Physics Enrolments in Australian and New Zealand Universities 2000 to 2005

John de Laeter, Philip Jennings and Graeme Putt

Introduction

This is the thirteenth of a series of triennial surveys of physics enrolments in Australian and New Zealand Universities. This project began in 1974 with surveys by Watson-Munro[1] and de Laeter[2] for physics enrolments at Australian Universities and Colleges of Advanced Education respectively in the period 1963 to 1973. The original aim of the surveys was to collect data for planning purposes and to study the effects of Government policy on the physics profession.

In 1975, de Laeter and Watson-Munro[3] produced the first of their combined surveys for all Australian tertiary educational institutions covering the period 1965-1975. They repeated the exercise in 1979[4]. Following the retirement of Professor Watson-Munro in 1979, Philip Jennings and John de Laeter combined to continue the surveys at triennial intervals through the eighties.[5,6,7,8] In 1993 the survey was expanded to include New Zealand universities and Graeme Putt joined the team.[9,10,11,12] We now have a consistent set of data covering the period 1968 to 2005 for Australian universities and from 1991 to 2005 for New Zealand universities.

Originally, the surveys focused on the numbers of third and fourth year physics students. These were easier to identify than graduates in physics, as some students study double majors which are difficult to keep track of, while others graduate at mid-year. Although it is easier today to collect the data on physics graduates because it is required by the Federal Government, we have continued to count third and fourth years physics enrolments for historical consistency. They also represent a more realistic estimate of the class sizes in physics rather than the output of physics departments.

Beginning with the 1982 survey, we began to collect the total number of postgraduate students in physics. Here again we chose to count the total number of postgraduate students to gain an indication of the size of the postgraduate effort. In earlier surveys[6,7,8] we also estimated the number of pass, honours and higher degree graduates each year. In 1991 we also began to address gender issues because of the perceived low level of participation by females in physics. Initially there was some difficulty in obtaining this information, but we now have sufficient data to draw conclusions and, as time goes by, we are able to study trends in participation rates of males and females.

Methods

In the 2002 survey, in addition to collecting data about third year,

from left to right: Emeritus Professor J.R. de Laeter is at Curtin University, Professor P.J. Jennings is at Murdoch University and Dr G.D. Putt is at the University of Auckland

Good News at Last

The Physics communities in Australian and New Zealand Universities have endured a difficult period over the past decade or so in terms of a marked diminution in funding, leading to a serious decline in the number of academic and technical staff, a marked deterioration in the infrastructure of undergraduate teaching laboratories and increased teaching loads. This has affected the research output of many Departments. Although a reduction in funding for universities has affected disciplines other than physics, it has been particularly serious for physics and other laboratory-based courses as teaching costs are high, student numbers at the senior level are sometimes low and there are difficulties in attracting full fee-paying international students. This has been compounded by the loss of service teaching, such as engineering physics units, because these disciplines are also facing funding constraints. Thus the term 'Enabling Sciences' has become a misnomer in many universities. These problems have caused some universities to close down or amalgamate some Physics Departments on the grounds that they are high-cost, low-enrolment Departments - despite their obvious importance to the profile of the university, especially in research.

Due to the severe budget cuts and declining enrolments in Physics in many tertiary educational institutions, the 1996, 1999 and 2002 surveys were undertaken in the midst of considerable upheaval and unprecedented anxiety about the future of physics in Australia and New Zealand. In our last report, we noted that there was some indication that the number of third year students was increasing, and that some stability was returning after the "rationalisation" policies of the past years. This prognosis has proved to be accurate as demonstrated by the statistical information presented in this paper. A comparison of the total number of third year students in the 2000 to 2002 period with the 2003 to 2005 period, for example, reveals an increase of over 42 % in this most recent survey. Increased enrolments have also occurred at the fourth year and postgraduate levels. This renaissance in physics enrolments has been brought about in part by a diversification of "pure" physics into "applied" physics courses such as Astronomy/ Space Physics, Computational Physics, Medical Physics, Nanotechnology and Photonics, but also in the realisation that basic physics underpins many of the developments in these applied fields. This report is therefore good news for the Australian physics community. However, except at the fourth year level, these encouraging trends have not been reflected in New Zealand.

fourth year (Honours and Diploma) and postgraduate (MSc and PhD) enrolments, we asked a set of questions about recent changes in course content and structure, and to the administration of the physics courses in the various Universities. We also sought information about changes planned for the near future, changes in the student population and significant problems facing the departments. We have continued this practice in the present survey.

