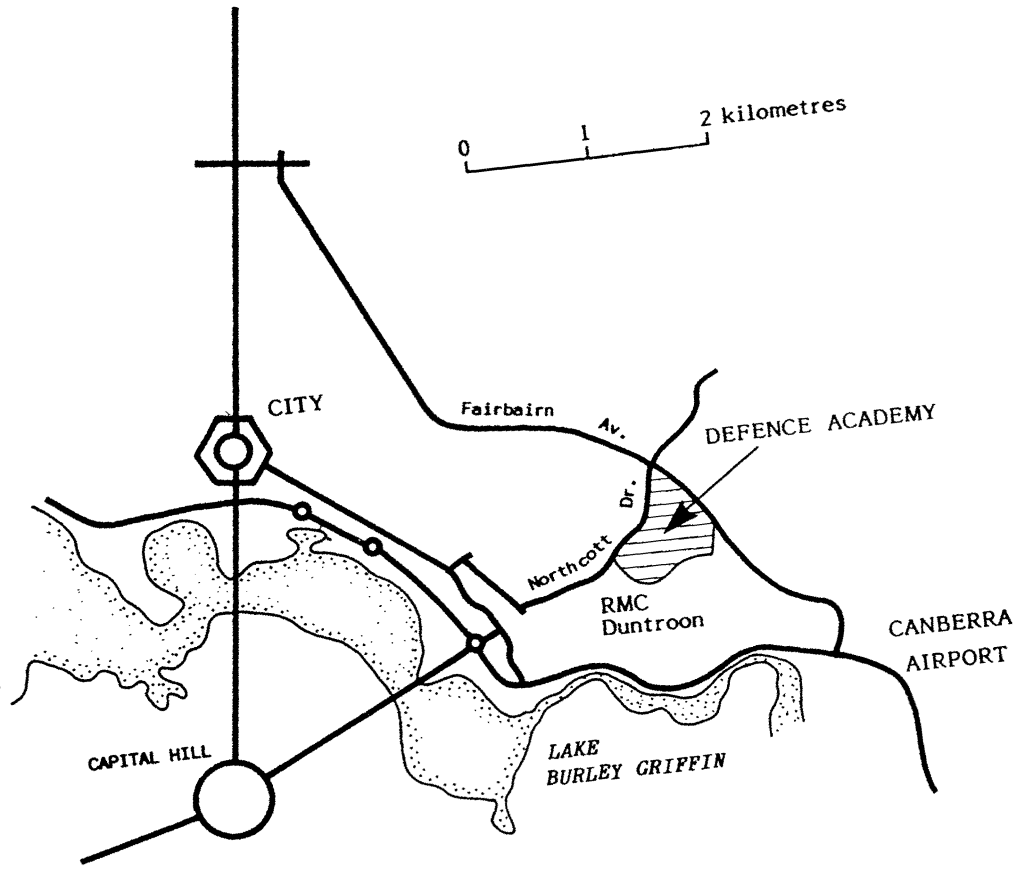
THE UNIVERSITY OF NEW SOUTH WALES

AUSTRALIAN DEFENCE FORCE ACADEMY

University College

HANDBOOK

1997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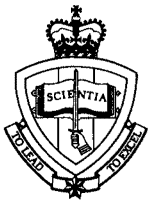
THE UNIVERSITY OF
NEW SOUTH WALES

AUSTRALIAN DEFENCE
FORCE ACADEMY



University
College

HANDBOOK

1997

The address of the Australian Defence Force Academy is:

Northcott Drive,
Canberra, 2600
Telephone: (06) 268 8111

General correspondence should be addressed to the Commandant, Australian Defence Force Academy.

Correspondence on academic matters should be addressed to the Director, Student Administration, University College.

Subjects, courses and any arrangements for courses including staff allocated, as stated in the Calendar or any Handbook or any other publication, announcement or advice of the University, are an expression of intent only and are not to be taken as a firm offer or undertaking. The University reserves the right to discontinue or vary such subjects, courses, arrangements or staff allocations at any time without notice. The University College reserves the right not to offer any subjects or units with enrolments of 5 or less.

Information in this Handbook has been brought up to date as at 1 September 1996 but may be amended without notice by the University Council.

Table of Contents

Preface 7

The Australian Defence Force Academy 7
Establishment of the Academy 7
The University of New South Wales 8

Calendar for 1997 9

Dates to Note in 1997 11

Agreement between the Commonwealth and the University 13

The Academy Council 19

Membership of the Academy Council 19

Military Education and Training 21

Defence Force Staff 21
Directorate of Military Education and Training 21
Corps of Officer Cadets 21
Military Training Wing 21
Directorate of Administration 22
Directorate of Budgets and Financial Services 22
Section 1—Military Organisation 22
Section 2—Common Military Training 23
Section 3—Sessional Break Activities 24
Section 4—Sport 25
Section 5—Graduation Requirements 25
Section 6—Common Military Training (CMT) Subject Descriptions 26
Section 7—Voluntary Extra Curricular Activities 28
Section 8—Single Service Training 29

The University College 31

Structure of the University College 31
The University College Academic Board 31
Executive Committee of the University College Academic Board 31
Higher Degree Committee 32
The Boards of Studies in Humanities & Social Sciences, Science and Engineering 32
Assessment Committees in Humanities & Social Sciences, Science and Engineering 32
Admissions and Re-enrolment Committee 32
Staff of the University College 33
School of Aerospace and Mechanical Engineering 33
School of Chemistry 33
School of Civil Engineering 34

School of Computer Science 34
School of Economics and Management 34
School of Electrical Engineering 35
School of English 35
School of Geography and Oceanography 35
School of History 36
School of Mathematics and Statistics 36
School of Physics 36
School of Politics 37
Australian Defence Force Academy Library 37
Information Technology Services Centre 37
Australian Defence Studies Centre 37
Australian Technical Staff Officers' Centre 37

Handbook Guide 39

Admission to the Academy 41

General Entry Qualifications 41
Educational Qualifications for Admission to the University College in 1997 41

Facilities and Services 43

The Library 43
Information Technology Services 43
Counselling Services 44
English Communications Program 44
Unisearch Limited 44

Degree Rules 45

Rules governing the award of the degrees of Bachelor of Arts and Bachelor of Science 45
Schedules of subjects for the degrees of Bachelor of Arts and Bachelor of Science 46
Rules governing the award of the degree of Bachelor of Arts with Honours 49
Rules governing the award of the degree of Bachelor of Science with Honours 49
Rules governing the award of the degree of Bachelor of Engineering 49
Schedule of Subjects for the BE Degree 50
Combined BSc/BE Degree Courses 52
Rules governing the award of the degree of Bachelor of Technology 52
Schedule of Subjects for the Bachelor of Technology Degree 53

Undergraduate Course Programs 55

The Undergraduate Courses 55
Undergraduate Course Codes 55
Arts and Science 56
Engineering 58

Subject Descriptions undergraduate 61

Summary of subjects and units offered in the Arts and Science courses 61
School of Chemistry 67
School of Computer Science 72
School of Economics and Management 80
School of English 84
School of Geography and Oceanography 88
  Geography 88
  Oceanography 90
School of History 91
School of Mathematics and Statistics 96
School of Physics 99
School of Politics 107

First Year Engineering Courses 111
School of Civil Engineering 114
School of Electrical Engineering 119
School of Aerospace and Mechanical Engineering 127
Mechanical Engineering 127
Aeronautical Engineering 134
Bachelor of Technology in Aeronautical Engineering 140
General Education Subjects 143
Asian Languages 147
Asia–Pacific Studies 147

Graduate Study 149

Research Degrees 149
Program Identifiers for Research Degrees 149
Coursework Degrees, Diplomas and Certificates 150
MA (English) 150
Defence Studies 150
Engineering Science 151
Information Science 154
Management Studies 156
Subject descriptions 158
Aerospace and Mechanical Engineering 159
Civil Engineering 159
Computer Science 162
Economics and Management 166
Electrical Engineering 170
English 173
Geography and Oceanography 174
History 174
Politics 175
Interdisciplinary Studies 177

Conditions for the Award of Higher Degrees 179

Academic Prizes 191

Undergraduate University College Prizes 191
General 191
Aeronautical Engineering 192
Chemistry 192
Civil Engineering 192
Computer Science 192
Electrical Engineering 192
English 193
History 193
Management 193
Mathematics 193
Oceanography 193
Physics 193
Graduate University College Prizes 193

Timetables 195

Arts and Science Courses 195
Engineering Courses 195
Military Training Program 195
Timetable of Arts and Science Subjects for 1997 196
Personal Timetables 196
Period Times 196

Information for Students **203**

Equal Opportunity in Education 203
Harassment Policy 203
Enrolment in the University 203
Change of Course 203
Variations in Enrolment (including Withdrawal) 204
Attendance at Classes 204
Examinations 204
Use of Computers and Electronic Calculators in Examinations 205
Conduct of Examinations 205
Academic Misconduct 205
Examination Results 205
Review of a Result 206
Special Consideration 206
Further Assessment 206
Restrictions upon Re-enrolling 206
Student Records 208
Change of Address 208
Notice-boards 208
Admission to Degree 208
Academic Dress 208
Advice 208

Index **210**

Preface

The Australian Defence Force Academy

The Australian Defence Force Academy is the centre for tertiary education for the Australian Defence Force. It is located in Canberra, the national capital.

Within the Academy, The University of New South Wales has established a college, known as University College, which is responsible for conducting courses of study and research. University College offers undergraduate courses leading to the University's degrees of Bachelor of Arts, Bachelor of Science, Bachelor of Engineering, and Bachelor of Technology, and opportunities for graduate study and research leading to higher degrees, diplomas and certificates.

The undergraduate students are officer cadets of the Royal Australian Navy, Australian Regular Army, and Royal Australian Air Force, who are in residence at the Academy, and certain other members of the Australian Defence Force. In addition to their academic studies, officer cadets undertake programs of military training at the Academy and at Service training establishments. Registration for higher degrees is available to both military and civilian applicants.

Entry to the Academy as an officer cadet is by selection. Applications are invited from young men and women who are seeking careers as officers in the Australian Defence Force, and who have appropriate educational qualifications and meet certain physical and personal standards.

The total number of students enrolled at University College in 1996 was 1553. 1085 were undergraduates (of whom 988 were members of the Corps of Officer Cadets) and 468 were postgraduate students.

Establishment of the Academy

From their foundation, the Royal Military College (1911) and the Royal Australian Naval College (1913) provided general education as well as professional training for cadets, except during the two World Wars when normal courses were curtailed. After World War II, each of the three Armed Services adopted the policy that educational standards should be raised for officers in training.

The establishment of the Royal Australian Air Force College in 1947 was the first move to provide professional education at tertiary level for officer cadets. The College developed into the RAAF Academy in 1957 as an affiliated College of the University of Melbourne, and then its graduates were required to complete degree courses in science at that university, in addition to their flying training and military studies.

Two decades of improvements in courses and standards at the RMC led in 1967 to an agreement between the Department of Defence and The University of New South Wales, under which they would co-operate in the further development of the RMC into a degree-granting institution. To that end, the University established the Faculty of Military Studies at the RMC to conduct courses leading to the award of the University's degrees in arts, science and engineering.

Also in 1967, the University entered into an association with the RAN College enabling it to present approved courses. Subsequently, first year courses for certain of the University's programs in arts, science and engineering were introduced. Successful cadets were sponsored by the Navy to complete bachelor's degrees on the University's campus.

Concurrent with the developments at the RAN College and the RMC, there was an inquiry by the Department of Defence into the feasibility of setting up a college for the joint education of officer cadets of the three Armed Services. Investigations on a wider scale followed, with the result that the Federal Government in 1974 announced its intention of establishing a single tertiary institution for the Defence Force.

A Development Council was appointed and this body carried out much of the early planning for the proposed institution. In due course, the Government sought the assistance of the University of New South Wales in setting up the institution in order to ensure its academic integrity. Negotiations led in 1981 to a new agreement between the Commonwealth and the University, under which the University undertook to establish a University College within the ambit of the proposed Australian Defence Force Academy.

In accordance with the agreement, the Interim Academy Council was set up in 1982 to oversee the development of the Academy in co-operation with the University, which developed the University College. The Academy Council was established in late 1985.

The Australian Defence Force Academy opened in January, 1986.

The University of New South Wales

The University of New South Wales is situated in Kensington, an inner south-eastern suburb of Sydney. In addition to the sub-campus at the Australian Defence Force Academy, there are sub-campuses at Oatley and Paddington as well as a number of research stations in other parts of New South Wales. It is one of the largest of the Australian universities, having a student population of more than 29,000 and a full-time staff of some 5100, of whom more than 2000 are teaching and research staff.

The University consists of twelve faculties: Applied Science, Arts and Social Sciences, Biological and Behavioural Sciences, the Built Environment, Commerce and Economics, Engineering, Law, Medicine, Professional Studies, Science, the Australian Graduate School of Management; and the College of Fine Arts. There are also Boards of Studies in Science and Mathematics, and Taxation. A wide range of first degrees, higher degrees, graduate diplomas and other courses is offered, and there are substantial research facilities within these units.

In 1990, as a result of amalgamations, the University established the College of Fine Arts at Paddington, and the St George campus at Oatley, which is integrated into the Faculty of Professional Studies.

The University was incorporated by Act of the Parliament of New South Wales in 1949 as The New South Wales University of Technology, a name reflecting the special emphasis of its activities at that time. In 1958 the academic scope was broadened when alterations were made to the Act, and the name was changed to The University of New South Wales.

The Act of Incorporation gave the University Council power to establish colleges and Schools. It set up colleges in 1951 and in 1962 which developed to become the independent University of Newcastle and University of Wollongong, respectively.

The Council also set up, in 1967, the Faculty of Military Studies at Duntroon. The Faculty operated until the end of 1985, when its activities were absorbed into the University College at the Australian Defence Force Academy. In 1986 the University became responsible for the students who completed their degree courses at the Royal Military College.

Under the agreement between the Commonwealth and the University of 7th May 1981, the Council established the University College, and the Academy opened in January 1986.

Calendar for 1997

Week beginning	*Week No.*	
30 December 6 January		Leave
13	1	
20	2	Military Training
27	3	
3 February	4	
10	5	
17	6	
24	7	
3 March	8	
10	9	
17	10	Session 1
24	11	(14 weeks: 3 March to 20 June)
31	12	
7 April	13	
14	14	
21	15	
28	16	
5 May	17	May recess: career development and field trips
12	18	
19	19	
26	20	
2 June	21	
9	22	
16	23	
23	24	Mid-year examinations
30 June	25	
7 July	26	Mid-year leave
14	27	

Week Beginning	*Week No.*	
21	28	
28	29	
4 August	30	Session 2
11	31	(13 weeks: 21 July to 24 October)
18	32	
25	33	
1 September	34	
8	35	
15	36	
22	37	
29	38	Session 2 study recess
6 October	39	
13	40	
20	41	
27	42	
3 November	43	Study and annual examinations
10	44	
17	45	Military training
24	46	
1 December	47	
8	48	Graduation week
15	49	Leave
22	50	

Dates to Note in 1997

		Meetings of College Committees (Tentative dates)	
January			
13	Academy Year begins		
26	Australia Day		
February			
7	Academic orientation and enrolment for all 1st year undergraduate students	7	Academic Board Executive and Higher Degree Committees
12–13	Enrolment of postgraduate students		
25	Enrolment of officer undergraduates		
March			
3	**Session 1 begins**	7	Academic Board and Higher Degree Committees
		5	Engineering Board of Studies
		12	Science Board of Studies
		19	Humanities and Social Sciences Board of Studies
17	Canberra Day—Public Holiday		Committees
27	Last day for students to enrol in whole year or Session 1 subjects/units or to discontinue without failure Session 1 subjects/units		
28	Good Friday—Public Holiday		
31	Easter Monday—Public Holiday		
31	HECS census date		
April			
		4	Academic Board Executive and Higher Degree Committees
24	Publication of provisional timetable for mid-year examinations		
25	Anzac Day—Public Holiday		
May			
2	Last day for students to advise of examination clashes	2	Academic Board Executive and Higher Degree Committees
3	May recess begins	21	Humanities and Social Sciences Board of Studies
18	May recess ends	28	Science Board of Studies
19	Publication of final timetable for mid-year examinations		
June			
9	Queen's Birthday—Public Holiday	4	Engineering Board of Studies
20	**Session 1 ends**	6	Academic Board and Higher Degree Committees
23	Mid-year examination period begins		
July			
		4	Academic Board Executive and Higher Degree Committees
5	Examination period ends	17	Assessment Committees
6–20	Mid-year leave	23	Humanities and Social Sciences Board of Studies
18	Assessment results displayed on noticeboards		
21	Assessment results mailed to students	30	Science Board of Studies
21	**Session 2 begins**		

		Meetings of College Committees (Tentative dates)	
August			
8	Last day for students to discontinue without failure subjects/units which extend over the whole academic year	6	Engineering Board of Studies
		8	Academic Board Executive and Higher Degree Committees
8	Last day for students to enrol in Session 2 subjects/units		
29	Last day for students to discontinue without failure session 2 subjects/units		
31	HECS census date		
September			
		3	Science Board of Studies
		5	Academic Board and Higher Degree Committees
8	Publication of provisional examination timetable	10	Engineering Board of Studies
15	Last day for students to advise of examination timetable clashes	17	Humanities and Social Sciences Board of Studies
19	Publication of final timetable for the annual examinations		
27	Session 2 study recess begins		
October			
6	Labour Day—Public Holiday		
6	Session 2 study recess ends	10	Academic Board Executive and Higher Degree Committees
25	**Session 2 ends**		
28	Study and examination period begins		
November			
11	Remembrance Day	7	Academic Board and Higher Degree Committees
14	Study and examination period ends	27-28	Assessment Committees
December			
3	Assessment results displayed on noticeboards		
4	Assessment results mailed to students		
10	Degree conferring ceremonies		
11	Graduation Parade		
16	Academy Year ends		

PUBLIC HOLIDAY COMPENSATION:

Monday 17 March (Canberra Day)	Monday lost
Friday 28 March (Good Friday)	Friday lost
Monday 31 March (Easter Monday)	Monday timetable on Tuesday 1 April
Friday 25 April (Anzac Day)	Friday timetable on Thursday 24 April
Monday 9 June (Queen's Birthday)	Monday timetable on Wednesday 11 June
Monday 6 October (Labour Day)	Monday timetable on Tuesday 7 October

Agreement between the Commonwealth and the University

Agreement between the Commonwealth of Australia and the University of New South Wales to establish a University College within the Australian Defence Force Academy, 7th May 1981.

THIS AGREEMENT is made this Seventh day of May One thousand nine hundred and eighty-one between—

THE COMMONWEALTH OF AUSTRALIA (in this agreement called "the Commonwealth") of the one part; and

THE UNIVERSITY OF NEW SOUTH WALES (in this agreement called "the University") of the other part.

WHEREAS—

(A) the Commonwealth, acting through the Department of Defence, has decided to establish an Australian Defence Force Academy at which officer cadets for each arm of the Defence Force will be educated and trained;

(B) the Commonwealth wishes to continue at the Academy the tradition of cooperation in the university education and military training of officer cadets successfully developed under arrangements at the Royal Australian Naval College, at the Faculty of Military Studies at the Royal Military College and at the Royal Australian Air Force Academy;

(C) the Commonwealth and the University are agreed that it would be appropriate for that university education at the Academy to be provided by the University;

(D) the University is incorporated by the University of New South Wales Act, 1966 of the Parliament of New South Wales and by section 18 of that Act the Council of the University is empowered, if it deems fit and the Minister for Education of the State approves, to establish and maintain a college of the University; and

(E) the Council deems it fit and the Minister for Education has approved that a College of the University be established within the Academy.

NOW HEREBY AGREED as follows:

PART 1—INTERPRETATION

1.1 In the Agreement unless the contrary intention appears—

"academic staff" or "academic staff of the University at the College" means the members of the staff at the College who are declared by the University Council to be members of the academic staff at the College;

"general staff" or "general staff of the University at the College" means the members of the staff of the University at the College other than academic staff;

"the Academy" means the Australian Defence Force Academy to be established by the Commonwealth in accordance with this agreement;

"the Academy Council" means the Council of the Academy constituted as provided for by this agreement;

"the College" means the University College to be established by the University within the Academy in accordance with this agreement;

"the Department" means the Department of Defence of the Commonwealth; and

"the University Council" means the Council of the University.

1.2 In this agreement, unless the context otherwise indicates or requires—

(a) a reference to a Part or to a clause is a reference to the relevant Part or clause of this agreement and a reference to a sub-clause is a reference to the relevant sub-clause of the clause in which the reference appears;

(b) words in the singular number include the plural and words in the plural number include the singular; and

(c) words which import any gender include every gender.

1.3 (1) A reference in this agreement to the Minister for Defence shall include any other Minister of State of the Commonwealth who is for the time being acting for or on behalf of that Minister.

(2) A reference in this agreement to a person holding an office of the Academy or of the University shall, where the context permits, include a person who is for the time being carrying out the duties of that office.

PART 2—OPERATION OF AGREEMENT

2.1 This agreement shall come into force upon its execution by the parties.

2.2 The entering into of this agreement shall not, except as is expressly provided herein or may be consequential upon the operation of the provisions hereof, affect the continuance in operation until the date on which the Academy commences to function in accordance with clause 3.2 of this Agreement of either—

(a) the Agreement between the Minister for Defence and the University dated 17 January 1977 relating to the existing Faculty of Military Studies at the Royal Military College, Duntroon ("the Faculty Agreement"); or

(b) the Agreement concluded on or about April 1978 between the University and the Minister for Defence relating to the association of the Royal Australian Naval College with the University.

2.3 The Commonwealth shall ensure that the arrangements for the affiliation of the Royal Australian Air Force Academy with the University of Melbourne are terminated prior to the date on which the Academy commences to function in accordance with clause 3.2.

PART 3—ESTABLISHMENT OF THE ACADEMY

3.1 The Commonwealth, acting through the Department, shall establish the Academy. The Academy shall consist of the military component referred to in Part 4 and the College of the University referred to in Part 5.

3.2 The Commonwealth and the University acknowledge and accept for the purposes of this agreement that the essential aims of the Academy shall be—

(a) to provide military education and training of officer cadets for the purpose of developing the professional abilities and the qualities of character and leadership that are appropriate to officers of the Defence Force; and

(b) to provide for officer undergraduates and, by way of foundation for their careers as officers of the Defence Force, officer cadets a balanced and liberal university education in a military environment.

PART 4—THE MILITARY COMPONENT

4.1 The function of the military component shall be—

(a) to provide military education and training for officer cadets and other members of the Defence Force as directed by the Chief of Defence Force Staff;

(b) to develop and maintain the military environment of the Academy as directed by the Chief of Defence Force Staff; and

(c) subject to the approval of the Minister for Defence, to provide military education and training for members of the Armed Forces of countries other than Australia.

4.2 The military component shall be under the command of a serving officer of the Defence Force to be known as the Commandant.

4.3 Admission of students to the military component shall be as determined by the Chief of Defence Force Staff and shall be conditional on their admission to the College.

PART 5—THE UNIVERSITY COLLEGE

5.1 The University shall accept responsibility for the academic integrity of the Academy and for this purpose shall, in pursuance of the University of New South Wales Act, 1968, as amended, establish within the ambit of the Academy and maintain in accordance with the provisions of this agreement a College of the University.

5.2 The College shall be known as University College.

5.3 The functions of the College shall be—

(a) to provide university undergraduate education for—

(i) officer cadets;

(ii) other members of the Defence Force;

(iii) members of the Armed Forces of another Country approved for this from time to time by the Minister;

(iv) any person whom the Minister for Defence and the University determine should be admitted as a student of the College; and

(v) such other person or persons included in a class of persons determined from time to time by the Minister for Defence and the University to be a class of persons who should be admitted as students of the College;

in those disciplines and fields offered in the Faculty of Military Studies under the Faculty Agreement provided that changes in the range of disciplines and fields offered may be made by agreement between the University and the Minister for Defence; and

(b) to foster and make provision for the undertaking of higher studies and the carrying out of research, including work which may lead to the award of a higher degree, by any person considered appropriate by the University.

5.4 (1) The College shall have a chief executive to be known as the Rector.

(2) The Rector shall be appointed by the University and shall be responsible to the Vice-Chancellor for the management and supervision of the financial and administrative activities of the College. The Rector will have such other powers duties and functions in relation to the College as the University Council may determine.

5.5 Admission of students to the College shall be in accordance with academic criteria from time to time determined and applied by the University.

PART 6—THE ACADEMY COUNCIL

6.1 A council to be known as the Australian Defence Force Academy Council shall be established for the purposes of—

(a) advising the Minister for Defence on the development and operation of the Academy; and

(b) advising the University on matters relating to the development and operation of the College, with particular reference to policy, current activities and future operations.

6.2 the Academy Council shall be required to report at least annually to the Minister for Defence and to the University.

6.3 (1) The membership of the Academy Council shall consist of—

(a) the person appointed by the Minister for Defence, after consultation with the Vice-Chancellor, to be Chair of the Academy Council;

(b) the Vice-Chancellor of the University;

(c) the Secretary to the Department of Defence;

(d) the following persons holding office under the Defence Act 1903—

(i) the Chief of Defence Force Staff;

(ii) the Chief of Naval Staff;

(iii) the Chief of the General Staff; and

(iv) the Chief of the Air Staff;

(e) the Commandant;

(f) the Rector;

(g) the President of the Academic Board of the University;

(h) 3 members of the academic staff of the College elected by the academic staff of the College;

(i) one member of the general staff of the College elected by the members of that staff;

(j) 2 members of the University appointed by the Council of the University;

(k) one member of the military staff of the Academy appointed by the Commandant;

(l) one graduate of the University from the College, being neither a full-time member of the staff of the College nor of the military component of the Academy nor a member of the Academy Council, elected by the graduates of the University from the College;

(m) one full-time undergraduate student of the College, being neither a full-time member of the staff of the College nor of the military component of the Academy, elected by the undergraduate students of the College;

(n) one postgraduate student of the College, being neither a full-time member of the staff of the College nor of the military component of the Academy, elected by the postgraduate students of the College; and

(o) persons not exceeding 3 in number, none of whom is a member of the Academy Council, appointed by the Minister for Defence after consultation with the Vice-Chancellor.

(2) The Secretary to the Department of Defence may, by notice in writing given to the Chair of the Academy Council designate an officer of the Department to be his substitute for the purposes of a particular meeting or meetings, or for the purposes of all meetings, of the Council that he is unable to attend.

(3) A member referred to in sub-paragraphs (1)(d)(i), (ii), (iii), or (iv) may by notice in writing given to the Chair of the Academy Council designate a member of the Defence Force to be his substitute for the purposes of a particular meeting or meetings, or for the purposes of all meetings, of the Council that he is unable to attend.

(4) The Vice-Chancellor may, by notice in writing given to the Chair of the Academy Council, designate a member of the University to be his substitute for the purposes of a particular meeting, or for the purposes of all meetings, of the Academy Council that he is unable to attend.

(5) Where a member referred to in paragraph (1)(b), (c) or (d) is unable to attend a meeting of the Council for the purposes of which a person is his substitute in pursuance of such a notice, the substitute may attend the meeting in his place and, for the purpose of the meeting, shall be deemed to be a member.

(6) The persons to be elected to the Academy Council shall be elected in accordance with such of the procedures and for such term stipulated in the By-laws of the University as the Registrar of the University determines are appropriate.

6.4 (1) The term of office of persons appointed to be members of the Academy Council shall be for such period not exceeding three years as is specified in the instrument of their appointment.

(2) Persons appointed members of the Academy Council shall be eligible for re-appointment upon the expiration of the period of their appointment.

6.5 In the event of a casual vacancy in the membership of the Academy Council a person shall be elected or appointed as a member in accordance with the appropriate paragraph 6.3(1) and the person so elected or appointed holds office, subject to this Agreement, for the remainder of his predecessor's term of office.

6.6 There is a casual vacancy in the office of an appointed or elected member of the Academy Council if—

(a) he dies;

(b) he resigns his office by writing under his hand addressed, in the case of an appointed member, to the Minister or, in the case of an elected member, to the Vice-Chancellor of the University;

(c) he becomes a bankrupt, applies to take the benefit of any law for the relief of bankrupt or insolvent debtors, compounds with his creditors or makes an assignment of his remuneration for their benefit;

(d) he is under sentence of imprisonment for an offence;

(e) he ceases to have the qualification by virtue of which he was elected or appointed; and

(f) he is appointed to a position referred to in paragraph 6.3(1) other than that by virtue of the appointment or election to which he became originally a member of the Academy Council.

6.7 The procedure for calling meetings of the Academy Council, the procedure at those meetings and the number of meetings each year shall be such as is determined by the Academy Council.

6.8 The quorum at a meeting of the Academy Council shall be ten.

6.9 If the Chair is absent at a meeting of the Academy Council the members present at the meeting shall elect a chair for that meeting.

6.10 Questions arising at a meeting of the Academy Council shall be determined by a majority of the votes of the members present and voting.

6.11 The member presiding at a meeting of the Academy Council has a deliberative vote and, in the event of an equality of votes, also has a casting vote.

6.12 The Academy Council may regulate the conduct of proceedings at its meeting as it thinks fit and shall keep minutes of those proceedings.

6.13 The Academy Council may, by resolution, establish such boards and committees as it considers necessary and appoint persons (whether members or not) to constitute those boards and committees.

6.14 Boards and committees so established shall have such of its functions as the Academy Council determines.

PART 7—ADMINISTRATIVE ARRANGEMENTS AND STAFF

7.1 The Commandant shall be the chief executive responsible to the Chief of Defence Force Staff or the Secretary to the Department or both, as appropriate, for the control and management of the Academy other than for those activities that are the responsibility of the University.

7.2 The Department shall determine the staffing arrangements for the administration of the military component of the Academy.

7.3 The University shall determine the staffing arrangements for the administration of the College.

7.4 The Department and the University shall make arrangements for administrative services to be provided as far as practicable in common to the military component and the College in order to achieve maximum economy and effectiveness.

7.5 (1) All appointments to the academic staff of the University at the College other than those provided for by clause 7.6 shall be made by the University in accordance with and subject to the provisions of the University of New South Wales Act, 1968 and upon terms and conditions that apply to respective relevant classifications elsewhere in the University.

(2) All appointments to the general staff of the University at the College other than those provided for by Clause 7.6 shall be made by the University in accordance with and subject to the provisions of the University of New South Wales Act, 1968 and upon terms and conditions adopted by the University.

7.6 The provisions of the Schedule to the agreement shall apply and shall be carried out and observed by the University with respect to persons who are approved persons as defined in that Schedule and to the employment of those persons at the College.

PART 8—FACILITIES AND FUNDING

8.1 (1) The Commonwealth shall, after consultation between the University and the Department—

(a) make available for use by the University such buildings, grounds and other facilities as are necessary and appropriate to accommodate the teaching, research and associated administrative activities of the College;

(b) maintain the same in a condition satisfactory to the University; and

(c) develop and maintain an appropriate environment for these activities.

(2) The rights to be granted to the University under this clause shall not extend to the ownership of land and facilities, the property in which shall remain in the Commonwealth.

8.2 (1) The Commonwealth, through the Department, shall provide to the University adequate funds and resources to enable the University to meet its responsibilities under this agreement.

(2) The funds to be provided by the Commonwealth under this clause shall be in the form of block grants of such amounts as are negotiated and agreed upon from time to time between the Department and the University.

8.3 The Commonwealth shall—

(a) indemnify the University from and against liability arising from the conduct of the College or the operations of the Academy in accordance with this Agreement including any claim or proceeding for negligence of the University or its staff, and

(b) meeting the cost of the University of any liabilities or expenses that the University may incur in connection with the performance by it of this agreement, including any liability that may continue in the event of and notwithstanding the termination of this agreement.

PART 9—CONSULTATIONS AND ARRANGEMENTS

9.1 The parties shall arrange and participate in such consultations from time to time as are necessary for or conducive to the effective working of this agreement.

9.2 In furtherance of clause 9.1 the Minister for Defence and the Vice-Chancellor of the University shall arrange for regular consultations between officers of the Department and the University and shall themselves undertake consultations when they consider appropriate.

PART 10—TRANSITION

10.1 In the period prior to the date upon which the Academy Council can be constituted in accordance with Part 6 the Minister and the Vice-Chancellor and such other persons as they shall agree to co-opt shall for the purpose of facilitating the establishment of the College consult together as necessary.

10.2 The parties shall take all practicable steps to ensure that there extends to, or is made applicable to, the College those provisions of the University of New South Wales Act 1968 and of the regulations and by-laws made thereunder as are in force within the State of New South Wales from time to time which the parties consider should so extend or be made applicable.

The Schedule

(The Schedule deals with offers of employment or of continued employment by the University to members of staff of the three Service Colleges. The full text of the Schedule may be obtained on request from the Rector of the University College).

IN WITNESS WHEREOF this agreement has been executed as at the day and year first above written.

SIGNED on behalf of THE COMMONWEALTH OF AUSTRALIA by the Honourable DENIS JAMES KILLEN, Minister for Defence, in the presence of—

..... D. J. KILLEN

THE COMMON SEAL of THE UNIVERSITY OF NEW SOUTH WALES was this 7th day of May 1981 hereto affixed by resolution of the Council in the presence of—

..... RUPERT H. MYERS
Vice-Chancellor and Principal

..... I. R. WAY
Registrar

Membership of the Academy Council

Chair

The Hon Sir Edward Woodward, OBE, QC

Members

Miss E. Alexander, AM
Member appointed by the Minister for Defence

Mr A.J. Ayers, AC
Secretary,
Department of Defence

General J.S. Baker, AC
Chief of the Defence Force

Group Captain J.R. Cole
Member of the Military Staff nominated by the Commandant

Mr D.C. Templeman
Assistant Secretary Corporate Management (Forces Executive)
Chairman of the Defence Academy Finance Committee

Professor J.G.A. Davis
President of the Academic Board
The University of New South Wales

Professor P. Dibb, AM
Head, Strategic and Defence Studies Centre ANU
Member appointed by the Minister for Defence

Mr D.E. Quinn
Member elected by the postgraduate students of the University College

Professor C.J.D. Fell
Deputy Vice-Chancellor (Research and International),
The University of New South Wales
Member nominated by the Council of the University

Air Marshal L.B. Fisher, AO
Chief of the Air Staff

Lieutenant General J.M. Sanderson, AC
Chief of the General Staff

Professor J.A. Richards
Rector
Australian Defence Force Academy

Air Vice Marshall G.J.J. Beck, AO
Commandant
Australian Defence Force Academy

Sir William Keys, AC, OBE, MC
Member appointed by the Minister for Defence

Dr C. Pratt
Member elected by the academic staff of the University College

Officer Cadet P.C. Cameron
Member elected by the undergraduate students of the University College

Mr J. Baxter
Member elected by the general staff of the University College

Professor J.R. Niland, AO
Vice-Chancellor,
The University of New South Wales

Professor C. Pask
Member elected by the academic staff of the University College

Vice Admiral R.G. Taylor, AO, RAN
Chief of Naval Staff

Lieutenant R.C.A. Leahy, RAN
Member elected by the graduates of the University College

Dr A.R. Watson
Member elected by the academic staff of the University College

Professor A.J. Wicken
Deputy Vice-Chancellor (Academic Affairs),
The University of New South Wales
Member nominated by the Council of the University

Secretary
Mr P.G. Funnell

Military Education and Training

Defence Force Staff

Headquarters

Commandant
Air Vice-Marshal G.J.J. Beck, AO, BSc *Melb.*, MPA *Auburn*, awc, psc
Staff Officer—Projects
Commander S. McDowall, RAN, BSc *UNSW*
Personal Staff Officer to the Commandant
Squadron Leader K. Wiley, BEd GradDipEdSt *N'cle (NSW)*
Academy Sergeant Major
Warrant Officer R.J. Eley

Directorate of Military Education and Training

Director of Military Education and Training
Captain G.A. Ledger, RAN, jssc
Executive Officer
Wing Commander P.A. Lavelle, GradDipMgmtSt *Charles Sturt*, psc
Chief Instructor
Lieutenant Colonel M.B. Weibler, BE *UNSW*, psc
Staff Officer Co-ordination
Lieutenant Commander R.G. Fletcher, RAN, BA SocSci, *UNSW*, psc
Officer Commanding Advanced Student Squadron
Major B.W. Barnes
Legal Officer
Major C.M. Mathewson, BCom LLB *Qld.*, GDipComComp GDipLegPrac *Q.U.T.*

Corps of Officer Cadets

Commanding Officer
Captain G.A. Ledger, RAN, jssc
Executive Officer
Wing Commander P.A. Lavelle, GradDipMgmtSt *Charles Sturt*, psc
Adjutant
Captain S.I. Love, BA *UNSW*
Corps Sergeant Major
Warrant Officer Class 2 C. Baker, OAM
Officer Commanding A Squadron
Major A.R. Vanderpeer
Officer Commanding B Squadron
Major H.J. Jarvie
Officer Commanding C Squadron
Lieutenant Commander D. Sewell, RAN, DipAppSci *UNSW*, psc
Officer Commanding D Squadron
Squadron Leader B. Cummins
Officer Commanding E Squadron
Vacant
Officer Commanding F Squadron
Squadron Leader S. Ibbotson, BBus *D.D.I.A.E.*, Grad Dip Hosp/Tour *V.U.T.*

Military Training Wing

Chief Instructor
Lieutenant Colonel M.B. Weibler, BE *UNSW*, psc
Operations Officer
Major M.B. Matthews, BBus (Mgt) *Charles Sturt*, psc
Officer in Charge of Training Development
Squadron Leader D.T. Lindsay, BSc DipEd *N.E.*, GradCert HRM *Charles Sturt*
Officer in Charge of English Communications Program
Major A. Thomas, BEd *W.A.C.A.E.*, GradDipCompStud *Murdoch*
Chaplain—Anglican
Chaplain M. Walbank, RAN, BTh *A.C.T.*
Chaplain—Roman Catholic (located at RMC)
Chaplain M. Lappin
Chaplain—Other Denominations
Chaplain K.J. Bartlett, Dip Theol *U.T.C.*, Grad Dip RE *S.Aust.*
Chaplain M.D. Earl, BA *Adel.*, BD *Edin.*, PGCE *Lond.*
Student Counsellors
~~Captain L.J. Daish~~
Captain L.N. Kealy, BA GradDipPsych *Qld.*
Kim Marr, BSc *A.N.U.*, MAPsS
Officer in Charge of Physical and Recreational Training
Vacant

Directorate of Administration

Director of Administration
Commander G.V. Ryan, RAN, jssc
Officer Commanding Personnel and Administrative Support Squadron
Squadron Leader G.J. Flint
Officer Commmanding Supply Squadron
Lieutenant Commander J.A. Wittwer, RAN
Academy Engineer
Mr P. Bowler
Directorate Sergeant Major
Warrant Officer Class Two R.A. De Laine

Directorate of Budgets and Financial Services

Director
Mr P. W. McHardie
Finance Officer
Mr J. Mazengarb

Section 1—Military Organisation

The Commandant. The Commandant (Major General equivalent) has overall military responsibility for the Academy; all military staff and the Corps of Officer Cadets are under his command.

