Department of Mathematics

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

Study Guide

MATHS 101/MATHS 101G

Maths in Society

COURSE INFORMATION

Course Description

"Maths in Society" is for students enrolled in either MATHS 101 or MATHS 101G. MATHS 101G is the course number used by students enrolled in the General Education Mathematics Course while MATHS 101 is the course number used by those students enrolled in the Course as a first Mathematics course. It is assumed students enrolled in this course have little background in mathematics, are likely to have not done any mathematics for some time and may lack confidence in their ability to succeed in a mathematics course.

"Maths in Society" aims to build confidence using Mathematics while demonstrating the role mathematics plays in understanding and guiding human activity. This course allows you to investigate and understand the Mathematics needed to live in our society while teaching you the mathematical skills through every day themes such as the Environment (e.g. air pollution) and Medicine (e.g. burns, drug dosages). You need very little mathematical knowledge, just "Inveniens Quaerendo" (Latin, *discovering by trying*) ability to succeed in this paper.

Entrance Requirements and Restrictions

MATHS 101 is for students who have not studied Mathematics at NCEA Level 3 or equivalent or who have achieved less than 18 credits in Mathematics at NCEA Level 2 (e.g. who have not achieved a 6 or better in Sixth Form Certificate Mathematics or who have not done mathematics at Bursary level). Special cases may be enrolled after an interview. While MATHS 101 is not available for students who passed NCEA Level 3 Mathematics, MATHS 101G can be taken by such students as part of their General Education.

[MATHS 102 is for students who have achieved fewer than 12 credits in Calculus or statistics at NCEA Level 3 but who have achieved at least 18 credits in Mathematics at NCEA Level 2.]

Restrictions: MATHS 101 / MATHS 101G may not be taken with or after any other mathematics course at Stage 1 or above except MATHS 190. You will not be able to use MATHS 101 to satisfy the General Education requirements of your degree if you enrol in, or have previously enrolled in, other Mathematics courses.

Mathematics Beyond This Course

The course is primarily aimed at helping you to do mathematics in all aspects of your life. Mathematical ideas are often presented in the newspaper, and we all engage in mathematical thinking in many ways. People do mathematics when calculating financial transactions like loans, mortgages or investments; in arranging times and schedules; when gardening or cooking; when building fences or sewing; when analyzing statistics of all kinds. We hope this course will improve your ability to handle such mathematical situations. You may wish to extend your formal studies in mathematics after this course. MATHS 101 partly prepares you to take the courses STATS 101 (Level One Statistics) or MATHS 102 (Mathematics Two). A good pass (Grade B+ up) is recommended for progress to MATHS 102.

The Curriculum

The curriculum is drawn from the following themes, each developed in three to six lectures. They are listed in alphabetical order:

- Finding Patterns
- How to Solve it
- Let's Figure it Out
- Medical Matters
- Modeling the Environment
- Mountains Out of Molehills
- Putting it Together
- Vital Statistics

Lectures

You can expect to be active in lectures, which are 3 hours per week. Lectures are not a time to sit back, listen and take the odd note. You will be expected to DO things. For example you may be given incomplete notes - you will need to listen to the lectures and write on them as it proceeds. You may be asked to turn to your neighbour to discuss some point, or to work on a small task. You may be asked to work on problems during the lecture, and to offer your working to the class. The lecturers and tutors expect you will have many questions, comments and contributions to make. We hope you will speak out in lectures by asking questions, by challenging what is presented, by seeking clarification or by offering alternative methods.

Tutorials

A feature of the course is the tutorial approach in which students - working in groups and individually in tutorials - undertake a variety of work related to each theme. Tutorials will be held one hour per week in small groups of about 15 - 25 students. Each group will have one tutor who will help with any problems you have during the course. If you have questions you may contact your tutor, or the lecturer, at any time during the semester.

Course-Load

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):

- 3 hours lectures
- 1 hour tutorial
- 3 hours lecture preparation/revision
- 3 hours assignments/test preparation.