The data was obtained from the Heads of the various physics departments in Australian and New Zealand universities. We have tried to ensure that the data is consistent and accurate by circulating the tables to Heads for checking. However, there are certain to be minor errors due to the difficulty of uniquely identifying physics majors. If Physics-related courses have been accredited by the AIP, or have 50 % or more Physics content, their enrolments have been included in the statistical data in Table 1. We encourage readers to notify us if they detect any errors in the data.

Analysis of Enrolment Data

The third year, fourth year and postgraduate enrolments for the period 2000 to 2005 are presented in Tables 1, 2 and 3 respectively. Figures 1, 2 and 3 show the trends in total enrolments at third year, fourth year and postgraduate level over the 38 year period since data collection began in 1968. The following observations are made on this data:

Third Year Enrolments

Australia: Twenty eight universities are now offering some sort of Physics degree compared with 30 a decade ago. Third year enrolments have increased after falling from 704 in 1993 to 488 in 2001. The results for 2002 showed an increase in enrolments and this trend has continued from 2003 to 2005. The average number of students per year over the period 2000 to 2002 was 528, as compared to 761 students per year from 2003 to 2005. The 870 students enrolled in 2005 exceeds the previous record of 704 in 1993 by a massive 166. This increase is partly due to the introduction of new physics-related degrees such as Astronomy/Space Physics, Computational Physics, Medical Physics, Nanotechnology and Photonics that are taught alongside the existing physics degrees and utilize their third year units. The proportion of female students in third year physics has slightly decreased from 23 % of the cohort in the 2000 to 2002 triennium to 21% in the 2003 to 2005 triennium. The only university to register zero student enrolments in 2005 was Western Sydney, but the enrolments in Victoria University have declined rapidly since the decision was taken to phase out the physics course in 2001. This was a surprising decision in that the average number of enrolments from 2000 to 2003 was 23 per year. On the other hand Swinburne University of Technology has re-introduced a physics course which has 18 enrolments in 2005.

New Zealand: Six universities offer a degree in physics, the same as a decade ago. Enrolments continued at a relatively steady average level of 131 students per year. The percentage of females increased only marginally above the previous triennium from 15 %, to 17 % for the 2003 to 2005 triennium.

Fourth Year Enrolments

Australia: Fourth year enrolments in physics have increased again after falling substantially from 264 in 1996 to 132 in 2001. The average number of enrolments over the period 2003 to 2005 of 187 per year represents an increase of 26 % over the previous triennium of 148 per year. The gender balance in fourth year courses has remained stable and similar to that in the third year courses over the past decade, but it decreased from 24 % in 2000 to 2002, to 22 % in the present triennium. The Universities of Central Queensland, Western Sydney, Swinburne and South Australia reported zero enrolments in 2005.

New Zealand: There has been a noticeable increase in enrolments in fourth year over the last triennium. This most likely reflects the increasing interest in four-year programs of extended undergraduate study like BTech and BScs in Applied Science rather than postgraduate studies. Interestingly the increase is a stepped one, increasing from a flat 66 students per year (2000 to 2002) by almost 20% to a relatively flat 79 students per year (2003 to 2005). It is a trend that will probably hold up as physics departments attempt to provide attractive four-year program alternatives to Engineering Schools, who actively recruit able Physics/Mathematics secondary pupils directly from school into their own degrees. The gender balance has remained relatively stable over the past decade.

Postgraduate Enrolments

Australia: Postgraduate enrolments in physics fell from a high of 1023 in 1993 to 739 in 2002. In contrast, the postgraduate numbers steadily increased during the present triennium by 9 % with respect to the previous triennium. The proportion of female postgraduate students in Australia is about 23% over the past six years. The Northern Territory University (now Charles Darwin University) has had no postgraduate enrolments in physics in the present triennium.

New Zealand: There has been a drop in enrolments over the last triennium from the relatively higher and stable numbers of the first six years of the past decade. Numbers have now levelled out in line with the 17% plunge that occurred in 2002. Some of this decline can be attributed to government funding for PhD students, progressively reducing from a 6 year to 4 year maximum. Whatever the reason, it is a worrying statistic to departments given the heavy demand for such students to assist with departmental teaching needs (laboratories and tutorials), as

well as prosecute research. The gender balance has risen slowly for females over the past decade and in the present triennium it is 22.5 %.

