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, have not done any mathematics for some time or 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 / MATHS 101G is for students who have not studied Mathematics at NCEA Level 3 or equivalent (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.

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

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 enroll in, or have previously enrolled in, other Mathematics courses.

Curriculum, Resources, Lectures and Tutorials.

(i) Curriculum

A set of themes will be developed in lectures with relevant background ideas and resources. Within these sessions, and in laboratories/tutorials, students will be expected to explore certain tasks. The curriculum is drawn from the following themes, each taught in two to four lectures, listed in alphabetical order.

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

A feature of the course is the tutorial approach in which students -working in groups and individually- undertake a variety of work related to each theme.

(ii) 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 learn to work on problems in the computer laboratories using spreadsheets.

Students taking this course are expected to have a working knowledge of the basic elements of Year 10 Mathematics. 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 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.)

(iii) 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.

(iv) Tutorials

Tutorials are an integral part of this course and 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.

During the tutorial time, you will be expected to work together on a cooperative basis on tasks and collaborative exercises. Regular attendance is required as the tasks and collaborative exercises are an important part of the course. Your coursework marks are earned from full participation in task tutorials, doing assignment tasks, collaborative exercises and reflections.

(v) 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.

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 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. 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.

(ii) Final Examination

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. It will be an open book examination. You may also take in any calculators. You do not get to sit the examination again! A sample Final Examination can be accessed on Cecil. Further copies of previous examinations can be downloaded from http://examdb.auckland.ac.nz

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.

Academic English Language

(i) 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.

(ii) 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).

LECTURES, TUTORIALS & ASSESSMENT
MATHS 101 / MATHS 101G
SEMESTER 1 2007

Lectures and Tutorials

(i) Lecture and Tutorial Times – Three Streams (3 Campus')

City Campus:

Monday 8 – 9am   **Tuesday** 8 – 9am   **Wednesday** 8 – 9am

Please check nDeva for the lecture room allocated (http://ndeva.auckland.ac.nz)

Friday 1 hour tutorials will be held during the day at 8am, 10am, and 2pm.

Please select one tutorial time. Tutorial rooms will be announced in lectures once they have been allocated.

Epsom Campus:

Monday 10.30am – 12.20pm   **Wednesday** 10.30am – 12.20pm (includes tutorial)

Manukau Campus:

Tuesday 8.30 – 10am **Wednesday** 1 – 3pm   **Friday** 8.30 – 10am (includes tutorial)

(ii) Lecturers

City Campus:

Sheena Parnell	Room 324, Science Centre Building 303,
(Course Coordinator)	Ph 3737599 ext 85750
	E-mail: Sheena@math.auckland.ac.nz
Maxine Pfannkuch	Room 310, Science Centre Building 303,
	Ph 3737599 Ext 88794
	E-mail: pfannkuch@math.auckland.ac.nz

Epsom Campus:

Barbara Kensington-Miller	Room 326, Science Centre Building 303,
	Ph 3737599 ext 88790,
	E-mail: bmiller@math.auckland.ac.nz

Manukau Campus:

Phil Kane	Ph 9688765 Ext 8162
	E-mail: phil.kane@manukau.ac.nz

Assessment in This Course

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

Participation in task tutorials	**4.5%**
Three tasks	**15%**
Five collaborations	**7.5%**
Four reflections	**8%**
One open book semester test	**15%**
One open book examination	**50%**
	100%

Assessment Tutorials

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

(i)   Collaborative Tutorials for MATHS 101 / MATHS 101G

These tutorials will involve three parts:

1. **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.

2. **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.

3. **A personal reflection** on the <u>current tutorial theme</u>. This is done individually and handed in to the Resource Centre by 4pm on the allocated day (see p.9) following the tutorial. The reflection consists of

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

     i.   How you felt <u>this week</u> 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.

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

Totally your reflection should be three paragraphs, as described above, and no more than one page.

(ii) Task Tutorials
  These task tutorials will involve two parts:

1. **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.

2. **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.

What You Need to Know About Your Course Work

(i) Handing In Your Work
  For the City Campus Tasks and **Reflections** are placed in the box marked MATHS 101 / MATHS 101G in the basement of the Science Centre Building 303 by 4pm on the allocated day following each tutorial. (Due days and dates dates for each assignment appear on the summary timetable 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.
  The hand in procedures for the Epsom Campus and the Manukau Campus will be explained in lectures.

