

Department of Mathematics

Study Guide MATHS 362 S2 C Advanced Methods in Applied Mathematics 2

Lecturers & Contacts

The lecturers for this course are:

Vivien Kirk: Room 406 Building 303, Email: v.kirk@auckland.ac.nz

Bruce Calvert: Room 314 Building 303, Email calvert@math.auckland.ac.nz

Times & Rooms

There are four meetings per week for this course, at 10am on Monday, Tuesday, Wednesday and Friday. The current room allocation is Arts 206 on Monday, Wednesday and Friday, and Geology 1060 on Tuesday. Note however that room allocations can change before or during the first week of semester. Check nDeva for up-to-date information. Around one class meeting in four will be used for a tutorial or lab instead of a lecture.

Course Description

This paper introduces and develops four topics that are important in applied mathematics: vector calculus, complex variables, calculus of variations and Green's functions.

Pre-requisites and Restrictions

Before enrolling in this course, you should already have passed Maths 260 and Maths 253 or equivalent (preferably with a grade of B- or better). It is also strongly recommended that you have already passed Maths 361. Speak to your lecturer if you have any concerns about your mathematics background.

Expectations

It is expected that students in this course will spend 10 hours per week working on this course. The normal pattern of student study is expected to be (each week):

- 4 hours lectures or tutorials
- 4 hours lecture and tutorial preparation and review
- 2 hours assignments and exam preparation.

Students are expected to attend all lectures and tutorials.

After each lecture you should review the material from the lecture and try any examples recommended in the lecture. Details of material to be covered in the next lecture will be announced in class – you are expected to preview the material in the text, where appropriate, before you come to the lecture.

Resources

Textbook:

The text for this paper is

Advanced Engineering Mathematics (second edition), by Michael Greenberg.

The textbook will be used extensively in the first half of the course. The material in the second half of the course is not covered in the text. There are two copies of the text on short loan in the Library. The book costs \$100 new after student discount. There may also be second hand copies of the text available.

Recommended reading for second half of course:

Applied Partial Differential Equations with Fourier Series and Boundary Value Problems, by Richard Haberman (for Green's functions);

Differential Equations with Applications and Historical Notes, by George Simmons (for Calculus of Variations).

Both of these books are available on short loan in the Library.

CECIL and course website

CECIL is the main source of information about the running of the course. All announcements made in lectures will also be made on CECIL. Students are requested to log on to CECIL on a regular basis, and use it to get information about the coursework marks, about due dates for coursework, and about any matters concerning rooms, resources, or assessments.

Access CECIL at <http://www.cecil.auckland.ac.nz>

CECIL is also the place to get copies of lecture handouts, assignments etc for the second half of the course.

Information about the content of the first half of the course will be available from the course website:

http://www.math.auckland.ac.nz/courses/MATHS_362

The course website can be accessed from CECIL.

Topics covered in the course

The list below shows the topics that will be covered in the course and the order in which the material will be taught. Corresponding chapters in the textbook and approximate allocation of lecture and tutorial time for each topic is indicated. Not all material in the indicated chapters will be covered in the course.

- Vector calculus [12 lectures/tutorials]. Text, Chapter 16
- Complex variables [12 lectures/tutorials]. Text, Chapters 21-24
- Calculus of variations [11 lectures/tutorials]. Simmons, Chapter 12.
- Green's functions [12 lectures/tutorials]. Haberman, Chapter 9.

Assessment

The final grade for the course will be calculated as follows:

EITHER

- Exam (2 hours) 70%
- Mid-semester test 15%
- Assignments 15%

OR

- Exam (2 hours) 85%
- Mid-semester test 7.5%
- Assignments 7.5%

which ever gives the better mark,

EXCEPT

- The final grade will be 100% exam if the mark on the exam is <35%.

Assignment due dates are **August 10, September 14, October 5, October 19**. A one-hour test will be held during class on **September 19th**. All students should take this test.