Analysis of the Questionnaire Data

In addition to the enrolment data we collected responses to five questions. A content analysis was carried out on these responses and the results are summarised below:

1. Describe any major changes to your educational offerings in Physics over the past five years (eg new directions, new awards, termination of courses, etc)

Australia: Over the past five years, twenty new, physics-related courses have been introduced. These include Astronomy/Space Physics (4), Computational Physics (2), Medical Physics (2), Nanotechnology (6) and Photonics (6). In the same period of time, two courses in Medical Physics have been discontinued and three courses in basic physics have suffered the same fate.

Most universities have undertaken major reviews and subsequent restructuring of their physics courses over the past five years. Four universities have introduced joint degrees with physics and engineering. Only five Universities reported no substantial changes to their offerings over the past triennium.

New Zealand: While most universities have adopted a conservative approach to initiatives because of staff depletion and decreasing postgraduate student numbers, some new offerings have emerged with Biomedical Physics or Electronics slants. Canterbury has introduced PGDipSc, MSc and PhD programs in Medical Physics (the PGDipSc/MSc in response to demands from the medical physics profession) to which they have this year added a BSc (Hons) degree in Medical Physics. Interestingly, their near neighbour, Otago, has decided to withdraw the MSc in Medical Physics they had introduced some five years ago because of limited, subsequent uptake. A national restructuring program driven by Government to enable greater transportability of undergraduate course credits between universities has generally usurped interest in fresh offerings. This normalisation of all three-year degrees to a common 360-point tally has resulted in universities like Auckland needing to repackage existing 21 (equal credit value) courses to 24 (15 point) courses. Academic administrators there have temporarily embargoed new courses and programs until things have settled following implementation in 2006.

2. Are there any major changes planned in your educational offerings in the next three years?

Australia: Nineteen universities indicated that no major changes were planned.
Ten universities have planned major new initiatives for the next three years, including Astronomy/ Space Physics (1), Medical Physics (2), Nanotechnology (2), Photonics (1), Physical Science (1).

New Zealand: Massey, Canterbury and Otago have BSc degrees with Electronics majors that are sponsored by Physics (rather than Electrical Engineering) in the pipeline. Auckland has a bold plan for a BTech program in Medical Technology to attract students otherwise enrolled in pre-medical programs. This is a four-year program that will result in students being effective majors in both Physics and Physiology. Waikato, although cautious about overstretching its depleted academic establishment in Physics, also intend to revamp current course offerings with a biophysics focus. Wellington has no immediate plans, anticipating that the on-site establishment of the MacDiarmid Institute for Advanced Materials and Nanotechnology will attract a growing number of able students into the BSc Physics program.

3. Have you observed any substantial changes in the Physics student population at your University over the past five years? (eg change in gender balance, change in quantity or quality of students, changing age profile, etc)

Australia: Nine universities report an increase in enrolments over this triennium, but five report a decrease. Most universities report a decline in the quality in students entering a physics course, with respect to their preparation in mathematics and physics, but there is some evidence to suggest that allied courses such as Nanotechnology have attracted a better quality of student intake. One university has introduced a bridging course to alleviate the problem of poor student preparation for tertiary level physics. Part of the increase in student numbers is undoubtedly due to the introduction of allied physics courses, including combined degree programs.

New Zealand: The Physics student population has remained stable throughout the past triennium. The ethnicity make-up has also steadied within each university even though it differs from university to university from north to south in the country. Otago, which has experienced some growth in numbers, reports increased numbers of females taking Physics. However, Waikato has experienced declines with fewer females beyond first year.

4. Have there been any significant changes to the administration of your Physics degree over the past five years? (eg mergers, closure, etc.)

Australia: Eighteen universities said that there had been no significant changes in the administration of their physics degree over the past three years, but all the other universities have experienced substantial changes. The most common were mergers with a related discipline and consequent loss of Departmental autonomy. The most common mergers were with engineering, mathematics and chemistry. Three universities have phased out their physics programs,

but two universities have elevated their Departments of Physics to School status.

New Zealand: There have been no significant changes to the administration of the degree courses. This is primarily because of the major national restructuring changes that are to be implemented in 2006. It will probably remain so until the restructuring changes of 2006 have settled down.

5. What do you consider are the most significant problems facing your Department at this time? (eg declining enrolments, lack of junior staff, etc)

Australia: Four universities said that there were no significant problems facing their Department. The remaining universities listed a wide variety of issues of concern. These are listed below in descending order of frequency of response.

