

**MACQUARIE UNIVERSITY
DEPARTMENT OF ACTUARIAL STUDIES**

DISCIPLINE PROFILE (October 2006)

OVERVIEW

Actuaries apply mathematical, statistical, economic and financial analysis to a wide range of business problems, particularly those involving the assessment and management of risk and the control of long term cashflows in volatile conditions. Actuaries need high order technical and problem-solving skills, an up-to-date knowledge of the financial system, practical judgement, and the ability to communicate at many levels.

Actuarial science has some distinctive features of organisation. In the English-speaking world, the profession established at an early stage its own rigorous systems of research, education and examination. The actuarial profession has continued until recently to maintain itself largely separate from the university system, both in Australia and in other English-speaking countries, and also in Asia. (In continental Europe the profession is integrated into the university system, but the role of actuaries in Europe is generally much narrower than in English-speaking countries, concentrating on technical issues.) The foundation of the Department of Actuarial Studies at Macquarie University in 1968 represented a major change in this situation. Since 1968 Macquarie has led universities in the development of a key role in actuarial science and education in Australia. These developments have been influential internationally: indeed, the UK actuarial profession has recently explicitly stated its intention to emulate the Australian model. The Department is also playing a part in extending actuarial science and education in Asia.

The Macquarie University Department of Actuarial Studies strenuously maintains its academic independence. Nonetheless it benefits from a close working relationship with the wider actuarial profession. Not only does the profession provide financial and other support to the Department, but in addition, the Department is uniquely placed to influence the direction of actuarial education, in Australia and internationally.

Another distinctive feature of the actuarial studies discipline is that actuarial graduates, both at the time of completing a degree and later in their careers, are highly sought after by employers and command large salaries.

These special characteristics have a number of consequences for the Department's profile:

- The Department places a heavier emphasis on outreach to the professional community than may be the case in some other disciplines.
- The Department values research into actuarial education, because of its leadership role in this area, and places a high priority on the quality of its teaching.
- The Department attracts top quality students, but these students rarely proceed to postgraduate research degrees because of attractive graduate employment opportunities. Members of the Department thus have limited opportunities for postgraduate supervision.
- There are few actuaries with research degrees.

- There are also very few actuarial academics in Australia, as it is only in the last fifteen years that departments of actuarial studies have been established outside Macquarie (at the Universities of Melbourne and New South Wales and the Australian National University). All new appointments to the Department in the last fifteen years have come from industry, and their practical experience has been of great benefit to the Department in maintaining links with the profession and in ensuring that the curriculum is up-to-date and relevant to the needs of graduates.
- It is difficult to attract individuals with actuarial qualifications and industry experience to Level A positions, and the Department has had only one member below Level B in the last fifteen years. This means that members of the Department have to carry out some tasks that might otherwise be done by Level A staff, such as conducting tutorials and carrying out routine administration. On the other hand, as the Department is relatively small (9 full-time academics), all members, including Level A and B, make significant contributions to innovation in teaching and research and to non-routine administration and service.

The expectations which would typically apply at each level from A to E are set out below. Individuals may well vary from the norm, having strengths in certain areas which outweigh apparent shortfalls in other areas.

QUALIFICATIONS:

It is important for the Department's reputation with the profession, for the accreditation of its courses, and for its ability to contribute to actuarial education at the highest level, that a significant number of members of the Department should hold the Fellowship of the Institute of Actuaries of Australia (FIAA). The FIAA qualification is highly regarded in the financial sector.

The FIAA is completed in three Parts. Part I covers technical material and requires high-level problem-solving skills. Completion of Part I requires grades of Credit or above in selected units of the BCom in Actuarial Studies, mainly at 200- and 300-level. Part II involves the conceptualisation and solution of actuarial problems, applying the skills of Part I to unfamiliar situations. Since 1992 the Department has been accredited to provide education in Part II, through units initially at Masters level and, since 1996, at 400-level. Again, grades of Credit or above are required. The Associateship of the Institute of Actuaries of Australia (AIAA) is awarded on completion of Part II. The FIAA then requires two or more additional years of part-time study to complete subjects in Investments and Commercial Actuarial Practice as well as two specialist modules in either Life Insurance, General Insurance, Superannuation and Planned Savings or Investment Management and Finance. There is also a one year professional experience requirement, and a requirement to attend a two-day residential course in professionalism. The Part III component is provided by the Institute of Actuaries of Australia.

Level A:

Newly-appointed Department members at Level A are expected to have an excellent Bachelors degree in Actuarial Studies or a related discipline area. They are not expected to have prior research training or experience.

Level B:

Level B Department members are expected to have an exceptionally good academic background, at least the AIAA qualification. They also may have practical actuarial experience, sometimes at a senior level. Generally, newly-appointed Department members at Level B are not required to have university qualifications higher than a Bachelors degree, nor have they had prior research training or experience.