Resources
Resources are available either by accessing the website (http://www.math.auckland.ac.nz/~class101/index.html) or going online to Cecil (http://cecil.auckland.ac.nz). Students will use scientific calculators and their use will be necessary in tests and examinations. The use of other technology, particularly computers, will be introduced but will not be part of the examinable skills of the students. Students will also learn to work on problems in the computer laboratories using spreadsheets.

Assumed Knowledge
You can check your pre-requisite knowledge for the course by attempting the 'Assumed Knowledge' questions and checking against the given answers, which can be found on Cecil. Students who experience difficulties with this pre-requisite knowledge are expected to spend some time learning it outside of lectures. (*Skills in Mathematics: Volume 1* by Forbes, Morton and Rae may be a useful resource for basic skills.)

Academic English Language

DELNA
DELNA is The University of Auckland's English Language testing programme. Information on the programme can be found at: http://www.delna.auckland.ac.nz/
DELNA:

- Diagnoses your academic English language ability.
- Does not cost you anything.
- Directs you to the best language support for you.
- Does not exclude you from the courses you are enrolled in.
- Does not appear on your academic record.

The Department of Mathematics requires ALL first year students to undertake DELNA screening. This is a half-hour web-based test. Individual results are given only to you, although the department gets a summary of the class results. Arrangements for sitting the test will be made through the Course Coordinator, who will advertise times and places where the screening will take place.

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 at the Web site http://www.elsac.auckland.ac.nz/ This computer-laboratory based service is free and open 7 days a week. Tutors are available to help. Alternatively, there are credit-bearing English language courses (ESOL 100/101/102—see p340 of the 2007 Calendar). The Department of Mathematics offers special tutorial support for Maori and Pasifika students (contact Garry Nathan, Extn 84931), and occasionally runs Mandarin or Cantonese-speaking tutorials (contact Jamie Sneddon, Extn 82121).

ASSESSMENT IN MATHS 101 / MATHS 101G

This course is about **doing** mathematics and so the assessment is designed to reflect:

a) your participation in the course;
b) all the work you do during the semester;
c) the new mathematical skills you have achieved;
d) the way you communicate in mathematics, written and oral;
e) the new mathematical understandings you have achieved;
f) your ideas about mathematics.

We are not so interested in what you can learn by rote, nor what you can achieve in short periods of time working under pressure. There is less emphasis on the final exam than is usual.

Your final grade in MATHS 101 / MATHS 101G is calculated from your work in the tutorials, the mid-semester test and in the final examination. Your coursework marks are 50% of your final grade for this course. These coursework marks are earned from

- your full participation in task tutorials,
- doing assignment **tasks***,
- doing collaborative exercises and
- doing **reflections***,

hence regular attendance is important. Your final examination counts for the other 50% of the final grade for this course, and you must achieve at least 40/100 in the examination.

Handing In Your Work*

Tasks and **Reflections** are placed in the box marked MATHS 101 / MATHS 101G in the basement of the Science Centre Building 303. (Due dates and times appear on the timetable of the current semester on the last page.) For all students, personal tasks and reflections should have the standard **blue cover sheet** attached, with **name** and **ID** number filled in, and the **time and tutor** of your tutorial. These cover sheets are available from the Student Resource Centre.

Marks and Cecil

All coursework marks will be available on Cecil. You should regularly check these and talk to the Course Coordinator (or your lecturer) if you find any discrepancies.

Complaints

Complaints about assignment or tutorial marks are best made to your lecturer or the Course Coordinator. 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 (extension 88063).

Getting Further Help

For assistance with the material covered in the course:

- Ask questions in lectures
- Ask about the material in the tutorial.
- Get help and advice from the tutors in the **Assistance Room** in room B25, basement of the Science Centre Building 303 (open weekdays 10am-4pm), or
- Get 'one to one' tutoring assistance using the booking sheet at the mathematics office on the 3rd floor of the Science Centre Building 303.
- Visit the lecturer during office hours.

