Web Portal, accessible via the Maths and stats marks link in the course menu of MATH1131 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. 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

Details of the computer laboratory Maple test follow in the next pages.
MATH1131 LABORATORY 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 the beginning of week 8 of semester at the latest. 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 2014.

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 printed paper copy of the First Year Maple Notes,
- 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 usual Maple TA class in a test called “Maple Lab Test question”. There you will also find a practice version of the Maple Lab Test. The practice version is exactly the same as the actual Maple Lab Test, however, each attempt at the practice or actual Maple Lab Test will have a different random selection of questions. 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.
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.

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