The Director of Military Education and Training. The Director of Military Education and Training (Colonel equivalent) is responsible for military training and education, and he commands the Corps of Officer Cadets. The Executive Officer of the Corps of Officer Cadets and the Chief Instructor (both Lieutenant Colonel equivalent) report directly to him. He understudies the Commandant and is responsible for administering command of the Academy during the Commandant's absence.

The Corps of Officer Cadets. The staff of the Corps of Officer Cadets includes the Director of Military Education and Training (as the Commanding Officer) and his immediate staff; the Executive Officer, Officers Commanding Squadrons, Divisional Officers and other officers, non-commissioned officers, and other ranks responsible for the command and administration of the Corps of Officer Cadets. Most of these also fulfil various duties as Military Instructors.

The Military Training Wing. This Wing is a sub-unit of the Directorate of Military Education and Training and is headed by the Chief Instructor (CI) (Lieutenant Colonel equivalent). It is primarily responsible for the design, scheduling and coordinating of the Common Military Training program undertaken by the Corps of Officer Cadets during their three years at the Academy. It is also responsible for liaison with the three Single Service training authorities to ensure the effective conduct of Single Service Training for the Single Service elements of the Corps of Officer Cadets.

The Directorate of Administration. This Directorate, headed by the Director of Administration (Lieutenant Colonel equivalent), comprises a Personnel and Administrative Squadron, a Supply Squadron, and an Engineering Division. These squadrons are headed by a Major (or equivalent) and the Engineering Division is headed by a Public Service Engineer Class Three. The Directorate of Administration provides necessary administrative support for all elements of the Academy.

The Directorate of Budgets and Financial Services. This Directorate, headed by a senior Commonwealth Public Service Officer, is responsible to the Commandant for the management of Defence Department financial responsibilities within the Academy.

The Corps of Officer Cadets

The organisation providing the military environment within which officer cadets' officer qualities are developed, is the Corps of Officer Cadets.

The Director of Military Education and Training (DMET) is the Commanding Officer, Corps of Officer Cadets. His second in command is the Executive Officer. The Corps of Officer Cadets is organised into six principal sub-units known as squadrons, each commanded by a Major (or equivalent) and containing a maximum of 192 officer cadets. Each squadron is divided into three or four divisions with a Captain (or equivalent) as the Divisional Officer. The smallest sub-unit in the Corps of Officer Cadets is a section, six of which comprise a division. Each squadron also has a Warrant Officer Class Two (or equivalent) and a Sergeant (or equivalent) to assist the Officer Commanding. The staff of the Corps of Officer Cadets is organised to ensure that an appropriate mix of Navy, Army and Air Force personnel is always maintained.

Under the supervision and guidance of the military staff, the day-to-day running of the Corps of Officer Cadets is the responsibility of the third year cadets. They fill senior and junior cadet appointments within the Corps of Officer Cadets at corps, squadron, division and section levels. The responsibilities include matters relating to the administration and discipline of the Corps, plus the co-ordination and administration of all sporting and social activities in which the Corps is involved.

Cadets are allotted to one of the six squadrons on joining the Corps of Officer Cadets. Throughout their time at the Academy cadets are mixed by Service, seniority and academic discipline. Each of the sub-units is therefore a combination from the three Services.

Advanced Student Squadron

Cadets remain members of the Corps of Officer Cadets for their first, second and third years. On successful completion of their third year they graduate from the Defence Academy to undertake further training with their respective Services before taking up their first appointments as commissioned officers in the Australian Defence Force. Those who are undertaking engineering courses or honours programs in Science or Arts, require a fourth year of study at the University College.

The Advanced Student Squadron (ADSS), commanded by a Major (or equivalent), administers all students who are taking fourth year courses. Navy and Air Force students remain at the Academy for four consecutive

years of study. They have separate privileges and live in the Officers' Mess, during their fourth year. All Army cadets leave the Defence Academy at the end of the third year and move to the Royal Military College, Duntroon, for a year of military study, on completion of which they are commissioned as Lieutenants. Those enrolling for a fourth year of a course in the University College return to the Defence Academy, and live in the Officers' Mess while they complete their course.

The Advanced Student Squadron is responsible for the administration of all military postgraduate students who are undertaking higher degrees at the Defence Academy, all Visiting Military Fellows, officer undergraduates, as well as officer cadets who complete specialised courses at other institutions.

Military Training Wing

The Military Training Wing is responsible for the planning, coordination and implementation of the military studies curricula as well as providing general administrative support for the COOC. Most instructors for Common Military Training subjects are drawn from the staff of the Corps of Officer Cadets. Overall supervision of the standard of the instructional staff is the responsibility of Military Training Wing. This unit is also responsible for liaison with the three Single Service Training authorities and for coordinating both the Services' and the Defence Academy's requirements for Single Service Training.

To enable the Military Training Wing to perform its functions effectively, the Chief Instructor has seven subordinate sections:

Operations Cell. The Operations Cell is responsible for the planning of all adventure training activities. It coordinates Single Service Training and is responsible for the forecasting and management of training resources to meet the aims of Military and adventurous training. It also coordinates movement of cadets for sessional break activities.

Field Training Wing. This wing is part of the Operations Cell and is responsible for planning and conducting field training common to all three Services. The wing also conducts staff and cadet weapons training and adventure training.

English Communication Section. This section is responsible for designing and conducting the English and Military Communication Program developed in consultation with the academic staff and single Service institutions. It is designed to develop oral and written communication skills and includes an introduction to Service writing and forms of Service correspondence.

Training Development Section. This section is responsible for the development, implementation, programming and quality control of the Common Military Training curriculum.

Physical and Recreational Training Section. This section is responsible for providing overall supervision of Defence Academy physical and recreational training and policy, including the Defence Academy's internal sports activities and participation by Defence Academy teams in local competitions.

Chaplains. Three chaplains (one from each Service) are attached to the Defence Academy. They are from the Uniting, Anglican and Baptist churches. The Roman Catholic chaplain is located at the Royal Military College, Duntroon, and is available for all Defence Academy cadets and staff. The Chaplains are members of the military staff, however all dealings with them by staff and cadets are treated in the strictest confidence.

Student Counsellors. The student counsellors are qualified psychologists, who are available to cadets and military staff for consultation on any matter. They provide a confidential counselling service as well as running courses and workshops on issues such as study skills and stress management.

Accommodation and Facilities

All cadets are accommodated in the Officer Cadets' Quarters and are members of the Corps of Officer Cadets Mess. All members of ADSS are accommodated in the Officers' Mess. Additional facilities available in Academy House include a coffee shop, laundry and dry cleaner, hair-dresser, bookshop and banking services.

Section 2—Common Military Training

The charter of the Australian Defence Force Academy is:

(a) to provide military education and training for officer cadets for the purpose of developing their professional abilities and the qualities of character and leadership that are appropriate to officers of the Defence Force, and

(b) to provide officer cadets with a balanced and liberal university education within a military environment.

Military Training within the Academy comes under the umbrella title of Common Military Training (CMT). CMT is conducted in three distinct phases, these being aligned to the Academic timetable. The phases are:

(a) Block CMT—January–February: Block CMT at the start of each year is conducted from early January up to and including the week prior to commencement of the Academic year.

(b) Sessional CMT—March–October: Sessional CMT is conducted throughout the Academic year. Cadets are programmed into a maximum of eight military lessons per week. These lessons are primarily programmed during the working day, the exceptions being lessons which have visiting lecturers or by their nature require a night venue. There is no CMT during sessional breaks and examination periods, and in the week leading up to each of the examination periods.

(c) End of Year CMT—November–December: End of year CMT is conducted after the final examination period of the academic year. It concludes with the Graduation Parade in the second week of December.

The source document for all CMT is the CMT Syllabus. The Syllabus is maintained and updated by Training Development and Services (TDS). Amendments to CMT are vetted by TDS and approved by the CI on behalf of DMET. Major course content changes require the concurrence of the three Services.

A detailed description of the subject matter in CMT is given in Section 6.

Section 3—Sessional Break Activities

The Academic timetable allows for two sessional breaks and one week of reduced academic and military activity. These breaks are taken as two weeks in May, two weeks immediately following exams in July and one week in late September. During sessional breaks cadets are required to complete a variety of academic and military activities.

May Training Period

During their three year tenure at the Academy all cadets must undertake a selection of the following activities during the May Training Period, in the following order of priority:

(a) academic field trips;

(b) engineering workshop practice/experience;

(c) Australian Defence Force Warfare Centre (ADFWC) Joint Warfare course;

(d) Defence Studies Tour;

(e) motivational attachment to single Service units;

(f) adventurous training (including survival training); and

(g) programmed private study.

All cadets are allocated to these activities based on their respective academic and military requirements. Allocation of cadets to activities is the responsibility of the CI and will be finalised after academic enrolment and re-enrolment early each year. Year 1 cadets will undertake one week of adventure training and one week of study, except aeronautical, civil, electrical and mechanical engineers, who are required as part of their academic studies to do two weeks of workshop practice. Cadets who enrol in Oceanography 1 will complete a one week field trip in lieu of the one week study.

Service Attachments. Service Attachments consist of visits to Single Service ships and units. It is designed to give cadets an opportunity to experience life in a Service environment prior to graduation. Service Attachments will generally be restricted to Year 2 cadets.

Academic Field Trips. Some degree streams require students to participate in field trips. These trips are conducted during the May Training Period. A year 3 Geography field trip is conducted in the September break. Further detail on Academic Field Trips is given in the University College section of this handbook.

Year Three Defence Studies/ADFWC. The year 3 Defence Studies program includes the five day Defence Studies Tour of selected military bases around Australia and a four day Joint Warfare Course conducted by staff of the ADF Warfare Centre. These activities are programmed during May of each year and involve all Year 3 officer cadets. These activities are compulsory CMT programmed activities.

Adventure Training. Adventure training forms an essential part of the cadet character and leadership development program. While participation in adventure training activities is compulsory, cadets have some degree of choice between the activities available.

Adventure training activities are conducted to provide cadets with an extra dimension in training involving physical and mental challenge. The objectives are:

(a) to further develop individual qualities which are required in times of military conflict, such as courage, endurance, resourcefulness, mutual trust and teamwork;

(b) to exercise leadership, planning and organising skills;

(c) to familiarise cadets with the terrain of Australia; and

(d) to introduce cadets to a wide range of military-orientated skills.

Survival Training. The Academy offers survival training in a variety of environments. These exercises are of five days duration during which officer cadets are taught the basics of survival in the field.

May Training

General Guide. The following table provides a general guide of activities a cadet can expect to participate in during the May training period, depending on his/her Service and specialisation. The hatched areas represent activities that may be foregone or rescheduled if a cadet is required to complete an academic field trip. The table designates the May break from 1—6 with blocks 1 & 2 for year 1, blocks 3 & 4 for year 2, and blocks 5 & 6 for year 3 officer cadets.

	YR 1		YR 2		YR 3	
BE (AERO)	WP	WP	WE	WE	AL	JWC
BE (CIV)	CE	STUDY	WE	WE	SVY	JWC
BE (ELEC)	WP	WP	WE	WE	DS	JWC
BE (MECH)	WP	WP	WE	WE	DS	JWC
BTECH (AERO)	WP	WP	SA	SA	AL	JWC
REMAINDER	STUDY	ADV	SA	SA	DS	JWC

LEGEND

ADV	Adventure Training
AL	Aeronautical Laboratories
CE	Introduction to Civil Engineering
DS	Defence Studies Tour
JWC	Joint Warfare Course
SA	Service Attachments
STUDY	Programmed Study
SVY	Surveying Camp
WE	Workshop Experience
WP	Workshop Practice

Hatched area represents periods when academic field trips can take precedence over military activities

Notes:

1. Midshipmen attend Motivational Training instead of Workshop Experience in Year 2.
2. Army Work Experience is conducted in units.
3. Navigators and Observers attend Navigation Camps as part of Motivational Training in Year 2.

July Break

The July break of two weeks immediately follows the mid-year examination period. All cadets are required to take two weeks leave during this period. There are generally no organised Academy military or academic activities permitted. Some Midshipmen will undertake motivational training during the period.

September Break

The week immediately prior to the Labour Day weekend in late September or early October is one of reduced military and academic activity. All Year 1 cadets (except those with an Academy Commendation) and those under academic warning remain at the Academy to undertake activities as required by the Director of Military Education and Training. Those cadets who have academic field trips or those Year 2 cadets who have military commitments outstanding will be required to attend those activities during this period. All other cadets may study at the Academy or any other place they desire. All travel is at the individual cadet's expense.

Civilian Participation

University College academic staff may participate in sessional break activities subject to approval of the Chief Instructor.

Section 4—Sport

All cadets at the Academy are required to participate in at least one organised competition sport during the winter season. Sports within the Academy are:

(a) Australian Rules Football,
(b) Basketball,
(c) Hockey,
(d) Netball,
(e) Orienteering,
(f) Rowing,
(g) Rugby Union,
(h) Sailing,
(i) Soccer,
(j) Touch Football,
(k) Triathlon,
(l) Volleyball, and
(m) Water polo.

All sports participate in the Canberra competitions. Participation in Academy Sport is part of the CMT curriculum.

The Defence Academy provides excellent facilities for many other recreational activities. They are organised and conducted on a voluntary basis by interested staff and cadets. (See Section 7)

Section 5—Graduation Requirements

To graduate from the Corps of Officer Cadets (COOC), officer cadets must successfully complete the CMT program as well as be awarded their degree. Cadets undertaking the BE are an exception - they may graduate from the Corps after their third year provided they are on schedule to complete their degree during their fourth year. Where cadets fail to satisfy military training requirements but pass academically, and are considered suitable for further military training, they may pass out of the COOC to single service colleges but they will not be deemed graduates of the Corps.

Completion of the CMT program requires that cadets:

(a) pass all CMT subjects,

(b) display the qualities expected of an officer, and

(c) be recommended by the Commandant as suitable to graduate, having met the requirements at (a) and (b).

At any time cadets who do not meet requirements (a) and (b), or who are considered unable to meet the requirements prior to graduation, may be required to show cause why their appointment should not be terminated. The progress of each cadet is reviewed regularly by the Broad of Review to identify those who are not meeting requirements (as well as those who are worthy of commendation). Inability to develop or display appropriate officer qualities may be signified by a number of events, or it may be signified by one significant event such as a conviction by a civil court or a military tribunal. In those instances the Commandant may recommend immediate suspension of the cadets.

For any academic, civil, or military matters pending against a cadet, if a decision against the cadet would preclude the cadet from graduating, the cadet may not graduate, march on the graduation parade or attend the graduation ball until the matter is finalised. Later, if the matter is decided in favour of the cadet, then the cadet will be allowed graduate status.

Year 3 cadets with long term medical restrictions who have not satisfied the military training requirements because of their restriction may graduate if they satisfy all other requirements. Aspects of training they have not completed will be recorded on their final report. Those with short term restrictions who are available for retest will be expected to satisfy the graduation requirement.

Year 3 cadets who fail to graduate but continue on to professional military training will be granted the option of remaining behind for another week to pass all tests. If they pass, their final report will be redrafted to record them as graduating, they will be added as a late entry to the Role of Graduates, and a Graduation Certificate will be mailed to them.

Year 3 cadets who have failed military training subjects may also be retested to Academy standards at any mutually convenient time in the year following their passing out of the Corps of Officer Cadets. In this case their date of graduation will be recorded as the date they successfully satisfied the military requirements. Retesting is to be arranged through the CI.

Assessment for each subject area in CMT is indicated in the detailed subject break up in Section 6.

Military Prizes

At the conclusion of each year, all cadets have their performance reviewed by the Commandant. As a result of this review of performance, the following military prizes are awarded to cadets annually.

Name of Prize/Donor	*Awarded For*
The Commander in Chief's Medal (Governor General)	Most outstanding third year cadet in the fields of military and academic achievement, leadership, personal example and performance of duty during the Cadet's time at the Defence Academy.
The Chief of Defence Force Prizes (one prize for each service)	Most outstanding performance in military and academic subjects over three years.
The RSL Prize	The third year cadet displaying the highest standard of leadership and officer development.
The Australian Defence Industries (ADI) Prize	Most promising first year cadet in military studies.
The A. J. Hayter Scholarship	The midshipman deemed to be the best Naval Honours prospect.
The Petro Fedorczenko Bequest	The cadet deemed to be the best honours or fourth year engineer prospect.
The Judge Advocate General's Prize	Best performance in Military Law studies.
The Joint Services Staff College Association Prize	Most outstanding third year cadet in the English Communications Program over three years.
First Year Military Training Award (Doubleday Australia and Pacific Defence Reporter)	Best first year cadet in Military Training.
Second Year Military Training Award (Doubleday Australia)	Best second year cadet in Military Training.
Third Year Military Training Award (Doubleday Australia)	Best third year cadet in Military Training.
The Navy Military Training Award (The John Palmer RN Prize)	Best performance by a midshipman in Military Training over three years.
The Army Military Training Award (National Australia Bank)	Best performance by an Army officer cadet in Military Training over three years.
The Air Force Military Training Award (University Cooperative Bookshop Ltd)	Best performance by an Air Force officer cadet in Military Training over three years.

Section 6—Common Military Training (CMT) Subject Descriptions

Common Military Training (CMT) has been detailed below to indicate subject content and the total time allocated, in 50 minute periods. CMT subjects are instructed throughout the year. Additional study, research or preparation for assignments is required, but no definitive quantitative assessment of out-of-hours demand can be provided due to individual abilities. Block CMT activities are conducted outside the academic year and as such do not impinge upon study requirements. All lessons shown below appear as part of the CMT syllabus.

All CMT subjects, including Physical Training, are assessed, usually by direct practical and/or theory examinations. The assessment scale used for CMT is the High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL) scale, which is common to all academic and military training and education at the Academy. An important difference between the assessment scales for academic education and military training is that the cut-off marks for the military assessments are higher - 65%, 75%, 85% and 95% for PS, CR, DN and HD. In case of failure in military subjects, cadets undergo remediation and re-testing, but the results of re-examination will be recorded as a Pass or a Fail.

Common Military Training

Subject	*Yr 1*	*Yr2*	*Yr3*	*Total*
Character Development	8	27	9	44
Counselling Skills	–	5	–	5
Defence Studies	13	13	89	115
Drill and Ceremonial	71	52	57	180
Drug and Alcohol Awareness	2	4	1	7
English Communication	31	33	34	98
Field Training	18	–	–	18
First Aid	16	8	–	24
Health and Safety	2	18	–	20
Interpersonal Relations	4	3	6	13
Leadership	30	61	31	122
Military Etiquette	18	15	20	53
Military Law	10	10	4	24
Military Orientation	24	–	–	24
Physical Training	54	46	62	162
Psychological Testing	3	–	–	3
Service Conditions	–	–	5	5
Stress Management	4	–	–	4
Study Skills	3	–	–	3
Weapons	22	27	–	49
TOTAL	*333*	*322*	*318*	*973*

Character Development

The Character Development course consists of 44 periods spread over the three years. It is closely integrated with Leadership training. Subjects include:

(a) Personal Qualities,

(b) Ethics and Morality,

(c) Decision Making, and

(d) Character Development Seminar (3 days continuous).

Counselling Skills

The Counselling Skills course enables cadets to conduct non-judgemental counselling and performance and discipline interviews of subordinates. It consists of five periods in Year 2.

Defence Studies

The Defence Studies course includes the history of the three Services, Australia's participation in past wars, current affairs and Australia's strategic outlook. It consists of 115 periods over the three years.

Year 3 cadets undertake a five day tour of defence facilities around Australia which highlights aspects of the Defence Studies program and they also participate in an introductory Joint Warfare course conducted by staff from the Australian Defence Force Warfare Centre.

Drill and Ceremonial

The Drill and Ceremonial course prepares cadets to participate in Academy ceremonial parades and to perform those drill and ceremonial duties required of a junior officer. It promotes a sense of discipline and esprit de corps.

It consists of 180 periods spread over the three years. Subjects include:

(a) Customs and Traditions,

(b) Foot Drill,

(c) Rifle Drill,

(d) Sword Drill,

(e) Colour Drill, and

(f) Ceremonial Parades.

Drug and Alcohol Awareness

The Drug and Alcohol Awareness course raises cadets' awareness of the symptoms and consequences of drug and alcohol abuse. The course consists of seven periods over the three years.

English Communication

The English Communication course is designed to develop cadets' oral and written skills over their three years at the Academy. The course consists of 98 periods spread over the three years. Subjects include:

(a) sentence and paragraph construction,

(b) synopsis writing,

(c) advanced research techniques,

(d) meeting procedures,

(e) oral briefs,

(f) impromptu speaking, and

(g) drafting service correspondence, including:

(1) service essays,

(2) visit briefs,

(3) minutes,

(4) messages,

(5) official letters,

(6) demi-official letters,

(7) post exercise reports, and

(8) administrative instructions.

Field Training

In Field Training, cadets learn how to live in the field as members of a group and how to navigate on land. The course consists of 18 periods at the beginning of Year 1.

First Aid

In First Aid, cadets learn the basic first aid required for common injuries likely in the field environment. The course consists of 16 periods at the beginning of Year 1 and 8 periods at the end of Year 2. It is assessed by written (theory) and practical tests in Year 2.

Health and Safety

Health and Safety course includes Occupational Health and Safety (OH&S) Induction training, completed in Year 1, and OH&S Supervisor training late in Year 2. Health and Safety is not asesssed.

Interpersonal Relations

The Interpersonal Relations course teaches cadets the standards of behaviour acceptable in the ADF and the measures appropriate for dealing with unacceptable behaviour. The course consists of 13 periods spread over the three years.

Leadership

The Leadership course is fundamental to the training of junior officers. Leadership training is conducted formally in the classroom and in practical exercises in the field. In addition to formal training, cadets gain practical leadership experience informally through participation in team sports and by assuming positions of responsibility within the COOC hierarchy. The Leadership course consists of 122 periods spread over the three years.

Year One Leadership training serves as an introduction to the subject. It incorporates elements of military psychology, 'followership' and an experiential learning exercise. It consists of 30 periods.

Year Two Leadership training comprises 61 periods. The following theory subjects are covered:

(a) human behaviour, both individual and group,

(b) interpersonal communications and leadership,

(c) leadership styles, approaches and qualities,

(d) motivation, discipline and morale,

(e) the functional approach to leadership, and

(g) the situational approach to leadership.

Year Two Leadership training culminates in Exercise LEADERSHIP CHALLENGE, which is the only exercise where cadets are formally tested on their ability to put leadership theory into practice. It is a non-tactical field exercise, in which cadets participate in a series of challenging small-group tasks, covering about 70 km over four days. Each cadet must perform as group leader at least twice, and all cadets are continuously assessed by Directing Staff drawn from Academy military staff.

Year Three Leadership training comprises 31 periods. The following subjects are covered:

(a) revision of key leadership theory principles,

(b) military ethics and professionalism,

(c) case studies of typical problems facing junior military leaders.

Military Etiquette

Military Etiquette includes instruction in the customs of the services and mess etiquette. Each cadet attends a number of Dining-In Nights during the three year course.

Military Law

The Military Law course provides cadets with the knowledge required to apply military law as a junior officer. It comprises study of the Defence Force Discipline Act, the Geneva Conventions and the Laws of Armed Conflict. The course consists of 24 periods spread over the three years. The subject matter is broken up as follows:

(a) components of the DFDA,

(b) principles of natural justice,

(c) identification of service offences,

(d) compilation of Summary Proceedings Reports,

(e) Service Tribunals,

(f) arrest procedures,

(g) custody and suspension,

(h) investigation of service offences,

(i) search procedures,

(j) rules of evidence,

(k) summary proceedings,

(l) punishments,

(m) post trial procedures, and

(n) Laws of Armed Conflict.

Military Orientation

The Military Orientation course teaches new Year 1 cadets the basic principles that facilitate their assimilation into the Academy. It is a 24 period course. Subjects include:

(a) Academy aims, charter and organisation,

(b) the COOC Hierarchy,

(c) COOC Standing Orders,

(d) Pay and Allowances,

(e) Fire Fighting,

(f) Uniform cleaning and preparation, and

(g) Security.

Physical Training and Sports

Academy Physical Training (PT) is designed to assist cadets to develop and maintain high personal standards of physical fitness and to prepare them for their physical responsibilities at the Defence Academy and in the Services. They are taught the importance of fitness and diet. The PT program consists of 162 periods over three years, including:

(a) swimming,

(b) aerobics,

(c) vaulting,

(d) individual fitness testing,

(e) competitive (inter squadron) sports carnivals, and

(f) major winter sports and training.

All cadets must undergo the Academy Fitness Test (AFT) each semester. Cadets who fail to meet the standard required will be given remedial training and will be retested. It is a graduation requirement to pass the AFT in Year 3.

Service Conditions

At the end of Year 3, cadets are briefed on conditions of service issues relevant to their status as newly commissioned officers about to proceed on the first posting of their careers. The briefings total five periods.

Stress Management

In the Stress Management course, cadets are instructed on the aetiology and management of stress. Particular emphasis is placed on coping with specific stressors associated with life at the Academy. Presentations are conducted by the Student Counsellors over four periods early in Year 1, including:

(a) stress and the human being,

(b) sources of stress and stress and performance,

(c) coping with stress, and

(d) practical stress management techniques.

Study Skills

The Study Skills course gives cadets guidance on how to plan and organise their study time. Study Skills is instructed by the student counsellors over three periods at the beginning of Year 1. Subjects include:

(a) organisation and timetabling,

(b) questioning and notetaking,

(c) improving concentration and effective reading, and

(d) examination preparation and techniques.

Weapons Training

Weapons Training includes the handling, firing and maintenance of the standard ADF rifle and pistol. Weapons Training consists of 49 periods (22 early in Year 1 and 27 late in Year 2). Army cadets undergo additional weapons training during periods of Single Service Training, conducted away from the Academy.

Section 7—Voluntary Extra-Curricular Activities

Cadets have the opportunity to participate in a range of voluntary extra- curricular hobby and general interest activities. The following clubs are presently available:

(a) Band and Choir,

(b) Cricket,

(c) Debating,

(d) Military Shooting (with the Canberra District Army Rifle Association),

(e) Performing Arts,

(f) Yearbook.

Membership is open to all cadets, staff and members of the University College. Cadets with other interests may apply to form other Clubs, or they may participate individually.

Section 8—Single Service Training

The CMT program conducted at the Defence Academy covers areas common to all three Services. Officer cadets are given instruction particular to their Service during periods called Single Service Training. Single Service Training is conducted at the individual Service training establishments during block and end of year CMT periods. Officer cadets will spend up to 16 weeks (depending on Service) over three years on Single Service Training.

The University College

Structure of the University College

There are twelve academic Schools in the University College. The heads of the Schools are appointed by the University Council. Vice-Chancellor

The senior academic body of the University College is the Academic Board. This body functions as a faculty of the University and it reports to the University's Academic Board.

Academic grouping is into three Boards of Studies—in Humanities and Social Sciences, in Science and in Engineering—which report to the Academic Board.

The University Council has approved the establishment of Advisory Committees associated with each of the Boards of Studies which may be convened if necessary.

The University College Academic Board

Composition

- The Rector
- The Commandant of the Academy plus one member of the military staff nominated by him.
- The professors, associate professors, senior lecturers, lecturers and associate lecturers in the subjects for which the University College is responsible.
- The Librarian of the University College.
- Not more than four military members appointed by the Vice-Chancellor of the University in consultation with the Commandant and Rector.
- Student representatives as for faculties of the University.
- The Registrar, or nominee, as Secretary to the Board.
- Such other persons having appropriate qualifications as the University Council may appoint.

Presiding Member

The Academic Board elects a Presiding Member to chair its meetings and to discharge any other duties which the University Council may assign.

Terms of Reference

The terms of reference for the Academic Board are generally as set out in Chapter IV (The Faculties) of the By-laws of the University in respect of all matters.

Committees

The standing committees established under the By-laws by the Academic Board are the Executive Committee, the Higher Degree Committee, an Assessment Committee for each one of the Boards of Studies, and executive committees for the Higher Degree Committee and the Assessment Committees.

Executive Committee of the University College Academic Board

Composition

- The Presiding Member of the University College Academic Board
- The Rector
- The Commandant of the Academy plus one member of the military staff nominated by him.
- The heads of Schools of the University College and professors of the University College who are not heads of Schools
- The Presiding Members of the three Boards of Studies of the Academic Board
- The Registrar, or nominee
- Such other persons having appropriate qualifications as the Academic Board may appoint.

Function

The Executive Committee meets as required to consider all business relating to the Academic Board, and it submits to each meeting of the Academic Board recommendations upon matters contained in the agenda.

Higher Degree Committee

Composition

- The Presiding Member of the University College Academic Board
- The Rector
- The Heads of Schools of the University College and professors of the University College who are not heads of Schools
- The Registrar, or nominee
- Such other members of the University College Academic Board as the University College Academic Board may appoint.

Function

The Higher Degree Committee is responsible for matters relating to the candidature of higher degree students under authority delegated by the University Council, and for performing such duties as may be assigned to it by Council on the recommendation of the Academic Board. The general supervision of higher degree matters is the responsibility of the University College Academic Board.

The Boards of Studies in Humanities & Social Sciences, Science and Engineering

Composition

- Appropriate groupings of members of the Academic Board, as determined by the Academic Board
- Such other persons having appropriate qualifications as the University Council may appoint.

Presiding Member

Each Board of Studies elects a Presiding Member from among its members for a period of office of two years.

Terms of Reference

Each of the Boards of Studies may make recommendations to the University College Academic Board concerning:

- the rules governing the award of the degrees with which it is primarily concerned;
- the subjects of the degree courses with which it is primarily concerned;
- the assessment of those subjects; and
- teaching, scholarship and research in those subjects;

and it considers and reports upon all matters referred to it by the Academic Board or the Executive Committee of the Academic Board.

Assessment Committees in Humanities & Social Sciences, Science and Engineering

Composition of each

- The Presiding Member of the relevant Board of Studies (Presiding Member of the Committee)
- The Presiding Member of the University College Academic Board
- The Rector
- The Registrar, or nominee
- Such other members of the University College Academic Board as the University College Academic Board may appoint.

Function

Each Assessment Committee determines the results of the students in the undergraduate courses for which the relevant Board of Studies is responsible and, where appropriate, determines each student's standing in a course.

Admissions and Re-enrolment Committee

Composition

- The Presiding Member of the University College Academic Board
- The Rector
- The Registrar, or nominee
- Such other members as the University College Academic Board may appoint.

Function

The Committee is responsible for the selection of students for admission to the undergraduate courses in the University College and the determination of applications for re-admission by students who infringe the re-enrolment rules of the University or who have previously been excluded under those rules.

