



AUSTRALIAN  
SCHOOL OF BUSINESS™

THE UNIVERSITY OF NEW SOUTH WALES

**Information for Undergraduate Students**

**Actuarial Studies Programs**

**2008**

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## INTRODUCTION

This brochure is designed to outline the possible ways of studying for an actuarial career at UNSW in the Faculty of Commerce and Economics. One of the major strengths of the UNSW Actuarial Studies program is the wide diversity of Course offerings available and the resulting diversity of potential career prospects available to commerce graduates with a strong quantitative background provided by the actuarial studies major (Plan) at UNSW.

Most students wishing to complete the actuarial studies major (Plan) will aim to obtain accreditation for as many professional actuarial Courses as possible. The Actuarial Courses at UNSW, along with Courses in Accounting, Economics and Finance, cover all of the Part I professional examinations of The Institute of Actuaries of Australia. Part II Courses are available in both Honours and Masters level Courses. Part II Courses can also be completed in the Actuarial Studies Coop Program and in Combined degree programs such as the B.Com / B. Sc.

It is possible to complete a double major (Plan) in Actuarial Studies and any of the other disciplinary streams in the Bachelor of Commerce at UNSW. These include Accounting, Business Strategy and Economic Management, Business Economics, Business Statistics, Economic History, Finance, Financial Economics, Business Law and Taxation, Human Resource Management, Industrial Relations, Information Systems, Information Management, International Business, Marketing and Modern Languages.

In order to complete all of the UNSW Courses corresponding to the Part I professional Courses of the Institute of Actuaries of Australia it may be necessary to complete additional voluntary Courses if students wish to also satisfy B.Com requirements for a double major (Plan). Permission to include additional voluntary Courses is not automatic and depends on student performance and ability.

An Actuarial Studies major (Plan) can be combined with a minor in the other disciplinary areas in the Faculty of Commerce and Economics. Completion of a minor allows a broader selection of Courses in the B. Com., something that the employers of actuarial graduates value highly.

There is a mathematics entry requirement for The Institute of Actuaries of Australia. Students are normally expected to have completed Extension 2 Mathematics or equivalent at High School and obtained a high result. Students are also required to complete a program in first year undergraduate mathematics courses or equivalent. The courses Mathematics for Actuarial Studies and Finance 1A (MATH1151) and Mathematics for Actuarial Studies and Finance 1B (MATH1251) are recommended in Year 1.

It is important to select a study program allowing for your future career aspirations as early as possible so that the necessary options can be included in Year 1. Students should seek academic advice if they are uncertain about which options are best for them before they enrol.

Michael Sherris  
Professor of Actuarial Studies

## ACTUARIAL STUDIES

Actuarial Studies is a broadly based commerce discipline that involves the study of mathematics, statistics, accounting, economics, finance, and their application to long term financial management particularly in life insurance, general insurance, health insurance, and superannuation as well as in other financial services such as funds management and banking.

It includes the study of models used in insurance and superannuation to quantify and manage risks such as survival, sickness, retirement, accident, fire, flood, and fluctuations in asset values. Actuarial studies focuses on the actuarial principles involved in the pricing, risk assessment, investment, financial management and the financial soundness of the obligations of insurance companies, benefit plans and other financial security systems.

The Actuarial Courses are quantitative and intellectually demanding. They require a very strong ability and interest in mathematics and statistics and their applications to business. Success as a professional actuary also requires problem solving skills, reasoning, well-rounded business skills and an ability to communicate complex ideas in simple terms.

The profession of Actuary is one of the oldest in the financial world. It is highly regarded and requires the completion of, or exemption from, professional examinations. Fellows of The Institute of Actuaries of Australia, the Institute of Actuaries or Faculty of Actuaries (UK), or the Society of Actuaries (North America) can practice as actuaries in Australia.

