MACQUARIE UNIVERSITY
ACST200 : MATHEMATICS OF FINANCE
1st Semester 2004

Unit Timetable

Week	Week Begins	Topics Covered
1	1 March	1. Compound Interest & Discount; Forces of Interest
2	8 March	2. Inflation and Capital Gains Tax 3. Annuities
3	15 March	4. Annuities payable m'thly 5. Housing Loans & Flat Rate Loans
4	22 March	6. Bonds
5	29 March	7. Unit Pricing Systems (Reading Topic) 8. Yields on funds.
6	5 April	10. Yield Curves. Public holiday Friday
2-week study break		
7	26 April	9. Project Appraisal. (NPV, IRR) (Reading Topic) Public holiday Monday
8	3 May	11. "No Arbitrage" Assumption and Forward Contracts
9	10 May	12. Bond Management
10	17 May	13. Immunisation
11	24 May	14. Stochastic Models
12	31 May	15. Options
13	7 June	

Due to the public holidays in weeks 6 and 7, the order of two topics has been reversed this year.

Changes to the timetable may occur and any alterations will be advised in lectures.

Unit Objectives

By the end of the unit you should be able to demonstrate competence in the range of techniques described in the unit notes and lectures. Ideally you will be able to demonstrate an understanding of the techniques rather than simply demonstrating the ability to rote learn formulae without understanding. You should also be able to demonstrate ethical behaviour by complying with examination rules and by not colluding on assessment tasks.

Prerequisites & Assumed Knowledge

If you do not satisfy the prerequisites and have not had the prerequisites waived then you should withdraw from this unit as soon as possible. If you do not, you will be automatically withdrawn from the unit, possibly after the HECS census date.

The prerequisite includes ACST101(Cr). Students will be assumed to be proficient with the entire maths of finance content of that unit. If necessary, you should carry out suitable revision of that material.

The prerequisite also includes MATH133(P) or MATH136(P), and the prerequisites for those units include certain levels of high school mathematics. While it is difficult to list all the mathematical

skills students will require for this unit, the following is a brief list of items students will require but often seem to forget. If necessary, you should revise these items.

- Integration by parts.
- Binomial Expansion: $(1+x)^n$
- Taylor series expansions for e^x and $\ln(1+x)$, and the ranges for which they converge.
- l'hôpital's Rule

The unit notes give some brief material on l'hôpital's Rule. For more information, consult almost any first year maths textbook.

While there is no formal Statistics prerequisite on this unit, there is a small amount of assumed knowledge of random variables in one topic. If you are studying STAT272 concurrently with ACST200, (or have previously passed STAT272) you should have no difficulties. If you are not in this situation, you should contact the lecturer to discover what statistical concepts you need to learn.

Students are assumed to be able to construct simple spreadsheets. While Excel is the spreadsheet package available in the library computing labs, students may use whichever package they choose.

ACST200 Web Site

To access this web site, go to http://online.mq.edu.au/pub/ACST200/

If you did not understand the above, you can obtain training on how to use a web browser by contacting the Information Technology Training Unit on Level 1 of the Library. If you can't access the site due to having forgotten your password, contact the Information Technology Customer Support Desk also on Level 1 of the Library.

Before logging in to this site, you should follow the link labelled "Technical Information" and read all the information there, including the "Information Technology Security Policy & Rules" and the "Information Technology Conditions Of Use Rules." This technical information mentions a number of "plugins" that may be required. Of those listed, in this unit you will only need Acrobat Reader.

If your home computer does not have internet access, you can access this web site from computers in the library.

This web site uses software called WebCT. If several of your units use this software, you might find it more convenient to go to http://online.mq.edu.au/student/ and use the "login" link on that page. This leads you to a page which lists all Macquarie University WebCT sites to which you have access.

ACSTINFO Web site

To access the site, go to: http://online.mq.edu.au/pub/ACSTINFO/

This site is used to distribute information to all students majoring in actuarial studies. The information supplied may include administrative information and job advertisements. You will retain access to this site during the vacation following the end of this semester.