Staff of the University College

Rector
John Alan Richards, BE PhD *UNSW*, FIREE, FIEAust., FIEEE, CPEng

Deputy Rector
~~Vacant~~

Presiding Member of the University College Academic Board
Ian Robert Young, BE MEngSc PhD *James Cook*, MAGU, FIEAust, CPEng

Director, Personnel, Finance and Planning
~~Terence Richard Earle, BCom *UNSW*~~

Director, Student Administration
Sally-Ann Phillips, BA *Monash*

Postgraduate Executive Officer
Peta Jayne Kennedy, BA *A.N.U.*, MA *UNSW*

Assistant Director, Student Systems
Deborah Ann Gairns, BA (Math) *Canberra C.A.E.*

Manager of Financial Services
Kelly Fenner, BA *Ambassador*, BA *S.Colorado*, MBA *Cinc.*, ACA

Manager of Personnel Services
Rosemaree Michele Laurie, BA *Tas.*

Research Office Manager
~~Beverley Jean Mutch, BA *A.N.U.*~~

Research and Further Education Officer
Patricia Elizabeth Burgess

Distance Education Administrator
Christa Elisabeth Savatich, BA GDipEd MEdAdmin *N.E.*

Document Production Centre Manager
Ronald Stuart Campbell, IPMA

Centre for Media Resources Manager
Nigel Alan Pearson, BA *N.E.*, ABIPP, ARPS, AIMI, MIScT, RBI

Equal Employment Opportunity Officer
Joan McPherson, BSW *UNSW*, DipEd *N.E.*

Staff Development Officer
Vacant

School of Aerospace and Mechanical Engineering

Associate Professor and Head of School
John Patrick Baird, BSc PhD *A.N.U.*, FIEAust, CPEng

Professor of Mechanical Engineering
Robert Kirby Duggins, BSc(Eng) *Lond.*, PhD *Nott.*, CEng, FIEAust, MIMechE, CPEng

Associate Professors
Sudhir Laxman Gai, BE *Karn.*, MSc *Belf.*, PhD *Brist.*, CEng, FRAeS, AFAIAA
Joseph Cho Sam Lai, BSc(Eng) *H.K.*, MEngSc PhD *Qld.*, MIEAust, MAIAA, MAAS, CPEng

Senior Lecturers
Rikard Benton Heslehurst, BE(Aero) MEng *R.M.I.T.*, MIEAust, MAIAA, MSAMPE, MSAE, MASC, CPEng
John Frederick Milthorpe, BSc BE MEngSc PhD *Syd.*, MDefStud GradDip *UNSW*, MAIAA, MIEAust, CPEng
Alexander Ray Watson, BE *Qld.*, MSc *Manc.*, PhD *UNSW*, CEng, FIMechE, FIEAust, CPEng
Hugh Munro Williamson, BSc(Mech Eng) *Alberta*, PhD *UNSW*, MIEAust, MIMMA, MAAS, CPEng

Lecturers
Peter James Gage, BE *Syd.*, MSc PhD *Stan.*, MAIAA, MIEAust
Michael John Harrap, BE *Melb.*, PhD *UNSW*
Ian William Linnett, BE MEngSc *Syd.*
Neil Robert Mudford, BSc PhD *A.N.U.*
Krishnakumar Shankar, BTech *IITMadras*, MSc PhD *Tas.*
Vivek Sharma, BTech *IITKharagpur*, MS PhD *Minn.*, AHS, AIAA

Associate Lecturer (Full-Time)
Kaliope Vassilopoulos, BE (Aero) *R.M.I.T.*, GradIEAust, Stud RAeS

Associate Lecturers (Half-Time)
Murat Tahtali, MSc(Mech Eng) *Mid.East.T.U.*, MASME

Research Officers
Marion Anne Burgess, BSc *Syd.*, MSc(Acoust) *UNSW*
Frank Edward Irons, BSc PhD *Syd.*

Adjunct Senior Lecturer
Martin Brett Aubury, BSc(Eng) *S'ton*, CEng, FRAeS

Visiting Military Fellow
John Frederick Lutton, BE *UNSW*, GradDipCompEng ME *R.M.I.T.*, CPEng, CEng, MRAeS, MIE Aust, RAAF

School of Chemistry

Professor and Head of School
William Gregory Jackson, BSc PhD *Melb.*, CChem, FRACI

Professor of Chemistry
Richard Bearman, AB *C'nell.*, PhD *Stan.*, FAIC, CChem, FRACI

Associate Professor
Eric Alfred Magnusson, BSc PhD *Lond.*, PhD *UNSW*, CChem, MRACI

Senior Lecturers
Alan Peter Arnold, BSc *Melb.*, PhD *Tas.*, CChem, MRACI
John Grant Collins, BSc PhD *A.N.U.*, CChem, MRACI
Kenneth Robert Harris, BSc PhD *Adel.*, CChem, MRACI
Dennis Joseph McHugh, BSc *Syd.*, PhD *UNSW*
Clifford Edwin Woodward, BSc PhD *Syd.*, DOC *Lund.* CChem, MRACI

Lecturers
Rodney John Blanch, BSc PhD *Qld.*, CChem, FRACI
John Arthur Broomhead, MSc DSc *Syd.*, PhD *A.N.U.*, CChem, FRACI

Associate Lecturers
Simon Antony Hudson Petrie, BSc PhD *Cant.*
Abul Fazal Mohammad Mokhlesur Rahman, MSc *Rajsh.*, DiplChem Dr rer nat *Regensburg*, CChem, MRACI
Roger Bruce Waring, BSc PhD *A.N.U.*, CChem, MRACI

Senior Research Scientist
Benjamin Colin Freasier, BSc PhD *Louisiana State*, CChem, MRACI

Senior Programmer
Stephen James McMahon, BSc *A.N.U.*

Visiting Fellow
Hugh Albert McKenzie, MSc PhD *Syd.*, FRSC, CChem, FRACI

Visiting Military Fellow
Barry Brian Snushall, RAN, BSc *N'cle (NSW)*, MSc *UNSW*

School of Civil Engineering

Professor of Civil Engineering and Head of School
Ian Robert Young, BE MEngSc PhD *James Cook*, MAGU, CPEng, FIEAust

Associate Professors
Muhammad Naseerul Haque, BSc(Eng) *W.Pak. Eng.*, MEng *A.I.T. Bangkok*, PhD *UNSW*, CPEng, FIEAust, MACI, MASCE
Stephen Ross Yeomans, BSc PhD *UNSW*, CPEng, MIEAust., MIMMA

Senior Lecturers
Bruce Wilfrid Golley, BE *Adel.*, MSc(Eng) PhD *Qu.*, CPEng, FIEAust
Obada Kayali, BE *A.U. Beirut*, MSc PhD *Strath.*, CPEng, MIEAust
Keith Thomas Linard, BE BCom BTRP Dip TRP *Melb.*, CPEng, MIEAust
Sik-Cheung Robert Lo, BSc *H.K.*, PhD *UNSW*, MICE, MIStructE, CPEng, MIEAust, MHKIE
Raymond Charles Nelson, BE MEngSc *UNSW*, ASTC, CPEng, FIEAust
John Sneddon, BSc(Tech) *N'cle (NSW)*, BE PhD *UNSW* CPEng, MIEAust, MISAust
Anthony Thomas Webb, BSc BE *Syd.*, MEngSc PhD *UNSW*, DipHydEng *Delft*, MAMSA, MIAHR, CPEng, MIEAust
Alan Stephen White, BTech *Adel.*, MBldgSc *Melb.* MAIB, MAIPM, AIArbA

Lecturers
Gary F. Barker, BE *Swinburne*, CPEng., MIEAust., psc
~~Bachir Brimo, BSc (Civ Eng) *Aleppo*, PhD *T.U. Freiberg*, CPEng., MIEAust.~~

Visiting Military Fellow
Anthony George Wallace, BEc *Qld.*, BE MEngSc *UNSW*, GradDipMgtStud, CPEng, MIEAust, psc

School of Computer Science

Professor of Computer Science and Head of School
Charles Sinclair Newton, Cand Scient *Copenhagen*, PhD *A.N.U.*

Senior Lecturers
Mariam Fergusson, BA *Macq.*, MSc *A.N.U.*
Thomas Graham Freeman, BSc PhD *Qld.*
George William Gerrity, MSc *Sask.*, PhD *A.N.U.*
David Leon Hoffman, BA *A.N.U.*
Edward James Essington Lewis, BSc PhD *N'cle (NSW)*
Donald Kay Munro, BA *A.N.U.*, MACS
Andrew John Quaine, BEE BSc *Melb.*, MSc *A.N.U.*
Xin Yao, MS *N.C.I. Beijing*, PhD *U.S.T.C. Hefei*

Lecturers
Michael Barlow, BMath *W'gong*, PhD *UNSW*
Lawrence Peter Brown, BSc *Monash*, PhD *UNSW*
Frantz Clermont, BSc MSc *Polytech. Univ. N.Y.*, PhD *A.N.U*
Dennis Neil Hart, BSc *Adel.* BAppSc *Charles Sturt*
Christopher John Lokan, BSc PhD *A.N.U.*
Robert Ian McKay, BSc *A.N.U.*, PhD *Brist.*
Robert Allan Pearson, BSc *Adel.*, PhD *Miami*, DipEd *Monash*, GradDipAdmin *Canberra C.A.E.*
Santha Sampath, MSc PhD *Osm.*, GradDipCompStud *Canberra C.A.E.*
Jian Yang, BSc *N.Jiaotong*, PhD *A.N.U.*

Associate Lecturers
Jennifer Mary Backhouse, BA DipEd *Syd.*
Daryl Essam, BSc *N.E.*
Michael John Ford, DipMechEng *R.M.I.T.*, FIEAust, CPEng
Warren Keith Toomey, BSc *N.E.*
~~Christopher John Stanley Vance, BSc *A.N.U.*, PhD Grad CertHEd *UNSW*~~

Visiting Military Fellows
LCDR Gary Millar, BSc DipEd *Flin.*, DipCompSc *Canberra C.A.E.*, MInfSc *UNSW*
SQNLDR Gregory Shaw, BBus *D.D.I.A.E.*, MSc *Cran.*

School of Economics and Management

Associate Professor and Head of School
Paul Anthony McGavin, BA *N.E.*, MEconSt *Qld*, ThDip *A.C.T.* , PhD *Melb.*, ASA, AIMM, MACE

Professor of Economics
Wolfgang Ernst Kasper, Staatl gepr Ubers Dipl Volksw *Saarbr.*, Dr rer pol *Kiel*

Associate Professors
Jeffrey William Bennett, BAgEc *N.E.*, PhD *A.N.U.*
Peter Hall, MA MPhil *Oxf.* (from 1 January 1997)
Paul Laurence Robertson, AB *Mich.*, MA PhD *Wisc.*, MBA *Deakin*, FAIM

Senior Lecturers
Cheah Hock-Beng, MSocSc *Sing.*, MPhil DPhil *Sus.*
Gary J. Manger, BA MCom PhD DipEd *UNSW*, ASIA, FAIM
Stefan Markowski, MSc Econ *Warsaw*, PhD *Lond.*
Abul Mansur Mohammad Masih, MA *Dhaka*, MA(Econ) *Manc.*, PhD *Leeds*
Robert Ian McEwin, BBus *Mitchell C.A.E.*, MCom *N'cle (NSW)*, LLB PhD *A.N.U.*
On Kit Tam, BSSc *Chinese H.K.*, PhD *LaT.*

Lecturers
Sharon Jackson, BA *N'cle (NSW)*, MEc *A.N.U.*
Arlene Susan Rutherford, BAgSc *Qld.*
James Raymond Warn, BA DipEd *Melb.*, GradDipMgt *CQU*, PhD *LaT.*, MAPsS

Associate Lecturers
Elizabeth Barber, BA MEconSt *Qld.*
Antonius Wilhelmus Gerardus Maria Huybers, Dipl *HEAO Sittard,* Drs(Econ) *Limburg*

Research Assistant
Albert Richard Alexander Dessi, BEc GradDipEc *A.N.U.*

School of Electrical Engineering

Senior Lecturer and Head of School
Geoffrey Cochrane, BSc *Lond.*, PhD *N.E.*, CPhys, MInstP, SMIREE, MIEAust, CPEng

Professor of Electrical Engineering
John Alan Richards, BE PhD *UNSW,* FIREE, FIEAust., FIEEE, CPEng

Associate Professors
John Fredrick Arnold, BE MEngSc *Melb.*, PhD *UNSW,* FIEAust, SMIEEE, CPEng
Michael Charles Cavenor, BSc *Aston,* PhD *N.E.*, SMIEEE, MIEAust, CPEng
Donald Fraser, BE PhD *Syd.*, SMIEEE, SMIREE, MIEAust, MACS, MINNS, MAPRS, CPEng
Ian Richard Petersen, BE *Melb.*, MSEE PhD *Rochester,* SMIEEE, MIEAust, MSIAM, CPEng

Senior Lecturers
John Desmond Cashman, BE PhD *UNSW,* BA MSc *A.N.U.*, MIEEE, MIEAust
Michael Robert Frater, BSc BE *Syd.*, PhD *A.N.U.*, DipHEd *UNSW,* MIEEE
Lal Chand Godara, BE *B.I.T.S.*, M Tech *I.I.Sc,* PhD *N'cle (NSW),* SMIEEE, FASA.
~~Trevor Ian Hobbs, BSc PhD, AMusA *Adel.*, MIEEE~~
Hemanshu Roy Pota, BE *S.Guj.*, ME *I.I.Sc.*, PhD *N'cle (NSW)*
Duco Willem Johannes Pulle, MSc *T.U.Eindhoven,* PhD *Leeds,* MIEE, CEng

Lecturers
Andrew John Lambert, BSc(Hons) *Otago,* APRS
Mark Richard Pickering, BE *C.I.A.E.*, ME PhD *UNSW,* MIEEE

Associate Lecturer
Xiuping Jia, BEng *Beijing,* MIEEE

Professional Engineers
Peter Alan Boyland, BAppSc *Canberra*
Gregory Neville Milford, BE *Qld,* MEngSc *UNSW,* MIEEE
Anthony Peter Watson, BSc BE *Syd.*

Research Fellows
Wee Sun Lee, BE(Hons) *Qld,* MIEEE
S. O. Reza Moheimani, BSc *Shiraz,* MEngSc PhD *UNSW,* MIEEE
Valeri Ougrinovski, PhD *Nizhny Novgorod*

Research Officers
Zheng Zhitao, MSc *Peking*

Programmers
Martin Benhard Rolf Kuchlmayr, BSc *A.N.U.*
Dong Wang, BSc *Syd.*
James Gordon Webb

Visiting Military Fellows
John Wade Kearney, BE *RMIT,* MSc *Cran.*, MIEAust, MIEEE
Michael John Ryan, BE MEngSc *UNSW,* GradDipMgtStud, MIEAust, SMIREE, AIMM, CPEng

School of English

Professor of English and Head of School
Bruce Harry Bennett, AO, BA DipEd *W.Aust.*, MA *Oxf.*, MA(Ed) *Lond.*, FAHA, FACE

Associate Professors
Paul Raymond Eggert, BA *Syd.*, MA *Melb.*, PhD *Kent*
Susan Patricia Lever, BA *A.N.U.*, DipLib *Canberra C.A.E.*, MA PhD *Syd.* (from 1 January 1997)

Senior Lecturers
Adrian David Caesar, BA PhD *R'dg.*
David John Headon, MA DipEd *Syd.*, PhD *Br.Col.*
Clara Elizabeth Lawson, MA DipEd *Syd.*, PhD *W.Aust.*

Lecturers
Jeffrey Cameron Doyle, BSc BA *Syd.*
Philippa Kelly, BA PhD *Qld.*
Heather Lucy Elizabeth Neilson, BA *Melb.*, DPhil *Oxf.*
Catherine Cecilia Pratt, BA *A.N.U,* PhD *UNSW*

Associate Lecturer
Peter David Looker, BA *LaT.*

Research Assistants
Susan Cowan, BA *A.N.U.*
Sarah Randles, BA *Syd.*

Visiting Research Fellows
Gerald E. Bentley, BA *Princeton,* BLitt DPhil DLitt *Oxf.*
Jose Yap Dailsay, AB *Philippines,* MFA *Mich.*, PhD *Wisc.*

Honorary Visiting Fellows
Harry Payne Heseltine, AO, BA *W.Aust.*, MA PhD *Louisiana State*
Joy Wendy Hooton, BA MPhil *Lond.*
Geoffrey Shields Ingram
Geoff Page, BA DipEd *N.E.*
William Henry Wilde, MA DipEd *Syd.*, MACE

School of Geography and Oceanography

Senior Lecturer and Head of School
Laurence John Olive, BSc *N.E.*, MSc *Tas,* GradDipProfAccount *Canberra C.A.E.*

Professor of Geography
Roger Fairbairn McLean, MA. *N.Z.*, PhD *McG.*

Senior Lecturers
Kay Janette Anderson, BA *Adel.*, PhD *Br. Col.*
James Sidney Burgess, MA PhD *Cant.*
Peter Crabb, CertEd *Lond.*, BSc *Glas.*, MA *Adel.*, PhD *Hull*
David Shaw Gillieson, BA PhD *Qld.*
Clifford John Hearn, BTech *Brunel,* PhD *Wales*
Peter Eric Holloway, BSc PhD *Flin.*

Graham Symonds, BSc *Flin.*, PhD *Dal.*
Paul Joseph Tranter, BA PhD *N'cle (NSW)*
Richard Nunes Vaz, BSc *Lond.*, PhD *Wales*
Kenneth L. White, MA *Cal.State,* PhD *Calif.*

Lecturer
Rochelle Elizabeth Ball, BA *N'cle (NSW),* PhD *Syd.*

Associate Lecturers
Glenn Adrian Banks, MSc *Cant.*
John William Doyle, BSc *McG.*, MA *A.N.U.*
David James Paull, MA *Adel.*
Jiashu Shen, BSc *East China*, PhD *W'gong*
Hua Wang, BSc *Shandong*, PhD *James Cook*

Research Assistant
Julie Ann Kesby, BSc *N.E.* Grad. Dip Lib *Canberra C.A.E.*

School of History

Professor of History and Head of School
Peter John Dennis, BA *Adel.*, MA PhD *Duke*, DipT(Sec) *Adel. T.C.*, FRHistS

Associate Professor
Jeffrey Guy Grey, BA *A.N.U.* PhD *UNSW* (from 1 January 1997)

Senior Lecturers
Francis Michael Cain, MA *Adel.*, PhD *Monash*
Stewart Peter Lone, BA *Lond.*, PhD *A.N.U.*
Robin Prior, BA PhD *Adel.*, ALAA
Roger Clark Thompson, BA DipEd *Melb.*, PhD *A.N.U.*
Gerald Patrick Walsh, MA DipEd *Syd.*, MA *A.N.U.*

Lecturers
Linda Jean Bowman, BA *Pomona*, MA PhD *Calif.*
Charles Glyn-Daniel, BA *Birm.*, FREconS

Associate Lecturers
Debbie Gayle Lackerstein, BA *Adel.*
Christopher William Waters, BA LLB *Melb.*, MA *Lond.*, PhD *UNSW*

Research Assistants
Helen Boxall, BA *A.N.U.*
John Stephen Connor, BA *A.N.U.*, DipEd *Canberra*
Elizabeth Patricia Greenhalgh, BA *Manc.*

School of Mathematics and Statistics

Professor and Head of School
Colin Pask, BSc *Lond.*, PhD *UNSW*

Professor of Mathematics
Rowland Alexander Sammut, BSc *UNSW*, PhD *A.N.U.*

Associate Professor
Edward Arthur Catchpole, BSc *Lond.*, MSc *Kent*, PhD *Dund.*

Senior Lecturers
Geoffrey Karl Aldis, BSc(Med) *Syd.*, BA BMath *W'gong.*, PhD *Camb.*
Stephen John Garth, BSc PhD *A.N.U.*
Peter Donald McIntyre, BSc PhD *A.N.U.*
Rodney Oscar Weber, BSc *Melb.*, PhD *Tas.*

Lecturers
Steven Ian Barry, BSc *Adel.*, PhD *UNSW*
Wendy Rosemary Catchpole, BSc *Lond.*, MSc *Dund.*, PhD *UNSW*
Mark Francis Collins, BSc *Syd.*, MSc *Kent*, PhD *UNSW*
Glenn Robert Fulford, BSc *A.N.U.*, PhD *W'gong*

Associate Lecturers
Barbara Rae Anderson, BSc *W'gong.*, DipEd *Canberra C.A.E.*
Zlatko Jovanoski, BSc *Monash,* PhD *UNSW*
Caroline Houda Rasheed, BSc *Adel.*
Harvinder Singh Sidhu, BSc, PhD *Qld.,* DipEd *S'pore.*

School of Physics

Associate Professor and Head of School
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Associate Professors
Ian Arthur Bourne, BSc PhD *N.E.*, MAIP
Stewart James Campbell, BSc *Aberd.*, MSc *Salf.*, PhD *Monash*, CPhys, FInstP, FAIP
Donald Hugh Chaplin, BSc PhD *Monash*, FAIP, MIIR

Senior Lecturers
Vincent Alistair Drake, MA DPhil. *Oxf.*, FRMetS, GradCertHEd *UNSW*
Dennis Keith Fowler, MSc *N.E.*, PhD *UNSW*, MAIP
Dennis John Isbister, BSc PhD *UNSW*, MSc *Indiana*
~~Robert William Noel Kinnear, MSc *N.Z.*, PhD *UNSW*, MAIP~~
Peter Lynam, BSc *Birm.*, PhD *S'ton.*, CPhys, FAIP, MInstP
Garry Robinson, BSc PhD *Melb.*, ARMIT
Robert Gordon Smith, BSc PhD *Melb.*, MAIP, MASA, MAAS, FRAS
Glen Alan Stewart, BSc PhD DipEd *Monash*, FAIP
~~Philip Wayne Thompson, BSc *Adel.*, MSc *W'gong*, DipT *Adel. C.A.E.*, PhD *UNSW*, MAIP, MACE~~

Lecturers
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John Robert Taylor, BSc PhD *A.N.U.*, MAIP, MAGU

Computing Services Officer
Stephen James, BSc PhD *Melb.*, MAIP,

ARC Senior Research Fellow
Craig Smith, BSc PhD *Melb.*, MAIP, MS, MASA, MAAS

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ARC Research Associates
Stephen Andrew Holt, BSc PhD *Griffith*
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Ardon Robin Hyland, BSc *Qld.*, PhD *A.N.U.*, FAIP, MIAU, MASA

Honorary Visiting Fellow
Gert Herman Wantenaar, MSc *Natal*, PhD *UNSW*, DipEd *Canberra*

School of Politics

Associate Professor and Head of School
Carlyle Alan Thayer, AB *Brown*, MA *Yale*, PhD *A.N.U.*

Associate Professors
Anthony Samuel Bergin, BA LLB *Monash*, MA PhD *A.N.U.*
William Hugh Smith, BSc(Econ) MPhil *Lond.*, PhD *A.N.U.*

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Paul Ernest Keal, BA *Flin.*, PhD *A.N.U.*
David Kelly, BA PhD *Syd.*
Chandran Kukathas, BA *A.N.U.*, MA *UNSW*, DPhil *Oxf.*
David William Lovell, MA *Flin.*, PhD *A.N.U.*
Malcolm Hugh Mackerras, BEc *Syd.*
William Lee Maley, BEc LLB MA *A.N.U.*, PhD *UNSW*
Aurelia Dorane George Mulgan, BA *Auck.*, MA *Well.*, PhD *A.N.U.*

Associate Lecturer
Shirley Scott, BMus BA PhD *Qld.*

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Susan Constance Moss, BA *A.N.U.*
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Adrian Van Ash, BA *UNSW*, BD *M.C.D.*, Dip Ed *N.E.*, AALIA

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Applications Development Manager
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Database Manager
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Information Technology Services Centre

Information Technology Services Manager
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Deputy Manager
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Senior Programmer
Geoffrey Jack Collin, DipEd *W.Aust.*, MSc *A.N.U.*

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Arto Juhani Levonpera, BSc *A.N.U.*
Michael James Reardon, BA (CompSt) *Canberra C.A.E.*
Leanne Maree Sole, BA *N.E.*

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PC Consultant
Peter Murray, BA (CompSt) *Canberra*

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Michael John Ryan, BE MEngSc *UNSW*, GradDipMgtStud, MIEAust, SMRIEE, AIMM, psc, tem

Handbook Guide

The information in this handbook is set out as follows:

1. Admission to the Academy

- Admission requirements for undergraduate students

2. Facilities and Services

3. Undergraduate Study

This contains:

- Degree Rules
- Undergraduate course programs
- Summary of subjects and units in the BA and BSc degrees
- Subject descriptions: *this section includes HSC requirements, prerequisites, corequisites, exclusions and other notes*

4. Graduate Study

This contains:

- Courses and Programs: *followed by course outlines*
- Subject descriptions: *this section includes prerequisites, corequisites, exclusions and other notes*
- Conditions for the Award of Degrees

5. Academic Prizes

6. Timetables

7. Information for Students

Information Key

The following key provides a guide to abbreviations used in this book:

C	Credit points
F	full year (Session 1 plus Session 2)
HPW	hours per week
HPS	hours per session
HPY	hours per year
L	lecture
LAB	laboratory
P	practical
P/T	part-time
S1	Session 1
S2	Session 2
SS	single Session, but which Session taught is not known at time of publication
T	tutorial
TH	total hours

Identification of Undergraduate Subjects and Units by Numbers

A subject is defined by the Academic Board of the University as 'a unit of instruction approved by the University as being a discrete part of the requirements for a course offered by the University'.

A unit at University College is a component of a subject.

The University uses numbers to identify subjects and units, and these are allocated by the Registrar. At University College the system of numbering is based on the following:

- Each subject and unit has a unique Subject Identifier comprising an alphabetic prefix and a numeric suffix together with a separate alphabetic subject code.
- The authority offering a subject or unit is indicated by an alphabetic prefix.
- The particular undergraduate subject or unit is identified by four digits. Subjects will have a Subject Code 'U' and units a Subject Code 'E'.
- An undergraduate subject has a number in the range 5 to 9 as the second digit of the suffix to the subject identifier.
- An undergraduate unit has a '0' as the second digit of the suffix to the subject identifier.
- The level of a particular subject or unit is indicated by the first digit of the numeric suffix of the subject identifier.
- Each identifying number is allocated to one subject or one unit only.

The authorities offering subjects and units in the University College are the Schools. The identifying prefixes for each of the Schools are set out below.

AMEC	Aerospace and Mechanical Engineering
ACMA	Civil Engineering
AELE	Electrical Engineering
AECM	Economics and Management
AENG	English
AHIS	History
APOL	Politics
ACHM	Chemistry
ACSC	Computer Science (including Information Systems)
AGOC	Geography and Oceanography

AMAT	Mathematics and Statistics
APHY	Physics
AINT	University College (Interdisciplinary)
GENZ	General Education subject

The following subject codes identify undergraduate subjects and units:

U	Undergraduate subject
E	Undergraduate unit
H	Fourth year Honours level subject
C	Fourth year Combined Honours level subject

Prerequisites and Corequisites

To be eligible to enrol in a particular subject in the University College a student must meet any prerequisites and corequisites which may be prescribed for it.

First year prerequisites are defined in terms of the NSW Higher School Certificate examination. With the approval of the Academic Board, students who completed Year 12 in another State will meet a particular prerequisite if they obtained a comparable result in an equivalent Year 12 subject.

Prerequisites and corequisites for second and later year subjects and units are expressed in terms of current University College subjects and units.

Any queries relating to prerequisites and corequisites should be referred to the relevant Heads of Schools.

Admission to the Academy

General Entry Qualifications

To be eligible for entry to the Australian Defence Force Academy as an officer cadet an applicant:

- must be under the age of 21 at 31 January in the year of entry (Army) ***or***
- must be under the age of 25 at 31 January in the year of entry (Navy and Air Force)
- must be, or must undertake to become, an Australian citizen
- must meet certain medical and psychological standards
- must meet the educational qualifications for admission to the University College

and must be selected by the Defence Academy Selection Board of one of the three Services.

Details of the requirements and further information may be obtained from any Defence Force Careers Reference Centre. The educational qualifications are set out in the section below.

Applications

Applications for entry to the Academy usually close at the end of July.

Applicants seeking entry in the next calendar year may have already completed secondary education, and some may have begun tertiary courses. However, most will be Year 12 students who will not have met the educational qualifications for the Academy at the time of applying, but who expect to do so in the current year.

Scholarships

Prospective applicants who are Year 11 students may apply for Defence Academy Scholarships. A scholarship is worth $1000, and is tenable in Year 12. About 240 scholarships are awarded annually.

Educational Qualifications for Admission to the University College in 1997

To be qualified educationally for admission to an undergraduate course in the University College, a candidate must:

(1) meet the admission requirements of The University of New South Wales;

(2) meet the subject prerequisites, if any, for one of the degree courses in the University College, and

(3) have reached a standard of performance in Year 12 of secondary education acceptable to the University College Academic Board.

1. Admission

(a) A candidate who completes the Higher School Certificate in the State of New South Wales must meet the admission requirements prescribed for The University of New South Wales.

(b) A candidate who completes Year 12 in another State and qualifies for admission to an appropriate faculty in a university in that State will meet the requirements provided that in the opinion of the Academic Board there is an acceptable correspondence between the qualifying conditions relied upon by the candidate and the conditions laid down for entry to the nominated degree courses at the University College.

2. Subject Prerequisites

There are no compulsory subjects in the BA and BSc courses. However, to be eligible to enrol in certain first year subjects in either of these courses, candidates must meet the relevant subject prerequisites shown in Schedule I.

Candidates for admission to the BE and BTech courses must meet the subject prerequisites for the compulsory subjects, as shown in Schedule II.

Subject prerequisites are defined in terms of the NSW Higher School Certificate examination. With the approval of the University College Academic Board a candidate who completes Year 12 in another State will meet a particular prerequisite if a comparable result in an equivalent Year 12 subject is obtained or, in the case of a Tasmanian candidate, an equivalent Level III subject.

SCHEDULE I
FIRST YEAR SUBJECT PREREQUISITES
BA AND BSc COURSES

First year Subjects	*HSC Subject and minimum required mark for 2 unit subjects (New South Wales)*
Chemistry I	As for Mathematics I plus 2 unit Science (Physics) 53% or 2 unit Science (Chemistry) 53% or 4 unit Science (Multistrand) or 2 unit Science (Geology) 60% or 2 unit Science (Biology) 60%
Economics I	As for English I
English I	3 unit English or 2 unit English 53% or 2 unit English (General) 63% or 2 unit Contemporary English 63%
History I	As for English I
Mathematics I§	4 unit Mathematics or 3 unit Mathematics or *2 unit Mathematics 67% *NOT 2 unit Mathematics (Mathematics in Society)
Physics I	As for Mathematics I, plus 2 or 4 unit Science (Including Physics or Chemistry)
Politics I	As for English I

§ Students enrolling in either of these subjects are expected to have completed HSC 3 unit Mathematics, or equivalent.

SCHEDULE II
FIRST YEAR SUBJECT PREREQUISITES
BE AND BTECH COURSES

First year Subjects	*HSC Subject and minimum required mark for 2 unit subjects (New South Wales)*
Mathematics IE§	4 unit Mathematics or 3 unit Mathematics or *2 unit Mathematics 67% *NOT 2 unit Mathematics (Mathematics in Society)
Physics IE/ICE	As for Mathematics IE, plus 2 or 4 unit Science (including Physics or Chemistry)
Civil Engineering I Mechanical Engineering I Electrical Engineering I Aeronautical Engineering I	As for Mathematics IE, plus 2 or 4 unit Science (including Physics)

3. Standard of Performance

Entry to the Academy is competitive and candidates should bear in mind that while selection is not based entirely on academic performance, the admission standards for courses in the University College are similar to those required by the faculties of Arts, Science, and Engineering at The University of New South Wales, Kensington.

New Zealand Candidates

New Zealand candidates require a minimum of a 'B' Bursary pass for admission to an undergraduate course in the University College. A candidate seeking to enrol in Mathematics I or Physics I in the BA or BSc course or seeking admission to a BE or BTech course must have at least a 60% pass in mathematics.

Enquiries

Specific enquiries related to educational qualifications should be addressed to:

The Director, Student Administration,
University College,
Australian Defence Force Academy,
Canberra, A.C.T. 2600

Telephone (06) 268 8111

Facilities and Services

The Library

The Academy Library ensures the provision and promotion of access to knowledge and information. It supports research and undergraduate and postgraduate study within the University College, and the military study and training programmes and administration of the Academy. The major national collection in international defence, strategic studies and military history, and major ACT collections in engineering and Australian literature are included in the Library's holdings of approximately 384,000 volumes. There are current subscriptions to some 2928 periodical titles.

The Library's Australian Special Research Collection focuses on Australian Military History and Australian Literature and contains manuscript collections of major national significance.

Materials in other Australian and overseas libraries may be obtained by inter-library loan or electronic document delivery. Online searches are available to identify material on particular topics, and a number of databases are available online or via CD-ROM. The audiovisual section allows staff and students to use video and audio tapes, films, slides, etc. Photocopiers and microfiche and microfilm reader-printers are available.

The Library's catalogue and the catalogues of other ACT libraries may be checked from the computer terminals within the building, throughout the campus, and remotely via the Internet. Library materials are purchased, catalogued and lent by means of an integrated computer system. Information about the Library is also available on the World Wide Web.

The Library maintains two in-house online databases: MIHILIST® which covers Australasian military history, and AUSTLIT which covers Australian literature. These are also available on CD-ROM.

The Library's Information Desk provides assistance to library users together with printed guides concerning many aspects of the Library's holdings. In addition, the Library conducts orientation classes and tutorials on library use for specific subjects each year.

Persons other than staff and students at the Academy are welcome to use the Academy Library. If borrowing privileges are desired members of the public may apply to the Librarian. The Library has reciprocal borrowing arrangements with the libraries of the Australian National University, the University of Canberra, and the Australian Catholic University (Signadou Campus). Special arrangements exist for Defence personnel.

The Information Technology Services Centre

The IT Services Centre provides computer processing, programming support, consultant services, and the electronic communications and information infrastructure for teaching, research, and administration throughout the Academy. The facilities of the Centre are available for use upon application by all students and staff of the Academy.

The Centre supports, as a large part of its role, the campus network. This now has over two thousand nodes and includes full network access in all undergraduate accommodation. The Centre also still supports analog video distribution via its older broadband technology. Remote access to the network via dialup services is also heavily used, both locally and in support of the Academy's distance education pilot program.

The internal information flows on the network, along with complementary links to sources within the ACT Regional Network, and elsewhere in Australia and overseas via the Internet, make this network an increasingly important part of the education process at the Academy.

The staff of the Centre, beside their normal service roles, are directly involved in the support of many academic projects. Some of these in less conventional areas for a IT Services Centre include the First AIF database project of the School of History and the Australian Scholarly Editions project.

The Centre operates numerous multiuser hosts for teaching, research, and administration purposes, and directly supports a significant number of servers for microprocessor laboratories and network functions. The functions provided by these include electronic mail, news, file transfer, directory services, and more general information services such as the Internet World Wide Web. The Centre maintains two X-terminal based laboratories and two microprocessor laboratories for teaching and general use.

The Centre maintains a number of application packages available on various hosts and servers; these include scientific and graphic libraries, statistical and econometric analysis programs, symbolic mathematics, text analysis and processing, typesetting, simulation and engineering design, and database work. Staff are involved in both direct desktop support, more traditional application development and use, and hardware/software maintenance for a wide range of IT equipment. More information on both the IT Services Centre and the Academy in general is available via the Internet at http://www.adfa.oz.au/

Counselling Services

The Student Counsellors offer a counselling service for any students who wish to refer themselves for counselling or advice.

Any student needing advice or assistance is invited to consult one of the Counsellors. When students refer themselves for counselling the consultation is completely confidential. Students commonly refer themselves for academic, motivational and personal counselling. To make an appointment simply contact the Student Counselling Section directly.

As well as individual assistance, the Student Counsellors conduct workshops on study techniques and methods for reducing stress and anxiety. Courses are also taught on leadership dynamics, interviewing and counselling skills and drug and alcohol awareness.

The Student Counsellors have a special role in assisting first year officer cadets make the transition from civilian to military life, and from secondary to tertiary education. Their assistance includes advice on approaching academic work and study techniques, and on course and subject choices in relation to students' abilities and vocational goals.

Counsellors are normally available during working hours, and by appointment at other times. Counsellors can be contacted by ringing (06) 268 8064.

English Communications Program

The English Communications Program (ECP) is designed to develop officer cadets' communication skills (oral, aural and written) and encourage the critical analysis of defence issues. As an integral part of the common military training program, the ECP inculcates a tri-service ethos by ensuring that assessment units cover issues of interest to all three services. Emphasis is also placed on equipping students with the service writing skills required as junior officers.

The 98 period program consists of 13 assessed modules taught over three years. In addition, each cadet is assigned a counsellor who becomes the cadet's first point of contact if problems in communication skills become apparent. Cadets may seek assistance voluntarily or may be referred to ECP staff for counselling by any School at the Academy.

Unisearch Limited

Unisearch Limited is the commercial company of The University of New South Wales which provides the services of the University's academic staff for consultancies and research projects, manages the commercialisation of the intellectual property of the University and offers a wide range of specialised training courses.

Unisearch supports the academic staff in providing such services by managing commercial aspects which include marketing, contracts, order administration, report production, debt collection, finance and professional indemnity liability control.

The Company is a wholly owned subsidiary of The University of New South Wales, and surpluses from the Company's operations return to the University to further its objectives and work in the community.

All enquiries should be addressed to Unisearch's Manager at University College, Mrs Beverley Mutch, University College, ADFA, Canberra ACT 2600, telephone (06) 268 8497, or to Mr Richard Kaan, Managing Director, Unisearch Ltd, The University of New South Wales, Sydney 2052, telephone (02) 385 5401.

Rules governing the award of the degrees of Bachelor of Arts and Bachelor of Science

1. The degrees of Bachelor of Arts and Bachelor of Science shall be conferred as pass degrees.

2. No person shall be permitted to enrol in any qualifying subject for the degree of Bachelor of Arts or the degree of Bachelor of Science if enrolled at the same time for any other degree or diploma in this University or elsewhere.

3. Where, in the following rules, reference is made to the requirement that a candidate shall complete a subject, the requirement shall be construed as meaning that the candidate shall:

(a) attend such lectures, seminars and tutorials as may be prescribed in that subject; and

(b) perform satisfactorily in such exercises, laboratory work, essays, theses and examinations as may be prescribed in that subject.

4. (a) A candidate may not enrol in a subject until he or she satisfies all prerequisite and corequisite conditions specified for that subject.

(b) A candidate may not enrol in a Level II subject until he or she has completed an appropriate Level I subject; and a candidate may not enrol in a Level III subject until he or she has completed an appropriate Level II subject.

5. Candidates for the Bachelor of Arts and the Bachelor of Science degree will select the subjects for their courses according to these Rules from the Schedules appended. For the purposes of the Rules:

(a) Subjects in the following fields of study are designated as Arts subjects,

Economics

English

History

Information Systems

Management

Politics

and in the following fields of study as Science subjects,

Chemistry

Computer Science

Mathematics

Oceanography

Physics

and in the following field of study as Arts subjects in an Arts degree, and as Science subjects in a Science degree,

Geography

(b) A subject is defined as a course of study in a single discipline or in two cognate disciplines, at one level, usually taken over both sessions of a single academic year, which may consist of related discrete units, and which is recognised by the University for the purposes of accreditation.

Subjects are allotted credit points as defined in the schedules.

