

THE UNIVERSITY OF NEW SOUTH WALES

SCHOOL OF MATHEMATICS  
AND STATISTICS



MATH2060 Professional Issues and Ethics in Mathematics  
2007 S2

Lecturer: Dr James Franklin,  
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Consultation times will be advised, but you are welcome to call  
anytime.

Lectures will be Fri 10-12, RC M032. At Friday 11-12 (except wk 1),  
there will be visiting speakers (weeks 2-9), and talks by students in  
tutorials (weeks 10-14).

The course is worth 3 units of credit. It is compulsory for mathematics  
majors.

**Rationale of the Course:**

This is a course where students come to understand the relation of their  
technical mathematical studies to the ways in which mathematics is  
used in the world outside university. Visiting speakers explain their  
work experience. Lectures and class discussion will introduce a wide  
range of topics giving an overview of mathematics and its relation to  
practical and ethical issues in the workplace. In order to develop skills  
of planning, management, teamwork and communication that are  
highly valued in the workplace, most of the assessment is on a team  
project of students' own choosing, involving written and oral  
presentation.

An article on the course is at  
<http://www.austms.org.au/Publ/Gazette/2005/May05/franklin.pdf>

**Provisional Lecture Outline:**

- Wk 1. Employment in mathematics, and the skills required in employment and research.
- Wk 2. Presentation from UNSW Careers and Employment.
- Wk 3. Classification of mathematics and the formal sciences, and their place in the wider science and culture.
- Wk 4. Overview of history of mathematics from the Greeks to the present.
- Wk 5. Mathematical modelling: example of greenhouse models
- Wk 6. Statistics, data, data mining, risk; differences from mathematics
- Wk 7. Plato's *Meno*. Proof in mathematics versus experiment in science
- Wk.8. Communicating mathematics: spoken word, diagrams, graphs
- Wk 9. Ethics: codes of ethics, foundations
- Wk 10. Presentation from APESMA. Ethics: case study
- Wk 11. Ethical/legal issues: duty of care, conflict of interest
- Wk 12. Ethical issues: military work, worthwhile careers
- Wk 13. Ethical and professional issues: data, confidentiality, legal
- Wk 14. Class test in lecture room

Notes of the lectures will be made available on the course My eLearning Vista page. There is no textbook.

**Assessment:**

- 10% Short writing assignment (set week 1, due week 3; see later)
- 30% Written version (essay or report) on a project, which will be done in teams of two (due in tut week 13) (5% of these marks will be given for a one-page plan of the project, due at lecture week 7)
- 30% class presentation on project (to be delivered by both of the team)
- 10% Participation in tutorials (that is, active involvement)
- 20% Short-answer class test (in wk 14 lecture time) on the lecture material and the talks by visitors

Late assessments are accepted, with a gradual decay of marks.

The graduate attributes that the course particularly aims to develop are communication skills, both written (in the project and class test) and

oral (in the class presentation); research and analytical skills (in the project); teamwork and management skills (in the project); and information literacy (in the research for the project). The wide choice of project topic encourages intellectual initiative.

Since part of the point of the course is to listen, a roll will be marked in tutorials, and occasionally in lectures. A satisfactory level of attendance (about 80%) is required to pass.

The content of this course is still being developed. Comments and suggestions are welcome. If you see any material (in newspapers etc) that would be of interest to the whole class, let the lecturer know and it will be copied and distributed.

A book token of \$40 will be awarded for the best performance in the course.

**Short writing assignment:** (Due at lecture week 3)

Suppose you are asked to speak at a careers fair at your old school, for students aged about 14. Write a short talk (between 700 and 1000 words) about careers in maths, including some colourful and unusual examples of mathematics in the real world that would appeal to that age. (The examples below may give ideas, but find some of your own. Don't just list the examples – give a short description, so the hearers gain some understanding).

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From: Phil.Owen@CSIRO.AU [mailto:Phil.Owen@CSIRO.AU]

Sent: Wednesday, 11 July 2007 2:49 PM

To: Mike Archer [Dean of Science, UNSW]

Subject: Exciting new opportunity for a Post Doctoral Fellow

CSIRO Mathematical and Information Sciences and the Australian Institute of Sport have an exciting new opportunity for a Post Doctoral Fellow to conduct novel research into fluid dynamic simulation of elite swimmers.