It is to your advantage to ensure you read information on this web site regularly. You should not assume that information posted there will also be repeated in lectures.

When you login to this site, please read the section labelled "How to use this site." This contains useful information which will help you determine when there is new information on the site which you should read.

Tutorials

Tutorials will commence in the first week of lectures.

Please ignore the tute location that appears on the timetable you received when you enrolled. New tute lists are being prepared allocating you to one of four tutorial groups. The new lists will be available in the downloads section of the unit's web site around Wednesday of week 1.

Tutorial solutions will become available on the unit's web site at the end of the tutorial.

Weekly Assignments

Solutions to assignments will be available on the ACST200 web site at the start of the next week's teaching. It is recommended that you:

(a) Make a serious attempt at each assignment over the weekend.

(b) Bring your solutions to the first lecture in the following week and swap them with another student. (Try to swap with a different student each week so that you are exposed to a variety of styles.)

(c) Correct this other student's assignment using the model solutions and return them to that student at the Wednesday lecture along with any helpful comments you can offer. You can discuss any issues arising from this process at the Wednesday lecture, since the lecture material seldom uses the entire time available. Thursday

Do not waste your colleagues' time by submitting an assignment solution which you have transcribed from previous years' model solutions.

Textbooks

The prescribed reading is the "ACST200 Unit Notes", which most of you have already purchased from the University Co-Op Bookshop. The list of all relevant textbooks I am aware of is at:

http://www.actuary.mq.edu.au/unit_info/ACST200/textbooks.shtml

Grading

Macquarie University uses the grades HD, D, Cr, P, PC and F for grading the achievements of students in units of study. The meaning of each symbol is explained in section 10 of the Bachelor Degree Rules in the current Macquarie University Handbook of Undergraduate Studies.

The numerical marks resulting from assessment of your work in this unit will be used as an initial indicator of the quality of your learning and understanding. The use of these numerical marks is, however, only a starting point in determining the appropriate grade. In particular, note that the mark ranges mentioned on p40 of the 2004 Undergraduate Handbook are not the raw marks. To obtain a grade you must satisfy the qualitative definition of that grade. Once your grade has been determined, you are allocated a standardised mark in the appropriate range from p40 indicating your approximate position amongst students assigned that grade.

The following table gives an indication of the relative weighting of the assessment components:

Quizzes	10%
Examination	90%

When you work as a professional, whether as an actuary or in any other profession, if you misunderstand a concept you may provide incorrect advice to a client, possibly with severe financial consequences for your client and yourself. However, if you realise that you have no understanding

of a concept you would refrain from giving advice on it until you have filled the gaps in your knowledge. That is, misunderstandings are more dangerous than a lack of knowledge.

The grading philosophy and marking scales adopted in this unit reflect the above situation. While correct and relevant statements earn marks, errors which indicate serious misunderstandings result in the deduction of marks. If your answers reveal that your misunderstandings are very severe or numerous, you might earn a negative mark for a question.

Quizzes

There are five quizzes to complete, relating to the first 5 topics. Note that we sometimes cover 2 topics in a week, so sometimes you will need to complete 2 quizzes in a week. The quizzes are accessible on the ACST200 web site. They use the same system used in ACST101.

Roughly speaking, quizzes must be completed in the week following the topic. The exact deadlines are shown on the web site. With respect to the deadlines, please be aware of the department policy on use of computers, shown later in this document.

When completing the quizzes, you may refer to any notes, textbooks or other non-human resources, but you must not seek assistance from any humans or offer assistance to any other students. Your results for a quiz become available when the deadline for completing the quiz has passed. You should not discuss the quiz with anyone (even with fellow students who claim they have already submitted the assignment) until the deadline has passed. Note that a breach of any of these requirements constitutes a failure to satisfy one of the unit objectives and so would result in a fail grade being awarded.