A unit is defined as a discrete element within a subject, which may be separately examined and assessed within one session, and which has no credit point value in its own right except to account notionally for part value of a complete subject.

(c) A major is a sequence of subjects from one field of study, or from two approved fields of study. It consists of a Level I subject to the value of 30 credit points, a Level II subject to the value of 40 credit points, and a Level III subject to the value of 60 credit points. Similarly a sub-major is a sequence of a Level I subject to the value of 30 credit points and a Level II subject to the value of 40 credit points.

(d) A sub-major may also be any combination of Level I, Level II and Level III subjects in the same field of study, or in cognate fields of study, to the value of at least 70 credit points, providing that prerequisite and corequisite conditions are met.

6. To qualify for the degree of Bachelor of Arts, a candidate shall, in accordance with the provisions of Rule 8, complete subjects totalling in value at least 360 credit points which shall include:

(a) Level I subjects each of value 30 credit points chosen from at least three fields of study,

(b) at least one major and one sub-major in Arts subjects,

(c) a second major or sub-major in Arts or in Science subjects,

(d) general education subjects for the Arts course, of total value 30 credit points. Mainstream subjects may not be substituted for general education subjects.

7. To qualify for the degree of Bachelor of Science, a candidate shall, in accordance with the provisions of Rule 8, complete subjects totalling in value at least 360 credit points which shall include:

(a) Level I subjects each of value 30 credit points chosen from at least three fields of study,

(b) at least one major and one sub-major in Science subjects,

(c) a second major or sub-major in Science or in Arts subjects,

(d) general education subjects for the Science course, of total value 30 credit points. Mainstream subjects may not be substituted for general education subjects.

8. To qualify for the degree of Bachelor of Arts or Bachelor of Science, a candidate shall be enrolled for a minimum of six sessions and gain a total of at least 360 credit points of which:

(a) no more than 30 credit points may be gained from general education subjects, with a maximum of 15 credit points to be taken in any one School,

(b) no more than 120 credit points may be gained from Level I subjects,

(c) at least 210 credit points must be from Level II or Level III subjects,

(d) no more than 30 credit points may be completed in any one School in the first year,

(e) no more than 230 credit points may be gained from subjects presented by any one School,

(f) no general education subject may be taken concurrently with, or subsequent to, a Level I subject presented by the same School.

9. Upon sufficient cause being shown, the University College Academic Board may vary the provisions of Rules 4, 6, 7 and 8 in particular cases on the recommendation of the Head of the School concerned.

Schedules of subjects for the degrees of Bachelor of Arts and Bachelor of Science

SCHEDULE A—ARTS SUBJECTS

Subject No.	*Subject Name*	*Level*	*Credit Points*
Economics and Management			
AECM1601 U	Economics 1	I	30
AECM2603 U	International Trade	II	20
AECM2604 U	Quantitative Methods in Economics and Management	II	20
AECM2605 U	Intermediate Microeconomics	II	20
AECM2606 U	Intermediate Macroeconomics	II	20
AECM2704 U	Introduction to Corporate and Government Accounting	II	20
AECM2705 U	Organisational Behaviour	II	20
AECM2690 U	Economics 2 (Honours)	II	—
AECM2790 U	Management 2 (Honours)	II	—
AECM3603 U	Quantitative Analysis and Econometrics	III	30
AECM3604 U	Industrial Economics	III	30
AECM3605 U	Public Sector Economics	III	30
AECM3606 U	Economic Development	III	30
AECM3607 U	Asia-Pacific Economies	III	30
AECM3608 U	Labour Economics and Industrial Relations	III	30
AECM3703 U	Public Sector Management	III	30
AECM3704 U	Human Resource Management	III	30
AECM3609 U	Advanced Economic Theory and Policy	III	30
AECM3610 U	International Economic Theory and Policy	III	30
AECM3611 U	Economics of Regulation	III	30
AECM3612 U	Resource Economics	III	30
AECM3613 U	Capitalism, Socialism and Economic Growth	III	30
AECM3705 U	Logistics	III	30
AECM3706 U	Management Accounting	III	30
AECM3707 U	Finance	III	30
AECM3708 U	Organisational Management	III	30
AECM3690 U	Economics 3 (Honours)	III	—
AECM3790 U	Management 3 (Honours)	III	—
AECM3692 U	Economics 3 (Combined Honours)	III	—
AECM3792 U	Management 3 (Combined Honours)	III	—
AECM4690 H	Economics 4 (Honours) F/T	IV	—
AECM4691 H	Economics 4 (Honours) P/T	IV	—
AECM4790 H	Management 4 (Honours) F/T	IV	—
AECM4791 H	Management 4 (Honours) P/T	IV	—
AECM4692 C	Economics 4 (Combined Honours) F/T	IV	—
AECM4693 C	Economics 4 (Combined Honours) P/T	IV	—
AECM4792 C	Management 4 (Combined Honours) F/T	IV	—
AECM4793 C	Management 4 (Combined Honours) P/T	IV	—
English			
AENG1600 U	English 1	I	30
AENG2601 U	English 2A	II	40
AENG2602 U	English 2B	II	40
AENG2690 U	English 2 (Honours)	II	40
AENG3601 U	English 3A	III	60
AENG3602 U	English 3B	III	60
AENG3603 U	English 3C	III	30
AENG3690 U	English 3 (Honours)	III	60
AENG3692 U	English 3 (Combined Honours)	III	—
AENG4690 H	English 4 (Honours) F/T	IV	—
AENG4691 H	English 4 (Honours) P/T	IV	—
AENG4692 C	English 4 (Combined Honours) F/T	IV	—
AENG4693 C	English 4 (Combined Honours) P/T	IV	—

Subject No.	Subject Name	Level	Credit Points
History			
AHIS1600 U	History 1	I	30
AHIS1601 U	History 1: The Second World War	I	30
AHIS1602 U	History 1: World History Since 1945	I	30
AHIS2601 U	Revolts and Counter-insurgency	II	20
AHIS3601 U	in Southeast Asia	III	30
AHIS2603 U	Colonial Australia	II	20
AHIS3603 U		III	30
AHIS2604 U	Modern Australia:	II	20
AHIS3604 U	Politics and Culture	III	30
AHIS3605 U	The Origins of Modern War	III	30
AHIS2606 U	From Democracy to	II	20
AHIS3606 U	Dictatorship	III	30
AHIS2610 U	Southeast Asia: Revolution,	II	20
AHIS3610 U	Nation and Society, 1870–1965	III	30
AHIS2611 U	Russian History	II	20
AHIS3611 U		III	30
AHIS3612 U	Soviet History	III	30
AHIS2613 U	The American Civil War	II	20
AHIS3613 U		III	30
AHIS2614 U	East Asia: Between Tradition	II	20
AHIS3614 U	and Modernity	III	30
AHIS2615 U	Social Change in	II	20
AHIS3615 U	East Asia	III	30
AHIS2616 U	Science and Technology	II	20
AHIS3616 U	in Australia	III	30
AHIS2620 U	The Sea and Seafarers	II	20
AHIS3621 U	International Naval History 1945 to the Present	III	30
AHIS2622 U	The European Powers in	II	20
AHIS3622 U	Peace and War 1870–1914	III	30
AHIS2623 U	The Pacific Basin, 1945–1990	II	20
AHIS3623 U		III	30
AHIS2624 U	International Naval History 1890-1945	II	20
AHIS3625 U	The Great War 1914-1918	III	30
AHIS2690 U	History 2 (Honours)	II	—
AHIS3690 U	History 3 (Honours)	III	—
AHIS3692 U	History 3 (Combined Honours)	III	—
AHIS4690 H	History 4 (Honours) F/T	IV	—
AHIS4691 H	History 4 (Honours) P/T	IV	—
AHIS4692 C	History 4 (Combined Honours) F/T	IV	—
AHIS4693 C	History 4 (Combined Honours) P/T	IV	—
Information Systems			
ACSC1700 U	Information Systems 1	I	30
ACSC2701 U	Information Systems 2A	II	40
ACSC2702 U	Information Systems 2B	II	40
ACSC3700 U	Information Systems 3	III	60
ACSC3701 U	Information Systems 3A	III	60
ACSC3703 U	Information Systems 3C	III	30
ACSC4790 H	Information Systems 4 (Honours) F/T	IV	—
ACSC4791 H	Information Systems 4 (Honours) P/T	IV	—
ACSC4792 C	Information Systems 4 (Combined Honours) F/T	IV	—
ACSC4793 C	Information Systems 4 (Combined Honours) P/T	IV	—

Subject No.	Subject Name	Level	Credit Points
Politics			
APOL1600 U	Politics I	I	30
APOL2601 U	Politics of Russia	II	20
APOL3614 U		III	30
APOL2602 U	Politics of Southeast Asia	II	20
APOL3625 U		III	30
APOL2603 U	Politics of the USA	II	20
APOL3615 U		III	30
APOL2604 U	Politics of China	II	20
APOL3618 U		III	30
APOL2605 U	Politics in Japan	II	20
APOL3605 U		III	30
APOL2610 U	The Collapse of Communism	II	20
APOL3620 U		III	30
APOL2611 U	The Politics of	II	20
APOL3611 U	Australian Defence Policy	III	30
APOL2613 U	Electoral Systems	II	20
APOL3613 U		III	30
APOL2614 U	Issues and Problems in	II	20
APOL3609 U	Australian Foreign Policy	III	30
APOL2615 U	War in International	II	20
APOL3607 U	Politics	III	30
APOL2619 U	The Politics of Korea	II	20
APOL3623 U		III	30
APOL2621 U	Security Issues in Southeast	II	20
APOL3601 U	Asia	III	30
APOL2622 U	The Politics of International	II	20
APOL3626 U	Cooperation	III	30
APOL2623 U	Approaches to Politics	II	20
APOL3627 U		III	30
APOL2624 U	From International to	II	20
APOL3628 U	Global Politics	III	30
APOL2625 U	Strategic Issues in	II	20
APOL3602 U	Northeast Asia	III	30
APOL2626 U	Culture, Conquest and	II	20
APOL3629 U	International Society	III	30
APOL4690 H	Politics 4 (Honours) F/T	IV	–
APOL4691 H	Politics 4 (Honours) P/T	IV	–
APOL4692 C	Politics 4 (Combined Honours) F/T	IV	—
APOL4693 C	Politics 4 (Combined Honours) P/T	IV	
Asia–Pacific Studies			
AINT2601 U	Asia Pacific Culture—China	II	20
AINT3601 U	Asia Pacific Issues—Economics, Politics and Society	III	30

SCHEDULE S—SCIENCE SUBJECTS

Subject No.	Subject Name	Level	Credit Points
Chemistry			
ACHM1600 U	Chemistry I	I	30
ACHM2601 U	Chemistry 2A	II	40
ACHM2602 U	Chemistry 2B	II	40
ACHM3601 U	Chemistry 3A	III	60

ACHM3602	U	Chemistry 3B	III	30
ACHM4690	H	Chemistry 4 (Honours) F/T	IV	—
ACHM4691	H	Chemistry 4 (Honours) P/T	IV	—
ACHM4692	C	Chemistry 4 (Combined Honours) F/T	IV	—
ACHM4693	C	Chemistry 4 (Combined Honours) P/T	IV	—

Subject No.		*Subject Name*	*Level*	*Credit Points*
Computer Science				
ACSC1600	U	Computer Science 1	I	30
ACSC2601	U	Computer Science 2A	II	40
ACSC2602	U	Computer Science 2B	II	40
ACSC3601	U	Computer Science 3A	III	60
ACSC3603	U	Computer Science 3C	III	30
ACSC4690	H	Computer Science 4 (Honours) F/T	IV	—
ACSC4691	H	Computer Science 4 (Honours) P/T	IV	—
ACSC4692	C	Computer Science 4 (Combined Honours) F/T	IV	—
ACSC4693	C	Computer Science 4 (Combined Honours) P/T	IV	—
Mathematics and Statistics				
AMAT1600	U	Mathematics I	I	30
AMAT2601	U	Mathematics 2A	II	40
AMAT2602	U	Mathematics 2B	II	40
AMAT3601	U	Mathematics 3A	III	60
AMAT3602	U	Mathematics 3B	III	60
AMAT3603	U	Mathematics 3C	III	30
AMAT4690	H	Mathematics 4 (Honours) F/T	IV	—
AMAT4691	H	Mathematics 4 (Honours) P/T	IV	—
AMAT4692	C	Mathematics 4 (Combined Honours) F/T	IV	—
AMAT4693	C	Mathematics 4 (Combined Honours) P/T	IV	—
Oceanography				
AGOC1700	U	Oceanography 1	I	30
AGOC2700	U	Oceanography 2	II	40
AGOC3700	U	Oceanography 3	III	60
AGOC4790	H	Oceanography 4 (Honours) F/T	IV	—
AGOC4791	H	Oceanography 4 (Honours) P/T	IV	—
AGOC4792	C	Oceanography 4 (Combined Honours) F/T	IV	—
AGOC4793	C	Oceanography 4 (Combined Honours) P/T	IV	—
Physics				
APHY1600	U	Physics I	I	30
APHY2600	U	Physics 2	II	40
APHY3605	U	Physics 3A	III	60
APHY3606	U	Physics 3B	III	60
APHY3607	U	Physics 3C	III	75
APHY3608	U	Physics 3D	III	30
APHY4690	H	Physics 4 (Honours) F/T	IV	—
APHY4691	H	Physics 4 (Honours) P/T	IV	—
APHY4692	C	Physics 4 (Combined Honours) F/T	IV	—
APHY4693	C	Physics 4 (Combined Honours) P/T	IV	—

SCHEDULE AS—ARTS OR SCIENCE SUBJECTS

The following are regarded as Arts subjects when associated with an Arts degree, and as Science subjects when associated with a Science degree.

Subject No.		*Subject Name*	*Level*	*Credit Points*
Geography				
AGOC1600	U	Geography I	I	30
AGOC2601	U	Geography 2A	II	40
AGOC2602	U	Geography 2B	II	40
AGOC2603	U	Geography 2C	II	40
AGOC2604	U	The Geography of Development	II	20
AGOC3601	U	Geography 3A	III	60
AGOC3602	U	Geography 3B	III	60
AGOC3603	U	Geography 3C	III	40
AGOC4690	H	Geography 4 (Honours) F/T	IV	—
AGOC4691	H	Geography 4 (Honours) P/T	IV	—
AGOC4692	C	Geography 4 (Combined Honours) F/T	IV	—
AGOC4693	C	Geography 4 (Combined Honours) P/T	IV	—

SCHEDULE GE—GENERAL EDUCATION SUBJECTS

Subject No.		*Subject Name*	*Credit Points*
For the Arts Course			
GENZ0501	U	The World of Chemistry	7.5
GENZ0502	U	Chemistry and Life	7.5
GENZ0503	U	Chemistry in Defence and Peace	7.5
GENZ1501	U	Engineering the Environment	7.5
GENZ8502	U	Information Technology in Organisations	7.5
GENZ2001	U	Telecommunications: Principles, Systems and Policy	7.5
GENZ3501	U	Marine Environment	7.5
GENZ3502	U	Marine Resources	7.5
GENZ5501	U	Presenting and Analysing Data in the Social Sciences	7.5
GENZ5502	U	Statistical Modelling in the Social Sciences	7.5
GENZ5503	U	The World of Mathematics	7.5
GENZ2501	U	Mechanics of Flight 1	7.5
GENZ2502	U	Mechanics of Flight 2	7.5
GENZ6001	U	Physics for Society	7.5
GENZ6002	U	Astronomy	7.5
GENZ6003	U	Introductory Meteorology	7.5
GENZ6004	U	Environmental Physics	7.5
For the Science Course			
GENZ1501	U	Engineering the Environment	7.5
GENZ8501	U	Computers and Society	7.5
GENZ1001	U	Competition and Innovation	7.5
GENZ1002	U	Macroeconomic Growth and Stability	7.5
GENZ1003	U	Leadership Studies	7.5

GENZ5001	U	Writing and the Media 7.5
GENZ5002	U	Issues in Modern Australian Literature and Film 7.5
GENZ5003	U	Literature and Modern War 7.5
GENZ5004	U	Science and the Literary Imagination 7.5
GENZ5005	U	Australian Literature and Film 7.5
GENZ5006	U	American Literature 7.5
GENZ4501	U	The First World War: Image and Reality 7.5
GENZ4502	U	Rats, Lice and History 7.5
GENZ4503	U	Suakin to Saigon: A Survey of Australian Military History 7.5
GENZ4504	U	Black-White Relations in Australia 7.5
GENZ4505	U	Japan in the Modern World 7.5
GENZ4506	U	The American Civil War 7.5
GENZ4507	U	Australia in the Twentieth Century 7.5
GENZ2501	U	Mechanics of Flight 1 7.5
GENZ2502	U	Mechanics of Flight 2 7.5
GENZ4001	U	Why Politics Matters 7.5
GENZ4002	U	Issues in Contemporary Australian Politics: foreign policy dimensions 7.5

Rules governing the award of the degree of Bachelor of Arts with Honours

1. The degree of Bachelor of Arts with Honours shall be conferred in the following categories:

Honours Class I
Honours Class II Division I
Honours Class II Division II
Honours Class III

2. A student seeking recognition as a candidate for this degree shall choose either one, or, with the approval of the relevant heads of Schools, two fields of study from the following in which to undertake the honours program:

Economics	History
English	Information Systems
Geography	Management
	Politics

3. Admission to candidature for the degree of Bachelor of Arts with Honours shall be considered only after an applicant has completed the requirements for the degree of Bachelor of Arts in the University College. To qualify for admission he or she must have completed subjects at required grades as determined by the Head(s) of the relevant Schools(s). In order to ascertain such requirements a student contemplating honours is advised to consult the Head(s) of the Schools(s) not later than the end of the first year of study. Admission is subject to the approval of the Academic Board.

4. There shall be no re-examination of a final honours year subject.

5. A candidate for the degree of Bachelor of Arts with Honours who withdraws from or fails to complete the final honours year program shall be qualified for the award of the degree of Bachelor of Arts.

6. On the recommendation of the Head(s) of Schools(s) concerned, graduates who have been awarded the degree of Bachelor of Arts in the University College may be admitted by the Academic Board to candidature for the degree of Bachelor of Arts with Honours with credit for all subjects completed if, during their studies for the pass degree, they have satisfied the prerequisites or the equivalent of those prerequisites for entry to the honours levels laid down by the school or schools concerned.

Rules governing the award of the degree of Bachelor of Science with Honours

1. The degree of Bachelor of Science with Honours shall be conferred in the following categories:

Honours Class I
Honours Class II Division I
Honours Class II Division II
Honours Class III

2. A student seeking recognition as a candidate for this degree shall choose either one, or, with the approval of the relevant Heads of Schools, two fields of study from the following in which to undertake the honours program:

Chemistry	Computer Science
Physics	Geography
Oceanography	Mathematics

3. Admission to candidature for the degree of Bachelor of Science with Honours shall be considered only after an applicant has completed the requirements for the degree of Bachelor of Science in the University College. To qualify for admission he or she must have completed subjects at required grades as determined by the Head(s) of the relevant School(s). In order to ascertain such requirements a student contemplating honours is advised to consult the Head(s) of the School(s) not later than the end of the first year of study. Admission is subject to the approval of the Academic Board.

4. There shall be no re-examination of a final honours year subject.

5. A candidate for the degree of Bachelor of Science with Honours who withdraws from or fails to complete the final honours year program shall be qualified for the award of the degree of Bachelor of Science.

6. On the recommendation of the Head(s) of School(s) concerned, graduates who have been awarded the degree of Bachelor of Science in the University College may be admitted by the Academic Board to candidature for the degree of Bachelor of Science with Honours with credit for all subjects completed if, during their studies for the pass degree, they have satisfied the prerequisites or the equivalent of those prerequisites for entry to the honours levels laid down by the school or schools concerned.

Rules governing the award of the degree of Bachelor of Engineering

1. The degree of Bachelor of Engineering shall be conferred as a pass degree or as an honours degree. Honours may be awarded in the following categories:

Honours Class I
Honours Class II, Division I
Honours Class II, Division II

2. No person shall be permitted to enrol in any qualifying subject for the degree of Bachelor of Engineering at the same time as that person is enrolled for any other degree or diploma in this University or elsewhere.

3. Where, in the following Rules, reference is made to the requirement that a candidate shall complete a subject, the requirements shall be construed as meaning that the candidate shall:

(a) attend such lectures, seminars and tutorials as may be prescribed in that subject; and

(b) perform satisfactorily in such exercises, laboratory, drawing office, field work, essays, thesis and examinations as may be prescribed in that subject.

4. Before a candidate's enrolment will be accepted for any subject, the candidate must have completed the relevant prerequisite subjects shown in Schedules E2, E3, and E4 except where the Subject Authority for the appropriate subject approves otherwise.

5. **Academic Requirements:**

(a) *Standard Program.* The candidate shall complete in the years prescribed the qualifying subjects prescribed for all engineering students and those pertaining to one particular branch of engineering as set out in Schedules E1, E2, E3 and E4. The general education subjects shall be chosen from those listed in Schedule E5. No more than half of the general education requirement for the degree may be completed in any one School. Subject to the approval of the Heads of Schools concerned, students may substitute for three sessional general education subjects (22.5 credit points) one Level I Language subject studied externally.

(b) *Non-standard Programs.* Subject to the requirements of Rule 4 and timetabling requirements and the approval of the appropriate Heads of School, a candidate may be permitted to enrol in any one year in subjects selected from more than one of Schedules E1, E2, E3, and E4. Non-standard programs are subject to the general regulations of the University regarding re-enrolment, and to the requirement that all subjects in Schedule E1 must be completed in the first two years of the course.

6. **Practical Engineering Experience Requirements:**

Before graduation a candidate shall complete 60 days of approved practical engineering experience which must be done in blocks of at least 20 working days each, each such block being in the service of a single employer.

7. Upon sufficient cause being shown, the Academic Board may, in special cases, vary the requirements of the Rules provided that any proposed variation shall be initiated by a recommendation from the Head of School concerned.

Note: Engineering timetables will be provided by individual Schools

Schedule of Subjects for the BE Degree

Schedule E1—The First Year Course

All Engineering Students

AMAT1800 U	Mathematics 1E
ACSC1800 U	Computer Science 1E

Civil Engineering

ACMA1800 U	Civil Engineering 1
APHY1801 U	Physics 1CE
ACHM1801 U	Materials and Environmental Chemistry

Aeronautical Engineering

AMEC1900 U	Aeronautical Engineering 1
APHY1800 U	Physics 1E

Electrical Engineering

AELE1800 U	Electrical Engineering 1
APHY1800 U	Physics 1E

Mechanical Engineering

AMEC1800 U	Mechanical Engineering 1
APHY1800 U	Physics 1E

Schedule E2—The Second Year Course

		Prerequisite Subjects
All Engineering Students		
AMAT2800 U	Mathematics 2E	*Mathematics 1E*
Civil Engineering		
ACSC2801 U	Computer Science 2CE	*Mathematics 1E and Computer Science 1E*
AMAT2801 U	Engineering Mathematics 1E	*Mathematics 1E and Computer Science 1E*
ACMA2800 U	Civil Engineering 2	*Civil Engineering 1, Physics 1CE, Materials and Environmental Chemistry, Mathematics 1E, and Computer Science 1E*
	General Education subjects	
Electrical Engineering		
ACSC2802 U	Computer Science 2EE	*Mathematics 1E and Computer Science 1E*
APHY2801 U	Physics 2E	*Mathematics 1 or 1E and Physics 1 or 1E*
AELE2800 U	Electrical Engineering 2	*Mathematics 1E, Computer Science 1E, Electrical Engineering 1 and Physics 1E*
	General Education subjects	
Mechanical Engineering		
ACSC2804 U	Computer Science 2ME	*Mathematics 1E and Computer Science 1E*
AMEC2800 U	Mechanical Engineering 2	*Mechanical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*
Aeronautical Engineering		
AMEC2900 U	Aeronautical Engineering 2	*Aeronautical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*
ACSC2803 E	Computer Science 2AE	*Mathematics IE and Computer Science IE*

Schedule E3—The Third Year Course

		Prerequisite Subjects
Civil Engineering		
ACMA3800 U	Civil Engineering 3	*Civil Engineering 2*
	General Education subjects	
Electrical Engineering		
AELE3800 U	Electrical Engineering 3	*Electrical Engineering 2, Computer Science 2EE and Physics 2E*
AMAT3800 U	Mathematics 3E	*Mathematics 2E*
	General Education subjects	
Mechanical Engineering		
AMAT3800 U	Mathematics 3E	*Mathematics 2E*
AMEC3800 U	Mechanical Engineering 3	*Mechanical Engineering 2*
	2 General Education subjects	
Aeronautical Engineering		
AMAT3800 U	Mathematics 3E	*Mathematics 2E*
	General Education subjects	
AMEC3900 U	Aeronautical Engineering 3	*Aeronautical Engineering 2*

Schedule E4—The Final Year Course

		Prerequisite Subjects
Civil Engineering		
ACMA4800 U	Civil Engineering 4	*Civil Engineering 3*
ACMA4801 U	Project, Thesis and Seminar	*Civil Engineering 3*
ACMA4802 U	Design and Seminar	*Civil Engineering 3*
ACMA4803 U	Practical Experience	

Electrical Engineering

AELE4801 U	Project, Thesis and Specialist Lectures	*Electrical Engineering 3 and Mathematics 3E*
AELE4800 U	Electrical Engineering 4	*Electrical Engineering 3 and Mathematics 3E*

Mechanical Engineering

AMEC4801 U	Project and Thesis	*Mechanical Engineering 3*
AMEC4800 U	Mechanical Engineering 4	*Mechanical Engineering 3*

Aeronautical Engineering

AMEC4900 U	Aeronautical Engineering 4	*Aeronautical Engineering 3*
AMEC4901 U	Project and Thesis	*Aeronautical Engineering 3*
	General Education subjects	

All fourth year engineering students must complete the appropriate Practical Experience subject.

Schedule E5—General Education Subjects

(See pp 144-147 for availability in 1997)

GENZ1001 U	Competition and Innovation	7.5
GENZ1002 U	Macroeconomic Growth and Stability	7.5
GENZ1003 U	Leadership Studies	7.5
GENZ5001 U	Writing and the Media	7.5
GENZ5002 U	Issues in Modern Australian Literature and Film	7.5
GENZ5003 U	Literature and Modern War	7.5
GENZ5004 U	Science and the Literary Imagination	7.5
GENZ5005 U	Australian Literature and Film	7.5
GENZ5006 U	American Literature	7.5
GENZ4501 U	The First World War: Image and Reality	7.5
GENZ4502 U	Rats, Lice and History	7.5
GENZ4503 U	Suakin to Saigon: A Survey of Australian Military History	7.5
GENZ4504 U	Black-White Relations in Australia	7.5
GENZ4505 U	Japan in the Modern World	7.5
GENZ4506 U	The American Civil War	7.5
GENZ4507 U	Australia in the C20	7.5
GENZ3501 U	Marine Environment	7.5
GENZ3502 U	Marine Resources	7.5
GENZ4001 U	Why Politics Matters	7.5
GENZ4002 U	Issues in Contemporary Australian Politics: foreign policy dimensions	7.5

Combined BSc/BE Degree Courses

While programs for the following combined degrees have been approved by the University, it is not current Service policy to permit cadets to enrol in them.

Enrolment in any of these programs is subject to the recommendations of the relevant Heads of Schools, and the approval of the Academic Board.

Students who commence a combined course but subsequently do not wish to proceed with both areas of study, or who fail to maintain a satisfactory performance, may revert to a single degree program with appropriate credit for subjects completed.

In each of the programs the requirements for the BSc degree are completed in the first three years, and years 4 and 5 are devoted entirely to the engineering course.

BSc/BE Programs

Engineering Stream	*Science Major*
Civil & Mechanical	Computer Science Mathematics Physics
Electrical	Computer Science Mathematics Physics
Civil & Mechanical	Chemistry Geography Oceanography
Electrical	Chemistry Geography Oceanography

Details of each program are available from the Director, Student Administration.

Rules governing the award of the degree of Bachelor of Technology

1. The degree of Bachelor of Technology shall be conferred as a pass degree.

2. No person shall be permitted to enrol in any qualifying subject for the degree of Bachelor of Technology at the same time as that person is enrolled for any other degree or diploma in this University or elsewhere.

3. Where, in the following Rules, reference is made to the requirement that a candidate shall complete a subject, the requirements shall be construed as meaning that the candidate shall:

(a) attend such lectures, seminars and tutorials as may be prescribed in that subject; and

(b) perform satisfactorily in such exercises, laboratory, drawing office, field work, essays, thesis and examinations as may be prescribed in that subject.

4. Before a candidate's enrolment will be accepted for any subject, the candidate must have completed the relevant prerequisite subjects shown in Schedule BT2,

(a) attend such lectures, seminars and tutorials as may be prescribed in that subject; and

(b) perform satisfactorily in such exercises, laboratory, drawing office, field work, essays, thesis and examinations as may be prescribed in that subject.

4. Before a candidate's enrolment will be accepted for any subject, the candidate must have completed the relevant prerequisite subjects shown in Schedule BT2, and BT3 except where the Subject Authority for the appropriate subject approves otherwise.

5. Academic Requirements:

(a) Standard Program. The candidate shall complete in the years prescribed the qualifying subjects as set out in the Schedules BT1, BT2 and BT3. General Education subjects shall be chosen from those listed in Schedule E5. No more than half of the general education requirement for the degree may be completed in any one School. Subject to the approval of the Heads of Schools concerned, students may substitute for three sessional general education subjects (22.5 credit points) one Level I Language subject studied externally.

(b) Non-standard programs. Subject to the requirements of Rule 4 and timetabling requirements and approval of the appropriate Heads of School, a candidate may be permitted to enrol in any one year in subjects selected from more than one of the Schedules BT1, BT2 and BT3. Non-standard programs are subject to the general regulations of the University regarding re-enrolment, and to the requirement that all subjects in Schedule BT1 must be completed in the first two years of the course.

6. Practical Experience Requirements:

Before graduation a candidate shall complete 20 days of approved practical experience which must be done in one block with one employer.

7. Upon sufficient cause being shown, the Academic Board may, in special circumstances, vary the requirements of the Rules provided that any proposed variation shall be initiated by a recommendation from the Head of the School concerned.

Schedule of Subjects for the Bachelor of Technology Degree

Schedule BT1—The First Year Course

Aeronautical Engineering

AMAT1800 U	Mathematics 1E
ACSC1800 U	Computer Science 1E
APHY1800 U	Physics 1E
AMEC1900 U	Aeronautical Engineering 1

Schedule BT2—The Second Year Course

Aeronautical Engineering		**Prerequisite Subjects**
AMAT2800 U	Mathematics 2E	*Mathematics 1E*
	General Education subjects	
AMEC2901 U	Aeronautical Engineering 2BT	*Aeronautical Engineering 1, Physics 1E, Mathematics 1E, and Computer Science 1E.*

Schedule BT3—The Third Year Course

Aeronautical Engineering		**Prerequisite Subjects**
AMEC3902 U	Aero Project	
	General Education subjects	
AMAT3802 U	Mathematics 3BT	*Mathematics 2E*
ACSC2803 U	Computer Science 2AE	*Mathematics 1E & Computer Science 1E*
AMEC3901 U	Aeronautical Engineering 3BT	*Aeronautical Engineering 2BT*

Undergraduate Course Programs

The Undergraduate Courses

The BA and BSc courses in the University College are three-year courses at pass level, and four-year courses at honours level.

The BE course is of four years duration, and the degree may be awarded as a pass or an honours degree. The engineering courses have been granted full recognition by the Institution of Engineers Australia and in addition the Electrical Engineering course has been recognised by the Institution of Radio and Electronics Engineers, Australia, and by the Institute of Electrical and Electronics Engineers.

The BTech course is a three year course at pass level. There is provision for students who have completed the BTech to upgrade it to a BE degree in Aeronautical Engineering by undertaking at least 18 months further study at a later stage.

Pass level students in arts and science generally complete their degree programs at the end of the third year. Honours students and engineering students who are RAN and RAAF officer cadets continue with their courses in the University College and complete their degree programs at the end of the fourth year.

Army officer cadets at the end of the third year transfer to the Royal Military College, Duntroon. After completing a year of military training they are commissioned as lieutenants. Those who are continuing with honours courses in arts and science and all engineering students return to the Academy to complete their degree programs in the final academic year at the University College.

Undergraduate Course Codes

Degree		*Course*	*Code*
BA	Bachelor of Arts		4400
BSc	Bachelor of Science		4410
BE	Bachelor of Engineering		
		Civil Engineering	4421
		Electrical Engineering	4422
		Mechanical Engineering	4423
		Aeronautical Engineering	4424
BTech	Bachelor of Technology	Aeronautical Engineering	4430

Arts and Science

The programs shown below are samples of those available under the rules for the BA and BSc degrees. They are intended to illustrate the operation of the degree rules, and to be a ready reference for course structures, typical programs and the sorts of options available. For simplicity, subject numbers have been omitted. Nothing in this chapter replaces or modifies any part of the degree rules.

Many subjects have prerequisites and/or corequisites. A student must have completed a prerequisite for a subject before being permitted to enrol in that subject. A corequisite must be taken concurrently with the subject, unless the student has completed it already. In general, a level I subject is a prerequisite for a level II subject, and a level II for a level III. Other prerequisites may be prescribed in subject syllabuses or in the degree rules.

Students are strongly advised to read the section 'Information for Students' in the yellow pages at the end of this *Handbook*.

BA Course

				Credit Points
Hist 1	Pol 1	Eng 1	Any other Level 1 Arts or Science subject	120
2 Level II Hist	2 Level II Pol	Eng 2A		120
2 Level III Hist		Eng3C	4 GE subjects	120
				360
Pol 1	Eng 1	Hist 1	Inf Sys 1	120
2 Level II Pol	2 Level II Pol	2 Level II Hist		120
2 Level III Pol	1 Level III Pol		4 GE subjects	120
				360
Econ 1	Geog 1	Inf Sys 1	Any other Level 1 Arts or Science subject	120
2 Level II Econ	2 Level II Mgmt		4 GE subjects	110
2 Level III Econ	1 Level III Mgmt	Inf Sys 2A		130
				360
Eng 1	Pol 1	Geog 1	4 GE subjects	120
Eng 2A		Geog 2A	Ocean 1	110
Eng 3A	1 Level II Pol	Geog 3A		140
				370
Maths 1	Inf Sys 1	Eng 1	Any other Level 1 Arts or Science subject	120
Maths 2A	Inf Sys 2A	Eng 2A	2 GE subjects	135
Maths 3C		Eng 3A	2 GE subjects	105
				360
Chem 1	Comp Sc 1	Hist 1	Pol 1	120
Chem 2A	1 Level III Hist	2 Level II Hist	1 Level II Pol	130
4 GE subjects	1 Level III Hist		2 Level III Pol	120
				370
Maths 1	Econ 1	Inf Sys 1	Phys 1	120
Maths 2A	2 Level II Mgmt		Phys 2	120
	2 Level III Mgmt	Inf Sys 2A	4 GE subjects	130
				370
Geog 1	Inf Sys 1	Chem 1	Any other Level 1 Arts or Science subject	120
Geog 2A	Inf Sys 2A	Chem 2A		120
Geog 3A	Geog 3C		4 GE subjects	130
				370

BSc Course

				Credit Points
Chem 1	Maths 1	Geog 1	Any other Level 1 Arts or Science subject	120
Chem 2A	Maths 2A	Geog 2A		120
Chem 3A		Geog 3C	4 GE subjects	130
				370
Pol 1	Maths 1	Phys 1	Any other Level 1 Arts or Science subject	120
1 x Pol 2	Maths 2A	Phys 2	2 GE subjects	115
1 x Pol 2	Maths 3C	Phys 3	2 GE subjects	125
				360
Comp Sc 1	Geog 1	Maths 1	4 GE subjects	120
Comp Sc 2A	Geog 2A		Ocean 1	110
Comp Sc 3A		Comp Sc 3C	Ocean 2	130
				360
Geog 1	Comp Sc 1	Maths 1	Any other Level 1 Arts or Science subject	120
Geog 2A	Comp Sc 2A	Geog 2B	2 GE subjects	135
	Comp Sc 3A	Geog 3C	2 GE subjects	115
				370
Econ 1	Inf Sys 1	Geog 1	Maths 1	120
	Inf Sys 2	Geog 2A	Maths 2A	120
2 Level II Mgmt		Geog 3A	4 GE subjects	130
				370
Chem 1	Maths 1	Hist 1	Any other Level 1 Arts or Science subject	120
Chem 2A	Maths 2A	2 Level II Hist	2 GE subjects	135
	Maths 3A	1 Level III Hist	2 GE subjects	105
				360
Chem 1	Hist 1	Ocean 1	Maths 1	120
Chem 2A	2 Level II Hist	Ocean 2	2 GE subjects	135
	1 Level III Hist	Ocean 3	2 GE subjects	105
				360
Maths 1	Phys 1	Comp Sc 1	Any other Level 1 Arts or Science subject	120
Maths 2A	Phys 2		4 GE subjects	110
Maths 3A	Phys 3A	Phys 3S		150
				380

Engineering

The programs shown below are standard programs, i.e. those which can be completed in minimum time. A student may be granted an extension of time in order to complete a course, and this often necessitates a non-standard program, which is drawn up by the School concerned.

