MACQUARIE UNIVERSITY

FACULTY OF BUSINESS AND ECONOMICS

ACST101
Techniques and Elements of Finance

Semester 1, 2010

Department of Actuarial Studies

MACQUARIE UNIVERSITY
FACULTY OF BUSDINESS AND ECONOMICS
ACST101 UNIT GUIDE

Year and Semester: **Semester 1, 2010**

Unit convenor: **David Westcott**

Prerequisites **Nil**

Students in this unit should read this unit guide carefully at the start of semester. It contains important information about the unit. If anything in it is unclear, please consult one of the teaching staff in the unit.

ABOUT THIS UNIT

Credit Points: 3

Unit Description:

This unit provides an introduction to the pricing of financial instruments in the techniques section, and to the functions of the Australian financial system in the elements section. The principal components are the basic methods of financial mathematics and the structure of the financial system. In this unit students apply the mathematical concepts in valuing a range of financial instruments including investment accounts, promissory notes, mortgage loans, personal loans and bonds. They also learn about financial institutions (e.g. banks, insurance companies, superannuation funds), financial instruments (e.g. bills, bonds, shares) and financial markets. A background of HSC Mathematics or equivalent numerical competency is desirable.

Unit Rationale:

Students will gain skills in the pricing of financial instruments in the Techniques section and knowledge of financial institutions, instruments and markets in the Elements section. ACST101 is a prerequisite for further study in the areas of actuarial studies and finance.

TEACHING STAFF

The staff member involved in the teaching and unit co-ordination of this unit is

		Room	Telephone	Email
David Westcott	Unit Co-ordinator	E4A615	9850 8568	Use Mail link on ACST101 website

For ALL email use the Mail link on the ACST101 website. Click on Mail, then on Compose Message and send to **ACST101 Inquiries** which is at the top of the Browse for Recipients list.

Questions relating to the administration of the unit should be directed to the Unit Co-ordinator. Questions relating to the unit content should be directed to your tutor at your tutorial or by email to ACST101 Inquiries.

Consultation hours for the Unit Co-ordinator and the tutors will be shown on the ACST101 Blackboard website under the Announcements link.

CLASSES

There are 3 hours of face-to-face teaching per week consisting of 2 x 1 hour lectures and 1 x 1 hour tutorial.

Class times can be found at: http://www.timetables.mq.edu.au

Lectures

The **Techniques** lecture is held at the following time:

Wednesday 10 am in Macquarie Theatre	Wednesday 12 pm in Price Theatre
Thursday 3 pm in W5AT1	Thursday 7 pm in X5BT1

The **Elements** lecture is held at the following time:

Wednesday 1 pm in Price Theatre	Thursday 10 am in Macquarie Theatre
Thursday 4 pm in W5AT1	Thursday 8 pm in X5BT1

You should attend your allocated techniques lecture and elements lecture each week.

The lecture notes for both techniques lectures and elements lectures are available from the ACST101 website. A copy should be brought to each lecture.

Tutorials

Tutorials which are held weekly commence in the second week of the semester.

Tutorial attendance is compulsory.
Students must attend and fully participate in at least **9** tutorials.

Tutorial enrolment or change of tutorial can be made through eStudent in the first two weeks of the semester. **No tutorial changes are allowed after Week 2**.

To prepare for each weekly tutorial, print a copy of the **Tutorial Exercises** from the website and attempt the first few questions eg for the Week 2 tutorial you should attempt Q1 to Q4 of the Tutorial Exercises on Week 1.

Tutorial Room locations can be found on eStudent. The tutorial list will also be shown under the Announcements link of the ACST101 website on the Monday of the second week of classes. **You must attend your allocated tutorial**.

RECOMMENDED TEXTS

The textbooks are available as a package from the Macquarie University Co-op Bookshop.