*If you are serious about obtaining professional recognition for your university studies, then you need to have a strong maths background. This means a good result in Mathematics Extension 2 or very high results in Mathematics Extension 1 or equivalent mathematics results. You must be prepared to work hard – you should achieve at least an average mark of 70% in your university studies.*

*A NSW UAI of 97 or more or equivalent is usually a good indicator of reasonable prospects of success in obtaining exemptions from the actuarial profession subjects.*

To qualify as an actuary in Australia requires the completion of, or exemption from, subjects in the professional syllabus of the Institute of Actuaries of Australia.

Qualification as a Fellow of The Institute of Actuaries of Australia (F.I.A.A.) requires the completion of subjects in Part I, II, and III of the professional examinations.

Qualification as an Associate of The Institute of Actuaries in Australia (A.I.A.A.) is attained on completion of the subjects in Part I & II.

Part I is covered by the relevant courses in the actuarial disciplinary stream of the Bachelor of Commerce. Part II is studied after graduating, in Year 4 of a combined degree, in an honours year or at postgraduate level, and is made up of courses that cover actuarial principles and actuarial practice.

Part III consists of subjects completed by distance education through The Institute of Actuaries of Australia usually on a part time basis after completing the Part I and Part II subjects. Students select these subjects from practice areas including Investment Management and Finance, Life Insurance, General Insurance and Superannuation.

The F.I.A.A. is recognised internationally by local actuarial societies in Europe, North America, Hong Kong, Singapore, Malaysia, New Zealand and Japan.

## COURSES REQUIRED FOR PROFESSIONAL RECOGNITION

Below is a brief outline of the actuarial professional Part I subjects and the corresponding UNSW Courses that have to be completed at Credit or better grade to obtain exemptions from the professional examinations.

<u>Subject No.</u>	<u>Corresponding UNSW Course (s)</u>
CT1 Financial Mathematics	ACTL2001 Financial Mathematics
CT2 Finance and Financial Reporting	FINS1613 Business Finance and ACCT1501 Accounting 1A and ACCT1511 Accounting 1B
CT3 Statistical Modeling	ACTL2002 Probability and Statistics for Actuaries or MATH2801 Theory of Statistics and MATH2831 Linear Models or MATH2901 Higher Theory of Statistics and MATH2931 Higher Linear Models
CT4 Models	ACTL2003 Stochastic Models for Actuarial Applications and ACTL3001 Actuarial Statistics
CT5 Contingencies	ACTL3002 Life Insurance and Superannuation Models
CT6 Statistical Methods	ACTL2003 Stochastic Models for Actuarial Applications and ACTL3003 Insurance Risk Models
CT7	ECON1101 Microeconomics and ECON1102 Macroeconomics
CT8 Financial Economics	ACTL3004 Financial Economics for Insurance and Superannuation
Part II	ACTL4001 Actuarial Theory and Practice A & ACTL4002 Actuarial Theory and Practice B

### **Note:**

#### **For students completing the actuarial major:**

To be recommended for exemption from the Institute subject CT4 Models, UNSW students will need to gain a Credit average in ACTL2003 Stochastic Modelling for Actuaries (1/3 of grade) and ACTL3001 Actuarial Statistics (2/3's of grade).

To be recommended for an exemption from the Institute subject CT6 Statistical Methods UNSW students will need to gain a Credit average in ACTL2003 Stochastic Modelling for Actuaries (1/3 of grade) and ACTL3003 Insurance Risk Models (2/3's of grade).

For CT3, CT1, CT5, CT7 CT2, and CT8 existing course requirements for a Credit or higher grade in the corresponding UNSW courses in the Table.

An average mark of 75% or higher will apply for exemptions from the Part II subjects for ACTL4001 Actuarial Theory and Practice A and ACTL4002 Actuarial Theory and Practice B.

MATH2801 Theory of Statistics and MATH2831 Linear Models cover the syllabus for Institute/Faculty CT3 Statistical Modeling and satisfy exemption requirements of The Institute of Actuaries of Australia. Science/Mathematics students completing the actuarial Courses at UNSW will normally study these Courses in place of ACTL2002.