This unique post-doctoral opportunity exists at the leading edge of fluid dynamic research to help bring together advanced CFD modelling and swimming technique evaluation and enhancement for elite Australian swimmers.

This research involves the coupled prediction of deforming swimmer bodies interacting with turbulent bubbly fluid flow. The modelling is based on the

Smoothed Particle Hydrodynamics (SPH) method. The research will involve contributions to the development of the modelling capability, its validation and its use to assist in the evaluation and possibly modification of elite swimmer technique.

This is a challenging and rare opportunity for doing both high end and high impact CFD coupled with elite sports. The post-doctoral fellow will work with the established development and application teams, specialising in the extension and application of the SPH method and software to modelling all aspects of the swimming application.

This position will be advertised shortly, both in the print media as well as on our careers website [www.csiro.au/careers](http://www.csiro.au/careers). Would you please pass this information to anyone you think will be a suitable candidate?

Regards,

Phil Owen, Applications Specialist

Computational Fluid Dynamics Group, CSIRO Mathematical & Information Sciences

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### **Dodgy maths stopped bombers**

*The Australian*, July 10 2007

THE four would-be suicide bombers who attempted to blow themselves up in London two weeks after the deadly 2005 attacks failed because their ringleader could not do simple mathematics.

The men, Muktah Said Ibrahim, Yassin Hassan Omar, Ramzi Mohammed and Hussain Osman, have been found guilty of conspiracy to murder at Woolwich Crown Court in London after a trial lasting almost six months.

They had tried to blow up trains and a bus on July 21, 2005, and had been planning attacks "bigger and better" than the bombings on three Tube trains and a bus in London a fortnight earlier that had killed 52 people, the court heard.

The explosives would have caused carnage on the transport network, but the plot mastermind, Ibrahim, miscalculated the ratios of ingredients when making the bombs, Britain's Daily Mail newspaper has reported.

The court heard Ibrahim personally bought the bleach and chapati flour used to make the devices in his flat, which was also booby-trapped. Police said the highly volatile triacetone triperoxide, known as "mother of Satan" was used as a detonator.

But Ibrahim, who failed maths at school, got his sums wrong when mixing the recipe, making the bombs - which were packed with nails and screws - harmless.

## The Project:

First, you will need to choose a partner. Marks will be equally distributed, unless problems arise (which should be discussed with the tutor or lecturer).

The written version of the project should be an **essay or report**, as the team think appropriate. **About 5,000 words** would be usual, but that depends on the nature of the project, whether there are many illustrations, etc. The project should be submitted in hard copy to the tutor and by email to the lecturer (so plagiarism detection tools can be used).

It is important that the work is your own, and not plagiarised. More guidance on plagiarism is given later in the handout. Written or other sources, whether directly quoted or summarised, should have full references given in footnotes. There are different styles of giving references that can be used, but references must be full enough so that a reader can easily check them (for example, exact page numbers should be given for quotations). See more later in this handout.

A sample successful essay from a previous year is included in this handout (but note that projects were then individual, so it is shorter than what is required this year).

To encourage an early start on the project work, each team will submit a **one-page plan** on the project at the lecture in **week 7**. It will describe the idea of the project, and will include at least three of the references that will be used.

The talk on the project will not consist simply of reading the essay, although reading some parts may be appropriate. The talk should be a presentation that convinces the audience that the topic is interesting. Some suggestions on oral presentation, provided by a 1998 student, are included later in the handout. Students in the class will assist with evaluation of the talks.

It is important to search widely for information on the topic chosen. Good sources to begin with include:

The Internet, using such search engines as google (google.com) and google scholar (scholar.google.com)

Encyclopedias, notably the *Encyclopaedia Britannica*, Wikipedia

(don't trust everything in it...), the *Encyclopedia of Mathematics*, the *Companion Encyclopedia of the History and Philosophy of the Mathematical Sciences*, and the *Encyclopedia of Statistical Sciences*;

Popular books on mathematics by such authors as Keith Devlin, Ian Stewart, Morris Kline and Martin Gardner;

Online databases available in the Library or through the Library's web page, such as General Science Abstracts; Mathscinet; Web of Science;

Keyword search of the library catalogue;

People who know something.