Knox D M, Zima P and Brown R L, *Mathematics of Finance*, 2nd Edition, McGraw-Hill (1999)

Viney C, *Financial Institutions, Instruments and Markets*, 6th Edition, McGraw-Hill (2009) (Custom edition of selected chapters)

UNIT WEB PAGE

The web page for this unit can be found at http://learn.mq.edu.au

The Student IT Service Desk (C5C244) provides information technology support and assistance to students of Macquarie University.

The login address gives you access to all of your online units. Just click on the name of the unit you want to work on. When you want to change from one unit to another click on My Online Units at the top right of the screen.

If you do not attend a lecture, you should consult the Announcements section of the website to see what information, if any, you have missed.

If you wish to contact the unit co-ordinator, use the ACST101 website. Click on Mail, then on Compose Message and send to ACST101 Inquiries.

The following are available on the website:
1. Lecture notes and Revision Exercises for "Techniques".
2. Lecture notes and internet exercises for "Elements".
3. Tutorial Exercises and solutions.
4. Assignments.
5. Class Test solutions for the past two semesters and the current semester.
6. Final Examination specimen exam papers and solutions.

When moving around the website the path that you have followed is displayed below the ACST101 Techniques and Elements of Finance line. To move back to a previous page, click on the title of that page. In particular to move back to the opening page, click on Home Page.
An example is: Home Page > Tutorial Solutions > Tutorial Exercises on Week 1.
To close your connection click on Log out at the top right of the screen.

LEARNING OUTCOMES

The learning outcomes of this unit are summarised in the lecture notes. **Understanding of the concepts is required rather than memorisation of formulae**.

It is essential that you work steadily and consistently over the whole semester; in particular attend tutorials and keep up with the weekly assignments. You should revise the previous week's techniques lecture before you attend your weekly tutorial. Each topic builds on the previous one. **It is extremely difficult to catch up if you fall behind**.

The Academic Senate of the University has set the average workload as three hours total work per credit point per week. (ie 9 hours per week for ACST101). Total work includes time for private study and reading as well as attending classes and performing set tasks.

GRADUATE CAPABILITIES

In addition to the discipline-based learning objectives, all academic programs at Macquarie seek to develop the capabilities the University's graduates will need to develop to address the challenges, and to be effective, engaged participants in their world. This unit contributes to this by developing the following graduate capabilities:

1 Critical, Analytical and Integrative Thinking
2 Problem Solving and Research Capability

TEACHING AND LEARNING STRATEGY

This unit is taught via lectures and tutorials. Tutorial exercises will be provided for each tutorial so that you can practise applying the results developed in lectures.

Weekly online assignments will encourage you to revise the material regularly.

The week-by-week list of the topics is as follows:

Week Number	Week Beginning	Techniques	Elements	Class Test
1	22 February	Simple interest & simple discount	Information about Assignments	-
2	1 March	Compound interest	Overview	-
3	8 March	Compound interest	Banks and RBA	-
4	15 March	Annuities	Banks and RBA	-
5	22 March	Annuities	-	1
6	29 March	Annuities	Non-bank institutions	-
STUDY	5 April	STUDY	STUDY	
BREAK	12 April	BREAK	BREAK	
7	19 April	Mortgage loans	Non-bank institutions	-
8	26 April	Flat rate loans, NPV, IRR	-	2
9	3 May	Bonds & debentures	Government finances and instruments	-
10	10 May	Tax on bonds	Corporate finances and instruments	-
11	17 May	Varying annuities	Financial markets	-
12	24 May	Sinking funds and capitalised costs	-	3
13	31 May	Revision	-	-

In weeks where there is a Class Test:
The test is held in the Techniques lecture time;
The Techniques lecture will be held in the Elements lecture time;
There will be no Elements lecture.

RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING OUTCOMES

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

Weekly Assignments (11)	10%
Class Tests (3)	30%
Final Examination	60%

Assignments, Final Examination and Tutorial Attendance have minimum requirements.

Weekly Assignments

A satisfactory attempt by the due date is required for at least 8 assignments.