Students at UNSW will normally complete ECON2101 Microeconomics 2. This Course provides the foundations for Year 3 Insurance and Financial Economics topics.

Institute/Faculty Subject CT2 Finance and Financial Reporting covers topics in Corporate Finance and Financial Statement Analysis covered by Year 1 Accounting Courses. The UNSW Courses ACCT1501 /1511 Accounting 1A & 1B, and FINS1613 Business Finance cover the Institute of Actuaries of Australia syllabus.

A Credit or higher average grade in the UNSW Actuarial Courses will be required for professional exemption.

In order to complete some double majors (Plans) and all of the Part I Professional Subjects of The Institute of Actuaries of Australia in a 3 year study program, it will often be necessary for students to complete additional voluntary courses. Permission to do this is dependent on academic performance and student's ability to cope with the workload.

Approval to enrol in additional courses is not automatic. The taking of additional courses over and above those required for a degree requires payment of a fee for each additional course.

## **REQUIREMENTS FOR AN ACTUARIAL STUDIES MAJOR**

### **B.Com.**

To satisfy the Bachelor of Commerce requirements students complete 144 units of credit. Courses in the Faculty of Commerce and Economics are usually 6 units of credit each.

36 units of credit will be completed by students in the Level 1 Core Courses. For a double major (Plan), students must complete at least 42 units of credit in each Core discipline area. Students not completing a double major (Plan) must complete the minimum requirement of a single major (Plan) of 48 units of credit and a disciplinary minor or 24 unit of credit in another discipline area besides the major (Plan). All students enrolled in the B.Com must complete 12 units of credit of General Education Courses. (General Education Courses are worth 3 or 6 units of credit.)

The following Courses are compulsory for all B.Com. students who wish to complete a major (Plan) in Actuarial Studies.

Level 1 Core Courses:

ACCT1501 Accounting and Financial Management 1A

ACCT1511 Accounting and Financial Management 1B

ECON1101 Microeconomics 1

ECON1102 Macroeconomics 1

MATH1151 Mathematics for Actuarial Studies and Finance 1A

MATH1251 Mathematics for Actuarial Studies and Finance 1B

MATH1151 & MATH1251 should be completed to satisfy Institute of Actuaries of Australia mathematics entry requirements for students wishing to complete the Part I Courses of the actuarial professional syllabus and to provide the required mathematical background for the Actuarial Studies major (Plan).

### **B.Com. (Actuarial Studies)**

#### **Major**

For students to be awarded a B.Com. with a **single major (Plan)** in Actuarial Studies students must complete 48 units of credit (8 Courses) from the following:

Students must complete (compulsory Courses for a major (Plan) in Actuarial Studies), these are also the required courses for a Minor in Actuarial Studies:

ACTL1001 Actuarial Studies and Commerce

ACTL2001 Financial Mathematics

ACTL2002 Probability and Statistics for Actuaries

ACTL2003 Stochastic Models for Actuarial Applications

And at least 3 from the following list should normally be completed:

ACTL3001 Actuarial Statistics

ACTL3002 Life Insurance and Superannuation Models

ACTL3003 Insurance Risk Models

ACTL3004 Financial Economics for Insurance and Superannuation

Other optional Courses that can count for an actuarial study single major (Plan) include:

ACTL3005 Superannuation and Retirement Benefits

To satisfy the requirement of a B.Com with double majors students need only complete 7 courses from the above list, however for students to complete all the courses equivalent to the Part I professional subjects of the IAAust. the following sample program should be followed.

## **1<sup>st</sup> YEAR ENROLMENT GUIDELINES – COURSE CHOICES**

**First Year Enrolments for Actuarial Studies major (plan) must include the following courses:**

### **Semester 1 Core**

ACCT1501 Accounting & Financial Management 1A  
ECON1101 Microeconomics 1  
MATH1151 Mathematics for Actuarial Studies and Finance  
\* Option

### **Semester 2 Core**

ACCT1511 Accounting & Financial Management 1B  
ECON1102 Macroeconomics 1  
MATH1251 Mathematics for Actuarial Studies and Finance  
ACTL1001 Actuarial Studies and Commerce

\* Option should be a course towards a co-major (Plan) or a computing / information systems course is recommended.