Level C:

Senior Lecturers would generally hold at least the AIAA, and either the FIAA qualification or a higher degree, and have a good track record in published research, teaching and service. For newly-appointed Department members at Level C, it is possible that extensive professional experience at a senior level, including research related consultancies or other forms of research activity, would compensate for a lesser track record in either teaching or scholarly research.

Levels D and E:

Level D and E Department members would generally hold either a PhD or the FIAA qualification, and have an excellent record of achievements and leadership in research, teaching and service.

TEACHING:

The department currently teaches each year:

for students of commerce, etc:

One 100–level unit to 1,200 students per annum, one 200–level unit to 400 students, and six 800–level units.

for actuarial students:

One 100–level unit, three 200–level units, six 300–level units and two 400/800–level units, which are offered on campus, in the city and externally.

New units will be introduced in 2007 and 2008 as part of the Master of Actuarial Practice degree.

Recently the Department has had one or two Honours students each year. Postgraduate research students have been (and probably will continue to be) rare. Department members therefore have relatively limited opportunities for research supervision.

Teaching responsibilities are shared equally by all members of the Department according to a formula which gives credit for research supervision and curriculum development as well as unit workloads. Staff are expected to maintain the Department's reputation for excellence in education by an enthusiastic, innovative and committed approach to teaching.

Level A:

Level A staff are expected to undertake major lecturing responsibilities in two undergraduate units (or in some cases a second offering of the same unit) in each year, each unit or offering containing about 50 to 100 students, or possibly up to 250 students for the simpler service units. This includes the responsibility for initiation and development of unit material. In addition, they are expected to take tutorials in their own units and/or in other units.

Level B:

Lecturers are expected to undertake lecturing and tutoring responsibilities as described for Level A. In addition, they typically act as unit co–ordinator in at least one, and often two units each year, of size 50 to 100 students. (In larger units general staff would assist with unit co–ordinator duties). Some Lecturers act as unit co–ordinator and/or undertake major lecturing responsibilities in 400–level and Masters units, including initiation and development of course material, but this should be regarded as above a normal Lecturer's teaching responsibility.

Lecturers may from time to time supervise Honours research projects.

Level C:

Senior Lecturers undertake lecturing, tutoring and unit coordination responsibilities as described for Level B. They may also act as unit co-ordinator and/or undertake major lecturing responsibilities in 400-level and Masters units, including initiation and development of course material.

Senior Lecturers may from time to time supervise Honours, Masters and PhD research students.

Level D:

Associate Professors undertake teaching responsibilities as described for Level C. They should also provide leadership in teaching, for example in major curriculum review or contribution to professional debate on the actuarial curriculum or cognate study areas. They may, when the opportunity presents, be involved in accrediting actuarial programs at other universities.

Associate Professors are expected to make a significant contribution in attracting and supervising Honours, Masters and PhD research students.

Level E:

A Professor would be expected to contribute to the teaching responsibilities as described for Level D. A Professor should foster the Department's reputation for teaching excellence.

SCHOLARSHIP AND RESEARCH:

At all levels, staff are expected to keep up-to-date with research developments relevant to the units they teach. In addition, all staff are expected to develop an active research program in an area of their choice.

The type of research work varies considerably. Some research is highly theoretical and of a mathematical, or mathematical statistical nature. Other research would be more like applied statistics, and might involve, for example, the collection of data as well as its analysis. Still another area of research would be more akin to economics, particularly when the investigation is, for example, of superannuation or insurance within the Australian financial system. Another area is research which contributes to the development of actuarial education.

The leading international journals in the discipline are: the *ASTIN Bulletin*, *British Actuarial Journal*, *Insurance Mathematics and Economics*, *Journal of Risk and Insurance*, *North American Actuarial Journal* and the *Scandinavian Actuarial Journal*. Other journals which are well-regarded and widely read, with a stringent referee procedure, include the *Australian Actuarial Journal*, *Journal of Actuarial Practice*, and the *Singapore International Insurance and Actuarial Journal*.

The following journals also have a good reputation but are subject to a less stringent referee procedure: *Actuarial Research Clearing House (US)*, *Journal of the Securities Institute of Australia*, and the *Quarterly Journal of the Institute of Actuaries of Australia* (now discontinued). Papers presented at actuarial conferences may be published in proceedings such as: the *Proceedings of the AFIR Colloquium*, *Proceedings of the Convention of the Institute of Actuaries of Australia*, *Transactions of the Institute of Actuaries of Australia* (now discontinued), and the *Transactions of the International Congress of Actuaries*. Such papers are vetted by an editorial committee and in some cases, but not all, the papers are subject to conventional refereeing. Papers may also be published as part of the Department's Research Paper series, in which case they are vetted by an editorial committee.