Before completing their academic studies engineering students must complete 60 working days of approved practical experience, which must be done in periods of 20 or more working days at a time.

The Head of School may require students to maintain an approved record for each period of work experience and return the record to the School to obtain credit for the work experience.

Standard Programs for the BE degree

Civil Engineering

		Prerequisite subjects
Year I	Mathematics 1E	
	Physics 1CE	
	Computer Science 1E	
	Materials and Environmental Chemistry	
	Civil Engineering 1	
Year II	Mathematics 2E	*Mathematics 1E*
	Engineering Mathematics 1E	*Mathematics 1E and Computer Science 1E*
	Computer Science 2CE	*Mathematics 1E and Computer Science 1E*
	Civil Engineering 2	*Civil Engineering 1, Computer Science 1E, Mathematics 1E, Physics 1CE and Chemistry 1E*
	2 General Education subjects	
Year III	Civil Engineering 3	*Civil Engineering 2*
	2 General Education subjects	
Year IV	Civil Engineering: Project and Seminar *or*	*Civil Engineering 3*
	Civil Engineering: Design and Seminar	
	Civil Engineering 4	*Civil Engineering 3*

Electrical Engineering

Year I	Mathematics 1E	
	Physics 1E	
	Computer Science 1E	
	Electrical Engineering 1	
Year II	Computer Science 2EE	*Mathematics 1E and Computer Science 1E*
	Physics 2E	*Mathematics 1 or 1E and Physics 1 or 1E*
	Electrical Engineering 2	*Mathematics 1E, Computer Science 1E, Electrical Engineering 1 and Physics 1E*
	Mathematics 2E	*Mathematics 1E*
	2 General Education subjects	
Year III	Electrical Engineering 3	*Electrical Engineering 2, Computer Science 2EE and Physics 2E*
	Mathematics 3E	*Mathematics 2E*
	2 General Education subjects	
Year IV	Electrical Engineering: Project and Thesis and Specialist Lectures	*Electrical Engineering 3 and Mathematics 3E*
	Electrical Engineering 4	*Electrical Engineering 3 and Mathematics 3E*

Mechanical Engineering

Year I	Mathematics 1E	
	Physics 1E	
	Computer Science 1E	
	Mechanical Engineering 1	
Year II	Mathematics 2E	*Mathematics 1E*
	Computer Science 2ME	*Mathematics 1E and Computer Science 1E*
	Mechanical Engineering 2	*Mechanical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*
Year III	Mathematics 3E	*Mathematics 2E*
	Mechanical Engineering 3	*Mechanical Engineering 2*
	4 General Education subjects	
Year IV	Mechanical Engineering: Project and Thesis	*Mechanical Engineering 3*
	Mechanical Engineering 4	*Mechanical Engineering 3*

Aeronautical Engineering

Year I	Mathematics 1E	
	Physics 1E	
	Computer Science 1E	
	Aeronautical Engineering 1	
Year II	Mathematics 2E	*Mathematics 1E*
	Computer Science 2AE	*Mathematics 1E and Computer Science 1E*
	Aeronautical Engineering 2	*Aeronautical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*
Year III	Mathematics 3E	*Mathematics 2E*
	Aeronautical Engineering 3	*Aeronautical Engineering 2*
	2 General Education subjects	
Year IV	Aeronautical Engineering: Project and Thesis	*Aeronautical Engineering 3*
	Aeronautical Engineering 4	*Aeronautical Engineering 3*
	2 General Education subjects	

Standard Program for the Bachelor of Technology Degree in Aeronautical Engineering

Year I	Mathematics 1E	
	Physics 1E	
	Computer Science 1E	
	Aeronautical Engineering 1	
Year II	Mathematics 2E	*Mathematics 1E*
	2 General Education subjects	
	Aeronautical Engineering 2BT	*Aeronautical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*
Year III	Aero Project	
	2 General Education subjects	
	Computer Science 2AE	*Computer Science 1E, Mathematics 1E*
	Mathematics 3BT	*Mathematics 2E*
	Aeronautical Engineering 3BT	*Aeronautical Engineering 2BT*

Subject Descriptions

This chapter contains descriptions of the undergraduate subjects and units offered by the University College, under the following groups:

1. Arts and Science disciplines, listed alphabetically
2. The First Year Engineering courses
3. Second and later year Engineering courses, listed alphabetically
4. The Bachelor of Technology course
5. General Education subjects

Note: **Level I** (first year) subjects are listed in **bold** type. Not all subjects or units may be offered in the current year. Please check **Subject Descriptions**.

Summary of subjects and units offered in the Arts and Science courses

Chemistry

ACHM1600 U	**Chemistry 1**
ACHM2601 U	Chemistry 2A
ACHM2602 U	Chemistry 2B
ACHM2001 E	Analytical Chemistry
ACHM2002 E	Inorganic Chemistry
ACHM2003 E	Organic Chemistry
ACHM2004 E	Physical Chemistry
ACHM2005 E	Atmospheric Chemistry
ACHM2006 E	Dealing with Dangerous Substances
ACHM2007 E	Energy in Chemical Contexts
ACHM2008 E	Novel Ideas and Developments in Chemistry
ACHM2009 E	Selected Modern Materials
ACHM2010 E	Marine Chemistry 2
ACHM3601 U	Chemistry 3A
ACHM3602 U	Chemistry 3B
ACHM3001 E	Biological Chemistry 3
ACHM3002 E	Aspects of Environmental Water Chemistry
ACHM3003 E	Fuels and Explosives
ACHM3004 E	Polymeric Materials
ACHM3005 E	Marine Chemistry 3
ACHM4690 H	Chemistry 4 (Honours) F/T
ACHM4691 H	Chemistry 4 (Honours) P/T
ACHM4692 C	Chemistry 4 (Combined Honours)
ACHM4693 C	Chemistry 4 (Combined Honours)
GENZ0501 U	The World of Chemistry
GENZ0502 U	Chemistry and Life
GENZ0503 U	Chemistry in Defence and Peace

Civil Engineering

GENZ1501 U	Engineering the Environment

Computer Science

ACSC1600 U	**Computer Science 1**
ACSC1700 U	**Information Systems 1**
ACSC2601 U	Computer Science 2A
ACSC2602 U	Computer Science 2B
ACSC2701 U	Information Systems 2A
ACSC2702 U	Information Systems 2B
ACSC2003 E	Numerical Analysis 2
ACSC2008 E	Numerical Linear Algebra 2
ACSC2015 E	Artificial Intelligence 2
ACSC2016 E	C³I Systems 2
ACSC2017 E	Comparative Programming Languages 2
ACSC2018 E	Computer Graphics 2
ACSC2019 E	Computer Science Core A2
ACSC2020 E	Computer Science Core B2
ACSC2021 E	Computer Systems Architecture 2
ACSC2022 E	Data Communications 2
ACSC2023 E	Decision Analysis 2
ACSC2024 E	Information Systems Core A2
ACSC2025 E	Information Systems Core B2
ACSC2026 E	Knowledge Based Systems 2
ACSC2027 E	Management Science Techniques 2
ACSC2028 E	Object-Oriented Programming 2
ACSC2029 E	Personal Support Systems 2
ACSC2030 E	Special Topic 2
ACSC3601 U	Computer Science 3A
ACSC3603 U	Computer Science 3C
ACSC3701 U	Information Systems 3A
ACSC3702 U	Information Systems 3C
ACSC3006 E	Computer Graphics 3
ACSC3008 E	Operating Systems 3

ACSC3009 E Theoretical Computer Science 3
~~ACSC3011 E Computer Science Project 3~~
ACSC3012 E Applied Stochastic Processes 3
ACSC3013 E Optimal System Control 3
ACSC3027 E Artificial Intelligence 3
ACSC3028 E Computer Systems Architecture 3
ACSC3029 E Computer Project 3
ACSC3030 E Cryptography and Computer Security 3
ACSC3031 E Database 3
ACSC3032 E Data Networks 3
ACSC3033 E Fourth Generation Languages 3
ACSC3034 E Human Computer Interaction 3
ACSC3035 E Human Factors 3
ACSC3036 E Information Systems Core A3
ACSC3037 E Information Systems Core B3
ACSC3038 E Information Systems Engineering 3
ACSC3039 E Management Science Techniques 3
ACSC3040 E Software Engineering 3
ACSC3041 E Systems Administration 3
ACSC4690 H Computer Science 4 (Honours) F/T
ACSC4691 H Computer Science 4 (Honours) P/T
ACSC4692 C Computer Science 4 (Combined Honours) F/T
ACSC4693 C Computer Science 4 (Combined Honours) P/T
ACSC4790 H Information Systems 4 (Honours) F/T
ACSC4791 H Information Systems 4 (Honours) P/T
ACSC4792 C Information Systems 4 (Combined Honours) F/T
ACSC4793 C Information Systems 4 (Combined Honours) P/T
GENZ8501 U Computers and Society
GENZ8502 U Information Technology in Organisations

Economics and Management

AECM1601 U Economics 1: Principles of Economics
AECM2690 U Economics 2 (Honours)
AECM2790 U Management 2 (Honours)
AECM2603 U International Trade
AECM2604 U Quantitative Methods in Economics and Management
AECM2605 U Intermediate Microeconomics
AECM2606 U Intermediate Macroeconomics
AECM2704 U Introduction to Corporate & Government Accounting
AECM2705 U Organisational Behaviour
AECM3603 U Quantitative Analysis and Econometrics
AECM3604 U Industrial Economics
AECM3605 U Public Sector Economics
AECM3606 U Economic Development
AECM3607 U Asia-Pacific Economies
AECM3608 U Labour Economics and Industrial Relations
AECM3609 U Advanced Economic Theory and Policy
AECM3610 U International Economic Theory and Policy
AECM3611 U Economics of Regulation
AECM3612 U Resource Economics
AECM3613 U Capitalism, Socialism and Economic Growth
AECM3703 U Public Sector Management
AECM3704 U Human Resource Management
AECM3705 U Logistics
AECM3706 U Management Accounting
AECM3707 U Finance
AECM3708 U Organisational Management
AECM3690 U Economics 3 (Honours)
AECM3790 U Management 3 (Honours)
AECM3692 U Economics 3 (Combined Honours)
AECM3792 U Management 3 (Combined Honours)
AECM4690 H Economics 4 (Honours) F/T
AECM4691 H Economics 4 (Honours) P/T
AECM4790 H Management 4 (Honours) F/T
AECM4791 H Management 4 (Honours) P/T
AECM4692 C Economics 4 (Combined Honours) F/T
AECM4693 C Economics 4 (Combined Honours) P/T
AECM4792 C Management 4 (Combined Honours) F/T
AECM4793 C Management 4 (Combined Honours) P/T
GENZ1001 U Competition and Innovation
GENZ1002 U Macroeconomic Growth and Stability
GENZ1003 U Leadership Studies

Electrical Engineering

GENZ2001 U Telecommunications: Principles, Systems and Policy

English

AENG1600 U English 1
AENG2601 U English 2A
AENG2602 U English 2B
AENG2001 E Language Revitalised: Literature of the English Renaissance
AENG2002 E British Literature in the C18–C19
AENG2009 E Modern Women Writing
AENG2014 E C20 American Literature
AENG2015 E C19 Australian Literature
AENG2016 E Australian War Literature
AENG2017 E Literature and Society in England in the 1930s
AENG2018 E Literature of the Great War
AENG2020 E Modern Drama
AENG2022 E Commonwealth Literature
AENG2023 E After Modernism
AENG2028 E Reading and Writing Poetry
AENG2031 E The Century's Corpse
AENG2032 E Reading and Writing Short Fiction
AENG2033 E Occasional Option I
AENG2034 E Occasional Option II: African-American Literature
AENG2035 E Classic Literary Texts 1H
AENG2036 E Classic Literary Texts 2H

AENG2037	E	Travel Writing
AENG2038	E	A History of Drama
AENG2039	E	Romanticism and Revolution
AENG2040	E	Images of the Asia-Pacific
AENG2041	E	Shakespeare
AENG2603	U	Australia and the Asia-Pacific
AENG2690	U	English 2 Honours
AENG3601	U	English 3A
AENG3001	E	Radical Cousins: C19 American and Australian Writers
AENG3002	E	Post Colonial Literatures in English
AENG3009	E	Modern Women Writing
AENG3014	E	C20 American Literature
AENG3015	E	C19 Australian Literature
AENG3016	E	Australian War Literature
AENG3017	E	Literature and Society in England in the 1930s
AENG3018	E	Literature of the Great War
AENG3020	E	Modern Drama
AENG3022	E	Commonwealth Literature
AENG3023	E	After Modernism
AENG3028	E	Reading and Writing Poetry
AENG3031	E	The Century's Corpse
AENG3032	E	Reading and Writing Short Fiction
AENG3033	E	Occasional Option I
AENG3034	E	Occasional Option II: African-American Literature
AENG3035	E	Issues in Contemporary Criticism and Theory 1H
AENG3036	E	Issues in Contemporary Criticism and Theory 2H
AENG3037	E	Travel Writing
AENG3038	E	A History of Drama
AENG3039	E	Romanticism and Revolution
AENG3040	E	Asia-Pacific Images
AENG3041	E	Shakespeare
AENG3602	U	English 3B
AENG3603	U	English 3C
AENG3690	U	English 3 (Honours)
AENG3692	U	English 3 (Combined Honours)
AENG4690	H	English 4 (Honours) F/T
AENG4691	H	English 4 (Honours) P/T
AENG4692	C	English 4 (Combined Honours) F/T
AENG4693	C	English 4 (Combined Honours) P/T
GENZ5001	U	Writing and the Media
GENZ5002	U	Issues in Modern Australian Literature and Film
GENZ5003	U	Literature and Modern War
GENZ5004	U	Science and the Literary Imagination
GENZ5005	U	Australian Literature and Film
GENZ5006	U	American Literature

Geography

AGOC1600	**U**	**Geography 1**
AGOC2601	U	Geography 2A
AGOC2602	U	Geography 2B
AGOC2603	U	Geography 2C
AGOC2604	U	The Geography of Development
AGOC2001	E	Geomorphology
AGOC2002	E	Social Geography
AGOC2003	E	Cartographic Methods
AGOC2004	E	Biogeography
AGOC2006	E	Remote Sensing Applications
AGOC2007	E	Geography of Economic Activity
AGOC3601	U	Geography 3A
AGOC3602	U	Geography 3B
AGOC3603	U	Geography 3C
AGOC3001	E	Geographic Research Methods
AGOC3002	E	Geographic Information Analysis
AGOC3003	E	Geomorphological Systems
AGOC3004	E	Ecological Systems
AGOC3005	E	Population and Development
AGOC3006	E	Transport Geography
AGOC3007	E	Environmental Hazards
AGOC3008	E	Cultural Geography
AGOC3009	E	Selected Special Topics
AGOC3010	E	Political Geography
AGOC3011	E	Resource Management
AGOC3012	E	Global Change
AGOC3013	E	The Geography of Development
AGOC4690	H	Geography 4 (Honours) F/T
AGOC4691	H	Geography 4 (Honours) P/T
AGOC4692	C	Geography 4 (Combined Honours) F/T
AGOC4693	C	Geography 4 (Combined Honours) P/T

History

AHIS1600	**U**	**History 1:Modern History**
AHIS1601	**U**	**History 1:The Second World War**
AHIS1602	**U**	**History 1: World History Since 1945**
AHIS2601	U	Revolts and Counter-Insurgency in SE Asia
AHIS2603	U	Colonial Australia
AHIS2604	U	Modern Australia: Politics and Culture
AHIS2606	U	From Democracy to Dictatorship
AHIS2610	U	Southeast Asia: Revolution, Nation and Society 1870–1965
AHIS2611	U	Russian History
AHIS2612	U	Soviet History
AHIS2613	U	The American Civil War
AHIS2614	U	East Asia: Between Tradition and Modernity
AHIS2615	U	Social Change in East Asia
AHIS2616	U	Science and Technology in Australia
AHIS2620	U	The Sea and Seafarers
AHIS2622	U	The European Powers in Peace and War 1870–1914
AHIS2623	U	The Pacific Basin, 1945–1990
AHIS2624	U	International Naval History 1890-1945
AHIS2690	U	History 2 (Honours)
AHIS3601	U	Revolts and Counter-Insurgency in Southeast Asia
AHIS3603	U	Colonial Australia
AHIS3604	U	Modern Australia:Politics and Culture
AHIS3606	U	From Democracy to Dictatorship
AHIS3610	U	Southeast Asia: Revolution, Nation and Society 1870–1965
AHIS3611	U	Russian History
AHIS3612	U	Soviet History
AHIS3613	U	The American Civil War
AHIS3614	U	East Asia: Between Tradition and Modernity
AHIS3615	U	Social Change in East Asia

AHIS3616 U	Science and Technology in Australia
AHIS3621 U	International Naval History 1945 to the Present
AHIS3622 U	The European Powers in Peace and War 1870–1914
AHIS3623 U	The Pacific Basin, 1945–1990
AHIS3625 U	The Great War 1914-1918
AHIS3690 U	History 3 (Honours)
AHIS3692 U	History 3 (Combined Honours)
AHIS4690 H	History 4 (Honours) F/T
AHIS4691 H	History 4 (Honours) P/T
AHIS4692 C	History 4 (Combined Honours) F/T
AHIS4693 C	History 4 (Combined Honours) P/T
GENZ4501 U	The First World War—Image and Reality
GENZ4502 U	Rats, Lice and History
GENZ4503 U	Suakin to Saigon: A Survey of Australian Military History
GENZ4504 U	Black–White Relations in Australia
GENZ4505 U	Japan in the Modern World
GENZ4506 U	The American Civil War
GENZ4507 U	Australia in the C20

Mathematics and Statistics

AMAT1600 U	**Mathematics 1**
AMAT2601 U	Mathematics 2A
AMAT2602 U	Mathematics 2B
AMAT2005 E	Statistics 2
AMAT2006 E	Core Mathematics 2 Linear Algebra
AMAT2007 E	Core Mathematics 2 Multivariable Calculus
AMAT2008 E	Mathematical Modelling 2
AMAT2009 E	Special Topic 2
AMAT3601 U	Mathematics 3A
AMAT3602 U	Mathematics 3B
AMAT3603 U	Mathematics 3C
AMAT3002 E	Continuum Mechanics 3
AMAT3003 E	Differential Equations 3
AMAT3008 E	Multivariate Statistics 3
AMAT3010 E	Human Resource Planning 3
AMAT3013 E	Viscous Fluid Dynamics 3
AMAT3014 E	Generalised Linear Models 3
AMAT3016 E	Advanced Mathematical Techniques 3
AMAT3018 E	Projects 3
AMAT3019 E	Special Topics 3
AMAT3020 E	Statistical Forecasting 3
AMAT3021 E	Waves 3
AMAT3025 E	Waveguide Theory 3
AMAT3026 E	Complex Analysis 3
AMAT3027 E	Industrial Mathematics 3
AMAT3029 E	Modern Techniques in Data Analysis 3
AMAT3030 E	Statistical Modelling 3
AMAT3031 E	Linear Models and Experimental Design
AMAT4690 H	Mathematics 4 (Honours) F/T
AMAT4691 H	Mathematics 4 (Honours) P/T
AMAT4692 C	Mathematics 4 (Combined Honours) F/T
AMAT4693 C	Mathematics 4 (Combined Honours) P/T
GENZ5501 U	Presenting and Analysing Data in the Social Sciences
GENZ5502 U	Statistical Modelling in the Social Sciences
GENZ5503 U	The World of Mathematics

Aerospace and Mechanical Engineering

GENZ2501 U	Mechanics of Flight 1
GENZ2502 U	Mechanics of Fllight 2

Oceanography

AGOC1700 U	**Oceanography 1**
AGOC2700 U	Oceanography 2
AGOC3700 U	Oceanography 3
AGOC4790 H	Oceanography 4 (Honours) F/T
AGOC4791 H	Oceanography 4 (Honours) P/T
AGOC4792 C	Oceanography 4 (Combined Honours) F/T
AGOC4793 C	Oceanography 4 (Combined Honours)
GENZ3501 U	Marine Environment
GENZ3502 U	Marine Resources

Physics

APHY1600 U	**Physics 1**
APHY2600 U	Physics 2
APHY2006 E	Marine Acoustics and Optics 2
APHY2012 E	Astrophysics and Thermodynamics of the Universe
APHY2013 E	Applied Optics and Remote Sensing
APHY2014 E	Atmospheric Physics and Meteorology
APHY2015 E	Electronic Properties of Materials
APHY3600 U	Physics 3
APHY3609 U	Physics 3S
APHY3610 U	Physics 3T
APHY3031 E	Cosmology and Relativistic Astrophysics
APHY3032 E	Physics of Advanced Materials
APHY3033 E	Propulsion Physics
APHY3034 E	Infrared Technology
APHY3035 E	Atmospheric Dynamics
APHY3036 E	Electromagnetic Waves and Remote Sensing
APHY3037 E	Laser Physics and Applications
APHY3038 E	Case Studies in Military Physics
APHY3039 E	Applied Electronics
APHY3040 E	Aviation Meteorology
APHY3041 E	Computational Physics
APHY3042 E	Cosmic Radiation
APHY3043 E	Quantum Technology
APHY3044 E	Sonar Physics
APHY3045 E	Plasma and Ionospheric Physics
APHY3046 E	Nuclear and Particle Physics
APHY4001 E	Solid State Physics 4
APHY4002 E	Astrophysics

APHY4003 E	Microcomputer Applications in Advanced Materials, Astronomy and/or Meteorology
APHY4004 E	Experimental Magnetism
APHY4005 E	Group Theory in Quantum Mechanics
APHY4006 E	Statistical Mechanics 2
APHY4007 E	Nuclear Physics and Hyperfine Interactions
APHY4009 E	Meteorological Remote Sensing
APHY4010 E	Stellar Physics
APHY4011 E	Small Scale Atmospheric Motions
APHY4690 H	Physics 4 (Honours) F/T
APHY4691 H	Physics 4 (Honours) P/T
APHY4692 C	Physics 4 (Combined Honours) F/T
APHY4693 C	Physics 4 (Combined Honours) P/T
GENZ6001 U	Physics for Society
GENZ6002 U	Astronomy
GENZ6003 U	Introductory Meteorology
GENZ6004 U	Environmental Physics

Politics

APOL1600 U	**Politics 1**
APOL2601 U	Politics of Russia
APOL2602 U	Politics of Southeast Asia
APOL2603 U	Politics of the USA
APOL2604 U	Politics of China
APOL2605 U	Politics in Japan
APOL2611 U	The Politics of Australian Defence Policy
APOL2613 U	Electoral Systems
APOL2614 U	Issues and Problems in Australian Foreign Policy
APOL2615 U	War in International Politics
APOL2619 U	The Politics of Korea
APOL2622 U	The Politics of International Cooperation
APOL2623 U	Approaches to Politics
APOL2624 U	From International to Global Politics
APOL2625 U	Strategic Issues in Northeast Asia
APOL2626 U	Culture, Conquest and International Society
APOL3602 U	Strategic Issues in Northeast Asia
APOL3605 U	Politics in Japan
APOL3607 U	War in International Politics
APOL3609 U	Issues and Problems in Australian Foreign Policy
APOL3611 U	The Politics of Australian Defence Policy
APOL3613 U	Electoral Systems
APOL3614 U	Politics of Russia
APOL3615 U	Politics of the USA
APOL3618 U	Politics of China
APOL3623 U	The Politics of Korea
APOL3625 U	Politics of Southeast Asia
APOL3626 U	The Politics of International Cooperation
APOL3627 U	Approaches to Politics
APOL3628 U	From International to Global Politics
APOL3629 U	Culture, Conquest and International Society
APOL4690 H	Politics 4 (Honours) F/T
APOL4691 H	Politics 4 (Honours) P/T
APOL4692 C	Politics 4 (Combined Honours) F/T
APOL4693 C	Politics 4 (Combined Honours) P/T
GENZ4001 U	Why Politics Matters
GENZ4002 U	Issues in Contemporary Australian Politics

Interdisciplinary

Asia-Pacific Studies

AINT2601 U	Asia Pacific Culture—China
AINT3601 U	Asia Pacific Issues—Economics, Politics and Culture

School of Chemistry

The Chemistry School offers a variety of course structures and subjects.

At the least technical level, Chemistry and Society is a 15 credit point elective in which chemistry is discussed solely in a societal context.

Chemistry 1 is offered as a first year subject designed to prepare students for further studies in chemistry or other scientific subjects, or as a single subject. It is similar in content and academic outlook to first year chemistry subjects elsewhere, but is presented as a self-paced program.

Students may select a major, a submajor or a major/submajor in Chemistry.

The major comprises Chemistry 1, 2A and 3A and is designed to meet the needs of the majority of science or arts graduates of University College who will not be practising scientists, but who may require a broad fundamental understanding of chemistry at university level. In Chemistry 2A, students study chemistry in the context of units selected to develop basic chemical principles and then illustrate them from the viewpoint of the chemical generalist. Thus, attention is given to the study of analytical chemistry with applications drawn from trace analysis in the environmental and life sciences, inorganic chemistry with examples drawn from bioinorganic applications, organic chemistry with illustrations from a variety of industrial and biological processes, and physical chemistry as applied to electrochemical processes and devices. Third year topics are developed from the viewpoint of the chemical generalist and the principles are taught in that context. Thus Chemistry 3A is devoted to the study of fuels and explosives, the chemistry of materials, biological chemistry and environmental chemistry. Care is taken in the overall presentation of third year units to provide a balance among the four traditional branches of chemistry: analytical, inorganic, organic, and physical. The chemistry major is accredited by the Royal Australian Chemical Institute.

A major/submajor stream is available to students entering second year. Students undertaking the submajor must also undertake the major, and complete Chemistry 2B and Chemistry 3B. In Chemistry 2B, the topics of study build on the principles established in Chemistry 2A, and cover the areas of atmospheric chemistry, dangerous substances, energy, modern materials, and novel ideas and developments, the latter topic being a library research project. In Chemistry 3B students are given the opportunity to systematically learn more of the fundamental principles with a choice of study of two of the three areas: inorganic chemistry, organic chemistry and physical chemistry. As preparation for an honours program, talented students may be allowed to substitute a small research project for one of the five topics.

Chemistry majors who have not completed Chemistry 2B may elect to take Chemistry 3B in third year as an extra 30 credit point subject in order to prepare for an honours program or to round out their course of study.

For students majoring in subjects other than chemistry, there is a submajor consisting of Chemistry 1 and Chemistry 2A. Science students have a Mathematics 1 prerequisite for enrolment in Chemistry 2A. Arts students are allowed to substitute the unit Novel Ideas and Developments in Chemistry from Chemistry 2B for the unit Physical Chemistry, and a Mathematics 1 prerequisite is then not required.

Eligible students are admitted to the chemistry honours program after the third year. Honours candidates enrol in Chemistry 4, the content of which is tailored for each student individually. Entry to the honours program is subject to approval by the Head of School, and is based mainly on excellence of results in chemistry during the study of the major or major/submajor. Although desirable, Chemistry 3B is not a prerequisite to entry to Chemistry 4.

Certain other chemistry subjects/units are available only to students enrolled in Oceanography 2 or 3 or in the Engineering degree streams.

Outline Course Structures

	HPW [1]	C [2]
(a) Major		
Chemistry 1	7	30
Chemistry 2A	9	40
Chemistry 3A	13	60
(b) Major/submajor		
Chemistry 1	7	30
Chemistry 2A	9	40
Chemistry 2B	9	40
Chemistry 3A	11	60
Chemistry 3B	5	30
(c) Submajor		
Chemistry 1	7	30
Chemistry 2A	9	40
(d) General Education Subjects		
World of Chemistry	2	7.5
Chemistry of Life	2	7.5
Chemistry in Defence and Peace	2	7.5
(e) Honours program		
Chemistry 4 (Honours)	**	**
Chemistry 4 (Combined Honours)		

1 Hours per week.
2 Credit point value.
** Fourth year students are committed full time to their Honours work.

Level I

ACHM1600 U
Chemistry 1
Staff Contact: A/Prof E.A. Magnusson, Dr K.R. Harris
C30 FL/T4 LAB3
Prerequisite: See p. 42

Chemistry 1 is offered as a first year subject designed to prepare students for further studies in chemistry or other scientific subjects, or as a single subject.

There are no formal chemistry co- or prerequisites for entry into Chemistry 1. Students who have not studied chemistry in years 11 and 12 are advised to examine the

prescribed Chemistry 1 textbook and consult with chemistry staff to determine their suitability for enrolment.

Subject Outline:

The subject commences with chemical reactions, the concepts involved in chemical equations and their balancing, and an introduction to nomenclature of inorganic and organic substances. The gas laws are presented, and experiment is related to theory through the kinetic theory of gases. The electronic structure of gaseous atoms is developed and used to account for a variety of properties such as atomic size, ionization potential, electron affinity and ionic radii. It also leads to the concept of an orbital and provides a rational basis for the later description of ionic and covalent bonding and molecular geometry of polyatomic species. In this approach a balance between fact (experiment) and theory is maintained.

Intermolecular forces are introduced in relation to the transition from the gaseous to the liquid and solid phases on cooling. In this context phase equilibria are introduced, together with the nature of liquids and crystals, and bonding and stereochemistry in crystal lattices. This leads logically to the chemistry of solutions, entailing a consideration of solubility, acids and bases, colligative properties and other phenomena. Electron transfer (redox reaction) is introduced as an important area of chemistry, together with the principles of electrochemical cells.

The direction in which chemical reactions proceed (thermodynamics), and the speed with which they occur (kinetics), are phenomena commonly confused. Examples are chosen to illustrate the fallacy in this connection, and thereafter the two phenomena are treated separately. There is an introduction to the three laws of thermodynamics, while in kinetics the temperature and concentration dependences for rates of reaction are discussed. The latter includes the concepts of rate laws, activation energy, and mechanism.

Within the framework of the foregoing development there is a blending of the descriptive chemistry of the elements and their compounds, including those of the transition elements.

The chemistry of the element carbon is an important area in its own right, largely because of its relevance to living systems. Topics including classes of organic compounds, and common functional groups are presented.

The associated laboratory work is designed to teach experimental skills, to introduce chemical techniques and their application in the modern world, and to illustrate principles developed in the theory course.

Level II

ACHM2601 U
Chemistry 2A
Staff Contact: Dr D.J. McHugh, Dr A.P. Arnold
C40 FL4 T1 LAB4
Prerequisites: ACHM1600 U and AMAT1600 U

Chemistry 2A consists of the four units for a total of four lecture hours per week, Analytical Chemistry, Inorganic Chemistry, Organic and Physical Chemistry with one tutorial per week and four hours of laboratory. Arts students not enrolled in Chemistry 2B may substitute the unit Novel Ideas and Developments in Chemistry for Physical Chemistry, and a Mathematics 1 prerequisite is not required.

ACHM2001 E
Analytical Chemistry
F HPS26

Answering questions like "what is in this sample?" and "how much is present?", analytical chemistry provides the data on which many scientific, economic and political decisions are based. This unit uses a systematic approach to analysis—collection of samples, treatment to cope with interference, instrumental analysis, evaluation of results, and quality control. Important techniques are illustrated, for example, chromatographic separation (GC, HPLC), spectroscopic analysis (IR, UV/visible and Atomic Absorption) and electroanalytical chemistry (ion-selective electrodes, pH measurement). Applications are drawn largely from trace analysis in the environmental and life sciences.

ACHM2002 E
Inorganic Chemistry
F HPS26

Inorganic chemistry can be defined as the chemistry of the elements, and is widely applicable to natural and synthetic materials. This unit introduces the various concepts of bonding for metals and non-metals, and then applies these ideas to transition metal chemistry, providing a basis for the understanding of the principles of coordination number, stereochemistry, lability, reactivity, and accessibility of multiple oxidation states. These principles are exemplified in the pivotal role played by metal ions and their coordination complexes in bioinorganic chemistry, eg. nitrogen fixation in living systems, and in the use of metal ions and ligands in medicinal chemistry.

ACHM2003 E
Organic Chemistry
F HPS26

Organic chemistry is the chemistry of carbon compounds, the fabric of animal and plant life and many common materials. This unit introduces the common classes of organic compounds, their origins or syntheses, properties, stereochemistry, reactions and mechanisms, and nomenclature. The classes include hydrocarbons, alcohols, ethers, acids, bases, etc. Biological molecules such as sugars, proteins and nucleic acids are also studied. Examples illustrate applications, eg. in the petrochemical and food industries, in materials such as insecticides, herbicides, aerosol propellants, explosives, plastics, dyes, drugs and in biological systems.

ACHM2004 E
Physical Chemistry
F HPS26
Prerequisite: AMAT1600 U

Chemical thermodynamics and chemical kinetics determine the answers to the basic questions, "Can a chemical process occur, and if so, how quickly do products form and to what extent?" This unit covers the laws of thermodynamics, conditions for equilibrium in chemical systems, rate equations, rate constants and

the Arrhenius equation for activation energy, the Nernst equation and electrochemical energetics, and rate controlling electrochemical processes—ion migration, ion diffusion and electrodics. These topics are applied to electrochemical processes and devices, eg., metallic corrosion and its inhibition, and battery function and performance.

ACHM2602U
Chemistry 2B
Staff Contact: Dr D.J. McHugh, Dr A.P. Arnold
C40 FL4 T1 LAB4
Prerequisite: ACHM1600 U
Corequisite: ACHM2601 U

Chemistry 2B consists of five units for a total of four lecture hours per week, Atmospheric Chemistry, Dealing with Dangerous Substances, Energy in Chemical Contexts, Novel Ideas and Developments in Chemistry, and Selected Modern Materials plus four hours of laboratory and one tutorial per week.

ACHM2005 E
Atmospheric Chemistry
F HPS20

An introduction to the chemical processes which govern the evolution and properties of the earth's atmosphere and which determine its commanding influence on life. Topics include the chemical history of the atmosphere, its composition and stratification, the action of water, the absorption and emission of radiation, photochemical reactions and climate change, the ionosphere and radio transmission, the atmospheric chemistry of carbon, nitrogen, oxygen, and sulfur, and the fates and effects of pollutants in the atmosphere.

ACHM2006 E
Dealing with Dangerous Substances
F HPS20

Modern society must control chemical substances and reactions in the environment generally, including the home and the workplace. This unit aims to provide the basis for making rational decisions concerning hazardous chemical substances, especially with respect to issues of handling, protection and disposal. Chemical principles learned in Chemistry 2A, eg. thermodynamics, kinetics, redox reactions, and molecular interactions, are developed in this context. Applications such as flammability of solvents, corrosion of structural metals, toxicity of pesticides and modern chemical warfare agents are examined.

ACHM2007 E
Energy in Chemical Contexts
F HPS20

Containing three topics, this unit illustrates the importance and role of energy by examining it in highly diverse chemical contexts. The first topic introduces the thermochemistry of internal combustion engines and the mechanisms of fuel combustion, relates fuel composition to engine performance, and discusses exhaust gas production and composition. The second topic examines the chemistry of energy production by nuclear reactions—radioactivity, fusion and fission, the latter including fuel production, reprocessing and waste disposal. The third topic examines the chemistry of energy transformations in biological systems, with emphasis on photosynthesis in plants, and glycolysis and the citric acid cycle in animals.

ACHM2008 E
Novel Ideas and Developments in Chemistry
F HPS20

Students may regard chemistry as a static collection of facts and principles. In reality chemistry is a dynamic, growing science, teeming with new ideas and developments. Buckminsterfullerene, an allotrope of carbon, and high temperature superconductivity are two contemporary examples. Not all developments withstand careful scrutiny, eg. the infamous case of "polywater". Others like cold fusion remain controversial, with proponents and opponents confronting each other as in high drama. In this unit, students do library research on novel aspects of chemistry and then report back to the class.