There are 11 weekly assignments, each mainly based upon a "techniques" topic. For each assignment you will use the website to obtain the questions and to enter your answers and obtain the full solutions.

Before you can access Assignment 1 due in Week 3 you must score 100% in the Unit Requirements Quiz **and** at least 80% in **both** the Maths Revision Exercises and the Practice Assignment. These preliminary quizzes are all due early in Week 2.

The marks for all 11 assignments are used to calculate the final assessment mark out of 10 based on assignments. **Assignments 10 and 11 are given triple weighting**.

Details of the computerised assignments including the due dates are given separately.

Class Tests (held in Techniques lecture time)

Test One	Wed. 24 March	10 am Mac. Th.	12pm Price Th.
(Week 5)	Thu. 25 March	3 pm W5AT1	7 pm X5BT1
Test Two	Wed. 28 April	10 am Mac. Th.	12pm Price Th.
(Week 8)	Thu. 29 April	3 pm W5AT1	7 pm X5BT1
Test Three	Wed. 26 May	10 am Mac. Th.	12pm Price Th.
(Week 12)	Thu. 27 May	3 pm W5AT1	7 pm X5BT1

The three Class Tests each count 10% of the final assessment.
Full details of the Class Tests will be given on the website under Announcements.
Students must attend at the lecture time for which they are enrolled.
The formula sheet will be displayed on the overhead projector.
Tests will be returned to students at the tutorial in the week following the test.
The procedure for requesting Special Consideration is detailed in a later section.

Class Tests will be based on the following lecture topics from page 4:

	Techniques	Elements
Test 1	Weeks 1,2,3	Weeks 2,3,4
Test 2	Weeks 4,5,6	Weeks 4,6,7
Test 3	Weeks 7,8,9,10	Weeks 9,10,11

Attendance

Tutorial attendance is compulsory.
Students must attend and fully participate in at least **9** tutorials.

Final Examination

To pass this unit a satisfactory performance is required in the final examination.

The final examination will contain questions from all techniques and all elements lectures. It will be a three-hour written paper with ten minutes reading time.
The University examination period is between Tue. 8 June and Fri. 25 June 2010.

Part A: Forty-five multiple choice questions - twenty-two based on "techniques" and twenty-three based on "elements". Marked out of 45.
Part B: Three questions requiring application of "techniques" to the solution of practical problems. Marked out of 30.

The list of basic formulae shown at the end of this Unit Guide will be supplied.

The multiple choice questions are answered by marking (in pencil) a computer readable answer sheet. Bring TWO 2B Pencils, and an eraser, into the examination with you.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in Final form approximately four weeks before the commencement of the examinations.
http://www.timetables.mq.edu.au/exam

The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. Information about unavoidable disruption and the special consideration process is given below.

If a Supplementary Examination is granted as a result of the Special Consideration process the examination will be scheduled after the conclusion of the official examination period.

You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is the final day of the official examination period.

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 University Special Consideration Policy
http://www.mq.edu.au/policy/docs/special_consideration/policy.html

All requests for special consideration should be made in writing to the Student Enquiry Service and include full supporting documentation.

The Application Form and the Professional Authority Form which is required if you wish to request special consideration due to illness can be found at http://www.registrar.mq.edu.au/Forms/APSCons.pdf

Requests for special consideration for a Class Test should be made within 1 week of the test. Also email ACST101 Inquiries indicating that you have submitted the form.

Requests for special consideration for the Final Examination should be made within 5 working days after the date of the examination or the day after the end of the examination period which ever is sooner.

Special Consideration will NOT be granted where a student has unsatisfactory class test marks, unsatisfactory assignment marks or unsatisfactory tutorial attendance. The exam content and/or assessment standards of supplementary examinations will be made more stringent to allow for the extra time available for prior study.

Further details about Special Consideration and Supplementary Examinations will be posted on the ACST101 website under Announcements in the last week of the semester.

CALCULATORS

Calculators will be allowed in the class tests and the final examination but a clear indication of the steps involved in every calculation must be shown.