The Student Learning Centre (SLC) in the Information Commons (City Campus) also offers some one-to-one assistance. You pay $10 to join the SLC and this entitles you to book SLC assistance for the entire calendar year.

Working Together & Cheating

The University of Auckland will not tolerate cheating, or assisting others to cheat, and views cheating in coursework as a serious academic offence. The work that a student submits for grading must be the student's own work, reflecting his or her learning. You are encouraged to discuss problems with one another and to work together on assignments, but you must not copy another person's assignment. Any cases of suspected cheating will be referred to the course coordinator. Marks for the assignment may be deducted, or in serious or repeat cases, the student may be deleted from the course, or referred to the university for other possible disciplinary action.

Generally the following are **acceptable** forms of collaboration:

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

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. For complete information about the university's policy on cheating, see *Guidelines: Conduct of Coursework* on the university website.

Assessment Tutorials, Tasks and Reflections

During the tutorial time, you will be expected to work together on a cooperative basis either on tasks or on the collaborative exercises. You are expected to attend and participate in all tutorials. Attendance means arriving on time where possible, and staying to the end. Participation counts towards your coursework marks. This means contributing to group discussions and showing evidence of progress on the set work.

The 'Task' and 'Collaborative' tutorials involve two kinds of activity, individual tasks and group collaborations.

I. Collaborative Tutorials for MATHS 101 / MATHS 101G

This type of tutorial will involve three parts:

- ***An individual skills activity.*** The mathematical skills used in the current theme will be practiced. Some skills sheets are on Cecil. Others will be supplied where appropriate. These are not required to be handed in.

- ***A collaborative activity***. The requirements for the activity will be given out during the tutorial. Students, in groups of 3, will be required to work together and hand in their group solutions (results) at the end of the tutorial. Your group collaboration is written by one of the group who has been appointed as group writer. You will need to discuss the problem and tell the writer what to write. This is to be handed to your tutor as you leave the tutorial. Be sure to

put your names and ID on the cover sheet supplied by your tutor. Assessment will be based on participation and a good attempt at the solutions.

- ***A personal reflection*** on the current tutorial theme. This is done individually and handed in to the Resource Centre on the allocated day following the tutorial (see p.9). The reflection consists of

  A : Select **TWO** of the following and write a paragraph on each.

  i. How you felt this week as a learner of mathematics. (Give reasons.)
  ii. A discussion of any mathematics content learnt for the first time, or covered previously and then forgotten.
  iii. Notes on anything that is still unclear, or that you are worried about, or that you would like further work on.
  iv. How this week's theme could relate to the multi-cultural aspect of today's society.
  v. An explanation of any different strategies (methods to solve problems) learnt during this topic.
  vi. An explanation of any applications or relevance of the mathematics taught in this topic.
  vii. A discussion on any connections between different representations (numerical, algebraic, graphical, tabular, diagrammatic) and different terminology (language) that you have discovered within this topic.

  B: In one paragraph discuss how writing and reflecting on your mathematics learning in Part A has been helpful (or unhelpful) to you.

  Your reflection should be around three paragraphs in total, as described above, at least half a page and no more than one page.

II. Task Tutorials for MATHS 101 / MATHS 101G

A task tutorial will involve two parts:

- **An individual skills activity.** The mathematical skills used in the current theme will be practiced. Some skills sheets are on Cecil. Others will be supplied where appropriate. These are not required to be handed in.

- **A task**. Tasks will usually be open-ended mathematical investigations rather than closed problems for which you must find a solution. At the task tutorials you will work in a group on each task by thinking, discussing and questioning. Then you will be expected to write up the results of your thoughts, investigations and discussions and then do some extra work on your own before handing it in the following week on the due date (see p. 9). What you hand in should be organised so that it is easy to understand, and written so that the marker can follow your train of thought. You will also be expected to write two sentences commenting on the current theme.