In addition staff may publish short articles in the professional and industry journals, which are subject to very limited refereeing procedures but are important in promulgating ideas to practitioners. These journals include: the *Actuary Australia*, *Superfunds*, and *The Actuary (UK)*.

Some members of the department also publish in refereed and other journals outside of the actuarial/insurance literature, in related disciplines such as demography, education, finance, investment, mathematics and statistics.

The nature of published papers varies. Mathematical publications will be relatively short (a few pages) while those with a more descriptive economic or social background would normally be longer. Joint authorship by two authors is quite common. Authorship by three or more authors is less common except when a piece of research has been conducted under the auspices of an Institute committee. For such papers the contributions of the different members of the committee would vary considerably, and should be identified when considering the research record of any staff member.

The credit derived from publication of a book or research monograph would vary according to the amount of original material. A textbook which involved new techniques could be considered in part as research work.

Much actuarial research does not require major expenditure and therefore the number and size of grants obtained are not necessarily a suitable measure of research quality.

Level A:

A newly appointed Associate Lecturer with actuarial qualifications, but no research background, is expected to develop a research program after appointment. A research program may be evidenced by enrolment in a research degree, presentations at conferences and workshops, and other research activity. Research output in the form of refereed publications and research grant activity would be regarded as beyond the expectations of an Associate Lecturer, particularly one who is working towards completing the FIAA qualification or a higher degree during this time.

Level B:

A Lecturer is expected to develop a research program, as evidenced by research papers, presentations at conferences and workshops, research as part of a degree, research-based consultancies, and / or research grant activity. It may be some time before such a program could be expected to produce refereed publications, particularly if the Lecturer is also working towards completing the FIAA qualification or a higher degree during this time.

Level C:

A Senior Lecturer would be expected to have an established track record and an active ongoing research program, evidenced by a publication rate averaging one refereed publication annually, or equivalent. (Note that a book or monograph of a high degree of originality and rigour could be equivalent to several years of scholarly research output.) A Senior Lecturer should be establishing links with other institutions and building a strong reputation in a particular field.

Level D:

An Associate Professor would be expected to have an established track record and an active ongoing research program, evidenced by a publication rate averaging one refereed publication annually, or equivalent. This would normally include at least one publication in a leading international journal in the discipline of actuarial studies or a related discipline, or a book or monograph of international importance. (Note that a book or monograph of a high degree of originality and rigour could be equivalent to several years of scholarly research output.) An Associate Professor would be expected to have established research contacts with other institutions, to have a national reputation in a research area and to have a developing international reputation. An Associate Professor would also be expected to provide research leadership as may be indicated by supervising research students, mentoring more junior members of staff and developing appropriate research funding opportunities.

Level E:

A Professor would be expected to maintain a strong, internationally recognised research record, with many publications including some in leading international journals. Evidence of an international reputation would include invitations to present papers at international conferences and to review papers for international journals and/or serve on editorial boards. A Professor would also be expected to provide research leadership, indicated by supervising research students, mentoring more junior members of staff and developing appropriate research funding opportunities.

SERVICE TO THE UNIVERSITY AND COMMUNITY:

The small size of the Department (currently nine academics) means that all members are likely to make significant contributions in service within the University. Members will usually have one major area of responsibility each, which they are expected to approach with innovation and creativity as well as diligence, as well as sharing in other duties. Outreach activities to the profession are also very important. At any time the Department usually has about five representatives on various committees of the Institute of Actuaries of Australia, often entailing considerable amounts of work and responsibility. Again, this involvement is shared by staff at all levels. Senior members of the Department have served on the governing body of the Institute.

Level A:

Associate Lecturers carry out administration in the units in which they are involved, under the guidance of the unit–coordinator, and provide advice to students. They are expected to play a proactive role in the development of the Department and may also contribute to Division committees.

Level B:

Lecturers carry out administration in the units which they co–ordinate, and counsel students. They are expected to play a proactive role in the development of the Department. They may also contribute to the Division, and serve on committees of the University or the Institute of Actuaries of Australia.

Level C:

Senior Lecturers carry out administration in the units which they co–ordinate, and counsel students. They are expected to play a proactive role in the development of the Department and the Division, and make a significant contribution to the profession.

Level D:

Associate Professors carry out administration in the units which they co–ordinate, and counsel students. They are expected to play a proactive role in the development of the University, and serve as Head of Department on occasion. They serve as supervisors and mentors of junior staff. Associate Professors are expected to make a significant contribution to the profession.

Level E:

Professors carry out administration in the units which they co–ordinate, and counsel students. They are expected to play a proactive role in the development of the University, and serve as Head of Department on occasion. They serve as supervisors and mentors of junior staff and are expected to provide strong leadership in research, teaching and service. Professors are expected to be active in attracting resources and building links with other institutions, and in professional outreach at a national or international level.