The **topic** may be chosen by the team of students, but must be about some **ethical or social issue involving mathematics or statistics** (interpreted fairly widely). Examples of suitable topics might be:

- Misuse of statistical or actuarial evidence in some corporate scandal, such as the collapse of HIH
- Successful and socially beneficial uses of statistics in, for example some medical application
- "Smart" weaponry and whether it does or does not save lives
- Analysis of risks of disasters, such as of huge volcanic eruptions
- The (first) space shuttle disaster, involving a statistical bad inference
- Greenhouse climate models and their credibility
- The collapse of Long Term Capital Management

An interesting and original choice of topic will create a good impression. Consult the lecturer if in doubt if your topic is acceptable. The essay and the class presentation should maintain a balance between technical and ethical/social aspects: the necessary mathematical technicalities should be explained but about half the space at least should be devoted to ethical/social aspects, such as the social benefits or whether the people involved behaved rightly.

The School of Mathematics and Statistics evaluates each course each time it is run. Feedback on the course is collected from, e.g. the CATEI forms. Student feedback is taken into account and efforts are made to improve the course on the basis of feedback. This course has responded to suggestions to make the course structure clearer.

# **SCHOOL OF MATHEMATICS and STATISTICS, UNSW S2 2007**

## **IMPORTANT INFORMATION FOR UNDERGRADUATE STUDENTS**

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/students/current/policies/studentpolicy.html>

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.

The following is a brief outline of some of the most important MathsStats policies.

### **1. Course Enrolment, Tutorial Enrolment**

It is each student's responsibility to know the rules for their degree program and be enrolled in the correct courses by the census date. The School of Mathematics and Statistics can advise students if needed, but is not responsible for the student's program as it is not the Program Authority for any undergraduate program.

Students must be enrolled in a tutorial with the School of Mathematics and Statistics no later than week 3 if there are tutorials for a course. All assessment is recorded by tutorial and marked tests and assignments are normally handed back through tutorials. If a student is not in a tutorial then the student's marks may not be recorded.

### **2. Notices**

Any general announcement to students will be given in lectures and placed on the Course Home Page.

An email sent to students at `z<stuno>@student.unsw.edu.au` will be viewed as an official communication and the School of Mathematics and Statistics will assume that it has been read within 3 working days. Students communicating with the School must include their student number or a reply may not be given.

### **3. Attendance and participation during session**

It is UNSW policy that attendance at lectures, tutorials etc is compulsory

unless the student has permission of the Registrar. Consequently the School expects students to fully participate in all classes during the session.

In line with this, the School of Mathematics and Statistics marks the roll at all tutorials. If a student does not attend at least 70% of the tutorials then they may not be eligible for any special consideration if that is requested.

It is expected that students attempt all tests, assignments, etc during the session unless prevented by illness or misadventure. Tests and assignments are designed to test student's current knowledge and to assist with ongoing learning. Special consideration for final exams will not be given to students who miss more than a small number of tests or assignments. An exception may be made for long-term documented illness or misadventure.

#### **4. Cheating and Plagiarism**

Cheating at tests, exams or copying of assignments or any other person's work are all treated as Academic Misconduct and are severely punished. The University also has a strong policy on plagiarism.

See <http://www.lc.unsw.edu.au/plagiarism/index.html>

Also see

<http://www.maths.unsw.edu.au/students/current/policies/misconductpolicy.html>

#### **5. Release of Marks, Disputes over Marks**

The School endeavours to return student's tests and assignments within a short time and the marks for these are then displayed on the MathsStats secure student web portal within 7 days of the work being returned.

If a student has a dispute over the mark awarded then they must take the matter up as soon as possible with the tutor who marked the piece of work (or otherwise the Course Convenor). If it is not resolved at that time, then the student may appeal (see

<http://www.maths.unsw.edu.au/school/students/assesspolicies.html> for more information).

Disputes over incorrect recording of marks must be taken up no later than the first day of the final examination period. After that day no recorded during-session mark will be changed even if we have made an error.

The provisional final marks in each Mathematics and Statistics course will be available on the MathsStats secure student web portal on the Friday following the last day of exams. Note that this is earlier than the official final marks are released by the University so as to give students notice of possible additional assessment. The marks are not official until they are released by the University, usually a week after this.

Disputes over final marks awarded must be taken up following UNSW guidelines with the Course Convenor, Director of First Year or Director of Undergraduate Studies and if necessary UNSW Student Central within 15 working days of the release of the results.