Calculators that have a text-retrieval capacity are not allowed.
Calculators that have a full alphabet on the keyboard are not allowed.

You will need a calculator which has x^y or ^, 1/x and log or ln functions, and a memory.

ACADEMIC HONESTY (PLAGIARISM)

The University defines plagiarism in its rules: "Plagiarism involves using the work of another person and presenting it as one's own." Plagiarism is a serious breach of the University's rules and carries significant penalties. You must read the University's practices and procedures on plagiarism. These can be found in the *Handbook of Undergraduate Studies* or on the web at: http://www.student.mq.edu.au/plagiarism

The policies and procedures explain what plagiarism is, how to avoid it, the procedures that will be taken in cases of suspected plagiarism, and the penalties if you are found guilty. Penalties may include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

STUDENT SUPPORT SERVICES

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at http://www.student.mq.edu.au

BESS E4B106 (The Faculty of **B**usiness and **E**conomics **S**tudent **S**ervices)
http://businessandeconomics.mq.edu.au/for/new_and_current_students/undergraduate

Numeracy Centre C5A225
Students who lack the knowledge of mathematics needed for ACST101 are encouraged to seek the help of the Centre. Consultations are free of charge. Staff will recommend work to fill gaps in background knowledge of mathematics.

TECHNIQUES TOPICS AND TEXTBOOK REFERENCES

Textbook

Knox D M, Zima P and Brown R L, *Mathematics of Finance*, 2nd edition, McGraw-Hill (1999). The answers to the even-numbered exercises start on page 297, the answers to the odd-numbered exercises can be found on the website on the Tutorial Solutions page.

Week	Techniques Topic	Textbook Reference
1	Simple Interest and Simple Discount	Chapter 1 (exclude 1.4 and 1.5)
2	Compound Interest	Chapter 2, 2.1 to 2.3 (exclude 2.4)
3	Compound Interest, Logarithms and Linear Interpolation	Chapter 2, 2.5 to 2.8 Appendices A & C
4	Valuation of Annuities	Chapter 3, 3.1 to 3.3 Chapter 4, Section 4.2
5	Valuation of Annuities	Chapter 3, 3.4 to 3.7 Chapter 4, 4.3 and 4.5
6	Valuation of Annuities	Chapter 4, Section 4.4 Chapter 5 (exclude 5.4)
7	Mortgage Loans	Chapter 6, 6.1 to 6.4
8	Flat Rate Loans	Chapter 6, Section 6.6 (exclude Rule of 78)
	Net Present Value and Internal Rate of Return	Chapter 8, 8.1 and 8.2
9	Bonds and Debentures	Chapter 7, 7.1 to 7.4
10	Tax on Bonds	Chapter 7, 7.5 and 7.7 (exclude section 7.6 and pages 207 - 211)
11	Varying Annuities (The approach taken will be different to that of the textbook)	Chapter 4, Section 4.6
12	Sinking Funds and Capitalised Costs	Sections 6.5, 7.8 and 8.3

Notes

1. Other sections of the textbook not referred to above are outside the scope of this unit and are NOT examinable.

2. The "Part A" exercises in the textbook are ideal for practice in applying the "techniques" to solve financial problems. Some "Part B" exercises which involve mathematical proofs are beyond the scope of this unit.

ELEMENTS TOPICS AND TEXTBOOK REFERENCES

Textbook

Viney C, *Financial Institutions, Instruments and Markets*, 6th Edition, McGraw-Hill (2009)

References

Crane R, Fraser I and Martin T, *Financial Institutions, Markets and Instruments*, 5th edition, LBC Information Services (2001)

Valentine T, Ford G and Copp R, *Financial Markets and Institutions in Australia*, Prentice Hall (2003)

Hunt B and Terry C, *Financial Institutions and Markets*, 4th edition, Thomson (2005)

In addition the *Reserve Bank of Australia Bulletin* contains articles of current interest and statistical information. The "elements" tutorial exercises will contain a link to the RBA website which contains much of this information.