ACHM2009 E
Selected Modern Materials
F HPS20

Chemistry plays a central role in the discovery of materials with specific and desirable properties. In this unit, a range of materials is surveyed: (i) Thickening and gelling agents, whose application range from food additives to explosives, and whose development requires the principles of organic chemistry and viscous behaviour. (ii) Alloys, such as Li/Al used in airframes, whose manufacture requires the principles underlying phase diagrams. (iii) Inorganic polymers and clusters such as those which are models for metal surfaces in catalytic reactions, or have structural features dealt with by theories of directed valence and stereochemistry; (iv) Ceramics such as partially stabilized zirconia (PSZ), or composites such as those containing boron and graphite fibres.

Level III

ACHM3601 U
Chemistry 3A
Staff Contact: Prof W.G. Jackson, Dr C.E. Woodward
C60 FL5 T1 LAB5
Prerequisites: ACHM2601 U and ACHM2004 E

Chemistry 3A treats areas of chemistry that are of special importance to prospective officers in the services, but presented from the viewpoint of chemical fundamentals of analytical, inorganic, organic and physical chemistry.

ACHM3001 E
Biological Chemistry 3
L30

In this unit, metabolic processes in living organisms are examined at the molecular level. Mechanistic and structural organic and inorganic chemistry are developed and extended to biological reactions. The composition, structure and reactivity of biomolecules such as proteins, enzymes and nucleic acids are studied. The great enhancement of reactivity in enzymic reactions is demonstrated with the aid of model enzyme systems. Other topics include kinetics and inhibition processes of enzymes; how DNA replicates itself and the binding of small molecules to DNA; protein folding and the forces

involved. This section precedes a discussion of the roles played by essential inorganic elements in maintaining biomolecular structure, transport of oxygen and electrons, and the catalysis of redox and acid-base reactions: Why are certain inorganic elements specifically required for certain biological functions? Why is cobalt uniquely required for enzymatic reactions involving Vitamin B12? Why not Cu or Fe? Why is zinc unique in its involvement in the reactions of small biological substrates at the active sites of such a large number (>200) of enzymes? Finally, multinuclear NMR spectroscopy is introduced as a structural tool for biological chemistry.

ACHM3002 E
Aspects of Environmental Water Chemistry
L30

Chemical processes and physical interactions occur in natural bodies of fresh water and in the treatment of municipal water. Interdependent equilibria are used to describe the natural buffer system that controls the pH of fresh bodies of water. The effects of pollution (i.e. acid rain, greenhouse effect) are also discussed. The rich redox and complexation chemistry of metal ions, present naturally and through pollution, is examined in relation to pH and other factors including organic pollutants and surfactants. Several microbial processes, which are responsible for a vast number of natural chemical reactions are studied, including nitrogen fixation and biodegradation of pollutants.

A renewable source of potable water for human consumption is critical to much of the world, including countries like Australia with limited fresh water resources. The criteria used to assess water quality and the associated chemical tests are studied. The treatment of fresh water for consumption and waste water for release into the environment by removal of ionic, colloidal and organic wastes is examined.

ACHM3003 E
Fuels and Explosives
L30

Chemistry is central to the technologies of fuels and explosives. The burning of fuels and the decomposition of an explosive are rapid reactions with many common features. In this unit we examine the reasons why chemical reactions occur and the particular reasons for the rapidity of explosions. Chemical mechanisms and feedback effects for thermal and branched chain reactions are described. Also discussed are the detailed decomposition mechanisms for materials like HDX and RDX, as revealed by recent advances in mass-spectrometry and chemical kinetics. Thermodynamic models are used to estimate the maximum temperatures and pressures produced by explosives.

The classification of explosives into detonants, high explosives and propellants is discussed. The manufacture, properties and applications of military and commercial representatives of the three groups are described. These include detonants such as lead azide and lead styphnate, explosives such as TNT, RDX, ANFO and propellants based on nitrocellulose.

Fossil fuels, including crude petroleum, natural gas and coal, are considered as sources of energy. The chemistry of oil refinery processes that convert crude petroleum into useful fuels is examined. Methods for converting natural gas and coal to liquid fuels are discussed. The concept of a single fuel for battle situations is reviewed.

ACHM3004 E
Polymeric Materials
L30

Artificial macromolecules are of commercial, industrial and domestic importance. The synthetic methods of polymerisation (chain-growth polymerisation and step-growth polymerisation) are defined and illustrated through specific examples such as the production of polyethylene, synthetic rubbers, silicones, nylons, epoxy resins and carbon-fibre reinforced plastics. The degradation of polymers is also discussed. Some fundamental aspects of polymer solutions and melts are explored, e.g. polymer statistics, as related to viscosity and light-scattering experiments. Polyelectrolytes and their application in industry and nature are considered and crystal and glass formation from the polymer melt investigated. Some novel applications of polymers to technology are discussed through the use of solid state electronic structure theory. This theory provides the concepts required for understanding polymers that are currently being developed as chemical sensors and non-metallic conductors, and for their optical properties. Polythiophenes and polyacetylenes are taken as examples. Modern high performance polymers are also studied in this context with polyaryls, polyetherketones and polyamides as case studies.

ACHM3602 U
Chemistry 3B
Staff Contact: Prof W.G. Jackson, Dr C.E. Woodward
C30 HPW5
Corequisite: ACHM3601 U

Chemistry 3B can be elected as a single subject to augment Chemistry 3A or as part of a major/submajor comprising Chemistry 1, Chemistry 2A and 2B, Chemistry 3A and 3B. Two of the options Inorganic Chemistry, Organic Chemistry and Physical Chemistry are to be elected. Upon invitation by the Head of School, a student may substitute a project for one of the options. Contact hours are variable but the yearly total will not exceed 130 hours.

Inorganic Chemistry

This unit comprises two topics of approximately equal weight. (i) Molecular Architecture: The lecture series begins with elementary considerations of symmetry leading on to formal classifications of objects and molecules based on their symmetry elements and operations. Terms used to describe spatial relationships between atoms or groups of atoms, within and between molecules, are introduced. In this way an appreciation of complex structures such as the beautifully symmetric C_{1500} molecule and the intricate polymer DNA can be developed. Other structures with special appeal, both synthetic and naturally occurring, are considered from both aesthetic and chemical perspectives: e.g. inorganic and organic coupled-ring systems, helical molecules, molecular knots, and chemical curiosities such as spirane and cubane. (ii) Macrocyclic Coordination Chemistry: Macrocyclic ligands are large organic rings which often contain heteroatoms such as nitrogen that

can bind metal ions. Some also have the capacity to bind smaller non-metal-containing inorganic or organic molecules (host-guest chemistry), an example being the inclusion complexes formed by the cyclodextrins. This chemistry has developed rapidly over recent years and the discoveries now impinge on biochemistry. For example macrocyclic ligands are involved in fundamental biological systems, where enhanced kinetic and thermodynamic stabilities are bestowed on the metal-ions through complexation. Topics such as metal-ion catalysis, organic synthesis, metal-ion discrimination, supramolecular self-assembly, and associated analytical methods form a logical part of this area, with a number of potential industrial medical and other applications. This unit provides an overview of the main developments. Some selected systems are treated in more detail.

Organic Chemistry

The systematic treatment of organic reactions and reaction mechanisms is taken to an advanced level in this unit. This knowledge is applied to the problem of how to design syntheses of specific target molecules. The concept of retro-synthetic analysis is introduced, and the syntheses of a variety of chemotherapeutic agents, insecticides, perfumes, etc. are studied. The importance of stereochemistry and enantioselective synthesis is also stressed. This work is followed by case studies, concentrating on topics such as: the design and synthesis of complex chemotherapeutic agents, DNA binding drugs and their interaction with DNA, structure-activity studies and mechanisms of therapeutic action.

Physical Chemistry

The understanding of chemistry relies on two explanatory theories, quantum theory and statistical theory, applied in the two equal parts of this topic to isolated molecules and aggregates of molecules: (i) An introduction to the physical principles underlying spectroscopy and quantum chemistry, and their use in quantitatively determining the energies, structures, dimensions and other properties of individual molecules. (ii) An introduction to the behaviour of assemblies of molecules, either through the development of statistical thermodynamics as applied to the gas phase, or through the study of a particular case (e.g. liquids) incorporating thermodynamic behaviour, structure, intermolecular forces and the like. The laboratory work includes hands-on experience with computer packages that chemists use for theoretical molecular modelling, spectroscopic experiments for the determination of molecular energies and dimensions, and comparisons of the theoretical calculations with experimental results.

Project

Open by invitation only. Small individual research projects designed to introduce prospective honours students to research methodology and techniques in specialised areas.

Level IV

ACHM4690 H
Chemistry 4 (Honours) F/T
Staff Contact: Dr J.G. Collins

ACHM4691 H
Chemistry 4 (Honours) P/T
Staff Contact: Head of School

The subject will consist of study in a specialised field (or fields) of chemistry and will comprise such lectures, seminars, examinations, research projects, reports, as prescribed by the Head of School.

ACHM4692 C
Chemistry 4 (Combined Honours) F/T

ACHM4693 C
Chemistry 4 (Combined Honours) P/T
Staff Contact: Relevant Heads of Schools

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Chemistry and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete course work as approved by the Head of School.

ACHM1800 U
Chemistry 1E
Staff Contact: Dr J.A. Broomhead, Dr S. Petrie
HPW2

ACHM1801 U
Materials and Environmental Chemistry
Staff Contact: Dr J.A. Broomhead, Dr S. Petrie
HPW2

Subject descriptions appears under 1st year Engineering p. 112

ACHM2010 E
Marine Chemistry 2
Staff Contact: CMDR B.B. Snushall
SS HPW4

Open only to students enrolled in Oceanography 2.

This unit begins with discussion of the unique properties of water. The effects of pressure and temperature on the structure of water in the fluid and solid phases are examined, leading to consideration of structural changes due to the presence of hydrated ions, and properties such as diffusion, conductivity, and density of seawater. The chemical composition of seawater, its relationships with physical oceanographic and biological processes, techniques for the precise measurement of variables such as salinity and chlorinity, and their influence on speciation of major and trace elements, are illustrated using examples largely drawn from the chemistry of the southern oceans.

There are no formal chemistry co- or prerequisites for Marine Chemistry 2, but students who have not studied chemistry in year 12 are advised to consult with the Chemistry School to determine their suitability for enrolment.

ACHM3005 E
Marine Chemistry 3
Staff Contact: CMDR B.B. Snushall, Dr A.P. Arnold
HPS10 LAB12
Prerequisite: ACHM2010 E

This unit is available as an oceanography elective for students enrolled in Oceanography 3A.

This unit continues Marine Chemistry 2. Chemical equilibria in the ocean are discussed using a graphical "master-variable" technique. Detailed examination is made of effects of ionic strength, temperature and pressure on important carbonate equilibria using this approach. Diverse applications of the technique are considered from the mixing of fresh and saline waters to analytical errors in modern alkalinity measurements. The role of the ion-exchange equilibria at the sediment/water interface is discussed in relation to the evolution of seawater composition. The commercial recovery of natural products and fine chemicals from marine sources is discussed, together with the use of organic molecules as biogeochemical markers in sediments and ice.

School of Computer Science

Outline of subject structures for the Arts and Science degrees.

	HPW	C
(a) Single subject		
Computer Science 1 *or*	6	30
Information Systems 1	6	30
(b) the sub-major		
Computer Science 1	6	30
Computer Science 2A *or*	8	40
Information Systems 1	6	30
Information Systems 2A	8	40
(c) the single major		
Computer Science 1	6	30
Computer Science 2A	8	40
Computer Science 3A *or*	12	60
Information Systems 1	6	30
Information Systems 2A	8	40
Information Systems 3A	12	60

	HPW	C
(d) the major/sub-major combination		
Computer Science 1	6	30
Computer Science 2A	8	40
Computer Science 2B	8	40
Computer Science 3A	12	60
Computer Science 3C *or*	6	30
Information Systems 1	6	30
Information Systems 2A	8	40
Information Systems 2B	8	40
Information Systems 3A	12	60
Information Systems 3C	6	30

(e) the Honours program

The standard for entry to the Honours program is at least a good credit grade at Level III in Computer Science or Information Systems. Students proceeding to the Honours program are required to complete the unit ACSC3029E Computer Project 3 at Level 3.

Note:

1. Students are not permitted to take both Computer Science 1 and Information Systems 1 in the one degree course.
2. Students proceeding to a Computer Science or Information Systems major or sub-major from Computer Science 1E are required to undertake bridging studies as prescribed by the Head of School.
3. The availability of some units is conditional on class size.

Prerequisites for Level II Units

Units	Prerequisites
Session 1	
C^3I Systems 2	Computer Science 1 *or* Information Systems 1
Comparative Programming Languages 2	Computer Science 1 *or* Information Systems 1
Computer Science Core A2	Computer Science 1 *or* Information Systems 1
Data Structures 2EE	Computer Science 1E
Decision Analysis 2	Computer Science 1 *or* Information Systems 1
Information Systems Core A2	Computer Science 1 *or* Information Systems 1
Knowledge Based Systems 2	Computer Science 1 *or* Information Systems 1
Numerical Analysis 2	Computer Science 1, coreq. Mathematics 2A
Personal Support Systems 2	Computer Science 1 *or* Information Systems 1
Special Topic 2	Computer Science 1 *or* Information Systems 1
Session 2	
Artificial Intelligence 2	Computer Science 1 *or* Comparative Programmming Languages 2
Computer Graphics 2	Computer Science Core A2
Computer Science Core B2	Computer Science 1 *or* Information Systems 1
Computer Systems Architecture 2	Computer Science Core A2
Data Communications 2	Computer Science Core A2 *or* Information Systems Core A2
Information Systems Core B2	Information Systems Core A2
Management Science Techniques 2	Computer Science 1 *or* Information Systems 1
Numerical Linear Algebra 2	Numerical Analysis 2, coreq. Mathematics 2A
Object Oriented Programming 2	Computer Science Core A2
Special Topic 2	Computer Science 1 *or* Information Systems 1

Prerequisites for Level III Units

Units	Prerequisites
Session 1	
Artificial Intelligence 3	Artificial Intelligence 2
Computer Systems Architecture 3	Computer Systems Architecture 2
Cryptography and Computer Security 3	Computer Science Core A2
Database 3	Computer Science Core B2 or Information Systems Core B2
Data Networks 3	Data Communications 2
Human Computer Interaction 3	Computer Science Core A2
Information Systems Core A3	Information Systems Core A2
Information Systems Core B3	Information Systems Core B2
Management Science Techniques 3	Management Science Techniques 2
Software Engineering 3	Computer Science Core A2 and Computer Science Core B2
Session 2	
Computing Project 3	Software Engineering 3 *or* Information Systems Core A3
Fourth Generation Languages 3	Computer Science Core B2 *or* Information Systems Core B2
Human Factors 3	Information Systems Core B3
Information Systems Engineering 3	Information Systems Core A3
Systems Administration 3	Computer Science Core A2 *or* Information Systems Core A2

Level I Subjects

ACSC1600 U
Computer Science 1
Staff Contact: Dr C. Lokan
F C30 L3 T1 LAB2
Note/s: Excluded ACSC1700 U

Introduction to computing: history, overview of processors, memory, input/output, operating system, networks, mail, news, Internet, data representation, file and data organisation. Elementary word processing, spreadsheets, graphics, databases. Application examples: overview of management science, information in organisations, operations research and decision support systems.

Software development: software engineering, introduction to non-procedural programming languages. Elementary problem solving, algorithms and structures. Overview of human factors, ethics, computer security, artificial intelligence and graphics.

Algorithm development and problem solving using the Ada programming language: identifiers, variables, constants, input/output, simple arithmetic types, assignment, expressions, operators, functions, procedures, parameters, block structures, scope and visibility, conditionals, Boolean type, loops, user-defined types, arrays, records, sequential files, sets, searching and sorting.

ACSC1700 U
Information Systems 1
Staff Contact: Mr D. Hart
F C30 L3 T1 LAB2
Note/s: Excluded ACSC1600 U

Computer functions: history, components of a computer, network architecture and software, digital data representation, file organisation, personal computer use in word processing, spreadsheets and graphics, back-up strategies.

Computer programming: programming in the Ada language, conditional and repetitive program constructs, data types, algorithm development and problem solving, stages in system development.

Information usage: information use and decision making in organisations, office automation and management information systems, feasibility studies and interview techniques, introduction to databases.

Level II Subjects

ACSC2601 U
Computer Science 2A
Coordinator: Mr A. Quaine
F C40
Prerequisite: ACSC1600U

4 Level II units, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session. Both the units: ACSC2019 E Computer Science Core A2 and ACSC2020 E Computer Science Core B2 must be included. The remaining 2 units may be chosen from those level II units for which prerequisites are satisfied, usually 1 unit in each session.

ACSC2602 U
Computer Science 2B
Coordinator: Mr A. Quaine
F C40
Corequisite: ACSC1600 U

4 Level II units, excluding units chosen in Computer Science 2A, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session. Usually, 2 units per session will be chosen.

ACSC2701 U
Information Systems 2A
Coordinator: Dr S. Sampath
F C40
Prerequisite: ACSC1700 U

4 Level II units, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session. Both the units: ACSC2024 E Information Systems Core A2 and ACSC2025 E Information Systems Core B2 must be included. The remaining 2 units may be chosen from those Level II units for which prerequisites are satisfied, usually 1 unit in each session.

ACSC2702 U
Information Systems 2B
Coordinator: Dr S. Sampath
F C40
Corequisite: ACSC2701 U

4 Level II units, excluding units chosen in Information Systems 2A, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session. Usually, 2 units per session will be chosen .

Level II Units

ACSC2003 E
Numerical Analysis 2
Staff contact: Dr F. Clermont
S1 L2 LAB2
Prerequisite: ACSC1600 U
Corequisite: AMAT2601 U

Syllabus details are identical to Numerical Analysis 2E and 2CE on p. 79

ACSC2008 E
Numerical Linear Algebra 2
Staff contact: Dr F. Clermont
S2 L2 LAB2
Prerequisite: ACSC1600 U
Corequisite: AMAT2601 U

Syllabus details are identical to Numerical Linear Algebra 2E on p. 79

ACSC2015 E
Artificial Intelligence 2
Staff contact: Dr R. McKay
S2 L2 LAB2
Prerequisite: ACSC1600 U or ACSC2017 E

Search: unguided, optimal and heuristic search methods. Game playing: minimax search, alpha-beta pruning. Planning: GPS, scripts, deductive planning. Knowledge Representation: logic, slot-and-filler structures, production rules and object oriented representations. Functional programming techniques and applications using Lisp.

Logic programming techniques and applications using Prolog.

ACSC2016 E
C³I Systems 2
Staff contact: Dr E. Lewis
S1 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

C³I paradigms. Surveillance, intelligence, communications, command support and life-cycle support subsystems. Issues in complex systems: multi-sensor data fusion, data acquisition, abstraction, information management; Distributed systems, role of AI, human-computer interface; Interoperability, architectures and design goals, network protocols; Modelling and simulation of C³I systems.

ACSC2017 E
Comparative Programming Languages 2
Staff contact: Dr R. McKay
S1 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

Brief history of programming languages, language paradigms. Mapping between paradigms. Comparative features: syntax, semantics, binding, control structures, data types, I/O mechanisms, parameter passing mechanisms, abstraction, modularity. Factors governing language choice: efficiency, clarity, suitability, ease of programming. Paradigms: procedural, declarative, functional, 4GLs, object oriented, parallel.

ACSC2018 E
Computer Graphics 2
Staff contact: Dr G. Freeman
S2 L2 LAB2
Prerequisite: ACSC2019 E

Graphics input and output hardware and software principles, X Windows, 2D and 3D modelling, perspective views of visible surfaces, colour specification, output manipulation on a bit-mapped display, PostScript, rasterisation algorithms, ray tracing and radiosity.

ACSC2019 E
Computer Science Core A2
Staff contact: Mr A. Quaine
S1 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

UNIX: utilities, command interface, tools and features, command interpreters. Korn shell programming. Computer architecture: Boolean logic, data representation, byte and word addressing, function call and interface paradigms, parameter passing, stack frames, local and global referencing. Low level presentation mechanisms. The C/C++ programming language: Lvalues, expressions, loop constructs, memory aggregates and unions, pointers and arrays, structures. Program structuring strategies: local, global and static classes, external declarations, prototypes and header files, encapsulation techniques. Command line arguments, pointers to arrays, to functions, to tables, explicit linkage. Standard input/output, low level system calls for file processing, process creation and control. Overlays and parallel processes.

ACSC2020 E
Computer Science Core B2
Staff contact: Dr C. Vance
S2 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

Ada: packages, generics, overloading, tasking. Data Structures: abstract data types, encapsulation, aggregate and union memory structures. Dynamic data linkage with applications to stacks, queues, rings, hash chaining. Binary and general trees, recursive traversal algorithms. File access mechanisms. Programming tools: make files, version control. Data Bases: data modelling, relational theory, normalization, SQL.

ACSC2021 E
Computer Systems Architecture 2
Staff contact: Dr M. Barlow
S2 L2 LAB2
Prerequisite: ACSC2019 E

Overview of computer architecture and operating system principles. Architecture: hierarchical organisation, data representation and manipulation, arithmetic and logical operations, memory addressing and data structures, registers, procedure calls and the stack, the assembler, I/O, interrupts and the kernel, performance. Operating systems: function and evolution, system calls, processes, scheduling, I/O, the disk, memory management, virtual memory and paging, file systems and file system performance, security and virii.

ACSC2022 E
Data Communications 2
Staff contact: Dr L. Brown
S2 L2 LAB2
Prerequisite: ACSC2019 E or ACSC2024 E

Overview of data communications technology, OSI reference model and lower layers, protocol stacks, presentation layer, ASN.1, application layer and common applications, client-server models, network management, network design, network specification and network selection.

ACSC2023 E
Decision Analysis 2
Staff contact: Mr D. Hoffman
S1 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

Basic probability concepts. Multiple objectives. Utility theory. Creative analysis. Qualitative tools. Decision making under uncertainty: decision tables, decision trees, influence diagrams, sensitivity analysis. Bayes approach to decision problems. Group decision making: SMART and MAUT analysis. Negotiation problems.

ACSC2024 E
Information Systems Core A2
Staff contact: Dr S Sampath
S1 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

System modelling: process, data, control. Process modelling, data flow diagrams. Data modelling: entities, attributes, relationships, entity-relationship diagrams.

Project management: planning, PERT and Gantt charts. Networks, communications. Benchmarking.

ACSC2025 E
Information Systems Core B2
Staff contact: Mr D. Munro
S2 L2 LAB2
Prerequisite: ACSC2024 E

Database logical and physical design, relational model, entity-relationship model to relational schema translation. Normalisation from first to fourth normal form. Denormalisation and efficiency. Query languages and SQL. Transaction control and concurrency security and integrity. Spreadsheet programming and macros. Decision analysis. Decision tables and trees. Management information systems. Decision support systems. Executive support systems. Management of organisational change with respect to information systems. Legal and ethical issues.

ACSC2026 E
Knowledge Based Systems 2
Staff contact: Dr X. Yao
S1 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

Knowledge Engineering Technology Assessment: planning and management of expert system projects, knowledge representation formalism design for knowledge acquisition, design of inference engines, selection of expert systems shells, design and implementation of knowledge base, integration of expert system with operating environment, evaluation of expert systems. Knowledge acquisition: interviewing techniques, automatic rule acquisition, model-based acquisition.

ACSC2027 E
Management Science Techniques 2
Staff contact: Mr D. Hoffman
S2 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

Introduction: process of operations research, management cycle, model formulation, mathematical techniques. Linear programming. Allocation models: transportation, assignment. Game theory. Bidding models. Dynamic programming: networks, resource allocation, reliability. Networks: shortest path, maximal flow, minimal spanning tree. Integer programming: branch and bound, cutting plane. Modelling using computer packages.

ACSC2028 E
Object-Oriented Programming 2
Staff contact: Mr A. Quaine
S2 L2 LAB2
Prerequisite: ACSC2019 E

Data abstraction: information hiding, classes, members, and objects. Program structure: file strategies, scope, input/output streams, reference arguments, inline functions, constructors, destructors. Overloading functions and operators. Free store allocation and deallocation. Function definition, implicit object pointer, templates. Derivation: public, protected and private base classes, inheritance hierarchies. Polymorphism, virtual functions, virtual base classes, multiple inheritance.

ACSC2029 E
Personal Support Systems 2
Staff contact: Dr J. Yang
S1 L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

Advanced features of standard office automation software packages. Desktop publishing. New developments in personal support software: hypermedia, multimedia, presentation graphics. Personal information management systems: time scheduling, diaries, meeting control. New developments in personal support hardware: palmtops, organisers, personal digital assistants, pen-based systems. Information integration techniques: database replication and work flow aids, hot-linking between applications, soft information shareware. Information retrieval: email, Internet, remote systems access, World Wide Web. Computer based training: authoring languages and systems. Office of the future.

ACSC2030 E
Special Topic 2
Staff contact: Mr A. Quaine
SS L2 LAB2
Prerequisite: ACSC1600 U or ACSC1700 U

Occasional topics of relevance in the areas of Computer Science or Information Systems, given by visitors or external lecturers or members of staff.

Level III Subjects

ACSC3601 U
Computer Science 3A
Coordinator: Dr G. Gerrity
F C60

6 Level III units, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session. The unit ACSC3040E Software Engineering 3 must be included.

Level II units may be substituted for Level III units with the approval of the Head of the School.

ACSC3603 U
Computer Science 3C
Coordinator: Dr G. Gerrity
F C30

3 Level III units, excluding units chosen in Computer Science 3A, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session.

Level II units may be substituted for Level III units with the approval of the Head of the School.

ACSC3701 U
Information Systems 3A
Coordinator: Mr D. Munro
F C60

Level III units, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session. Level II units may be substituted for Level III units with the approval of the Head of the School. Both the units ACSC3037E Information Systems Core 3A and ACSC3038E Information Systems Core 3B must be included.

ACSC3702 U
Information Systems 3C
Coordinator: Mr D. Munro
F C30

3 Level III units, excluding units chosen in Information Systems 3A, each unit of 10 credit points consisting of 2 lectures and 2 laboratory/tutorial periods per week for 1 session. Level II units may be substituted for Level III units with the approval of the Head of the School.

Level III Units

ACSC3027 E
Artificial Intelligence 3
Staff contact: Dr X. Yao
S1 L2 LAB2
Prerequisite: ACSC2015 E

Machine learning: propositional and relational learning, stochastic and deterministic learning. Natural language processing: parsing methods, syntax and semantics, context. Neural computation: recognition, classification, control. Vision: object recognition approaches. Robotics: autonomous learning robots, navigation. Evolutionary computation: population-based learning, classifier systems. Techniques for advanced AI programming.

ACSC3028 E
Computer Systems Architecture 3
Staff contact: Dr G. Gerrity
S1 L2 LAB2
Prerequisite: ACSC2021 E

Computer architecture: CPU internal operation and design. Memory, Exception processing. Input/Output. CISC, RISC and parallel architectures. Operating systems: BSD Unix, processes, scheduling, context switching, virtual memory, paging. Device, file and buffer management. Performance and robustness. Security considerations.

ACSC3029 E
Computer Project 3
Staff contact: Mr M. Ford
S2 C20
Prerequisite: ACSC3040 E *or* ACSC3036 E

A substantial supervised project in a small team in consultation with an appropriate member of the school. Topics for projects will be garnered from the School, Defence and local organisations, and will be chosen in consultation with staff.

ACSC3030 E
Cryptography and Computer Security 3
Staff contact: Dr L. Brown
S1 L2 LAB2
Prerequisite: ACSC2019 E

Introduction to computer security. Introduction to cryptography: classical ciphers, modern private key block ciphers. Number theory. Public key ciphers. Authentication and integrity. Key management. Application examples. User authentication. Trusted computer systems: evaluation criteria, risk analysis techniques.

ACSC3031 E
Database 3
Staff contact: Dr J. Yang
S1 L2 LAB2
Prerequisite: ACSC2020 E *or* ACSC 2025 E

Introduction to distribution: fragmentation and transparency. Data distribution technologies: global query translation, query optimization, distributed transaction management, concurrency control, reliability. Current trends: object-oriented databases, intelligent databases, heterogeneous databases.

ACSC3032 E
Data Networks 3
Staff contact: Dr G. Gerrity
S1 L2 LAB2
Prerequisite: ACSC2022 E

Introduction to data networks: the OSI model, the Client/Server paradigm and APIs. Internetworking principles: the TCP/IP and Novell Netware networking stacks. Networking technologies: information theory, data communication techniques, circuit and packet switching. Future networks: ISDN, B-ISDN, ATN, network management, data encoding on these networks.

ACSC3033 E
Fourth Generation Languages 3
Staff contact: Mr D. Hart
S2 L2 LAB2
Prerequisite: ACSC2020 E *or* ACSC2025 E

Structuring a database application in a GUI environment. User-interface issues. The event-driven programming paradigm. Working with database objects from code. Error-handling. Report generators. Representative commercial fourth generation languages. Developing client-server database applications.

ACSC3034 E
Human Computer Interaction 3
Staff contact: Dr G. Freeman
S1 L2 LAB2
Prerequisite: ACSC2019 E

Human factors in user-interface design, graphical user interface construction, methods for implementing command languages, hypertext interfaces.

ACSC3035 E
Human Factors 3
Staff contact: Dr E. Lewis
S2 L2 LAB2
Prerequisite: ACSC3037 E

Impact of people upon information systems design: cognitive systems engineering, physical ergonomics, cognitive ergonomics, documentation requirements. Impact of information systems upon people: organisational structuring, decentralisation vs centralisation, re-engineering costs, change management.

ACSC3036 E
Information Systems Core A3
Staff contact: Mr D. Munro
S1 L2 LAB2
Prerequisite: ACSC2024 E

Requirements analysis, sizing. Detailed logical design: DFD to structure charts, ERA to database design, DSD to file design. System design: coupling, cohesion, design quality. Language selection, implementation, testing. Project management. Training. Documentation.

ACSC3037 E
Information Systems Core B3
Staff contact: Dr E. Lewis
S1 L2 LAB2
Prerequisite: ACSC2025 E

Strategic importance of information systems, IS strategic planning. Corporate planning. Business process re-engineering, systems thinking. Information in organisations. Organisational change.

ACSC3038 E
Information Systems Engineering 3
Staff contact: *Dr. E. Lewis*
S2 L2 LAB2
Prerequisite: ACSC3036 E

Methodologies, techniques and architectures that are applicable to the engineering of mission critical, distributed corporate applications (eg. transaction processing systems, financial management systems, emergency management systems). Client Server Systems, Open Systems solutions, staged implementaion, object-oriented techniques.

ACSC3039 E
Management Science Techniques 3
Staff contact: Mr D. Hoffman
S1 L2 LAB2
Prerequisite: ACSC2027 E

Queuing models. Simulation: modelling using iconic systems. Markov models. Project management: tools, packages. Inventory models. Reliability and replacement models. Heuristics: simulated annealing, tabu search, genetic algorithms.

ACSC3040 E
Software Engineering 3
Staff contact: Dr C. Lokan
S1 L2 LAB2
Prerequisite: ACSC2019 E and ACSC2020 E

Programming in the small vs programming in the large. Software life cycle, paradigms of software development, standards. Project management: planning, team organisation, cost estimation, risk management, quality assurance. Specification and design: notations, methods, CASE tools. Documentation. Reviews, verification, validation, testing, debugging, reliability assessment. Software maintenance. Software metrics.

ACSC3041 E
Systems Administration 3
Staff contact: Dr L. Brown
S2 L2 LAB2
Prerequisite: ACSC2019 E or ACSC2024 E

Introduction to systems administration. Ethics. User, device, file system administration. Backup, archive. System configuration. Security, user authorisation, access control, audit. System monitoring, benchmarking, performance, tuning. Administration support tools. Software installation, maintenance. Network administration: TCP/IP, OSI. Network security, firewalls. LAN and PC administration, Novell NetBIOS, Appletalk. Server administration.

Level IV Subjects

ACSC4690 H
Computer Science 4 (Honours) F/T

ACSC4691 H
Computer Science 4 (Honours) P/T

ACSC4790 H
Information Systems 4 (Honours) F/T

ACSC4791 H
Information Systems 4 (Honours) P/T

A course of advanced lectures and seminars supported by appropriate projects approved by the Head of School.

ACSC4692 C
Computer Science 4 (Combined Honours) F/T

ACSC4693 C
Computer Science 4 (Combined Honours) P/T

ACSC4792 C
Information Systems 4 (Combined Honours) F/T

ACSC4793 C
Information Systems 4 (Combined Honours) P/T

In the Combined Honours programs candidates are required to present a thesis or research project on a topic that is concerned with Computer Science/Information Systems and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete course work as approved by the Head of School.

Engineering Subjects

ACSC1800 U
Computer Science 1E
Staff contact: Mr M. Ford
F L2 LAB2

Subject description appears under 1st year Engineering, p. 112.

ACSC2803 U
Computer Science 2AE
Staff contact: Dr F. Clermont
S1 L2 LAB1
Prerequisites: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

Consists of the unit Numerical Analysis 2E.

ACSC2801 U
Computer Science 2CE
Staff contact: Dr F. Clermont
S1 L2 LAB2
Prerequisites: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

Consists of the unit Numerical Analysis 2CE.

ACSC2802 U
Computer Science 2EE
Staff contact: Dr F. Clermont
S1 L4 LAB3
Prerequisites: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800U

Consists of the units Numerical Analysis 2E and Data Structures 2EE.

ACSC2804 U
Computer Science 2ME
Staff contact: Dr F. Clermont
F L2 LAB1
Prerequisites: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

Consists of the units Numerical Analysis 2E and Numerical Linear Algebra 2E.

Engineering Units

ACSC2401 E
Numerical Analysis 2E
Staff contact: Dr F. Clermont
S1 L2 LAB1
Prerequisite: ACSC1800 U
Corequisite: AMAT2800 U

ACSC2402 E
Numerical Analysis 2CE
Staff contact: Dr F. Clermont
S1 L2 LAB2
Prerequisite: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

FORTRAN programming: advanced programming techniques and their applicability to numerical analysis. Computer calculations: Computer representation of numbers, floating point arithmetic, sources of errors, error propagation in computations, numerical instability of algorithms. Numerical solution of non-linear equations: bisection method, simple iteration, Newton's method, method of false position, secant method, convergence criteria. Interpolation and approximation: finite differences, interpolation formulae, nested multiplication, deflation of a polynomial, Lagrange interpolation polynomial, cubic spline interpolation. Numerical integration and differentiation: Newton-Cotes integration formulae, composite formulae, Richardson extrapolation, Romberg integration, Gaussian quadrature, adaptive quadrature, numerical differentiation. Numerical solution of ordinary differential equations: Taylor series methods, Euler and modified Euler method, Runge-Kutta methods. Use of mathematical software libraries.

ACSC2403 E
Numerical Linear Algebra 2E
Staff contact: Dr F. Clermont
S2 L2 LAB1
Prerequisite: ACSC2401 E
Corequisite: AMAT2800 U

The solution of linear equations: elimination methods, Gauss' method, pivoting strategies, scaling, Gauss' method adapted to banded matrices, triangular decomposition methods, iterative methods, successive over-relaxation, convergence criteria, condition number and ill-conditioned matrices, iterative improvement of solutions, accelerated convergence. Computation of eigenvalues and eigenvectors: properties of eigenvectors and eigenvalues, similarity transformations, the power methods, deflation of a matrix, eigenvalue problem for tridiagonal matrices, Householder's method, Given's method, the QR algorithm, method of inverse iteration. Engineering applications of numerical linear algebra: applications to boundary value problems for ordinary differential equations, finite difference methods for solving partial differential equations. Use of mathematical software libraries.

ACSC2404 E
Data Structures 2EE
Staff contact: Dr C. Vance
S1 L2 LAB2
Prerequisite: ACSC1800 U

Bridging material for CS1E to CS1 upgrade in Ada programming: file structures, explicit memory accessing, record structures, structure pointers, sorting and searching. Material from the first part of Computer Science Core B2. Data Structures: Abstract data types, encapsulation, aggregate and union memory structures. Dynamic data linkage with applications to stacks, queues, rings, hash chaining. Binary and general trees, recursive traversal algorithms.