### **Mathematics Requirements for Actuarial Studies**

Students who wish to enrol in Actuarial as a major / minor need to complete the following maths courses instead of ECON1202 and ECON1203 in their first year of study.

MATH1151 Mathematics for Actuarial Studies and Finance 1A – Session 1  
and  
MATH1251 Mathematics for Actuarial Studies and Finance 1B – Session 2

Prerequisites to these courses are as follows:

Foundation Year students

MATH1151 needs: Maths for Science at least grade B

HSC students

MATH1151 needs: Ext 1+2 mark at least 180, or  
Maths + Ext 1 mark at least 140

If you do not meet the entry requirements for MATH1151 then you should seek academic advice from Head, Actuarial Studies.



**PROGRAM OF STUDY FOR PROFESSIONAL RECOGNITION BY THE INSTITUTE OF ACTUARIES  
OF AUSTRALIA**

**B.COM. (ACTUARIAL STUDIES)**

The following **sample** program allows for a major (Plan) in Actuarial Studies and includes all Courses in Actuarial Studies that can be counted towards IAA Part I professional syllabus exemption.

<b>Course No.</b>	<b>Course Name</b>	<b>Assumed Knowledge</b>
<u>Year 1 Semester 1</u>		
ACCT1501	Accounting and Financial Management 1A	Nil
ECON1101	Microeconomics 1	Nil
MATH1151	Mathematics for Actuarial Studies and Finance 1A	HSC Prerequisite (Extension 2 Mathematics or equivalent)
Options	6 units of credit	
<u>Year 1 Semester 2</u>		
ACCT1511	Accounting and Financial Management 1B	ACCT1501
ACTL1001	Actuarial Studies and Commerce	Nil
ECON1102	Macroeconomics 1	ECON1101
MATH1251	Mathematics for Actuarial Studies and Finance 1B	MATH1151
<u>Year 2 Semester 1</u>		
ACTL2001	Financial Mathematics	MATH1151
ACTL2002	Probability and Statistics for Actuaries	MATH1251
Option	12 units of credit	
<u>Year 2 Semester 2</u>		
ACTL2003	Stochastic Models for Actuarial Applications	ACTL2002 or MATH2801 and MATH2831
Options	18 units of credit	
<u>Year 3 Semester 1</u>		
ACTL3001	Actuarial Statistics	ACTL1001, ACTL2003
ACTL3002	Life Insurance and Superannuation Models	ACTL1001, ACTL2003
Options	12 units of credit	
<u>Year 3 Semester 2</u>		
ACTL3003	Insurance Risk Models	ACTL1001, ACTL2003
ACTL3004	Financial Economics for Insurance and Superannuation	ACTL2001
Options	12 units of credit	

To complete the requirements for the B.Com Actuarial Major (Plan), Co-major (Plan)/Minor and General Education requirements the Options should be selected as follows:

12 units of credit – General Education \*

42 units of credit - Courses towards Co-major (Plan)

6 units of credit – free elective (FINS1613\*\* should be completed if Finance is not the Co-major)

\* Students may wish to consider completing COMP1091 Solving Problems with Software and/or MATH2871 Data Management for Statistical Analysis. More information on the General Education rules can be found at [www.handbook.unsw.edu.au](http://www.handbook.unsw.edu.au).

\*\* FINS1613 contributes towards the exemption for CT2. This course cannot be taken in the first semester of first year.



## COMBINED DEGREES

### **B.Com./B.Sc. (Actuarial - Mathematics)**

This recommended program has been specially designed to allow students to meet the requirements of the IAA Professional Syllabus Exemptions. Options must satisfy the requirements for the award of the double degree. The options in this program include Finance and Mathematics courses considered relevant to Actuarial Studies, however other courses can be chosen.