Mid-Semester Test and Examination

I. Mid-Semester Test

There will be one mid-semester test, worth 15% of the final mark.

The test will generally cover the three or four themes taught prior to the test. A sample mid-semester test can be accessed on Cecil. There will be three types of questions, each given about equal weighting:

Section A: Exercises and context problems requiring calculations and "answers".

Section B: Questions which will give you the opportunity to work through a kind of investigation, similar to those you have been doing in lectures and tutorials.

Section C: An essay-type question which will give you an opportunity to discuss your understanding of some aspect of mathematics.

The test will be conducted in two stages. The ***first stage*** will be a written open book test taken under test conditions. It will be a one and a half hour test. It is not intended that you should be working under time pressure. You may take into the test any calculators, books, notes, dictionaries or other reference material. The test will be marked and returned to you with comments and an indication of where further work could be done. You then do the ***second stage*** of further work on the test at home over the mid-semester break and hand this in after the break. The test will be marked again. It is expected you may get help from other people for this second stage of the test, however, please hand in your own work. You may be asked to discuss your answers with the marker, so be sure you fully understand what you hand in.

The mark awarded will be the average of the first stage and the second stage mark.

II. Final Examination

To pass this course you need to **score 40% or more** in the final exam.

- The final examination will cover all the material in the course and it will be two hours long.
- As with the Mid-Semester Test it will contain three types of questions in approximately equal proportions. You do not get to sit the examination again!
- It will also be set so that it should take less than 2 hours, but you may take the full 2 hours if you wish.
- It will be an open book examination (ie. you may take in whatever written material: notes, dictionaries, tasks, mathematical ideas etc).
- You may also take in any calculators. You will be expected to use a scientific calculator.
- The date that the examination will be held on will be announced during the semester.
- On the morning of the examination the exam rooms will be posted on notice boards at various places around the university campus.

A sample Final Examination can be accessed on Cecil. Further copies of previous examinations can be downloaded from http://examdb.auckland.ac.nz

LECTURES, TUTORIALS, LECTURERS & ASSESSMENT MATHS 101 / MATHS 101G IN **SEMESTER 2 2007**

Lectures and Tutorials

Lecture and Tutorial Times – Two Streams

Stream 1 - City Campus:
Monday 12 – 1pm **Tuesday** 12 – 1pm **Wednesday** 12 – 1pm
Stream 2 - City Campus:
Tuesday 5 - 7pm **Thursday** 5 – 6pm
Please check nDeva for the lecture room allocated (http://ndeva.auckland.ac.nz)

Thursday 1 hour tutorials will be held during the day at 12 noon, 1pm, 4pm, and 6pm. Please select one tutorial time. Tutorial rooms will be announced in lectures once they have been allocated.

Lecturers

Barbara Miller-Reilly *(Course Coordinator)*	Room 326, Science Centre Building 303, Ph 3737599 ext 88790 E-mail: barbara@math.auckland.ac.nz
Hannah Bartholomew	Room 308, Science Centre Building 303, Ph 3737599 Ext 84239 E-mail: bartholomew@math.auckland.ac.nz
Judy Paterson	Room 322, Science Centre Building 303, Ph 3737599 Ext 88605 E-mail: paterson@math.auckland.ac.nz

Assessment

To pass this course you need to, first of all, **score 40% or more** in the final exam **AND** also pass the total assessment which is made up as follows:

Participation in 3 task tutorials (1.5% each)	**4.5%**
Three tasks (4.5% each)	**13.5%**
Six collaborations (1.5% each)	**9%**
Four reflections (the best 4; 2% each)	**8%**
One open book semester test	**15%**
One open book examination	**50%**
	100%

Mid-Semester Test

You will be advised in lectures of the rooms for the test. The dates for the test in Semester 2 2007 are:

First stage:	Monday 13th August 6 – 8pm
Papers will be returned to you:	Thursday 23rd August (in tutorials)
Second stage:	Your revised test answers are due by 5pm Thursday 13th September.