Topics and Recommended Reading from Textbook

Topic 1	**Overview of the Financial System**
Week 2	Chapter 1
Topic 2	**Banks and RBA**
Week 3	Chapter 2 (2.1 to 2.4)
Week 4	Chapter 2 (2.5 to 2.8)
Topic 3	**Non-Bank Institutions**
Week 6	Chapter 3 (3.5 to 3.7)
Week 7	Chapter 3 (3.1 to 3.4, 3.8 to 3.11) (exclude 3.12)
Topic 4	**Government Finances and Instruments**
Week 9	Chapter 12
Topic 5	**Corporate Finances and Instruments**
Week 10	Chapter 5 (5.3, 5.5 only), 9 (9.3, 9.5, 9.6 only) and 10 (10.3, 10.5 only)
Topic 6	**Financial Markets**
Week 11	Chapter 18 (18.3 to 18.5), Chapter 19

ERRATA TO KNOX, ZIMA & BROWN, *Mathematics of Finance*, 2nd edition

Page 7	Example 2	Answer should be \$8.91 not \$6.51
Page 10	Example 4	The bill was purchased on 2 May not 3 May
Page 52	Solution Example 2	In the line beginning *Step 1*, 1000 should be 10000
Page 64	Example 2	The interest rate is $j_4 = 12\%$ not $j_4 = 3\%$
Page 227	Formula for i	Numerator should be $F_0 + F_1 + F_2 + F_3 + ... + F_n$
Page 297	Exercise 1.6 Q4	Answer should be \$1025.28 not \$810.66
Page 299	Exercise 3.6 A Q2	Answer should be \$4291.72 not \$2262.56
Page 300	Exercise 6.5 A Q2	Answer should be sinking fund by \$302.25 not \$1090.80

MACQUARIE UNIVERSITY

ACST101 : Techniques and Elements of Finance

FORMULAE FOR USE IN EXAMINATIONS

1 Future value at simple interest

$$S = P(1 + rt)$$

2 Present value at simple interest

$$P = S(1 + rt)^{-1}$$

3 Present value at simple discount

$$P = S(1 - dt)$$

4 Future value at compound interest

$$S = P(1 + i)^n$$

5 Present value at compound interest

$$P = S(1 + i)^{-n}$$

6 Future value of n payments of R at compound rate i

$$S = Rs_{\overline{n}|}^{i} = R\left[\frac{(1 + i)^n - 1}{i}\right]$$

7 Present value of n payments of R at compound rate i

$$P = Ra_{\overline{n}|}^{i} = R\left[\frac{1 - (1+i)^{-n}}{i}\right]$$

8 Approximation to bond or debenture yield for given price

$$i \approx \frac{I + \frac{1}{n}(C - P)}{\frac{1}{2}(C + P)}$$

9 Present value of an annuity with payments increasing in arithmetic progression

$$P = R[(1 + i)^{-1} + 2(1 + i)^{-2} + ... + n(1 + i)^{-n}]$$

$$= R\left[\frac{(1+i)a_{\overline{n}|}^{i} - n(1+i)^{-n}}{i}\right]$$

10 Future value of an annuity with payments increasing in arithmetic progression

$$S = R\left[\frac{(1+i)s_{\overline{n}|}^{i} - n}{i}\right]$$

11 Present value of an annuity with payments increasing in geometric progression

$$P = R[(1 + i)^{-1} + (1 + r)(1 + i)^{-2} + ... + (1 + r)^{n-1}(1 + i)^{-n}]$$

$$= R(1+r)^{-1}a_{\overline{n}|}^{j} \text{ where } j = \frac{i - r}{1 + r}$$

12 Future value of an annuity with payments increasing in geometric progression

$$S = R(1+r)^{n-1}s_{\overline{n}|}^{j} \text{ where } j = \frac{i - r}{1 + r}$$