- Funding cuts/ funding crisis
- Loss of staff
- Workload explosion for staff
- Loss of service teaching
- Administration-generated workload
- Lack of administration/university support
- Skewed age profile of staff/ succession crisis

New Zealand: Diminishing numbers of postgraduate students is a worry for several departments. For some time, the recruitment of interested international postgraduate students to New Zealand has been thwarted by funding short-sightedness in Government policy. Accordingly, a recent Government announcement to subsidise tuition fees for international students (currently around $22,000 for students not sourced as nationals from Australia, France or Germany) and reduce them to the same level as fees for domestic students (about $4,000), is very welcome, even though vague in implementation details at this stage. Another problem specified is the aggressive recruitment of the ablest physics and mathematics school students by the Engineering and Health Science Faculties, especially the former. This threatens the potential pool of local postgraduate students and some departments are looking at ways of addressing this. Finally, staff losses and increases in workload are highlighted as a major concern for smaller Departments.

Conclusions

The past six years has been a time of major changes in Physics education in Australia and New Zealand. Many departments have undergone changes of structure and many have been merged with other departments. At the end of this survey period the third, fourth and postgraduate enrolments in Australian Universities have increased significantly. In contrast, the corresponding enrolments in New Zealand Universities have remained almost static over this period, except for the fourth year enrolments, which have increased. Presumably these numbers will flow on to the postgraduate level in future years.

Some physics departments have introduced new allied courses in applied areas such as Astronomy/ Space Physics, Computational Physics, Medical Physics, Nanotechnology and Photonics in a successful attempt to make their courses more attractive. Others are planning to make similar changes in the near future. There is some evidence that these changes have also been successful in attracting more high-quality students into physics. Many physics departments are facing funding crises and workload explosions as a result of the departure of staff who are not being replaced. Many Heads of Department expressed concerns about continuity and succession planning as older staff retire and are not replaced. Most departments now have highly skewed age profiles with most staff over 50 years in age and in senior positions. A loss of service teaching to Engineering and other disciplines is of major concern to many universities.

Overall, it appears that the funding and enrolments crises that appeared in the mid-nineties may have almost run their course, and that physics departments have successfully restructured in many cases to cope with the new funding arrangements. Considerable staff losses have occurred and further losses seem inevitable, but the enrolments picture is encouraging and there are early signs of a recovery. Over the next five years most physics departments will have to cope with an increasing workload and declining staff and financial resources, but the future does look much more promising than it did three years ago.

Acknowledgements

The authors are indebted to our colleagues in the various Universities of Australia and New Zealand who have supplied us with the data and checked the tables for us.

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Table 1

Physics Enrolments in Australian & New Zealand Universities 2000 - 2005
Numbers of Third Year Physics Students