ACSC3402 E
Management Science 3E
Staff contact: Mrs M. Fergusson
S2 L2
Prerequisites: AMAT1800 U and ACSC1800 U

Introduction: process of operations research, the management cycle, model formulation. Decision theory: decisions involving multiple objectives, decision making under uncertainty, utility functions, decision trees and influence diagrams, modelling using DPL software. Linear programming: methodology, application to transportation, allocation, game theory, modelling using QUANT software.

School of Economics and Management

The School of Economics and Management offers subjects which may be included in the Bachelor of Arts (pass and honours) degrees, or the (pass and honours) Bachelor of Science degrees. The School also contributes to economics and management programs in the Engineering courses.

The undergraduate program aims to combine a balanced and liberal education in economics and/or management. The integration of economics and management in the School's teaching and research programs has the advantage of complementing the study of economic behaviour and the study of organisational behaviour and management. The School is actively expanding Leadership Studies within its curriculum.

Students seeking a self-contained, general introduction to the area may take Economics 1.

Pass students may take a major or sub-major in either Economics or Management and may also take a major in one of these fields with a sub-major in either. To obtain a sub-major in Economics or in Management, students must gain at least 70 credit points in relevant subjects over two or more levels (levels 1 and 2, or levels 2 and 3, or levels 1, 2, and 3) or at level 3. To complete a major, students must take at least two subjects at Level III from the field in which their major falls.

No subject at any level may count, for credit point purposes, towards sequences in both of the fields of Economics and Management.

Honours students wishing to concentrate on Economics will normally take Economics I; at Level II, Intermediate Microeconomics and Intermediate Macroeconomics, Quantitative Methods, International Trade, and Economics 2 (Honours); at Level III, Advanced Economic Theory and Policy, International Economic Theory and Policy, Quantitative Analysis and Econometrics, at least one further Level III Economics or Management subject, and Economics 3 (Honours). Economics 4H completes the Honours program.

Honours students wishing to concentrate on Management will normally take Economics 1; at Level II, Organisational Behaviour, Quantitative Methods, Corporate and Government Accounting, and Management 2 (Honours); and at Level III, Quantitative Analysis and Econometrics, Organisational Management, another Management subject, and a fourth Level III subject from either Management or Economics, and Management 3 (Honours). Management 4H completes the Honours program.

Other options may be exercised, but these should be discussed beforehand with the Head of the School of Economics and Management.

The relevant Rules of the University College apply to the structuring of programs for all undergraduate and postgraduate degrees.

Asia–Pacific Studies

NB. Students with the relevant prerequisites may construct a sub-major in Asia–Pacific studies from the subjects listed for this inter-School program at page 148.

Level I

AECM1601 U
Economics 1: Principles of Economics
Staff Contact: Ms A. Rutherford
C30 F L3 T1
Prerequisite: See p. 42

The first half of the year covers basic microeconomics and introduces students to the basic economic problem of scarcity and how market mechanisms resolve conflicts over the allocation of resources. Household consumption and firm production decisions are examined in detail. This analysis serves as the basis for examining some representative product market structures including perfect competition, monopoly, and oligopoly. The focus next turns to input markets where labour and capital markets are discussed. The final part of the microeconomic section uses the economic tools developed in the subject to analyse public policy issues such as the distribution of wealth, market and government failure, and the regulation of business.

The second half of the year deals with macroeconomics, international trade, and economic growth and development. Aggregate demand and supply analysis is used to examine the determination of levels and fluctuations in national income and output, the price level, and unemployment. Relationships between money, interest rates and the exchange rate are analysed, and the impact of stabilisation policy considered. Factors favouring and restricting international trade are identified and balance of payments issues presented. Analysis of long-term growth and development, nationally and globally, forms the last topic.

Level II

AECM2603 U
International Trade
Staff Contact: Dr O.K. Tam
C20 S2 HPW4
Prerequisite: AECM1601 U

This subject provides an exposition of the theoretical underpinnings of international trade as related to current economic events. It covers theories aimed at explaining the pattern, basis and consequences of international trade. Australia's trade policies and the strategic relevance of international economic issues are highlighted in the subject.

AECM2604 U
Quantitative Methods in Economics and Management *Staff Contact: Ms A. Rutherford*
C20 S1 HPW4
Prerequisite: AECM1601 U

This subject gives students an introduction to quantitative methods, particularly statistical methods, as used in economics and management, and to the sources and

quantitative and statistical uses of economic and managerial data. Stress is placed on understanding and applications of concepts, and no mathematical prerequisite is required. Throughout the subject the emphasis is on applications in management and economic analysis and decision-making. Students will be expected to gain basic competencies in a number of quantitative and statistical techniques, and be able to recognise when to apply them, to interpret their results, and to develop practical competencies in the use of a standard software package for basic statistical applications.

AECM2605 U
Intermediate Microeconomics: Theory and Policy
Staff Contact: Dr O.K. Tam
C20 S1 L3 T1
Prerequisite: AECM1601 U

This subject covers at an intermediate level microeconomic analysis and the policy implications that ensue. Among the topics included are consumer demand and production theory, price determination in goods and factor markets, and welfare economics.

AECM2606 U
Intermediate Macroeconomics: Theory and Policy
Staff Contact: A/Prof P.A. McGavin
C20 S2 L3 T1
Prerequisites: AECM1601 U and AECM2605 U

This subject covers at an intermediate level macroeconomic analysis and the policy implications that ensue. Among the topics included are aggregate demand and supply in an open economy; determination of and fluctuations in national incomes, prices, and employment; the balance of payments and exchange rates.

AECM2704 U
Introduction to Corporate and Government Accounting
Staff Contact: Head of School
C20 S1 HPW4
Prerequisite: AECM1601 U

The subject provides an introduction to accounting as an information development and communication function that supports management decision making in corporate and government settings. This is achieved by developing — an understanding of the basic accounting framework, skills in data processing systems of accounting, and skills in the analysis of accounting information. Students will be expected to develop practical competencies in the use of accounting software applications for the exercise of accounting skills.

AECM2705 U
Organisational Behaviour
Staff Contact: Dr J.R. Warn
C20 S2 HPW4
Prerequisite: AECM1601 U

This subject introduces students to the roles of individuals, groups and structures in organisations and their component parts. It draws upon the management literature and the research findings of social and organisational psychology to develop both theoretical perspectives and applied skills. Topics include motivation, leadership, decision-making and organisational structure. Emphasis is placed upon explaining the behaviour of groups and individuals in large organisations, with particular attention to the Defence organisation in Australia.

AECM2690 U
Economics 2 (Honours)
Staff Contact: A/Prof P.A. McGavin
F HPW1
Corequisites: AECM2605 U, AECM2606 U and AECM2604 U

Honours involves an extra hour of tuition each week designed to broaden and deepen students' knowledge of material covered in the Intermediate Microeconomics and Intermediate Macroeconomics subjects at the Pass level.

AECM2790 U
Management 2 (Honours)
Staff Contact: A/Prof P.A. McGavin
F HPW1
Corequisites: AECM2705 U, AECM2604 U and AECM2704 U

Honours involves an extra hour of tuition each week designed to broaden and deepen students' knowledge of material covered in the Level II Management subjects.

Level III

For the purposes of completing a major or sub-major in Economics, the following subjects may be taken: AECM3603 U, 3604 U, 3605 U, 3606 U, 3607 U, 3608 U, 3609 U, 3610 U, 3611 U, 3612 U, 3613 U.

For the purposes of completing a major or sub-major in Management, the following subjects may be taken: AECM3603 U, 3608 U, 3704 U, 3705 U, 3706 U, 3707 U and 3708 U.

AECM3603 U
Quantitative Analysis and Econometrics
Staff Contact: Dr A.M.M. Masih
C30 S2 HPW4
Prerequisite: AECM2604 U

This subject introduces students of economics and management to the methods and tools of applied regression analysis. It is designed to familiarise students with the problems involved in the empirical measurement of relationships in economics and management, and the techniques that can solve these problems. Emphasis is placed on developing practical skills in building and testing models with the use of computers.

AECM3604 U
Industrial Economics
Note/s: Not offered in 1997

AECM3605 U
Public Sector Economics
Note/s: Not offered in 1997

AECM3606 U
Economic Development
Note/s: Not offered in 1997

AECM3607 U
Asia-Pacific Economies
Staff Contact: Prof W. Kasper
C30 S1 HPW4
Prerequisites: AECM2605 U and AECM2606 U or AECM2603 U

This subject enables students to examine major changes in the Asia-Pacific region. It examines the changes being experienced in countries such as Japan, China, the newly industrialising countries in east and southeast Asia, and in selected Pacific economies. Attention is also given to the theoretical and policy implications of these developments and to the economic and strategic role of Australia in the Asia-Pacific region.

AECM3608 U
Labour Economics and Industrial Relations
Note/s: Not offered in 1997

AECM3609 U
Advanced Economic Theory and Policy
Staff Contact: A/Prof P.H. Hall
C30 S1 HPW4
Prerequisites: AECM2605 U and AECM2606 U

The subject provides an understanding in the Australian context of the rationale for government intervention in the economy and a critical appreciation of what economic policy can (and cannot) contribute to delivering major objectives. Analysis from welfare economics is used to characterise efficiency in allocating resources and the strengths and weaknesses of the market in delivering such an allocation are identified. The role of the government is discussed in terms of countering market imperfections, assisting the operation of the market, redistributing incomes, and stabilising fluctuations in aggregate real income and employment. Problems arising from government intervention in the economy are presented and possible counter-measures suggested.

AECM3610 U
International Economic Theory and Policy
Staff Contact: Dr A.M.M. Masih
C30 S2 HPW4
Prerequisites: AECM2605 U and AECM2606 U

This subject provides an understanding of international economic relations and policies based on theories of international trade, factor flows, and financial relations, with particular reference to Australia. The subject offers reviews of trade theory and its applications, and extended analysis of the balance of payments, international mobility of factors and firms, and international capital and foreign exchange markets. Major theoretical issues and policies and recent reforms in world trade and international financial institutions are examined.

AECM3611 U
Economics of Regulation
Note/s: Not offered in 1997

AECM3612 U
Resource Economics
Staff Contact: A/Prof J. Bennett
C30 S2 HPW4
Prerequisites: AECM2605 U and AECM2606 U

This subject introduces students to the complex interaction between economic activity and the natural environment and uses economic principles to analyse these interactions and suggest rational policies. Resource and environmental issues like the use of renewable and non-renewable resources, local and global pollution of water and the atmosphere, and preservation of natural environment are covered and the prospects for future growth in a sustainable natural environment are discussed.

AECM3613 U
Capitalism, Socialism and Economic Growth
Note/s: Not offered in 1997

AECM3703 U
Public Sector Management
Note/s: Not offered in 1997

AECM3704 U
Human Resource Management
Staff Contact: Dr H.B. Cheah
C30 S2 HPW4
Prerequisite: AECM2705 U

This subject aims to develop students' understanding of the personnel management function and to develop an appreciation of the vital role of this function in the successful operation of organisations. The evolution of this function is traced from its ad hoc origins to its present conceptualisation as the effective management of valuable human resources based on an integration of sound theory and practice. Similarities and differences of approach to human resources management in different cultures (such as USA and Japan) are examined.

AECM3705 U
Logistics Management
Staff Contact: Dr S. Markowski
C30 S2 HPW4

In this subject students examine the basic concepts and techniques of logistics management within the framework of an integrated logistics system. Various civilian and military applications are considered, such as systems engineering; reliability, maintainability and supportability of systems; systems effectiveness; operational requirements and logistics planning; and life-cycle costing.

AECM3706 U
Management Accounting
Staff Contact: Head of School
C30 S2 HPW4
Prerequisite: AECM2704 U

This subject develops the introduction to accounting as an information development and communication function supporting management decision making, as introduced in Introduction to Corporate and Government Accounting. The focus is on accounting for decision making in planning and control functions, capital budgeting, and product costing. Students gain competencies in the use of accounting software applications in the development of these management accounting skills.

AECM3707 U
Finance
Note/s: Not offered in 1997

AECM3708 U
Organisational Management
Staff Contact: A/Prof P.L. Robertson
C30 S1 HPW4
Prerequisite: AECM2705 U

Organisational Management covers a wide range of activities involved in the coordination of management tasks. Drawing on behavioural and quantitative skills taught in second-year Management subjects, students investigate the planning, execution, monitoring and control, and termination of important work assignments within the context of large organisations. The subject introduces students to the use of management decison tools and computer packages.

AECM3690 U
Economics 3 (Honours)
Staff Contact: Head of School
F
Prerequisite: AECM2690 U

AECM3790 U
Management 3 (Honours)
Staff Contact: Head of School
F
Prerequisite: AECM2790 U

Honours students in Economics or Management must enrol in the relevant pass subjects as stated in the introduction to studies in the School.

Enrolment in an Honours subject involves an additional tutorial per week.

AECM3692 U
Economics 3 (Combined Honours)
Staff Contact: Head of School
F

In this program, coursework is divided between the School of Economics and Management and another School as approved by the Heads of the two Schools concerned.

AECM3792 U
Management 3 (Combined Honours)
Staff Contact: Head of School
F

In this program, coursework is divided between the School of Economics and Management and another School as approved by the Heads of the two Schools concerned.

AECM4690 H
Economics 4 (Honours) F/T
Staff Contact: Head of School

AECM4691 H
Economics 4 (Honours) P/T
Staff Contact: Head of School

Applied Economics
Staff Contact: Head of School
F HPY112

Candidates will be expected to attend lectures, seminars and tutorials on topics determined by the Head of School, to submit regular written work and to write a supervised thesis of normally between 10,000 and 15,000 words.

Coursework will account for 60% and the thesis will account for the remaining 40% of the total marks.

With some modifications, the above program may be taken as a qualifying year towards a Masters (Honours) degree.

AECM4790 H
Management 4 (Honours) F/T
Staff Contact: Head of School

AECM4791 H
Management 4 (Honours) P/T
Staff Contact: Head of School

Applied Management
Staff Contact: Head of School
F HPY112

Candidates will be expected to attend lectures, seminars and tutorials on topics determined by the Head of School, to submit regular written work and to write a supervised thesis of normally between 10,000 and 15,000 words.

Coursework will account for 60% and the thesis will account for the remaining 40% of the total marks.

With some modifications, the above program may be taken as a qualifying year towards a Masters (Honours) degree.

AECM4692 C
Economics 4 (Combined Honours) F/T

AECM4693 C
Economics 4 (Combined Honours) P/T

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Economics and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete coursework as approved by the Head of School.

AECM4792 C
Management 4 (Combined Honours) F/T

AECM4793 C
Management 4 (Combined Honours) P/T

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Management and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete course work as approved by the Head of School.

Engineering Units

The following units are offered in the Engineering Program.

AECM3401 E
Engineering Economics
Staff Contact: Dr S. Markowski
S2 L2

Development of an economic framework for managerial decision making. Individual topics include—demand analysis, production, costs, market structure, pricing strategies, government regulation, and project evaluation techniques.

AECM3402 E
Management for Engineers
Staff Contact: Dr G. Manger
S1 L2

Introduction to the broad functional areas of management with which an engineer should be acquainted to undertake management functions. Topics include—decision making skills, leadership, managerial economics, strategy, human resource management, organisational behaviour, corporations law, marketing, and operations management. These topics are examined using three main streams of analysis—scientific, behavioural, and quantitative.

School of English

The School of English offers subjects which may be included in the Bachelor of Arts (Pass and Honours), Bachelor of Science (Pass and Honours) or Bachelor of Engineering degree programs.

Undergraduate subjects are offered at first, second, and third year level. For a Bachelor's degree, a major sequence in English will normally consist of English 1, 2A, and 3A; a submajor, of English 1 and 2A. Students wishing to construct a sub-major, as well as a major sequence in English may do so by combining four options from the schedule taken at second year level into English 2B (40 credit points) and either four options taken at third year level (English 3B, 60 credit points) or two options taken at third year level (English 3C, 30 credit points).

Science and Engineering students may satisfy their General Studies requirements, either completely or in part, by passing either (a) English 1 (30 credit points), or (b) four English General Education subjects (30 credit points), or (c) any two English General Education subjects (15 credit points).

Details of undergraduate subjects offered in 1997 are set out below.

Asia–Pacific Studies

Students with the necessary pre-requisites may construct a sub-major in Asia-Pacific Studies. The subjects available in 1997 in Australia and the Asia-Pacific are Asia-Pacific Images in first session and Commonwealth Literature in second session. Details are provided on p. 148.

Level I

AENG1600 U
English 1
Staff Contact: Dr C. Pratt
C30 F HPW4 (L3 T1)
Prerequisite: See p. 42

The principal subject matter of English I is Australian literature. The primary emphasis is on literary texts, but the course also examines 'texts' of other kinds, both written (journalism, essays, etc.) and visual (film, television, art, etc).

The course comprises two parts: Part A, 'Writing and Reading Practices' aims to familiarise students with the techniques required to read complex linguistic forms, and to enhance their appreciation of these by means of a variety of written exercises. Classes will develop these skills through the reading of poetry, prose (of various kinds) and drama (including film), with an eventual emphasis on ways to read culture through literature. Part B, 'Reading Possibilities: Writers and their Worlds' aims to develop the skills learnt in Part A, and to widen their application through the study of classic, Commonwealth and contemporary Australian texts.The course continues an interest in the formal qualities of specific texts, but with a focus on recurrent themes in Australian culture. Students will be expected to develop an awareness of the multiple approaches to reading and of the relationship of reading to Australian culture.

Both parts of the course are integrated with a weekly series of lectures, demonstrations, and workshops on cinema, television, photographic images, art, and journalism. The purpose of these lectures is to extend students' awareness of other media and to enhance better understanding and practice of communication skills.

Levels II and III

Subjects offered at levels II and III consist of (a) a series of core subjects devoted to chronological and introductory surveys of major periods of English and Australian writing, supported and enriched by (b) a range of options which either intensify or extend the work done in the core subjects.

Students enrolled in English 2A or English 3A will, in each session, take a core subject, together with one of the options set out in the Schedule below.

AENG2601 U
English 2A
C40 F HPW4
Prerequisite: AENG1600 U

AENG3601 U
English 3A
C60 F HPW4
Prerequisite: AENG2601 U

AENG2603 U
Australia and the Asia-Pacific
C20 F HPW2
Prerequisite: AENG1600 U

Students enrolled in this subject will take AENG2040 E Images of the Asia-Pacific in Session 1, and AENG2022

E Commonwealth Literature in Session 2, listed in 2/3 Options below.

English 2A Core Units

AENG2001 E
Language Revitalised: Literature of the English Renaissance
Staff Contact: Mr P. Looker
S1 L1 T1

This unit deals with English literature, 1580 - 1620, a period of great literary creativity and linguistic innovation, and one which has influenced and continues to influence later periods. The literary texts are related to their historical, political and social contexts. This includes an examination of the characteristic features of the literature produced in the reign of Elizabeth I and the reign of James I, comparisons and contrasts between these two bodies of literature, and a consideration of texts which challenge the prevailing literary conventions and ideologies. Some attention will be given to the ways in which Shakespearean plays have been interpreted and performed in Australia, and students will be encouraged to attend performances of these plays.

AENG2002 E
British Literature in the C18—C19
Staff Contact: Dr E. Lawson
S2 L1 T1

This unit studies a selection of British texts incorporating an Australian as well as a literary-historical perspective. The British texts are read within their historical context with attention given to C18 rationalism, Romanticism, various aspects of the Victorian world and British imperialism in general. With each historical development, readings are complemented by discussion of a selection of related Australian texts.

English 3A Core Units

AENG3001 E
Radical Cousins: C19 American and Australian Writers
Staff Contact: Dr H. Neilson
S1 L1 T1

This unit examines the connections and correspondences that existed between American and Australian writers last century. In his seminal essay, 'Nature', Ralph Waldo Emerson, aware of the pervasive influence of Old World literature, challenged his American contemporaries with the question: 'Why should not we also enjoy an original relation to the universe?' New World literature—brash, political, individual and often radically different from the literature of Europe and the Old World—had begun. We will consider the works of a range of writers from both sides of the Pacific who produced fresh and sometimes extraordinary responses to their 'new' part of the world.

AENG3002 E

Post-Colonial Literatures in English
Staff Contact:A/Prof S. Lever

S2 L1 T1

This unit offers a scrutiny of the concept of Post-Colonial Literatures in English and proceeds to examine selected texts in Australian and other literatures. The focus on particular nations or regions for comparison with Australia may vary from time to time but could include one or two of the following: Africa, Canada, Caribbean, New Zealand and South Pacific, South Asia, South-East Asia. In 1997 this unit will focus on Australia, Canada and New Zealand.

Schedule of English 2/3 Options offered in 1997

N.B. Options attempted at third year level will be assessed at a higher standard than those attempted at second year level.

Session 1

AENG2015 E/AENG3015 E	C19 Australian Literature
AENG2017 E/AENG3017 E	Literature and Society in England in the 1930s
AENG2032 E/AENG3032 E	Reading and Writing Short Fiction
AENG2039 E/AENG3039 E	Romanticism and Revolution
AENG2040 E/AENG3040 E	Images of the Asia-Pacific
AENG2041 E/AENG3041 E	Shakespeare

Session 2

AENG2009 E/AENG3009 E	Modern Women Writing
AENG2014 E/AENG3014 E	C20 American Literature
AENG2018 E/AENG3018 E	Literature of the Great War
AENG2022 E/AENG3022 E	Commonwealth Literature
AENG2034 E/AENG3034 E	Occasional Option 2: African-American Literature
AENG2037 E/AENG3037 E	Travel Writing

AENG2009 E/AENG3009 E
Modern Women Writing
Staff Contact: Dr E. Lawson
S2 L1 T1

This unit explores a group of texts which focus on the situation of women in a range of cultures. The texts are chosen to span the century which joins the first modern feminist movement of the 1880s-90s to the second of the 1970s-80s.

AENG2014 E/AENG3014 E
C20 American Literature
Staff Contact: Dr H. Neilson
S2 L1 T1

After a brief summary of American society and literature prior to the twentieth century, this unit examines a cross-section of significant works and authors from 1910 to the present. We will study not only the works of more familiar white male authors, but also works by African-American and Native-American writers. This is an issues-related course, attempting to raise questions about the phenomenon that is the United States at the end of this century, as the varied voices of the selected authors collectively present a nation that is heterogeneous and conflict-ridden.

AENG2015 E/AENG3015 E
C19 Australian Literature
Staff Contact: Dr C. Pratt
S1 L1 T1

Students in this unit read a range of 19th century Australian fiction. The unit maps some of the influences of European literature on Australian writing, and considers the ways in which the great intellectual debates of the nineteenth century emerged in Australian literature. The different modes of C19 fiction—melodrama, satire, romance—also come under discussion through readings of work by Joseph Furphy, Ada Cambridge, Rolf Boldrewood and Henry Handel Richardson.

AENG2017 E/AENG3017 E
Literature and Society in England in the 1930s
Staff Contact: Dr A. Caesar
S1 L1 T1

Through a selection of poetry and prose by young writers, this course aims to explore various literary-historical and literary-critical problems. The relationship of a work to its historic moment, to politics and to public events is of central concern. Other themes to be discussed include the part social class plays in literary production, the complex construction of literary reputations and literary-historical myths, and the competing claims of 'realism' and 'modernism' during the decade.

AENG2018 E/AENG3018 E
Literature of the Great War
Staff Contact: Dr A. Caesar
S2 L1 T1

A study of selected prose and poetry by the most celebrated writers of the First World War. The unit questions the widely held assumptions about this work: that it is predominently anti-war, that it constitutes a public and political statement of that position, and that it achieves this end by virtue of its 'realism'. In discussing these ideas, other problems are broached which focus attention on metaphors of violence and pain, on ideas concerning mateship, sexuality and 'manliness', and on some feminist perspectives.

AENG2022 E/AENG3022 E
Commonwealth Literature
Staff Contact: Mr J. Doyle
S2 L1 T1

This unit deals with a variety of post-World War II literary texts—fiction, poetry, drama and essays—written in English by authors from various countries within the Commonwealth. Its focus is on the ways in which English as a literary and cultural medium has been deployed by writers whose work is both inflected by cultural conventions different from the so-called 'mother tongue', and yet which demonstrates significant understanding of and influence by British literary and cultural traditions.

AENG2032 E/AENG3032 E
Reading and Writing Short Fiction
Staff Contact: A/Prof S. Lever
S1 L1 T1

This unit aims to give students a familiarity with the technical aspects of short fiction writing, and close understanding of the ways in which various writers have solved the technical problems of the genre. By writing short fiction of their own, students will develop an understanding of the relationship between their own critical and creative faculties. Writers studied will include contemporary figures such as Raymond Carver.

AENG2034 E/AENG3034 E
Occasional Option 2: African-American Literature
Staff Contact: Dr D. Headon
S2 L1 T1

This unit is an introduction to the range of African-American (Black) literature, a body of literature which has established its own coherent traditions but which also engages strongly with the traditions of other literatures and cultures. Beginning with 'classic' slave narratives, the course will also examine the writings of W.E.B. DuBois and Booker T. Washington, the books of the Harlem Renaissance, and the emergence of powerful African-American women's voices in fiction. The course will include *The Autobiography of Malcolm X* which exemplifies, as do other texts on the course, that writing as an African-American is in itself a political and politicized activity.

AENG2037 E/AENG3037 E
Travel Writing
Staff Contact: A/Prof P. Eggert
S2 L1 T1

Are the 'foreign' and the 'exotic' encountered by travel writers or are they cultural categories which pre-program the writer's perception? This unit deals with this and other issues using a range of travel writing over a hundred-year period about Italy, Bali, South America, Africa and Australia.

AENG2039 E/AENG3039 E
Romanticism and Revolution
Staff Contact: Prof G. Bentley
S1 L1 T1

A study of major English poets of the Romantic period including Blake, Wordsworth, Coleridge, Byron, Keats and Shelley. Students will examine texts by these poets for their aesthetic value and in relation to the social and political upheavals of the period.

AENG2040 E/AENG3040 E
Images of the Asia-Pacific

Staff Contact: Prof B. Bennett and Mr J. Doyle

S1 L1 T1

This course examines a small selection of literary representations of Asia and the Pacific by writers from the region, including some Australians. The principal aim of the course is to raise awareness of the ways in which the life, cultures and landscapes of Asian and Pacific countries may be 'read' by Australians. This involves a close attention to literary form and a recognition of the different contexts and conventions that govern literary production and reception in countries of the Asia-Pacific. While most attention will be given to literature written in English, some translations will also be discussed. Film and media images will supplement the primary attention given to literary texts.

AENG2041 E/AENG3041 E
Shakespeare
Staff Contact: Dr P. Kelly
S1 L1 T1

This unit aims to explore 'Shakespeare' and his cultural significance, from the labelling of sardine cans and cigars, to the use of Shakespeare's portrait to signify 'high culture'. Furthermore, various theoretical perspectives can transform what we see as 'Shakespeare' and how we read his plays.

AENG2035 E
Classic Literary Texts 1H
S1 L2

AENG2036 E
Classic Literary Texts 2H
Staff Contact: Prof B. Bennett, Dr A. Caesar
S2 L2

The above units will introduce Honours students to a selection of major works of English literature often characterised as 'canonical texts'. Ranging from Chaucer to T.S. Eliot, and beyond to some more recent work, students will study a wide selection of forms and genres, exploring both creative and critical responses to what becomes valued and accepted as the canon.

In both semesters the place of literary texts in literary history and within the history of criticism will be discussed. Considerable emphasis wil be placed upon those literary texts from each period which raise significant aesthetic or theoretical issues.

First session will focus on the development of literary practice from the late medieval period up to 1800. Second session's focus will be on the C19 and C20 centuries.

AENG3035 E
Issues in Contemporary Criticism and Theory 1H
Staff Contact: Mr J. Doyle
S1 L2

This unit confronts texts outside the canon, such as feminist, Aboriginal and postcolonial writing in the context of critical theories of the last twenty years. There will be three or four set texts which will be used to discuss theoretical problems and applications taught in the early part of the unit.

AENG3036 E
Issues in Contemporary Criticism and Theory 2H
Staff Contact: Dr A. Caesar
S2 L2

This unit follows from the previous three sessions in honours and is entitled 'Pop, Classic, Politics'. It places genre novels against supposedly 'high brow' texts, and discusses the political, sociological and literary-theoretical questions arising from this juxtaposition.

AENG2602 U
English 2B
C40 F HPW4
Corequisite: AENG2601 U

English 2B is constructed by taking four options at second year level (two in each session of the same academic year) not attempted in English 2A.

AENG3602 U
English 3B
C60 F HPW4
Corequisite: AENG3601 U

English 3B is constructed by taking four options at third year level (two in each session of the same academic year) not attempted in English 2A, 2B or 3A.

AENG3603 U
English 3C
C30 F HPW2
Corequisite: AENG3601 U

English 3C is constructed by taking two options at third year level (one in each session of the academic year) not attempted in English 2A, 2B, 3A or 3B.

ENGLISH HONOURS

The English Honours program is designed for students showing a special interest in and aptitude for advanced work in the discipline.

Students normally enter the program at the beginning of the second full year of academic study, and will be expected to have completed 120 credit points by the end of their first year of enrolment, with a pass in English 1 at Credit level or better. Rules governing the award of the degree of Bachelor of Arts with Honours are set out on p. 49 of this Handbook.

AENG2690 U
English 2 Honours
Staff Contact: Prof B. Bennett
C40 F
Prerequisite: AENG1600 U, passed at credit level or better.

The English 2 Honours program, consisting of English 2A and English 2H and carrying a value of 80 credit points, will be made up of the following components:

AENG2001 E and AENG2002 E English 2A Core, AENG2035 E and AENG2036 E English 2 Honours: Classic Literary Texts 1H and 2H, and four other options (two in each session) chosen from the English 2/3 Schedule.

AENG3690 U
English 3 Honours
Staff Contact: Mr J. Doyle
C60 F
Prerequisite: AENG2690 U, passed at credit level or better.

The English 3 Honours program, consisting of English 3A and English 3H and carrying a value of 120 credit points, will be made up of the following components:

AENG3001 E and AENG3002 E English 3A Core, AENG3035 E and AENG3036 E English 3 Honours: Issues in Contemporary Criticism and Theory 1H and 2H, and four other options (two in each session) chosen from the English 2/3 Schedule.

AENG3692 C
English 3 (Combined Honours)

In this program, coursework is divided between the School of English and another School as approved by the Heads of the two Schools concerned.

AENG4690 H
English 4 (Honours) F/T
F
AENG4691 H
English 4 (Honours) P/T
Staff Contact: Assoc. Prof P. Eggert
F
Prerequisite: AENG3690 U, passed at credit level or better.

- Thesis of some 12,500 words on a topic to be chosen by candidates in consultation with the Head of School
- Scholarship and Bibliography (first session), Blake (first session).
- The Australian Literary Canon (second session), "E Pluribus Unum" (second session).

AENG4692 C
English 4 (Combined Honours) F/T

AENG4693 C
English 4 (Combined Honours) P/T

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with English and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete coursework as approved by the Head of School.

School of Geography and Oceanography

Geography

Geography subjects are available for Arts and Science students. Therefore they contribute towards degrees of Bachelor of Arts, Bachelor of Arts with Honours, Bachelor of Science and Bachelor of Science with Honours. With respect to subject structure all major and sub-major sequences in Geography begin with Geography 1.

AGOC1600 U
Geography 1
Staff Contact: Mr J. Doyle
C30 F L3 T4

The basic aim of the subject is to provide both continuing and non-continuing students in Geography with a general environmental science-geography background, an introduction to geographical methods of inquiry and an indication of the systematic and thematic specialisations within the discipline. An integrative approach to the understanding of physical, biological and human patterns and processes that take place at or near the surface of the earth is developed.

Geography 1 is divided into two parts. One part covers physical and biophysical aspects of the subject including natural environmental processes, landforms, soils, vegetation and climate. The other part emphasises human aspects of the subject including the role of social, cultural,economic and political factors in shaping and changing settlement patterns and geographical distributions. Human-environment interactions are considered throughout the course.

Students are required to complete tutorial, test, essay and practical assignments. An examination is held at the end of each session. Several field classes in the Canberra region are organised throughout the year. To obtain a pass in Geography 1 all assessable components of the course must be completed to a satisfactory level.

Level II

AGOC2601 U
Geography 2A
C40 F L2 T/P6
Prerequisite: AGOC1600 U

AGOC2602 U
Geography 2B
C40 F L2 T/P6
Prerequisite: AGOC1600 U

AGOC2603 U
Geography 2C
C40 F L2 T/P6
Prerequisite: AGOC1600U

Geography 2A consists of two parts, a first session unit of Biogeography or Remote Sensing Applications, and a second session choice of either Geomorphology or Geography of Economic Activity. Geography 2B consists of two parts, a first session unit of Social Geography or Remote Sensing Applications, and a second session choice of either Geomorphology or Geography of Economic Activity. Geography 2C consists of two units, Remote Sensing Applications and Cartographic Methods. Students enrolled in Geography 2C cannot include the unit Remote Sensing Applications in either Geography 2A or 2B. There are two 5 day field schools, one for Geography 2A and one for Geography 2B. It is important that students enrolling in Level II Geography subjects indicate their choice of units for both sessions at the time of enrolment.

Students who intend to take more than 60 CP of Level III Geography should take two Level II Geography Subjects.

Syllabus Details for Level II Geography Units

AGOC2001 E
Geomorphology
Staff Contact: Mr L.J. Olive
S2

Introduction to the principles of geomorphology. Drainage basins and denudation systems. Weathering, hillslope hydrology, mass movement. Fluvial and aeolian processes and landforms. Other geomorphic processes and landforms may be emphasised in any one year.

AGOC2002 E
Social Geography
Staff Contact: Dr P. Tranter
S1

An examination of how settlements are structured by society and are shaped by people. The unit focuses on urban environments as they shape and are shaped by culture, society and politics. Policies of social change are addressed.

AGOC2003 E
Cartographic Methods
Staff Contact: Dr K. White
S2

Theoretical and practical aspects of field techniques, instrumentation and calculations used in the preparation and display of dimensional data bases for small and large scale cartography, with special reference to geographical and related applications.

AGOC2004 E
Biogeography
Staff Contact: Dr J. Burgess
S1

Introduction to the principles of biogeography. Energy flow and nutrient cycling in aquatic and terrestrial ecosystems. Plant community dynamics and recent ecological change. Contemporary environmental issues are highlighted.

AGOC2006 E
Remote Sensing Applications
Staff Contact: Dr D. Gillieson
S1

An introduction to the principles and applications of remote sensing for the monitoring and management of earth resources with an emphasis on Australian examples. Particular attention is given to satellite imagery and its linkage with geographic information systems.

AGOC2007 E
Geography of Economic Activity
Staff Contact: Dr P. Crabb
S2

This unit examines how people's lives in both rural and urban locations are affected by changing economic and social circumstances. Components include the location of economic activity, the geography of economic restructuring and the interactions between people, economy and the environment. Broad issues are illustrated using specific case studies.

Asia–Pacific Studies Program

The following subject is offered as a second year (20 credit points) subject in the Asia–Pacific Studies Program.

AGOC2604 U
The Geography of Development
Staff Contact: Dr R. Ball
S2 C20 L2 T/P4
Excluded: AGOC3013 E
Prerequisite: AGOC1600 U

Theories and explanations for the complex processes of development and underdevelopment are discussed and analysed. The subject examines issues confronting developing nations which are increasingly global in origin but whose local impacts vary according to the particular geographies, cultures and histories of regions and nations. Examples are drawn from the Asia–Pacific Region at a range of geographical scales from the international to the household.

Level III

AGOC3601 U
Geography 3A
C60 F L3 T6
Prerequisite: AGOC2601 U or AGOC2602 U

AGOC3602 U
Geography 3B
C60 F L3 T6
Prerequisite: AGOC2601 U or AGOC2602 U
Corequisite: AGOC15601 U

AGOC3603 U
Geography 3C
C40 F L2 T4
Prerequisite: AGOC2601 U or AGOC2602 U
Corequisite: AGOC15601 U

Each subject involves a choice of session length units each of which represents a specialist field of study within Geography. All students enrolled in Level III Geography must do Geography 3A, which comprises a choice of any 3 units, at least one of which must be taken in each session. Geography 3B comprises any 3 units not previously selected for Geography 3A. Geography 3C comprises any 2 units not previously selected for Geography 3A. Students enrolled in both Geography 3A and 3B must include the unit Geographic Research Methods. Prospective honours students in Geography should enrol in both Geography 3A and 3B.

Field work may be required as part of each subject. All units may not be offered in any one year. It is important that students enrolling in Level III Geography subjects indicate their choice of units for both sessions at the time of enrolment.