#### **Notes on B.Com./B.Sc. Combined Degree Program**

The combined degree requires:

- 84uc of Commerce, including a major and specified Level I courses
- 84uc of Science, including a major and at least 24uc of Level I Science courses
- Another 24uc chosen from Commerce or Science courses.

Units of Credit values are as follows

- All Commerce courses are 6uc each
- Science courses COMP1091, MATH\*\*\*1 are 6uc each
- Science courses MATH\*\*\*0 are 3uc each

Each Semester is 24uc.

NO General Education is required.

This program provides a full Actuarial Studies major (Plan) and the associated Courses which will exempt students who meet the required standards from Parts I and II of the Institute of Actuaries examinations.

The Commerce courses listed are required (except for FINS2624 and FINS3636, which are strongly recommended). The Mathematics courses listed in years 1 and 2 (except MATH2931) are compulsory and the others are strongly recommended. (MATH2910 replaces MATH2620 in the formal requirements for a Mathematics major (Plan).)

Mathematics courses are shown at the Higher level, but can be taken at the Ordinary level if desired. The particular selection of Mathematics options taken should have the approval of the Mathematics Program advisor. Particular care needs to be taken in choosing Level II courses to ensure that prerequisites for Level III courses are met.

#### **Course Code    Course Name**

##### Year 1 Semester 1

ACCT1501	Accounting and Financial Management 1A
ECON1101	Microeconomics 1
MATH1151	Mathematics for Actuarial Studies and Finance 1A
MATH1081	Discrete Mathematics

##### Year 1 Semester 2

ACTL1001	Actuarial Studies and Commerce
ACCT1511	Accounting and Financial Management 1B
MATH1251	Mathematics for Actuarial Studies and Finance 1B
COMP1911	Computing 1

##### Year 2 Semester 1

ACTL2001	Financial Mathematics
ECON1102	Macroeconomics
MATH2111	Higher Several Variable Calculus
MATH2901	Higher Theory of Statistics

##### Year 2 Semester 2

ACTL2003	Stochastic Models for Actuarial Applications
MATH2601	Higher Linear Algebra
MATH2130	Higher Mathematical Methods for Differential Equations
MATH2931	Higher Linear Models
MATH2910	Higher Statistical Computing for Categorical Data

#### Year 3 Semester 1

ACTL3002	Life Insurance and Superannuation Models
FINS1613	Business Finance
MATH3901	Higher Probability and Stochastic Processes
6 uoc	Commerce Option

#### Year 3 Semester 2

ACTL3004	Financial Economics for Insurance and Superannuation
MATH3311	Mathematical Computing for Finance
MATH3980	Higher Advanced Probability Theory
6 uoc	Commerce Option
3 uoc	Math Option

#### Year 4 Semester 1

ACTL3001	Actuarial Statistics
*FINS2624	Portfolio Management of Financial Assets
12 uoc	Math Options

#### Year 4 Semester 2

ACTL3003	Insurance Risk Models
*FINS3636	Interest Rate Risk Management
12 uoc	Math Options

Mathematics Courses in years 3 and 4 must be chosen to fulfil the following rules:

1. At least 18uc must be Level III Mathematics
2. Students wishing to proceed to Mathematics or Statistics Honours should include at least 30uc of Level III Mathematics or Statistics in appropriate Programs.

It is recommended that the Mathematics options include the following;

1. (Modelling)  
At least 6uc from:  
MATH2140 Operations Research,  
MATH2260 Dynamical Systems,  
MATH3041 Mathematical Modelling  
MATH3161 Optimization Methods,  
MATH3181 Optimal Control,  
MATH3201 Dynamical Systems and Chaos,  
MATH3641 Higher Differential Equations,
2. (Level III)  
At least 24uc of Level III Mathematics/Statistics courses

#### \*Part II Subjects

Students should note that The Institute of Actuaries of Australia requires that students have normally completed all of the Part I courses before enrolling in the Part II courses. The UNSW Part II courses ACTL4001 and ACTL4002 may be completed in the 4th year of Combined degrees as Commerce options. Enrolment in the Part II equivalent courses is subject to approval from the Head of Actuarial Studies. Students enrolled in the Combined degree program should meet the following requirements to be permitted to enroll in the Part II equivalent course:

- ❖ Have passed or gained exemption from most of the Part I subjects and be completing at MOST the final 2 of the Part I subjects at the same time,

- ❖ Have an average mark of at least 70% in the ACTL courses completed to date and
- ❖ Have at least 3 months work experience in a financial services company, preferably in an actuarial analyst role by the time the student commences the course.