Institution	2000		2001		2002		2003		2004		2005	
	M	F	M	F	M	F	M	F	M	F	M	F
Griffith University	14	2	10	3	13	4	12	3	10	3	19	3
James Cook University	5	0	3	0	5	1	5	2	4	6	7	1
Qld University of Technology	6	2	8	2	10	5	9	5	16	4	15	5
Central Qld University	11	2	11	5	12	0	4	0	4	0	5	0
University of Queensland	10	4	9	3	9	4	11	3	12	5	12	5
University of Southern Qld	3	0	3	1	2	4	6	3	5	3	4	3
Total - Queensland	*49*	*10*	*44*	*14*	*51*	*18*	*47*	*16*	*51*	*21*	*62*	*17*
	59		58		69		63		72		79	
Macquarie University	14	5	16	5	21	6	25	1	10	5	15	1
University of Newcastle	17	3	20	2	26	2	21	5	38	3	34	4
University of New England	2	0	2	0	2	0	7	1	3	0	3	0
University of N.S.W.	15	4	11	8	33	4	33	12	33	14	36	7
University of Sydney	25	9	35	7	33	13	56	12	51	15	73	22
University of Technology, Sydney	17	5	14	3	11	2	11	1	11	1	11	2
University of Western Sydney	15	3	13	4	12	3	11	4	11	8	0	0
University of Wollongong	10	2	14	2	18	4	28	8	21	4	30	9
Total - New South Wales	*115*	*31*	*125*	*31*	*156*	*34*	*192*	*44*	*178*	*50*	*202*	*45*
	146		156		190		236		228		247	
Aust. Defence Force Academy	22	7	12	1	9	3	10	2	18	6	12	3
Aust. National University	28	7	21	11	36	11	33	11	36	15	63	16
Total - ACT	*50*	*14*	*33*	*12*	*45*	*14*	*43*	*13*	*54*	*21*	*75*	*19*
	64		45		59		56		75		94	
La Trobe University	4	3	10	6	9	7	9	3	17	1	18	4
Monash University	31	9	31	10	25	13	24	6	28	6	36	13
R.M.I.T.	25	5	23	6	24	7	32	4	29	5	35	4
University of Melbourne	27	11	26	9	34	10	50	19	57	22	62	22
Swinburne University of Technology	0	0	0	0	0	0	0	0	11	1	15	3
Victoria University	24	4	11	2	21	3	23	3	14	3	4	2
Total - Victoria	*111*	*32*	*101*	*33*	*113*	*40*	*138*	*35*	*156*	*38*	*170*	*48*
	143		134		153		173		194		218	
University of Tasmania	*11*	*1*	*7*	*1*	*11*	*3*	*20*	*2*	*20*	*2*	*23*	*2*
	12		8		14		22		22		25	
Flinders University	2	6	8	1	20	7	23	2	27	3	34	20
University of Adelaide	15	1	13	4	21	8	29	8	50	13	57	10
University of South Australia	0	0	2	2	3	1	3	0	3	0	5	1
Total - South Australia	*17*	*7*	*23*	*7*	*44*	*16*	*55*	*10*	*80*	*16*	*96*	*31*
	24		30		60		65		96		127	
Curtin University of Technology	2	0	7	5	5	6	14	3	16	3	35	6
Murdoch University	2	0	6	2	6	3	3	1	5	2	4	1
University of Western Australia	27	12	29	8	27	15	19	11	26	8	27	7
Total - Western Australia	*31*	*12*	*42*	*15*	*38*	*24*	*36*	*15*	*47*	*13*	*66*	*14*
	43		57		62		51		60		80	
Australia - Total	*384*	*107*	*375*	*113*	*458*	*148*	*531*	*135*	*586*	*161*	*694*	*176*
	491		488		606		666		747		870	
Massey University	7	3	5	1	2	0	3	1	6	2	6	2
University of Auckland	40	9	45	9	48	7	34	8	25	3	27	5
University of Canterbury	37	9	27	6	24	1	25	5	19	9	35	7
University of Otago	8	2	9	2	11	2	19	6	20	4	19	4
University of Waikato	13	1	15	1	14	2	11	0	15	0	11	0
Victoria University of Wellington	10	4	13	2	19	0	21	2	15	2	16	7
New Zealand - Total	*115*	*28*	*114*	*21*	*118*	*12*	*113*	*22*	*100*	*20*	*114*	*25*
	143		135		130		135		120		139	

Table 2

Physics Enrolments in Australian & New Zealand Universities 2000 - 2005
Numbers of Fourth Year Physics Students