If illness or other problems prevent you from completing any of the assignments you should contact your lecturer as soon as possible. A medical certificate will be required if you wish to apply for exemption from an assignment. If you are ill at the time of the test or exam you should contact Student Health and Counselling (telephone 373-7599 extension 87681) immediately to obtain information on how to apply for an aegrotat or compassionate pass.

Calculators

Calculators may not be used in the test or exam.

Doing well in Maths 362

Here are some suggestions for doing well in Maths 362.

- Plan to spend 10 hours each week working on this course. This includes attending lectures, reading the textbook and doing assignment questions.
- Try hard not to miss lectures. If you miss a lecture, get any lecture notes available from the web site or CECIL and go over them before the next lecture.
- To get the most out of each lecture, review the material from the previous lecture before coming to class. You can also read any recommended sections in the textbook - these are usually listed on the lecture notes from the previous lecture.
- You can only learn mathematics by doing mathematics and it is important to supplement lecture material by trying some of the recommended problems from the textbook. Problems appropriate to each lecture will be given during each lecture. Try some of the problems every week. Don't wait until it is time to study for the exam.
- Attempt all the assignment questions. Once your assignment is marked, go over the assignment to check where you made mistakes. Sample solutions to the assignments will be distributed - read them, as they contain helpful information such as alternative ways to answer questions.
- If you are having problems with material in the course, first make sure you have read the appropriate parts of the lecture notes and the textbook. Then speak to your lecturer, either in lectures or tutorials or make an appointment with your lecturer. Good ways to make an appointment are by speaking to your lecturer after class or by emailing your lecturer. Don't be scared to approach your lecturers for help - they are happy to help students who are trying to help themselves.

- To prepare for the test or exam, first make sure you understand your lecture notes and make sure you can do all assignment and tutorial questions. Go over some old exam papers (these can be downloaded from the University Library web pages). The recommended problems listed in lectures can be used for extra practice. If you have problems, see your lecturer.

English Language Assistance

If students require assistance with English there are several services provided by the university and by the Department of Mathematics. The main assistance is ELSAC, the English Language Assistance Centre, which has a website:

<http://www.elsac.auckland.ac.nz/>

This computer-laboratory based service is free and open seven days a week. Tutors are available to help. Alternatively, there are credit-bearing English language courses (ESOL 100/101/102).

The Department of Mathematics offers special tutorial support for Maori and Pasifika students (contact Garry Nathan, telephone 373-7599 extension 84931), and occasionally runs Mandarin or Cantonese-speaking tutorials (contact Jamie Sneddon, telephone 373-7599 extension 82121).

Collaborating & Cheating

You are encouraged to discuss problems with one another and to work together on assignments, but you must not copy another person's assignment. Assignment marks contribute to the final mark you receive in this course. We view cheating on assignment work as seriously as cheating in an examination.

Generally acceptable forms of collaboration include:

- Getting help in understanding from staff and tutors.
- Discussing assignments and tutorial examples and methods of solution with other students.

Generally unacceptable forms of collaboration ("cheating") include:

- Copying all or part of another student's assignment, or allowing someone else to do all or part of your assignment for you.
- Allowing another student to copy all or part of your assignment, or doing all or part of an assignment for somebody else. This is treated as seriously as copying another student's assignment.

If you are in any doubt about the permissible degree of collaboration, then please discuss it with a staff member.

Harassment & Complaints

Complaints about assignment or tutorial marks are best made to your lecturer who is in a position to do something immediately. More general complaints can be taken up by your class representative who should be elected or appointed in the first couple of lectures. You may also approach the Head of Department or the Departmental Manager for Mathematics (telephone 373-7599 extension 88063).

Harassment on any grounds, such as racial, sexual, religious and academic is totally unacceptable. Complaints about harassment are best taken to the University Mediator (telephone 373-7599 extension 87478) or to any member of the Resolve Network whose names are displayed on posters around the campus.