(ii) Mid-Semester Test
  There will be one mid-semester test, worth 15% of the final mark. The test will be conducted in two stages, as explained earlier. You will be advised in lectures of the rooms for the test. The dates for the test are:

First stage:	Monday 26th March 6 – 8pm
Papers will be returned to you:	Wednesday 4th April (in

lectures)

Second stage:	Your revised test answers are due
	4pm Wednesday 2nd May.

(iii) Getting Further Help
  For assistance with the material covered in the course:
- Ask questions in class
- Ask about the material in the Friday 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.

(iv) 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.

(v) 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).

(vi) 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.

Final Examination

- 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.
- 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.

SUMMARY PAGE: MATHS 101/MATHS 101G TIMETABLE (City Campus)

Week Starting Monday -	Monday 8-9 am	Tuesday 8-9 am	Wednesday 8-9 am	Thurs No lecture	Friday Tutorials	Deadlines for assessments
26 Feb 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 **ReflectionMon 5/3**
5 March Week 2	Let's Figure It Out 1 **Reflection 1 due 4pm**	Let's Figure It Out 2	Mountains out of Molehills 1		**COLLAB 1 Let's Figure It Out**	Hand in Collab at tutorial. **Reflection Mon 15/3**
12 March Week 3	Mountains out of Molehills 2 **Reflection 2 due 4pm**	Mountains out of Molehills 3	Mountains out of Molehills 4		**TASK 1 tutorial Mountains out of Molehills**	TASK 1 due **Wednesday 21st March**
19 March Week 4	The Magic of Numbers 1	The Magic of Numbers 2	The Magic of Numbers 3 Task 1 due 4pm		REVISION FOR TEST	**NO assignment TEST MONDAY 26th March 6 – 8pm**
26 March Week 5	The Magic of Numbers 4 TEST 6-8pm	Putting it together 1	Putting it together 2		**TASK 2 tutorial** Putting it together	TASK 2 due Wednesday 4th April
2 April Week 6	Putting it together 3	Locking it in 1	Locking it in 2 Task 2 due 4pm		Good Friday	TEST RE-WRITE DUE Wednesday 2nd May
9 April	**Mid Semester**	**Break**				
16 April	**Mid Semester**	**Break**				
23 April Week 7	Locking it in 3	Finding Patterns 1	**ANZAC DAY**		**COLLAB 2 Locking it In**	Hand in Collab at tutorial. **Reflection Mon 30/4**
30 April Week 8	Finding Patterns 2 **Reflection 3 due 4pm**	Finding Patterns 3	Finding Patterns 4 **TEST REWRITE DUE**		**TASK 3 Finding Patterns Computer room**	TASK 3 due Wednesday 9th May
7 May Week 9	Finding Patterns 5	Medical Matters 1	Medical Matters 2 **Task 3 due 4pm**		**COLLAB 3 Medical Matters**	Hand in Collab at tutorial. **Reflection Mon 14/5**
14 May Week 10	Medical Matters 3 **Reflection 4 due 4pm**	Vital Statistics 1	Vital Statistics 2		**COLLAB 4 Vital Statistics**	Hand in Collab at tutorial. **ReflectionMon 21/5**
21 May Week 11	Vital Statistics 3 **Reflection 5 due 4pm**	Modelling the Environment 1	Modelling the Environment 2		**COLLAB 5 Modelling the Environment**	Hand in Collab at tutorial. **NO Reflection**
28 May Week 12	Modelling the Environment 3	Revision using Mind Maps	Exam Revision		Tutorial Help Session	
4 June	**Queen's Birthday**	**Study Leave/Exams**				

Task assignments (3@5%)	15%	
Collab tutorial tasks (5@1.5)	7.5%	

Contacts Phon
Sheena Parne
Room 324   Ex
Maxine Pfann
Room 310   E
Barbara Ken
Room 326   E

Reflections (4@2%)	8%
Task Tutorials (3@1.5%)	4.5%
Mid Semester test	15%
TOTAL COURSEWORK	50%
Examination	50%
TOTAL MARK	**100%**