Quizzes are not currently available for the later topics, partly due to some topics not being conducive to short answer questions, but mostly due to time constraints. If I do manage to write further questions during the semester, these may be made available as non-assessable practice sets. You are invited to submit plausible questions to the discussion area.

Exam

The exam will be a three-hour paper with ten minutes reading time.

Exam Rules

The University's examination rules apply to the conduct of the exam. These rules are set out under the heading "Rules governing student's conduct in examinations" on page 40 of the 2004 Handbook of Undergraduate Studies. Students are responsible for familiarising themselves with these rules.

Material in Exam

You may not bring any notes or dictionaries into the exam. The exam will include multiple choice questions. You should bring several 2B pencils and an eraser. You will be provided with a table of the normal distribution.

Calculators are allowed in the exam but a clear indication of the steps involved in every calculation must be shown. Calculators that have a text-retrieval capacity, whether or not they have a full alphabet on the keyboard, are not allowed. Calculators may be checked at the commencement of the exam, and the make/model may be recorded.

Communication devices, including but not restricted to mobile phones, text message receivers, pagers and wireless-equipped calculators, may not be brought into the class tests or exam. If a student is found to have brought such a device into the examination room, the argument that the device was turned off will NOT be regarded as an acceptable excuse.

Special Consideration

If the quality of your work in this unit is adversely affected by illness, accident or other form of unavoidable disruption, you should acquaint yourself with the special consideration provisions in Bachelor Degree Rules 7(3) and 9 which appear in the current year's Handbook of Undergraduate Studies.

Applications for special consideration in respect of a quiz must be made on the "Advice of Absence or other Circumstances" form. These are available from and should be submitted to the Student Enquiry Service on Level 1 of the Lincoln Building.

Applications in respect of the exam must be made on the "Request for Special Consideration" form. These forms are available from and should be submitted to the Academic Program Section on Level 4 of the Lincoln Building.

Applications based on medical grounds must be accompanied by the Professional Authority Form. Applications omitting this form, (such as those which only supply a doctor's certificate), will be ignored.

The application forms are also online at http://www.registrar.mq.edu.au/academic-index.htm

Exemptions – Information for those majoring in actuarial studies

The unit ACST200 corresponds to the professional subject 102. You require a grade of Credit or better in this unit to receive the exemption.

Spreadsheets

Many of the problems you encounter in this unit can also be solved using a spreadsheet. Using a spreadsheet to verify your solutions to tutorial exercises and assignment questions may improve your understanding. If you have a portable computer or organiser with a spreadsheet package, you may find it useful to bring it to tutorials.

Microsoft Excel is available in many computer laboratories on campus, but we do not advocate the use of any particular spreadsheet package. If you are considering buying a spreadsheet package, you might also like to consider free options such as Open Office, which can be downloaded from http://www.openoffice.org. The staff (and no doubt your fellow students) would appreciate any feedback you can give us of the ease of use of any free spreadsheet software.

Exam questions may ask you for a general description of how you would go about solving a problem if a spreadsheet was available, but since we don't mandate a particular package, we can't ask for details about precisely how to achieve some task in Excel. For example, we may ask questions requiring general answers like "I would enter the coupon rate in one cell and the yield in another. In a third cell I would calculate the price using the formula … . Then I would use the 'goal seek' tool, telling it to vary the number in the yield cell so as the make the number in the price cell \$120." But we couldn't ask you where in the Excel menus the "Goal Seek" tool is hidden. In fact this tool has different names in different packages, so your answer would be quite acceptable if you referred to "the solver", "the back-solver", or "solve for" rather than "Goal Seek".

If formulae are required, it is quite acceptable to state them in the normal mathematical notation such as $\frac{\sqrt{a}}{b}c^x$. You are not expected to write them in a "spreadsheet notation" such as SQRT(A1)*C1^D1/B1, since such details can also vary by package.

Questions?

We rarely use the full three hours of lectures and the unit web site contains a discussion facility. Rather than nominating consultation hours, which tend to result in the same question being asked by