

**ACST101 : TECHNIQUES AND ELEMENTS OF FINANCE**

**UNIT OUTLINE : Semester 1, 2004**

**Teaching Staff Involved in the Unit**

The staff member involved in the teaching of this unit is

	Room	Telephone	Email
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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. Consultation hours for the Unit Co-ordinator and the tutors will be shown on the ACST101 website. Instructions for accessing the ACST101 website are on page 3.

**Unit Prerequisites**

There are no prerequisites or corequisites, however a background of HSC mathematics or equivalent numerical competency is desirable.

**Unit Description and Objectives**

**Techniques**

The basic methods of financial mathematics (present value and accumulated value) are applied in valuing a range of financial transactions including the purchase of promissory notes, bank bills, bonds and debentures, the analysis of mortgage loans, personal loans and investment proposals.

**Elements**

The basic functions of the Australian financial system, the financial institutions (banks, insurance companies, finance companies, credit unions, etc.), the financial instruments (bills, bonds, debentures, shares, etc.) and the financial markets are discussed.

**Learning Strategy**

**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. It is extremely difficult to catch up if you fall behind. Each topic builds on the previous one.

**Understanding of the concepts is required rather than memorisation of formulae.** Success in this unit requires logical thinking, reasoning and problem solving skills.

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.

## Lectures

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

Day	Time	Location
Wednesday	10 am	Macquarie Theatre
Thursday	7 pm	Macquarie Theatre

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

Day	Time	Location
Thursday	10 am	Macquarie Theatre
Thursday	8 pm	Macquarie Theatre

You should attend one techniques lecture and one elements lecture each week.

Detailed lecture notes for techniques and a summary of elements lectures are available from the ACST101 website.

## Tutorials

To **prepare for each weekly tutorial**, attempt at least the first few questions from the **Revision Exercises** for the previous week's Techniques lecture eg for the Week 2 tutorial you should attempt the Revision Exercises on Week 1. Revision Exercises are accessed from the website in the same way as the assignments. (see page 9)

At each tutorial, **tutorial exercises** will be provided so that you can practise applying the results developed in lectures. Your tutor is available to help you sort out the things that are not immediately obvious or prove to be a bit tricky.

**Tutorials will commence in the second week of the semester.**

**Tutorial Room** locations are shown on your enrolment printout. The tutorial list will also be shown under the Lecture Announcements icon of the ACST101 website on the Monday of the second week of classes. **You must attend your allocated tutorial.**

To **enrol in a tutorial** or to change your tutorial enrolment you must attend a computerised change of program session held by the University in E7B in the **first two weeks** of the semester at the times shown on notices at the Student Centre. No forms are required to change a tutorial. **No tutorial changes are allowed after Week 2.**

**Tutorial attendance** is not compulsory but students are expected to attend most tutorials. Unsatisfactory tutorial attendance will be taken into account when grades for borderline students are determined and also when decisions are made regarding special consideration.

## Textbooks

The textbooks for the unit are

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

Viney C, *McGrath's Financial Institutions, Instruments and Markets*, 4th Edition, McGraw-Hill (2003) (Custom edition of selected chapters)

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

## ACST101 Website

The ACST101 website can be accessed using a web browser such as Netscape 4.76 or 6.2 or Internet Explorer 5.0 or above. See under the Technical Info icon on the ACST101 website for more details.

If you are not already familiar with using a web browser you can get assistance through the Library Information Technology Help Desk (level 1).

You may access the ACST101 website from your home or work computer if you are connected to the internet. You can also access it from the student laboratories located in E7B146 or C5C level 2 and from computers in the library.

The login address is <http://online.mq.edu.au>

Then click on the login button.

You will be required to enter a username and password.

Your standard Macquarie student username is of the form "gffff123", where "g" is the first letter of your given name, "ffff" are the first four letters of your family name (or as many as possible if less than four) and "123" are three digits. The University will advise you by letter of your standard Macquarie student username and your initial password. If you have not received this letter, contact the Library IT Help Desk. You can look up your MQID username and password at <http://www.lib.mq.edu.au/general/itsupport/mqid.html>. If you have changed your password in another unit's website this semester or in a previous semester, that change will apply for ACST101. Passwords are case sensitive.

The above 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 MYWEBCT at the top right of the screen.