## 6. Special Consideration for Illness or Misadventure

Special consideration may be granted for an illness or misadventure (that is, some other event that occurs that is outside the student's control) that affects a student's study in more than a minor way. This does not apply to anything that affects a student's study that is employment related as the University expects that employment will not affect a student's study. Anything related to a student's social or sporting life is also not included.

See also

<http://www.maths.unsw.edu.au/students/current/policies/illnesspolicy.html>

In all cases where a student wishes to ask for special consideration, then the student must present proper documentation – either a doctor's or counsellor's certificate for an illness or suitable documentation of the misadventure (such as a police report).

The procedure in cases of illness or misadventure is:

- a. If you miss a lecture, you do not need to notify us.
- b. If you miss a tutorial, give the tutor documentation at the next tutorial and ask that it be indicated on the roll.
- c. If you miss a class test at a tutorial, give the tutor documentation at the next tutorial and ask that they indicate it on the mark list and roll. If the test is at a lecture, give documentation to the Course Convenor.
- d. If you miss a class test worth at least 20% of the final mark, then apply for special consideration through UNSW Student Central and give the Course Convenor a copy of the application as soon as possible.
- e. If you miss an assignment, give documentation to the Course Convenor. Note that as assignments are available for an extended period, the illness or misadventure must be of an extended nature and not just on the last day or so before the due date.
- f. If you miss a final exam through illness or misadventure or are significantly affected by such during the exam period, then apply for special consideration through UNSW Student Central. There is no need to give a copy to the School.
- g. If you have long-term illness or misadventure then you should consult and register with the Director of First Year or Director of Undergraduate Studies as early as possible. Claims for long-term problems will normally not be accepted once the examination period has started and definitely not after the results are released.

## 7. Additional Assessment Exams

See the full policy at

<http://www.maths.unsw.edu.au/students/current/policies/addasspolicy.html>

There are two types of Additional Assessment: Normal and Concessional. The actual exam is the same for both.

The School runs all its Additional Assessment Exams on the first Tuesday to Thursday after the official marks are released by the University. **For S2 2007 the dates are 11-13<sup>th</sup> December.** The detailed Timetable is normally available on the MathsStats web site the week before the Additional Assessment Exams are held.

If awarded an Additional Assessment Exam you must take it at the

announced time within that period (unless you have two Mathematics or Statistics exams at the same time). For Normal Additional Assessment only, exceptions to this rule may be made if there is a long-term illness or misadventure registered in advance with the Director of First Year or Director of Undergraduate Studies. Students do not need to notify the School that they are attending.

#### **a. Normal Additional Assessment**

Permission to take a Normal Additional Assessment Exam may be granted to students who miss the final exam through illness or misadventure. For such students the Additional Assessment Exam mark will take the place of the final exam mark in the calculation of their final mark.

Permission to take a Normal Additional Assessment Exam may also be granted to students who are seriously affected by illness or misadventure during the exam period and who have failed or whose performance is significantly less than expected on the basis of during-session assessment. For such students any Additional Assessment Exam mark will replace the final exam mark and the final mark re-calculated (**up or down**) accordingly (unless that reduces the final mark from a pass to a fail in which case the final mark will be 50).

In both cases the student must apply and provide proper documentation through UNSW Student Central.

Note that NO Normal Additional Assessment Exam will be awarded unless the student has adequately participated in their class during the session. This is taken as meaning: attending at least 70% of the tutorials and having an overall during-session (before final exam) mark of at least 40%.

Permission to take the Normal Additional Assessment Exams will be shown on the provisional and official final marks by a **grade of WC**.

The School will try to notify students who are awarded Normal Additional Assessment by email, but it is still the student's responsibility to check if they have been awarded it.

Disputes over non-awarding of Normal Additional Assessment must be taken up with the Director of First Year or Director of Undergraduate Studies **before** the Additional Assessment exam period commences.

#### **b. Concessional Additional Assessment**

Concessional Additional Assessment is **automatically awarded** to any student taking a MATH2#### or MATH3#### course (but to no others) who gets a mark of 40 to 49. The maximum mark that can be awarded after

Concessional Additional Assessment is 50.

Permission to take Concessional Additional Assessment is **not notified in any way other than this notice**.

**John Steele, Director of Undergraduate Studies - for Head of School**  
July 2007

## UNSW Statement to Students on Plagiarism

Plagiarism is the presentation of the thoughts or work of another as one's own.\* 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 contributed.†

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](http://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.

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

† Adapted with kind permission from the University of Melbourne.