Students who do not meet these criteria may apply to the Head of Actuarial Studies for admission to the course setting out the reasons for waiving the entry requirements. Applications will be considered based on work experience and academic performance.

Students who are not able to complete the Part II courses will need to complete 2 Commerce options in Year 4 instead (FINS2624 and FINS3636 recommended).

## **B.Com. / LLB (Actuarial Studies and Law)**

Sample enrolment Program for students in completing an Actuarial Studies major

### Year 1

ACCT1501	Accounting and Financial Management 1A
ACCT1511	Accounting and Financial Management 1B
ECON1101	Microeconomics 1
ECON1102	Macroeconomics 1
*MATH1151	Mathematics for Actuarial Studies and Commerce A
*MATH1251	Mathematics for Actuarial Studies and Commerce B
LAW1051	Legal System
LAW1061	Torts
LAW7410	Legal Research and Writing

\* These 2 maths courses are completed instead of ECON1202 and ECON1203 for students completing Actuarial Studies

### Year 2

ACTL1001 Actuarial Studies and Commerce  
ACTL2001 Financial Mathematics  
ACTL2002 Probability and Statistics for Actuaries  
ACTL2003 Stochastic Models for Actuarial Applications  
5 Law courses (refer to Faculty of Law Handbook)

### Year 3

ACTL3001 Actuarial Statistics  
ACTL3002 Life Insurance and Superannuation Models  
ACTL3003 Insurance Risk Models  
ACTL3004 Financial Economics for Insurance and Superannuation  
5 Law courses (refer to Faculty of Law Handbook)

### Year 4

All Law (refer to Faculty of Law Handbook)

### Year 5

All Law (refer to Faculty of Law Handbook)

**Students should note that the Commerce/Law program with Actuarial Studies will NOT allow them to complete all the courses equivalent to the Part I and Part II subject of the IAAust.**

***In the above program students will only be eligible for exemption from 7 of the 8 Part I courses. Com/Law students may wish to complete FINS1613 as a voluntary course.***

In order to complete the remaining Part I and Part II subjects student will either have to switch to the BCom only at the end of Year 1, complete the MActSt., complete these courses directly through the IAAust or complete them as non award voluntary courses at UNSW. Students switching at the end of Year 1 may not be able to complete a double major in Commerce.

## Other Combined Degrees

The following Combined degrees including Actuarial Studies are available:

B.Com / B.Ec  
B.Com / B.Sc.  
B.Com / B.Soc. Sc.  
B.Com / B.Arts  
B.Com / B. Eng

Disciplines in the B.Sc. that can be combined with an Actuarial Studies major (Plan) in the Combined B.Com / B.Sc are:

Anatomy	Biochemistry	Biological Science
Biotechnology	Botany	Chemistry
Computer Science	Food Science	Genetics
Geography	Geographical Ecology	Mathematics
Mathematical Ecology	Mathematics with computing	Microbiology/Immunology
Molecular Genetics	Pharmacology	Philosophy
Physics	Physiology	Psychology
Safety Science	Science and Technology	Statistics
Zoology		

Disciplines in the B.Arts that can be combined with an Actuarial Studies major (Plan) in the Combined B.Com / B. Arts are:

Chinese	Education Studies	English
French	German Studies	Greek
History	Indonesian	Japanese
Korean	Linguistics	Music
Philosophy	Policy Studies	Political Science
Russian Studies	Science and Technology Studies	Sociology
Spanish and Latin American	Theatre, Film and Dance	

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