Department of Mathematics

Study Guide

Maths 190 and 190G: Semester 2 2010
Great Ideas Shaping our World

Lecturers & Contacts

Your lecturers are here to help you. You are welcome to speak to them about any aspects of the course. If you want to talk to your lecturer, you can either speak to him or her after a lecture, or in office hours, or you can make an appointment to meet at another time.

The lecturers for this course are:

- Claire Postlethwaite (course coordinator): Room 414, Building 303
  Email: `c.postlethwaite@auckland.ac.nz`
  Office hours: Monday 3pm, Wednesday 10am and Friday 9am.

- Vaughan Mitchell: Room 313, Building 303
  Email: `v.mitchell@math.auckland.ac.nz`
  Office hours: Monday 11am, Wednesday 1pm.

- Ivo Siekmann: Room 117, Building 303, or 6th floor, Bioengineering (70, Symonds St)
  Email: `ivo.siekmann@auckland.ac.nz`
  Office hours: Monday 1pm, Tuesday 2pm, Wednesday 11am.

Lectures and tutorials

The lectures are at 12:00, Monday and Wednesday. You should also enrol in one tutorial. Tutorials start in the **first week** of semester. Lecture and tutorial rooms are listed on nDeva.

Assignment due dates

There will be four assignments. The due dates are Wednesday 4th August, Wednesday 25th August, Wednesday 29th September and Monday 18th October. Assignments should be handed in by **4pm** on the due date to the assignment hand-in boxes on the ground floor of building 303 outside G16, SciSpace. **Late assignments will not be accepted**.

Test

There will be a one-hour evening test probably on Monday September 20th, from 6-8pm. All students should take the test.

Textbook

You are expected to read the textbook! You *must* prepare for lectures and review them afterwards - it is not enough just to sit through lectures and expect to do well.

Contents

1 Course Description

Mathematics contains many powerful and beautiful ideas that have shaped the way we understand our world. This course explores the development and use of some of the grand successes of mathematical thinking, covering topics such as infinity, knots, fractals and cryptography.

1.1 Aims

The goals of this course are summarised nicely by Edward Burger, one of the authors of the textbook we use: 'Mathematics is an artistic endeavour which requires both imagination and creativity. In this course, we will experience what mathematics is all about by examining some beautiful and intriguing issues. There are three basic goals for this course:

- To attain a better understanding of some rich mathematical ideas.
- To build sharper skills for analyzing life issues that transcend mathematics.
- To develop a new perspective and outlook on the way you view the world.

The overriding theme of the course is to gain an appreciation for mathematics and to discover the power of mathematical thinking in your everyday life.'

1.2 Pre-requisites and Restrictions

No formal mathematics background is required for this course. You may take this course at the same time or before or after any other Mathematics course, although you will not be able to use Maths 190 to satisfy the General Education requirements of your degree if you enrol or have previously enrolled in other Mathematics courses.

1.3 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 (on average, each week):

- 2 hours lectures
- 1 hour tutorial
- 4 hours lecture and tutorial preparation and review
- 3 hours assignments and exam preparation.

Students are expected to attend all lectures and tutorials.

Lectures are designed around your participation, and there will frequently be activities for you to try in class. You are expected to be an active participant in all classroom activities. When questions are posed in class, you are expected to try to think of an answer. If you don't know an answer then guess. Don't be afraid to make lots of mistakes — it is better to guess wrong that not to think about the question at all.

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 before you come to the lecture.

The tutorials are an integral part of the course. During tutorials you will be expected to work collaboratively with one or two other students, discussing puzzles and problems or issues raised in lectures. Part of your final mark for the course will depend on your participation and enthusiasm in tutorials. Written reports on tutorial work will be handed in and marked, with the mark contributing to your final mark for the course. (See below for details about assessment in the course.)

1.4 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.