If you do not attend a lecture or tutorial, (or if you miss the first few minutes, which is the time these announcements are often made), you should consult the Lecture Announcements section of the website to see what information, if any, you have missed.

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 screen click on the title of that screen. In particular to move to the opening screen click on Home.

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

The following are available on the website:

1. Lecture notes and self-test exercises for "Techniques".
2. Lecture summary, self-test exercises and internet exercises for "Elements".
3. Tutorial Exercise solutions.
4. Assignments and Revision Exercises.
5. Class Test solutions for the past two semesters and the current semester.
6. Final Examination Part A solutions for the past four semesters.
7. Final Examination Part B specimen multiple choice paper and solutions.

## 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 Rule 10 of the Bachelor Degree Rules on page 88 of the 2004 Undergraduate Studies Handbook. The standardised mark for each grade is in the Grades section on page 40 of the Handbook.

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 marks is, however, only a starting point in determining the appropriate grade. Grading is a question of quality, not quantity in terms of the number of marks accumulated.

## Assessment

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

Class Tests (3)	20%
Weekly Assignments (11)	10%
Final Examination	70%

## Class Tests

There are three class tests scheduled for the following dates in Weeks 5, 8 and 12.

Test One	Thursday 1 April	10 am	Macquarie Theatre
	Thursday 1 April	7 pm	Macquarie Theatre
Test Two	Thursday 6 May	10 am	Macquarie Theatre
	Thursday 6 May	7 pm	Macquarie Theatre
Test Three	Thursday 3 June	10 am	Macquarie Theatre
	Thursday 3 June	7 pm	Macquarie Theatre

The topics to be examined in each test are shown on page 6.

Students must attend at the lecture time for which they are enrolled.

Tests will be returned to students at the tutorial in the week following the test.

Any alterations to the dates will be advised in lectures and via the ACST101 website.

## Final Examination

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

The final examination will be a three-hour written paper with ten minutes reading time. The paper will be in two parts with Part A marked out of 30 and Part B out of 45.

Part A: Three questions requiring application of "techniques" to the solution of practical problems.

Part B: Forty-five multiple choice questions - twenty-two based on "techniques" and twenty-three based on "elements".

You will be supplied with a list of basic formulae for use in the exam. The list is shown at the end of this Unit Outline.

You will have to answer the multiple choice questions by marking (in pencil) a computer-readable answer sheet. It is recommended that you take **TWO 2B Pencils**, and an eraser, into the examination with you.

## Weekly Assignments

**You are required to submit a satisfactory attempt to at least eight assignments to be eligible to pass the unit.**

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

To access Assignment 1 you must score at least 70% in **both** the Maths Revision Exercises and the Practice Assignment. The former will give you practice in the types of algebraic operations required in ACST101.

Assignments 10 and 11 will be given triple weighting when calculating the component of the final assessment based on the assignments. Full details of the computerised assignments are given later in this Unit Outline.

## 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 Unavoidable Disruption section on page 37 of the 2004 Undergraduate Studies Handbook and the Special Consideration section on page 40 of the Handbook.

**All requests for special consideration should be made in writing to the Registrar's Office and include full supporting documentation.** Notification of absence from a Class Test should be made within 2 weeks of the test. Requests for special consideration for the final examination should be made by the day after the end of the examination period. The Professional Authority Form which is required if you wish to request special consideration for the final examination due to illness can be found at <http://www.reg.mq.edu.au/Forms/APSCons.pdf>

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.

## 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  $x^y$ ,  $1/x$  and  $\log$  or  $\ln$  functions, and a memory.

## 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.

Students may consult with the Centre's staff who will recommend what work they should do to fill the gaps in their background knowledge of mathematics.

## Unit Timetable

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

Any alterations will be advised in lectures and via the ACST101 website.

- Class Tests will be based on the following lecture topics:

	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

- At each Class Test, the formula sheet will be displayed on the overhead projector and normal examination rules will apply - see page 40 of the 2004 Undergraduate Studies Handbook. Students are responsible for familiarising themselves with these rules prior to the class tests.
- In weeks where there is a Class Test the Thursday evening techniques lecture will be held at 8pm instead of the normal time of 7pm. The Class Test will be at 7pm.

## 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 under the Tutorial Solutions icon.

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  Net Present Value and Internal Rate of Return	Chapter 6, Section 6.6 (exclude Rule of 78) 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, but some of the "Part B" exercises which involve mathematical proofs are beyond the scope of this unit.