Institution	2000		2001		2002		2003		2004		2005	
	M	F	M	F	M	F	M	F	M	F	M	F
Griffith University	2	2	5	1	4	1	3	1	3	1	5	2
James Cook University	1	0	1	0	0	0	0	1	0	0	1	0
Qld University of Technology	0	1	4	1	2	0	2	1	2	3	4	1
Central Qld University	2	0	1	0	1	0	3	0	3	1	0	0
University of Queensland	6	3	5	5	7	2	8	4	6	3	6	3
University of Southern Qld	1	0	2	0	0	0	0	0	0	1	1	1
Total - Queensland	*12*	*6*	*18*	*7*	*14*	*3*	*16*	*7*	*14*	*9*	*17*	*7*
	18		25		17		23		23		24	
Macquarie University	0	2	2	0	2	1	2	2	6	2	4	0
University of Newcastle	2	0	1	0	4	0	3	0	0	0	3	1
University of New England	0	0	0	0	0	0	0	0	2	0	2	1
University of N.S.W.	8	4	7	3	6	4	7	1	12	6	8	5
University of Sydney	10	4	9	5	10	4	13	8	12	5	17	6
University of Technology, Sydney	3	1	3	0	2	1	6	2	4	0	7	0
University of Western Sydney	4	0	0	0	2	1	0	0	1	0	0	0
University of Wollongong	4	1	3	0	7	0	8	3	2	0	3	2
Total - New South Wales	*31*	*12*	*25*	*8*	*33*	*11*	*39*	*16*	*39*	*13*	*44*	*15*
	43		33		44		55		52		59	
Aust. Defence Force Academy	2	1	0	0	1	0	1	0	1	1	3	0
Aust. National University	5	4	4	2	8	5	13	7	14	3	11	8
Total - ACT	*7*	*5*	*4*	*2*	*9*	*5*	*14*	*7*	*15*	*4*	*14*	*8*
	12		6		14		21		19		22	
La Trobe University	3	1	0	0	1	1	5	1	6	1	8	0
Monash University	4	1	7	1	2	0	1	0	9	0	6	3
R.M.I.T.	2	0	6	1	4	0	8	2	6	0	8	1
University of Melbourne	19	7	11	4	14	4	23	7	20	2	18	4
Swinburne University of Technology	1	0	3	0	3	0	2	0	1	0	0	0
Victoria University	3	0	3	0	2	2	3	2	3	0	1	1
Total - Victoria	*32*	*9*	*30*	*6*	*26*	*7*	*42*	*12*	*45*	*3*	*41*	*9*
	41		36		33		54		48		50	
University of Tasmania	*3*	*0*	*5*	*1*	*6*	*1*	*3*	*0*	*1*	*0*	*2*	*2*
	3		6		7		3		1		4	
Flinders University	3	1	2	2	5	0	4	2	4	0	11	0
University of Adelaide	7	2	7	0	9	3	10	2	6	0	12	2
University of South Australia	0	0	0	0	1	1	0	0	0	0	0	0
Total - South Australia	*10*	*3*	*9*	*2*	*15*	*4*	*14*	*4*	*10*	*0*	*23*	*2*
	13		11		19		18		10		25	
Curtin University of Technology	6	2	1	0	6	4	2	2	5	2	7	3
Murdoch University	2	0	1	0	1	0	2	0	3	0	2	0
University of Western Australia	9	3	10	3	12	2	11	2	9	2	4	2
Total - Western Australia	*17*	*5*	*12*	*3*	*19*	*6*	*15*	*4*	*17*	*4*	*13*	*5*
	22		15		25		19		21		18	
Australia - Total	*112*	*40*	*103*	*29*	*122*	*37*	*143*	*50*	*141*	*33*	*154*	*48*
	152		132		159		193		174		202	
Massey University	1	2	0	0	2	0	0	0	0	0	1	0
University of Auckland	16	3	13	1	16	3	18	1	9	2	14	1
University of Canterbury	14	7	16	8	10	4	21	4	26	7	25	9
University of Otago	13	1	11	4	13	1	15	1	10	2	12	3
University of Waikato	7	0	5	2	6	2	15	2	11	0	8	0
Victoria University of Wellington	1	1	3	3	8	2	4	0	7	2	4	2
New Zealand - Total	*52*	*14*	*48*	*18*	*55*	*12*	*73*	*8*	*63*	*13*	*64*	*15*
	66		66		67		81		76		79	

Table 3

Physics Enrolments in Australian & New Zealand Universities 2000 - 2005
Numbers of Postgraduate Physics Students