SUMMARY PAGE: MATHS 101/MATHS 101G TIMETABLE 2007SC

TWO Streams Week Starting **Monday -**	**Mon 12-1 pm OR Tues 5-6 pm**	**Tues 12-1 pm OR Tues 6-7 pm**	**Wed 12-1 pm OR Thurs 5-6 pm**	**Thursday Tutorials**	**Deadlines for assessments**
16 July Week 1	How To Solve It 1	How To Solve It 2	How To Solve It 3	**Practice COLLAB How To Solve It**	**Hand in Collab at tutorial. Practice Reflection Thurs 26/7**
23 July Week 2	Let's Figure It Out 1	Let's Figure It Out 2	Let's Figure It Out 3	**COLLAB 1 Let's Figure It Out - Practice Reflect'n due 5pm**	**Hand in Collab 1 at tutorial. Reflect'n1 - Thurs 2/8**
30 July Week 3	Finding Patterns 1	Finding Patterns 2	Finding Patterns 3	**COLLAB 2 Finding Patterns Reflect'n1 due 5pm**	**Hand in Collab 2 at tutorial. Reflection 2 Thurs 9/8**
6 August Week 4	Finding Patterns 4	Finding Patterns 5	Finding Patterns 6	**REVISION FOR TEST Reflect'n2 due 5pm**	**NO assignment TEST MONDAY 13th August 6–8pm**
13 August Week 5	Medical Matters 1 **TEST 6-8pm**	Medical Matters 2	Medical Matters 3	**TASK 1 Finding Patterns** Computer room	**TASK 1 due Thursday 23rd August**
20 August Week 6	Medical Matters 4	Mountains out of Molehills 1	Mountains out of Molehills 2	**COLLAB 3 Medical Matters Task 1 due 5pm**	**Hand in Collab 3 at tutorial. Reflect'n 3 Thurs 13/9**
27 August	**Mid Semester**	**Break**			
3 September	**Mid Semester**	**Break**			
10 September Week 7	Mountains out of Molehills 3	Mountains out of Molehills 4	Mountains out of Molehills 5	**TASK 2 Mountains Out of Molehills**	**TASK 2 due Thursday 20th September**
17 September Week 8	Vital Statistics1	Vital Statistics 2	Vital Statistics 3	**COLLAB 4 Vital Statistics Task 2 due 5pm**	**Hand in Collab 4 at tutorial. Reflect'n 4 Thurs 27/9**
24 September Week 9	Putting It Together 1	Putting It Together 2	Putting It Together 3	**TASK 3 Putting It Together Reflect'n4 due 5pm**	**TASK 3 due Thursday 4th October**
1 October Week 10	Putting It Together 4	Putting It Together 5	Putting It Together 6	**COLLAB 5 Putting It Together Task 3 due 5pm**	**Hand in Collab 5 at tutorial. Reflect'n 5 -Thurs 11/10**
8 October Week 11	Modelling the Environment 1	Modelling the Environment 2	Modelling the Environment 3	**COLLAB 6 Modelling the Environment Reflect'n5 due 5pm**	**Hand in Collab 6 at tutorial. NO Reflection**
15 October Week 12	Modelling the Environment 4	Exam Revision	Exam Revision	**Tutorial Help Session**	
22 October	**Labour Day**	**Study Leave/Exams**			

TEST RE-WRITE DUE Thursday 13th Sept 5pm

Task assignments (3@4.5%)	13.5%
Collab tutorial tasks (6@1.5)	9%
Reflections (the best 4@2%)	8%
Task Tutorials (3@1.5%)	4.5%
Mid Semester test	15%
TOTAL COURSEWORK	50%
Examination	50%
TOTAL MARK	**100%**

Contacts Phone 3737599
Barbara Miller-Reilly
Room 326 Ext 88790 barbara@math.auckland.ac.nz
Hannah Bartholomew
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Judy Paterson
Room 322 Ext 88605 paterson@math.auckland.ac.nz