## Elements Topics and Textbook References

### Textbook

Viney C, *McGrath's Financial Institutions, Instruments and Markets*, 4th Edition, McGraw-Hill (2003)

### References

The following contain material similar to that of the textbook.

Andrews P and Lynch D, *Financial Markets*, Oxford University Press (1994)

Hunt B and Terry C, *Financial Institutions and Markets*, 2nd edition, Nelson (1997)

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

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 (exclude 1.7)

#### Topic 2 Banks and RBA

Week 3 Chapter 2 (2.1 to 2.5)

Week 4 Chapter 2 (2.6)

#### Topic 3 Non-Bank Institutions

Week 6 Chapter 3 (3.1, 3.3 to 3.5)

Week 7 Chapter 3 (3.2, 3.6 to 3.9) (exclude 3.10)

#### Topic 4 Government Finances and Instruments

Week 9 Chapter 12

#### Topic 5 Corporate Finances and Instruments

Week 10 Chapter 5 (5.4, 5.6 only), 9 (9.4, 9.6, 9.7 only) and 10 (10.4, 10.6 only)

#### Topic 6 Financial Markets

Week 11 Chapter 18

### ERRATA to Knox, Zima & Brown *Mathematics of Finance* second 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 <i>Step 1</i> , 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 $F_0 + F_1 + F_2 + F_3 + \dots + F_n$
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



**ACST101 : TECHNIQUES AND ELEMENTS OF FINANCE**

**ASSIGNMENTS; REVISION EXERCISES**

This is a brief outline of how to complete your weekly assignments in ACST101 Techniques and Elements of Finance. The revision exercises are accessed in a similar manner.

**You are required to submit a satisfactory attempt to at least eight assignments to be eligible to pass the unit.**

**Overview** There are eleven assignments to be completed, each of which is based on a Techniques topic; e.g. Assignment 1 is based on the first Techniques topic - Simple Interest and Simple Discount.

You will use the ACST101 website to get your copy of each assignment, and subsequently enter your answers for marking. (Instructions for accessing the ACST101 website are on page 3.)

Your version of each assignment will be personalised - it will be different to that of each other student in ACST101. Your version will have the same number of problems as everyone else's, and each problem in your version will be of the same TYPE as the corresponding problem in everyone else's, BUT the numerical values (like monetary amounts, interest rates, dates, etc.) in your version will be different to those in everyone else's.

**What do you have to do to complete an assignment?**

When you have logged in to the ACST101 website, **click the left mouse button on the icon for Assignments**. The next screen gives you information about the availability of each assignment and the number of attempts that you are allowed. You are allowed 1 attempt at each assignment except the Practice Assignment for which you are allowed 3 attempts.

When you **click on the name of the assignment**, general information about the assignment will appear. When you click **Begin quiz** the assignment questions will appear on your screen. To scroll up or down through the questions click on the ▲ or ▼ arrows which appear on the screen. To **print** an assignment place the cursor in the frame containing the assignment questions and click the **right** mouse button. In Netscape the frame that appears on the screen contains an option to Open Frame in New Window. If you click on this you can then use the browser Print button to print the assignment. Close the window by clicking the  in the top right hand corner of the window. In Internet Explorer the frame that appears gives an option to Print. To exit from the assignment click on Home. Do NOT click on the Finish button at this stage. To close your connection click on LOGOUT at the top right of the screen.

When you have worked out the answers to your assignment questions (which may be several days later), login, click on Assignments then on the name of the appropriate assignment as before. The **answer** for Question 1 is **entered** in the answer box at the end of Question 1. Click the cursor into the answer box then type in the answer. Then when you have checked that the answer was typed in correctly click the Save Answer box. Repeat this for each subsequent question, scrolling between questions as indicated in the previous paragraph or by using the Tab key. When all answers have been entered and Save Answer has been clicked for each question click on the Finish button so that your assignment can be marked.

When your assignment has been marked click on the View Results button. A list of your answer and the correct answer is given for each question and an overall mark is given for the assignment.

**Solutions** to each question will appear each Thursday after answers can no longer be entered. To view the solutions, click on the Completed hyperlink on the right hand side of the Quiz page. On the next page click on 1 under Number.