Institution	2000		2001		2002		2003		2004		2005	
	M	F	M	F	M	F	M	F	M	F	M	F
Griffith University	14	2	11	2	10	3	11	3	10	2	7	3
James Cook University	15	4	14	4	15	3	9	1	12	2	13	2
Qld University of Technology	38	11	34	9	35	6	32	14	30	17	33	19
Central Qld University	2	0	3	0	1	0	1	0	1	1	2	0
University of Queensland	28	5	27	6	28	7	32	6	36	6	43	5
University of Southern Qld	4	0	4	0	5	0	6	0	5	0	2	1
Total - Queensland	*101*	*22*	*93*	*21*	*94*	*19*	*91*	*24*	*94*	*28*	*100*	*30*
	123		114		113		115		122		130	
Macquarie University	12	4	10	6	13	6	20	5	22	4	27	5
University of Newcastle	12	2	11	2	14	2	14	4	17	4	10	3
University of New England	3	0	2	0	0	0	0	0	1	0	3	0
University of N.S.W.	38	19	36	17	38	15	41	14	46	17	33	12
University of Sydney	50	11	45	11	40	12	57	16	69	22	75	22
University of Technology, Sydney	9	5	7	7	8	4	9	6	9	5	8	5
University of Western Sydney	4	0	5	0	5	0	1	0	1	0	1	0
University of Wollongong	25	2	23	3	22	4	21	3	20	4	19	4
Total - New South Wales	*153*	*43*	*139*	*46*	*140*	*43*	*163*	*48*	*185*	*56*	*176*	*51*
	196		185		183		211		241		227	
Aust. Defence Force Academy	5	0	6	1	8	1	7	1	8	1	4	0
Aust. National University	12	2	11	2	13	2	14	1	20	3	20	3
ANU - Research School Physics	35	20	38	21	39	23	57	23	60	25	72	30
Total - ACT	*52*	*22*	*55*	*24*	*60*	*26*	*78*	*25*	*88*	*29*	*96*	*33*
	74		79		86		103		117		129	
La Trobe University	11	4	11	5	7	5	11	4	11	4	10	3
Monash University	15	6	17	6	19	6	19	3	21	3	25	1
R.M.I.T.	44	8	35	11	26	10	35	8	39	13	46	9
University of Melbourne	71	29	71	29	67	29	54	27	55	24	56	19
Swinburne University of Technology	14	3	17	3	17	4	14	3	11	4	11	4
Victoria University	5	2	4	2	5	2	6	4	5	3	3	3
Total - Victoria	*160*	*52*	*155*	*56*	*141*	*56*	*139*	*49*	*142*	*51*	*151*	*39*
	212		211		197		188		193		190	
University of Tasmania	*6*	*0*	*5*	*0*	*6*	*0*	*5*	*0*	*6*	*0*	*7*	*1*
	6		5		6		5		6		8	
Flinders University	7	3	5	3	5	2	0	0	3	1	7	1
University of Adelaide	23	10	27	11	28	9	46	16	50	19	42	16
University of South Australia	2	0	2	0	3	1	4	0	3	0	2	1
Total - South Australia	*32*	*13*	*34*	*14*	*36*	*12*	*50*	*16*	*56*	*20*	*51*	*18*
	45		48		48		66		76		69	
Curtin University of Technology	39	6	43	6	45	6	29	7	23	6	29	5
Murdoch University	12	8	11	7	12	8	9	4	8	3	10	4
University of Western Australia	29	5	28	5	29	5	35	5	29	0	32	4
Total - Western Australia	*80*	*19*	*82*	*18*	*86*	*19*	*73*	*16*	*60*	*14*	*71*	*13*
	99		100		105		89		74		84	
Northern Territory University	*1*	*0*	*1*	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	1		1		1		0		0		0	
Australia - Total	*585*	*171*	*564*	*179*	*564*	*175*	*599*	*178*	*631*	*198*	*652*	*185*
	756		743		739		777		829		837	
Massey University	10	3	7	2	4	1	5	1	6	1	6	0
University of Auckland	19	5	26	5	19	4	23	4	28	2	25	4
University of Canterbury	26	9	23	12	26	10	24	17	29	16	33	14
University of Otago	32	9	27	6	22	5	16	5	18	8	13	5
University of Waikato	16	1	13	0	10	1	15	4	18	4	8	2
Victoria University of Wellington	27	5	28	13	21	12	15	3	18	3	19	2
New Zealand - Total	*130*	*32*	*124*	*38*	*102*	*33*	*98*	*34*	*117*	*34*	*104*	*27*
	162		162		135		132		151		131	