- Fun and Games: Text Chapter 1 (1 lecture)
- Number Contemplations: Text Chapter 2 (5 lectures)
- Infinity: Text Chapter 3 (4 lectures)
- Geometric Gems: Text Chapter 4 (4 lectures)
- Chaos and Fractals: Text Chapter 6 (4 lectures)
- Contortions of Space: Text Chapter 5 (5 lectures)

2 Assessment

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

- Final exam (2 hours) 50%
- Mid-semester test 15%
- Four assignments 20%
- Contribution to tutorials 5%
- Tutorial write-ups 10%

Assignment due dates are Wednesday 4th August, Wednesday 25th August, Wednesday 29th September and Monday 18th October. Assignments should be handed in by **4pm** on the due date to the assignment hand-in boxes on the ground floor of building 303 outside G16, SciSpace. **Late assignments will not be accepted**.

There will be a one-hour test, probably on Monday 20th September. All students should take the test.

During tutorials, you will work in small groups. You will be awarded marks for 'contribution to tutorials' for attendance and contribution at tutorials. You may be asked by your tutor to explain your answers to some tutorial questions to the whole class. **If you arrive late you will not receive the tutorial contribution mark.** For each tutorial, you will write up one question which will be handed in and graded with your assignments.

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 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.

3 Resources

3.1 Textbook

The textbook for this course is: The Heart of Mathematics, 3rd Edition, by Edward Burger and Michael Starbird.

This textbook is very good and the course will make extensive use of the text. **You must read the textbook**. There are several copies of the text available on short loan in the Kate Edgar Information Commons, and in the Library.

The textbook is available in the University Bookshop, who in addition have a number of second hand copies.

3.2 Textbook website

The text has an accompanying website at `www.heartofmath.com`.

3.3 Course website and Cecil

The course website is:

`http://www.math.auckland.ac.nz/wiki/MATHS_190_Semester_2_2010_Website`

and is the main source of information about the running of the course, including due dates for coursework, and about any matters concerning rooms, resources, or assessments. All announcements made in lectures will also be made on the course website, along with copies of assignments, lecture handouts and tutorial sheets.

Cecil will be used for posting courseworks grades. You can access Cecil at
`http://www.cecil.auckland.ac.nz`

3.4 Doing well in Maths 190 and Maths 190G

You will be challenged and excited by this course when you meet new and profound ideas. Sometimes you will come up against ideas that you do not at first understand, but persist and you will understand them in the end. Here are some suggestions for doing well in this course:

- Come to lectures prepared to think and to ask questions when you do not understand. If the lecturer or other students ask questions during lectures, try to think of an answer — don't just wait for someone else to answer the question.
- Read the textbook. It is easy and entertaining to read, and we will follow it closely (although we will not cover all topics in the book). The relevant parts of the text will be announced in lectures.
- Talk about the ideas raised in this course as much as possible. Tutorial discussions with classmates are a good opportunity for this, but also try explaining the ideas to your friends and family — or anybody else who is interested.
- Talk to your lecturers about the course material and any ideas about or difficulties that you have with the material. Don't be scared to approach your lecturers they are happy to talk to and help students who are trying to help themselves. A good time to talk to your lecturer is right after class or in office hours. Office hours for each lecturer will be announced in class. You can also make an appointment to meet with a lecturer by emailing your lecturer.

4 Administrative information

4.1 Times & Rooms

The course has two hours of lectures and one tutorial per week. The lectures are 12:00-1:00pm on Mondays and Wednesdays. Tutorials are 12:00-1:00pm on Thursdays or Fridays (students pick one of these days). Lecture and tutorial rooms can be found on nDeva.

4.2 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.

Register of Deliberate Academic Misconduct

Beginning in 2009, if a student deliberately cheats and receives a penalty, the case will be recorded in a University-wide Register. The record of the offence will normally remain until one year after the student graduates. The Register will help identify repeat offenders, with the risk that these students will receive more severe penalties for repeat offences.

4.3 Harassment & Complaints

Complaints about marking should be taken to your lecturers who are in a position to do something immediately. More general complaints can be taken up by your class representative. You may also approach the Head of Department or the Departmental Manager for Mathematics.

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