To move back to a previous screen click the appropriate title in the path below the ACST101 Techniques and Elements of Finance line. To close your connection click on LOGOUT at the top right of the screen.

### **Revision Exercises**

For each techniques lecture there is a set of revision exercises. You should attempt these before completing the corresponding assignment. The revision exercises do not count towards the final assessment but are part of the practice required to reinforce the concepts. You are allowed 3 attempts. They are accessed in the same way and from the same webpage as the assignments.

**Maths Revision Exercises** (This assignment should only take about 20 minutes to complete)

**You must score at least 70% in the Maths Revision Exercises to have access to the Practice Assignment.** If you score less than 70% make another attempt. The Maths Revision Exercises will give you practice in the types of algebraic operations required for ACST101. This is important if you are unsure about your maths or haven't done any maths for a long time. Students who have access to the facilities at the University may consult the Numeracy Centre C5A225.

**Practice Assignment** (This assignment should only take about 20 minutes to complete)

**You must score at least 70% in the Practice Assignment to have access to Assignment 1.** If you score less than 70% make another attempt. The Practice Assignment, which does not count towards the final assessment, tests calculator and basic algebra skills.

### **Assignment Availability Dates**

Answers to the assignments should be entered by 5 minutes to midnight on the following dates. Answers will be accepted for a further 24 hours after the due date but no special allowance will be made if students have computer problems during that time. Deadlines will not be extended.

Assignment	Due Date	Assignment	Due Date
Maths Rev.	Tue 9 March		
Practice	Tue 9 March	6	Tue 4 May
1	Tue 16 March	7	Tue 11 May
2	Tue 23 March	8	Tue 18 May
3	Tue 30 March	9	Tue 25 May
4	Tue 6 April	10	Tue 1 June
5	Tue 27 April	11	Thu 10 June

There is an assignment due on the Tuesday of each teaching week of the semester from Week 2 onwards. (Assignment 11 is due on the Thursday of the last teaching week.) No assignments are due in the mid-semester break.

### **Confidentiality**

You should read the Confidentiality section under the Technical Info icon on the main page of the ACST101 website. It sets out the types of information collected about student use of the site.

## Spreadsheets

Students enrolling in ACST101 are not required to use a computer spreadsheet. However some students will have learnt to use a spreadsheet in 100-level COMP units or in other studies. Spreadsheets can be used to perform ACST101 calculations and the following notes may be useful to students who wish to extend their learning.

There are several spreadsheet packages (e.g. Lotus 123, Excel) and students may have access to these on home computers. The spreadsheet available to ACST101 students on the computer network is Microsoft Excel.

### Excel Commands

The Help topics have a financial functions category.

Among the functions that are of use in ACST101 are:

FV( $i,n,-R,-P,0$ )	which calculates $Rs \frac{i}{n} + P(1+i)^n$
PV( $i,n,-I,-C,0$ )	which calculates $Ia \frac{i}{n} + C(1+i)^{-n}$
RATE( $n,-I,P,-C,0$ )	which calculates the value of $i$ for which $P = Ia \frac{i}{n} + C(1+i)^{-n}$
NPER( $i,-R,L,0,0$ )	which calculates the value of $n$ for which $L = Ra \frac{i}{n}$
PMT( $i,n,L,0,0$ )	which calculates the value of $R$ for which $L = Ra \frac{i}{n}$

Some of the parameters in the above expressions have negative signs. The convention is adopted that payments out of your pocket should have a negative sign and money coming in should have a positive sign.

The last entry in the above commands is 0 or 1. The indicator 0 means that the annuity payments are at the end of each period or (in arrear) and the indicator 1 means that the annuity payments are at the start of each period or (in advance).

NPV( $i,A1:A5$ ) which calculates the net present value at rate  $i$  of the set of cash flows in cells say A1,A2,...,A5 assuming A1 occurs at the end of the first time period. If A1 occurs at the start of the first time period, it must be added separately.

IRR(A1:A5,Guess) which calculates the internal rate of return of the cash flows in say A1,A2,...,A5. Guess is a rough estimate of the IRR. The numerical value of A1 is usually negative.

Another useful function is the **Solver** function in the Tools menu. As an example you might use the spreadsheet to set up a loan repayment schedule (studied in Week 7) for a given loan but using an estimate of the instalment. The Solver function allows you to find the instalment which will make the loan outstanding at the end of the term equal to zero.