Figure 1
NUMBERS OF THIRD YEAR STUDENTS

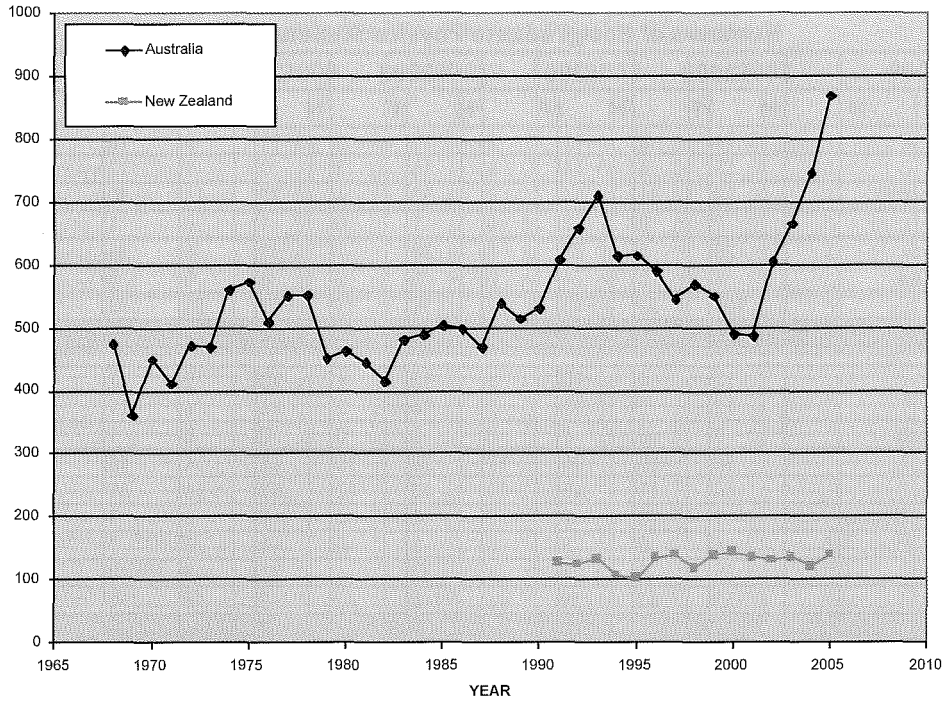


Figure 2
NUMBERS OF FOURTH YEAR STUDENTS

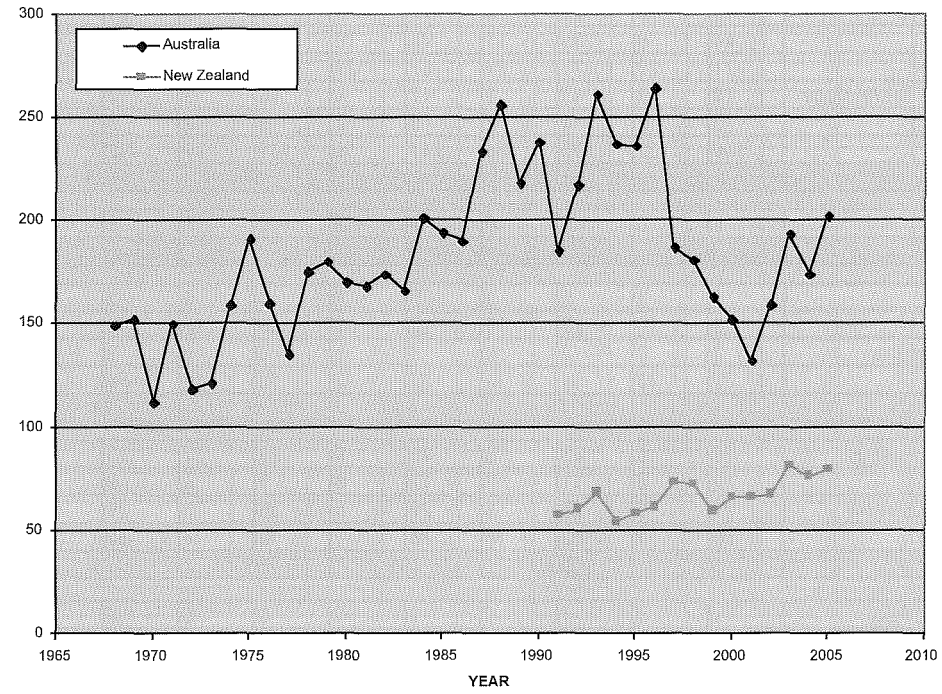
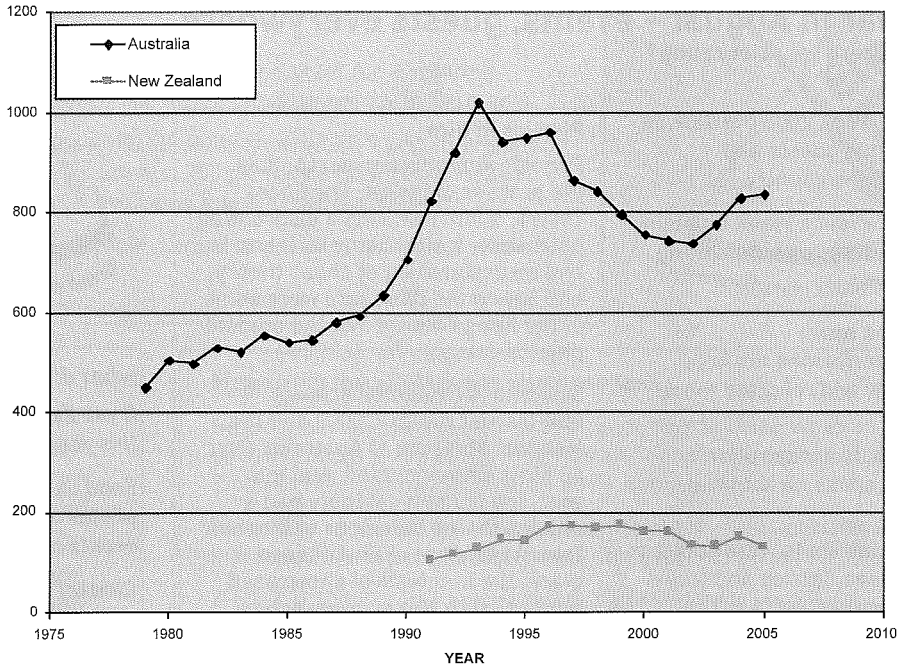


Figure 3
NUMBERS OF POSTGRADUATE STUDENTS



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