Syllabus Details for Level III Geography Units

AGOC3001 E
Geographic Research Methods
Staff Contact: Mr L.J. Olive
S1

An introduction to research methods in geography. Research frameworks in physical and human geography. Topic definition, theory and methodology. Practicalities of data collection and field work. Data analysis and interpretation. Reporting research findings. Applications of geographic research. The unit provides students with experience in designing a geographic research project.

AGOC3002 E
Geographic Information Analysis
Staff Contact: Dr K. White
S1

An introduction to the various methodologies involved with the collection, analysis and display of geographic information.

AGOC3003 E
Geomorphological Systems
Staff Contact: Prof. R. F. McLean
S1

The movement of sediments and solutes in geomorphic systems. A study of the processes which control this movement and the landforms which result from it with particular emphasis on one or more of the following: fluvial, karst, arid, slope or coastal systems.

AGOC3004 E
Ecological Systems
Staff Contact: Mr D. Paull
S2

Analysis of ecosystems in relation to environmental factors and community dynamics. Particular emphasis is given to one or more of the following: mountain ecology, coastal ecology, arid zone ecology, tropical ecology, island ecology or animal ecology.

AGOC3005 E
Population and Development
Note/s: Not offered in 1997

AGOC3006 E
Transport Geography
Staff Contact: Dr P. Tranter
S1

This unit evaluates alternative approaches to the geographical study of transport, using a range of case studies from Australia and overseas. Specific transport issues are investigated.

AGOC3007 E
Environmental Hazards
Staff Contact: Dr J. Burgess
S2

The principles of hazard research; the nature of environmental hazards; hazard perception, adjustment, planning and management.

AGOC3008 E
Cultural Geography
Staff Contact: Dr K. Anderson
S2

A critical examination of the cultural foundations of urban and natural environments in Western societies.

AGOC3009 E
Selected Special Topics: Geographical issues in the Asia-Pacific region.
Staff Contact: Mr J. Doyle
S2

A unit based on specialist interest of staff and visitors may be presented in a given year. For 1997 the course deals with contemporary issues in the Asia-Pacific region from a geographical perspective.

AGOC3010 E
Political Geography
Note/s: Not offered in 1997

AGOC3011 E
Resource Management
Note/s: Not offered in 1997

AGOC3012 E
Global Change
Note/s: Not offered in 1997

AGOC3013 E
The Geography of Development
Note/s: Not offered in 1997

Geography Honours

Geography Honours is designed for students showing a special interest in and aptitude for work in the discipline and who satisfy the requirements for entry into either the degree of Bachelor of Arts with Honours or the degree of Bachelor of Science with Honours.

AGOC4690 H
Geography 4 (Honours) F/T
Staff Contact: Dr J. Burgess

AGOC4691 H
Geography 4 (Honours) P/T

To enrol in Geography 4 (Honours) students must satisfy the requirements for entry into either the degree of Bachelor of Arts with Honours or the degree of Bachelor of Science with Honours and must have completed at least 190 credit points in Geography at an overall level of credit or better.

Candidates for Honours in Geography are required to (a) prepare a thesis of approximately 15,000 words in length; (b) undertake coursework as prescribed by the School; (c) present work-in-progress seminars; and (d) attend seminars related to the applications of geographic research.

AGOC4692 C
Geography 4 (Combined Honours) F/T
F

AGOC4693 C
Geography 4 (Combined Honours) P/T
F

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Geography and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete coursework as approved by the Head of School.

Oceanography

Students may undertake oceanography as a single subject, a major or a sub-major. The basic aim of Oceanography 1 is to provide both Arts and Science students with a broad introduction to the study of oceanography, including topics in marine physics, chemistry, biology and geology. Oceanography 2 and 3 use physical and applied mathematical arguments to develop an understanding of physical phenomena that take place within the world's oceans. Students wishing to study Oceanography 2 require a pass in Mathematics 1 (AMAT1600 U) as the course demands a basic understanding of algebraic manipulations and calculus. The emphasis in Oceanography 2 and 3 is placed on

physical oceanography but the course includes components covering marine acoustics and optics and marine chemistry.

AGOC1700
Oceanography I
Staff Contact: Dr J. Shen
C30 F L3 LAB4

General properties of sea water, marine and submarine topography, sea level variations, waves and tides, oceanic and atmospheric circulation, structure of the ocean floors, sediments, marine salvage, maritime law, ocean resources, biological and chemical oceanography and remote sensing. A field school is held during the May recess.

AGOC2700 U
Oceanography 2
Staff Contact: Dr H. Wang
C40 F L3 LAB5
Prerequisites: AGOC1700 U and AMAT1600 U

Physical properties of the oceans and sea water, introduction to ocean dynamics, physics of ocean circulation, theories of surface gravity waves and tides. Students must also take Marine Chemistry 2 (ACHM2010 E) and Marine Acoustics and Optics 2 (APHY2006 E). A field school is held during the May recess.

AGOC3700 U
Oceanography 3
Staff Contact: Dr G. Symonds
C60 F L5 LAB4
Prerequisite: AGOC2700 U

Students wishing to take the marine chemistry component require Marine Chemistry 2 (ACHM2010 E) and those taking marine acoustics and optics require Marine Acoustics and Optics 2 (APHY2006 E).

In this course the basis principles of physical oceanography developed in Oceanography 2 are used to examine the essential physics governing the major features of ocean and coastal circulation. Topics include wind driven circulation in the ocean basis, continental shelf oceanography, mixing processes, internal waves, estuaries and Australian regional oceanography. Observations and subsequent analysis are essential to developing our understanding of the oceans and these are covered in topics on oceanographic instrumentation and measurement techniques, and data analysis. In session 2 students must also choose either Marine Chemistry 3 (ACHM3005 E) **or** Marine Acoustics and Optics 3 (APHY3011 E).

AGOC4790 H
Oceanography 4 (Honours) F/T
Staff Contact: Dr P. Holloway
F

AGOC4791 H
Oceanography 4 (Honours) P/T
F

Candidates for Honours in Oceanography must undertake an approved research project and prepare a thesis. Additional requirements will normally include lectures and examinations, attendance at oceanography research seminars, and the undertaking of a prescribed reading course.

AGOC4792 C
Oceanography 4 (Combined Honours) F/T

AGOC4793 C
Oceanography 4 (Combined Honours) P/T

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Oceanography and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete coursework as approved by the Head of School.

School of History

The Pass Program

All major and sub-major sequences in History begin with History 1.

Students have maximum flexibility in completing major or sub-major sequences. They are able to select their own combinations of single-session subjects at Upper Level, provided only that they must complete Level II subjects to the value of 40 CP before proceeding to Level III subjects, and that subjects completed at Level II shall not be available as Level III options.

The Honours Program

The normal honours program in History will begin in second year. For details see Subject Descriptions (below).

Subject Descriptions

Level I

AHIS1600 U
History 1
Modern European History
Note/s: Not offered in 1997

AHIS1601 U
History 1: The Second World War
Note/s: Not offered in 1997

AHIS1602 U
History 1: World History Since 1945
Staff Contact: A/Prof J.Grey
C30 F HPW4
Prerequisite: See p. 42

This subject will deal with international contemporary history since 1941, with the emphasis on events since 1945. It seeks to explain the development of the contemporary world, and to provide a basis for students to study earlier periods and other societies in subsequent years. Issues to be covered will include the origins and course of the Cold War, decolonisation, the moves towards European union, the development of successor societies in newly independent states, and sources of conflict In the modern world. Emphasis will be placed on

the interaction of social systems and politics' and the development of international political and economic systems, whilst also looking into the influence of these forces in detail on specific regions including Africa, the Middle East and the sub-continent.

Upper Level

Upper Level subjects in History are sessional and may be taken at either Level II or Level III of the BA degree structure. Such subjects will be worth 20 credit points when taken at Level II, and 30 credit points when taken at Level III. Level III students will be required to undertake additional reading and will be examined at a higher level. Students may not count the same subjects at both Level II and Level III.

AHIS2601 U
Revolts and Counter-Insurgency in SE Asia
Staff Contact: Mr G. Walsh
C20 S2 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3601 U

This subject examines revolts, revolutionary warfare, communist strategy and national liberation movements in Southeast Asia, especially after 1945. After an introduction which covers the geographical setting and the recent political and economic history of the region, the subject deals with case studies in Burma, Malaya, the Philippines, Indonesia and Vietnam.

AHIS2603 U
Colonial Australia
Staff Contact: Mr G. Walsh
C20 S1 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3603 U

Australian history from the arrival of the first fleet to the federation of the six colonies. Special attention is paid to the economic, social and technological context of pastoral expansion, urbanisation and immigration, to the mental and physical challenges of the new environment, and to the socio-economic basis of the federal movement.

AHIS2604 U
Modern Australia: Politics and Culture
Staff Contact: Dr F. Cain
C20 S2 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3604 U

This subject explores the major themes in Australian political, cultural and economic history in the twentieth century. Topics include relationships between external events and domestic politics, the changing political consequences of Federal-State financial arrangements, the significance of wars in the expansion of Commonwealth powers, the reforms of the Whitlam era, the changing roles of women in Australian society, and the role of the Australian film industry in the evolution of a distinctive Australian culture.

AHIS2610 U
Southeast Asia: Revolution, Nation and Society, 1870—1965
Staff Contact: Mr C. Glyn-Daniel
C20 S2 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3610 U

This subject focuses upon the processes whereby the Indonesian state emerged from the period of Dutch high colonialism in the late 19th century and the first half of the 20th century, into fully fledged nationhood in the Sukarno era. At the same time other societies, two of significantly Malay origin, were also moving towards independence. In the Philippines the transfer of colonial power from Spain to the United States presented its own problems as did the more intense economic exploitation of the Malay states and Singapore by the British complicated by strong racial tension. The French control of Indo-China became a central issue of Asian history until well into the 20th Century and Thailand continued to attempt to balance traditionalism with the demands of rapid modernisation. The explosive appearance of Japan in the region was one of the elements which destroyed the old colonial structures but, as this course in comparative regional history attempts to show, external intervention was not the most powerful decolonising factor in the creation of the four nations after 1945.

AHIS2612 U
Soviet History
Staff Contact: Dr L. Bowman
C20 S1 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3612 U

The subject begins with the revolutionary upheavals of 1917. The role of the Civil War as a formative experience, the New Economic Policy as an alternative to the Stalinist economic model, Stalin's rise to power, the impact of World War II, and the attempts at reform by Khrushchev, Gorbachev and Yeltsin are examined in the light of recent 'revisionist' interpretations of both Western and Russian historians.

AHIS2613 U
The American Civil War
Staff Contact: Dr R. Thompson
C20 S2 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3613 U

This subject deals with the causes and course of the American Civil War. The examination of the causes of the war include long term causes, such as the revolutionary tradition, slavery and political instability as well as short term factors. The course of the war is discussed in terms of its place in American and wider military history as well as questions of strategy and tactics. Other issues include why the North won and the wider impact of the war.

AHIS2615 U
Social Change in East Asia: From the Twilight of Imperialism to Cold War, 1895–1975
Staff Contact: Dr S. Lone
C20 S1 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3615 U

This subject charts the social and political changes in Japan, Korea, and China from the first Sino-Japanese war (1894–95) to the end of the Vietnam war. Full consideration is given to the wider international climate in which these changes occurred. The first half of the subject concentrates on Japan's military and political expansion in Asia up to 1945. Themes explored include: the rise of radical nationalism; the development of communism in China and its role in ending the period of rule by warlords. The latter part of the subject examines the rise of demilitarised Japan as an economic power; the halting attempts of South Korea to institute democracy whilst remaining technically at war with the North; and Mao Tse-tung's unification of China along socialist lines, followed by the devastation of 'continuous revolution' in the 1960s.

AHIS2620 U
The Sea and Seafarers: Maritime History from the 18th Century
Staff Contact: Mr C. Glyn-Daniel
C4 S1 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3620 U

This subject introduces students to the major developments which have taken place in human exploitation of the sea as a means of economic, social and cultural communication. Against the background of a continuous review of historical changes in maritime technology, naval architecture, navigation, exploration and naval-military encounters, teaching and discussion concentrates on creating a composite picture of the ways in which the maritime environment has influenced and been influenced by modern societies.

AHIS2622 U
The European Powers in Peace and War 1870–1914
Staff Contact: Dr R. Prior, Ms D. Lackerstein
C20 S2 HPW4
Prerequisite: AHIS1600/1601/1602 U
Note/s: Excluded AHIS3622 U

This course deals with the European power system during a period of crisis. The course discusses the nature of power and its manifestations in military and naval policy, diplomatic manœuvrings and industrial power. It examines the effect of these factors and of social, political and intellectual developments on the internal stability of Britain, France, Germany, Russia and the minor powers. The course will also explore the eventual collapse of the European system in 1914 and the outbreak of the First World War. A case study of the impact of Imperialism, one of the major characteristics of the period, in the form of the Boer War, forms an important part of the course.

AHIS2624 U
International Naval History 1890-1945
Staff Contact:
C20 S2 HPW4
Prerequisite: AHIS1600/1601/1602 U

Starting from the fall of Bismarck and the rise of Mahan in 1890, this subject will examine the major technological, theoretical, strategic and geo-political factors that influenced and changed the use of navies by both major and minor powers alike in the period up to the end of the Second World War. It will focus on some naval battle case studies, e.g. the Battle of Tsushima Strait, the Dardanelles campaign, Jutland Force Z, the Battle of the Atlantic, etc. both as a means of exploring shifts in tactical doctrine and providing an opportunity of discovering not only why these classic confrontations ended as they did but also what crucial lessons may be learned from studying them.

Level III

The syllabuses are the same as the Level II equivalents, but involve additional reading and are examined at a higher level.

AHIS3601 U
Revolts and Counter-Insurgency in SE Asia
Staff Contact: Mr G. Walsh
C30 S2 HPW4
Prerequisite: 70 credit points in History.
Note/s: Excluded AHIS2601 U

AHIS3603 U
Colonial Australia
Staff Contact: Mr G. Walsh
C30 S1 HPW4
Prerequisite: AHIS1600/1601 U
Note/s: Excluded AHIS2603 U

AHIS3604 U
Modern Australia: Politics and Culture
Staff Contact: Dr F. Cain
C30 S2 HPW4
Prerequisite: 70 credit points in History
Note/s: Excluded AHIS2604 U

AHIS3610 U
Southeast Asia: Revolution, Nation and Society, 1870–1965
Staff Contact: Mr C. Glyn-Daniel
C30 S2 HPW4
Prerequisite: 70 credit points in History
Note/s: Excluded AHIS2610 U

AHIS3612 U
Soviet History
Staff Contact: Dr L. Bowman
C30 S1 HPW4
Prerequisite: 70 credit points in History
Note/s: Excluded AHIS2612 U.

AHIS3613 U
The American Civil War
Staff Contact: Dr R. Thompson
C30 S2 HPW3
Prerequisite: 70 credit points in History.
Note/s: Excluded AHIS2613 U

AHIS3615 U
Social Change in East Asia: From the Twilight of Imperialism to Cold War, 1895–1975
Staff Contact: Dr S. Lone
C30 S1 HPW4
Prerequisite: 70 credit points in History.
Note/s: Excluded AHIS2615 U

AHIS3621 U
International Naval History 1945 to the Present
Staff Contact:
C30 S2 HPW4
Prerequisite: 70 credit points in History

This subject is designed to complement International Naval History 1890-1945 but may also be taken by those who have not completed the earlier subject. It will seek to follow the development of naval power throughout the nuclear and Cold War eras, and continue the story after the breakup of the Soviet Union. Apart from tracing how massive technological improvements have brought about significant doctrinal changes in the implementation of naval power, this subject will also look at the impact of navies in wartime, paying special attention to the conflicts in Korea, Suez, Vietnam, the Falklands and the Gulf War. The subject will, in addition, address the contentious issue of what utility navies have in the post-Cold War period, and what future options may be taken by large and small powers in pursuit of an effective defence policy designed to provide security on a regional or hemispheric level.

AHIS3622 U
The European Powers in Peace and War 1870–1914
Staff Contact: Dr R. Prior, Ms D. Lackerstein
C30 S2 HPW4
Prerequisite: 70 credit points in History.
Note/s: Excluded AHIS2622 U

AHIS3625 U
The Great War 1914-1918
Staff Contact: Dr R. Prior
C30 S1 HPW4
Prerequisite: AHIS1600/1601/1602 U

This subject deals with the military, political, social and economic aspects of the Great War 1914-18. Topics covered will include generalship, strategies, politico-military relations, the economic mobilisation of economies for war and the social impact of war on civilian populations.

Additional 2nd/3rd year level options that may be offered in other years:
AHIS2602 U/AHIS3602 U
Modern American Foreign Policy
AHIS2608 U/AHIS3608 U
Pacific History: From European Contact to Fijian Coups
AHIS2609 U/AHIS3609 U
War and Society in Australia 1788-1988
AHIS2611 U/AHIS3611 U
Russian History
AHIS2614 U/AHIS3614 U
East Asia: Between Tradition and Modernity
AHIS2616 U/AHIS3616 U
Science and Technology in Australia
AHIS2617 U/AHIS3617 U
War, Society and the State, 1914-1945
AHIS2618 U/AHIS3618 U
America from Revolution to Civil War
AHIS2619 U/AHIS3619 U
The Fall and Rise of Europe: 1945 to the Present
AHIS2623/UAHIS3623 U
The Pacific Basin, 1945-1990
AHIS3605 U
The Origins of Modern War

The BA (Honours) in History

The honours program has been designed on the assumption that honours work will commence in the second year of degree studies. The pattern envisaged is as follows:

Level II

AHIS2690 U
History 2 (Honours)
Staff Contact: Dr R. Prior
HPW2
Prerequisite: AHIS1600 U
Corequisite: 40 credit points in Level II History

A subject (to be determined) to be taken in addition to pass subjects chosen from the Upper Level History Program.

Level III

AHIS3690 U
History 3 (Honours)
Staff Contact: Dr R. Thompson
HPW3
Prerequisite: AHIS2690 U plus 70 credit points in History
Corequisite: 120 credit points in Level III History

A subject (to be determined) to be taken in addition to the pass subjects chosen from the Upper Level History Program.

AHIS3692 U
History 3 (Combined Honours)
Staff Contact: Dr R. Thompson

In this program, course work is divided between the School of History and another School as approved by the Heads of the two Schools concerned.

AHIS4690 H
History 4 (Honours) F/T

AHIS4691 H
History 4 (Honours) P/T
Staff Contact: Mr G. Walsh
Prerequisite: AHIS3690 U

Students will complete an historical thesis of approximately 15,000 words, together with a course of study in historiography and a special unit (to be determined).

AHIS4692 C
History 4 (Combined Honours) F/T

AHIS4693 C
History 4 (Combined Honours) P/T
Staff Contact: A/Prof J. Grey

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with History and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete coursework as approved by the Head of School.

School of Mathematics and Statistics

Outline of subject structures for the Arts and Science degrees

	HPW	C
(a) single subject		
Mathematics 1	7	30
(b) the sub-major		
Mathematics 1	7	30
Mathematics 2A	6	40
		70
(c) the single major		
Mathematics 1	7	30
Mathematics 2A	6	40
Mathematics 3A	9	60
		130
(d) the major/sub-major combination		
Mathematics 1	7	30
Mathematics 2A	6	40
Mathematics 2B	6	40
Mathematics 3A	9	60
Mathematics 3B (or 3C)	9 (or 6)	60 (or 30)
		230 (or 200)

(e) the Honours program
A fourth year honours program is offered for students who have completed a major at a sufficiently high standard

(f) the General Education subjects (See p. 146)		
The World of Mathematics	2	7.5
Presenting and Analysing Data in the Social Sciences	3	7.5
Statistical modelling in the Social Sciences	3	7.5

The following subjects are offered in the Arts and Science programs:

AMAT1600 U
Mathematics 1
Staff Contact: Dr P. McIntyre
C30 F L4 T1 P2
Prerequisite: See p. 42

(Students who have not completed HSC 3 unit Mathematics, or equivalent, are not recommended to undertake this course).

An introductory course covering topics in logic and sets; combinatorics, probability and statistics; linear algebra, matrices; complex algebra, series and convergence; standard functions; differential and integral calculus; curve sketching; differential equations; vector algebra and calculus; elementary mechanics. Use of a graphics calculator.

AMAT2601 U
Mathematics 2A
C40 F L4 T2

AMAT2602 U
Mathematics 2B
C40 F L4 T2

Each of these subjects comprises four sessional units chosen with the approval of the Head of the School from the following list. The Core Mathematics 2 units are compulsory. Mathematics 1 is a prerequisite for all units.

In 1997 the following six units will be offered.

Session 1	Session 2
Core Mathematics 2 Linear Algebra	Core Mathematics 2 Multivariable Calculus
Mathematical Modelling 2	Differential Equations 2
Statistics 2	Probability 2

In second year students may take 5 second year units in order to broaden the options available when going on to Mathematics 3A. One of these units may then be counted towards Mathematics 3A but it will be weighted 0.75 as against 1.0 for the 5 third year units for calculating the final mark in that subject.

Students wishing to do both Mathematics 2A and 2B must see the Head of School who will arrange a special program.

AMAT2001 E
Discrete Mathematics 2
Note/s: Not offered in 1997

AMAT2002 E
Differential Equations 2
Staff Contact: Dr S. Garth
S2 L2 T1

Properties and methods of solution of first and second order ordinary differential equations, with applications. Linear second order partial differential equations, separation of variables and Fourier series. Laplace Transform solution of linear differential equations.

AMAT2003 E
Classical Mechanics 2
Note/s: Not offered in 1997

AMAT2004 E
Probability 2
Staff Contact: A/Prof E. Catchpole
S2 L2 T1

Combinatorics. Set theoretic formulation of probability in discrete sample spaces. Conditional probability and independence. Random variables. Important discrete and continuous distributions. Multivariate distributions and transformations of variables. The weak law of large numbers. Random walk and gamblers ruin problems.

AMAT2005 E
Statistics 2
Staff Contact: A/Prof E. Catchpole
S1 L2 T1.5

An introduction to data analysis and basic statistics using Minitab. Elements of Minitab. Presentation of data, summary statistics. Sampling, design of experiments. Sampling distributions, estimation, hypothesis testing. One and two-sample problems. Goodness-of-fit tests. Regression and correlation. Analysis of variance.

AMAT2006 E
Core Mathematics 2 Linear Algebra
Staff Contact: Dr R. Weber
S1 L2 T1

Matrices and their properties. Application to stochastic transitions and least squares curve fitting. Vector spaces and subspaces. Application to linear differential equations. Eigenvalues, eigenvectors and eigenspaces. Application to systems of linear differential equations and rotational dynamics. Inner product spaces and orthogonal projections. Application to approximation of functions, especially Fourier approximation.

AMAT2007 E
Core Mathematics 2 Multivariable Calculus
Staff Contact: Dr Z. Jovanoski
S2 L2 T1
Prerequisite: AMAT2006 E

Multivariable calculus, vector operators, Taylor's theorem, maxima and minima. Orthogonal curvilinear coordinates. Multiple integration.

AMAT2008 E
Mathematical Modelling 2
Staff Contact: Dr G. Fulford
S1 L2 T1

The formulation and interpretation of mathematical models as simple differential equations. Examples include: springs, combat models, spread of diseases and cooling of motorcycle engines.

AMAT2009 E
Special Topic 2

This unit will be used to develop a special mathematical topic for Mathematics 2B students.

AMAT3601 U
Mathematics 3A
C60 F L6 T3

AMAT3602 U
Mathematics 3B
C60 F L6 T3

AMAT3603 U
Mathematics 3C
C30 S1 or S2 L6 T3

Mathematics 2A is a prerequisite for third year mathematics subjects. Individual units have particular unit prerequisites and students having problems with those should consult the Staff Contact. Mathematics 3A and Mathematics 3B each comprise six sessional units, normally three in each session, and Mathematics 3C comprises three sessional units which can be taken in either session (or in both). Details of units are given below. In all cases, the choice of units is subject to the approval of the Head of the School. Not all the units will be offered every year. The following units are planned for 1997 with possible alternatives shown in brackets, but the final selection will depend on sufficient student demand:

Session 1	Session 2
Continuum Mechanics 3	Advanced Mathematical Techniques 3
Differential Equations 3	Industrial Mathematics 3
Waves 3	Viscous Fluid Dynamics 3
	[Special Topics3]
	[Waveguide Theory 3]
Linear Models and Experimental Design 3	Generalised Linear Models 3
	[Human Resource Planning 3]
Statistical Forecasting 3	Modern Techniques in Data Analysis 3
Statistical Modelling 3	Multivariate Statistics 3
	Projects 3*

Notes

Students taking both Mathematics 3A and 3C, or both 3A and 3B, may also take the unit Complex Analysis 3. This unit will use the lectures given to Engineering students in unit AMAT3401 E Complex Anaylsis 3E.

* Students who demonstrate good mathematical ability and particular motivation may request or be invited to replace one of their second session units with Projects 3. Timetabling is flexible.

AMAT3001 E
Compressible Fluid Dynamics 3
Note/s: Not offered in 1997

AMAT3002 E
Continuum Mechanics 3
Staff Contact: Dr S. Barry
S1 L2 T1
Corequisites: AMAT3003 E and AMAT3021 E

Kinematics and dynamics of rigid and deformable continua. Common constitutive equations. Illustrations from the linear theory of elasticity.

AMAT3003 E
Differential Equations 3
Staff Contact: Dr G. Aldis
S1 L2 T1
Prerequisite: AMAT2002 E
Series solutions. Systems of differential equations. Special functions. Boundary value problems, partial differential equations and applications.

AMAT3006 E
Applied Probability 3
Note/s: Not offered in 1997

AMAT3008 E
Multivariate Statistics 3
Staff Contact: A/Prof E. Catchpole
S2 L2 T1.5
Prerequisite: AMAT2005 E

Hotelling's T^2. Multivariate analysis of variance. Canonical correlation. Principal component analysis. Factor analysis.

AMAT3010 E
Human Resource Planning 3
Staff Contact: Dr M. Collins
S2 L2 T1
Prerequisite: AMAT 2004E

Discrete time models. Closed populations, limiting probabilities. Open populations. Controllability; attainable regions, recruitment and promotion strategies, maintainability.
Continuous time models. Length of service. Recruitment and wastage in systems of fixed and varying size. Systems with several grades.

AMAT3011 E
Numerical Fluid Dynamics 3
Note/s: Not offered in 1997

AMAT3012 E Advanced Differential Equations 3
Note/s: Not offered in 1997

AMAT3013 E
Viscous Fluid Dynamics 3
Staff Contact: Dr R. Weber
S2 L2 T1
Prerequisites: AMAT3002 E and AMAT3003 E

Approaches the study of fluid flow from the mathematical point of view of solving differential equations and approximating governing equations in limiting cases where viscosity is dominant or negligible. Applications from: underwater explosions, blood flow, aerodynamics, boundary layers, instability, lubrication, swimming of micro-organisms, vortices and waves in fluids.

AMAT3014 E
Generalised Linear Models 3
Staff Contact: A/Prof E. Catchpole
S2 L2 T1.5
Prerequisites: AMAT3031 E and AMAT3030 E

Multiway contingency tables. Log-linear models. Quantal response models. Generalised linear models: the GLIM statistical language and the interactively weighted least squares algorithm.

AMAT3016 E
Advanced Mathematical Techniques 3
Staff Contact: Prof C. Pask
S2 L2 T1
Prerequisite: AMAT3003 E

Techniques dealing with mathematical problems not amenable to exact analytical solutions. Selection from the following: perturbation theory; bifurcation; asymptotics; calculus of variations; integral transforms; integral equations.

AMAT3017 E
Projectiles 3
Note/s: Not offered in 1997

AMAT3018 E
Projects 3
Staff Contact: Prof C. Pask
S2 HPW3

A short introduction to mathematical modelling; the skills required, possible strategies. Occasional lectures on particular problems with emphasis on the way in which the problems were translated into mathematical form. Practical experience in setting up and using mathematical models: students work alone or in small groups. Regular reports and conferences with project supervisors are required. At the conclusion each student must make a formal presentation and submit a written report.

AMAT3019 E
Special Topics 3
Staff Contact: Prof C. Pask
S2 HPW3

This unit is available for the presentation of a specialist topic by a visiting member of staff or for presenting a lecture course on a trial basis.

AMAT3020 E
Statistical Forecasting 3
Staff Contact: Dr W. Catchpole
S1 L2 T1.5
Prerequisites: AMAT2004E and AMAT2005E
Note/s: if necessary, check prerequisites with Staff Contact

Stationary time series. Autocorrelation. Autoregressive and moving average processes. Frequency domain. Power spectrum. Estimation. Prediction and control.

AMAT3021 E
Waves 3
Staff Contact: Dr S. Garth
S1 L2 T1
Corequisites: AMAT3003 E and AMAT3002 E

An introduction to the mathematical theory of wave motion. Theory and physical intuition are developed using simple examples such as waves on strings. More complex systems are then examined, including sound waves and electromagnetic waves.

AMAT3022 E
Integral Equations 3
Note/s: Not offered in 1997

AMAT3023 E
Integral Transforms and Asymptotics 3
Note/s: Not offered in 1997

AMAT3024 E
Calculus of Variations 3
Note/s: Not offered in 1997

AMAT3025 E
Waveguide Theory 3
Staff Contact: Prof R. Sammut
S2 L2 T1
Prerequisite: AMAT3021 E

Wave propagation phenomena, reflection, refraction and diffraction, and understanding of wave guiding mechanisms. Mathematical theories of guided wave propagation. Applications in areas such as optics, acoustics, electromagnetic waves, continuum mechanics.

AMAT3026 E
Complex Analysis 3
Staff Contact: Prof R. Sammut
S1 L2 T1

Complex numbers. Analytic functions. Elementary functions and their mappings. Complex integrals, Cauchy's theorem and integral formula. Taylor's and Laurent's series. Residue theorem and evaluation of integrals.

AMAT3027 E
Industrial Mathematics 3
Staff Contact: Dr G. Fulford
S2 L2 T1
Prerequisites: AMAT2002 E and AMAT2008 E or AMAT 3002E

Illustration of the interaction between the mathematics community and industry using case studies. Emphasis is given to formulating simple models which may be analysed analytically to gain insight into the physical process involved. Examples are based on the classical heat-diffusion equation with modifications to account for nonlinear diffusion, convection, spontaneous combustion and melting and freezing.

AMAT3028 E
Case Studies in Statistics 3
Note/s: Not offered in 1997

AMAT3029 E
Modern Techniques in Data Analysis 3
Staff Contact: A/Prof E. Catchpole
S2 L2 T1.5
Prerequisites: AMAT2004 E and AMAT2005 E
Note/s: if necessary, check prerequisites with Staff Contact

A selection of topics from:

Graphical techniques in data analysis. Robust methods in regression; ridge regression, nonlinear regression. Diagnostic methods in regression, outliers, influence. Computer intensive methods; permutation tests, bootstrap, jackknife.

AMAT3030 E
Statistical Modelling 3
Staff Contact: A/Prof E. Catchpole
S1 L2 T1.5
Prerequisites: AMAT2004 E and AMAT2005 E
Note/s: if necessary, check prerequisites with Staff Contact

Statistical modelling using likelihoods; parameter estimation, properties of estimators, likelihood ratio test. A large proportion of the course will be devoted to developing models for a wide range of applied areas e.g. estimating wildlife populations, modelling choice behaviour, etc.

AMAT3031 E
Linear Models and Experimental Design 3
Staff Contact: A/Prof E. Catchpole
S1 L2 T1.5
Prerequisites: AMAT2004 E and AMAT2005 E
Note/s: if necessary, check prerequisites with Staff Contact

Quadratic forms. Estimation and hypothesis testing for the full rank case and less than full rank case. Multiple regression; diagnostic methods, transformations, weighted least squares. Randomised block designs, Latin squares, factoral designs. Crossed and nested designs. Random effects and mixed models.

AMAT4690 H
Mathematics 4 (Honours) F/T
Staff Contact: Prof C. Pask

AMAT4691 H
Mathematics 4 (Honours) P/T

Specialised study in selected topics, together with an approved project in the area in which the honours program is concentrated.

AMAT4692 C
Mathematics 4 (Combined Honours) F/T
AMAT4693 C
Mathematics 4 (Combined Honours) P/T

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Mathematics and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete course work as approved by the Head of School.

The following subjects are offered in the Engineering Program:

AMAT1800 U
Mathematics 1E
Staff Contact: Dr P. McIntyre
F L4 T1

Subject description appears under 1st year Engineering p. 110.

AMAT2800 U
Mathematics 2E
Staff Contact: Dr G. Aldis
F L3 T1
Prerequisite: AMAT1800 U

Matrices, systems of linear equations. Vector spaces. Orthogonal projections and least squares. Eigenvalues. Diagonalisation. Differential equations: first order, higher order linear; systems normal modes; Laplace transforms.

Multivariable calculus, maxima and minima. Integration. Vector field theory. Partial differential equations. Separation of variables. Fourier series.

AMAT2801 U
Engineering Mathematics 1E
F L/T2
Prerequisite: AMAT1800 U

This subject comprises the two sessional units AMAT3403 E and AMAT3404 E as described below.

AMAT3800 U
Mathematics 3E
F L/T4
Prerequisite: AMAT2800 U

This subject comprises the following four sessional units:

AMAT3401 E
Complex Analysis 3E
Staff Contact: Prof R. Sammut
S1 L/T2

Revision of complex numbers, modules, argument, conjugate, Euler's theorem, de Moivre's theorem, roots, solutions of polynomial equations. Functions, limits, continuity, differentiation, analytic functions, Cauchy-Riemann conditions, solution of Laplace's and Poisson's equation by complex variable methods. Elementary functions, singular points, zeros, poles. Complex line integrals. Cauchy's theorem, Integral formulae. Series: convergence, power, Taylor, Laurent. Residue theorem, integrals with indentations, evaluation of real definite integrals by contour integration, principle of the argument. Conformal mappings, elementary functions as mappings, inverse mappings.

AMAT3402 E
Differential Equations 3E
Staff Contact: Prof R. Sammut
S2 L/T2

Separation of variables for homogeneous and inhomogeneous partial differential equations, including Laplace, heat, wave and Poisson equations in rectangular, cylindrical polar, spherical polar coordinates in one, two, or three space dimensions, with and without time dependence. Separation solutions involving Bessel and Legendre functions and their properties. Boundary value problems; eigenvalues and eigenfunctions. Fourier series. Laplace transforms applied to partial differential equations.

AMAT3403 E
Probability 3E
Staff Contact: A/Prof E. Catchpole
S1 L/T2

Laws of probability, permutations and combinations. Random variables: discrete and continuous, change of variables. Expectations: moments. Chebyshev's theorem, generating functions. Distributions: binomial, Poisson, hypergeometric, normal, exponential, gamma and beta. Bivariate distributions; sums of random variables, central limit theorem. Simple random walk. Markov chains.

AMAT3404 E
Statistics 3E
Staff Contact: Dr M. Collins
S2 L/T 2

Presentation of data, histograms. Sampling distributions. Estimation; maximum likelihood, confidence intervals. Hypothesis testing, quality control. Regression and correlation. Goodness of fit. Non-parametric tests.

AMAT3801 U
Mathematics 3EE

A subject for students enrolled in a combined BSc/BE program comprising two units from the third year mathematics subject chosen with the approval of the Head of School.

AMAT3802 U
Mathematics 3BT

This subject comprises the two sessional units AMAT3404 E Probability 3E and AMAT3402 E Differential Equations 3E as described above.

AMAT4801 U
Mathematics 4BT

This subject comprises the two sessional units AMAT3401 E Complex Analysis 3E and AMAT.3404 Statistics 3E as described above.

School of Physics

The School of Physics offers subjects that contribute towards the degrees of Bachelor of Science, Bachelor of Science with Honours, Bachelor of Engineering and Bachelor of Technology. Subjects for the Bachelor of Science degree are also available in the degree of Bachelor of Arts.

Physics 1 is structured primarily to lead into Physics 2, but is a self-contained subject suitable for those Science and Arts candidates who wish to major in other fields of study.

The School of Physics offers four electives for the General Education Program. Any one or any two may be selected.

Outline course structures

	C
1. Pass Program—Arts and Science Degrees	
(a) Single Major (Minimal)	
Physics 1	30
Physics 2	40
Physics 3	60
(b) Sub Major (Minimal)	
Physics 1	30
Physics 2	40
(c) Single Subject	
Physics 1	30
(d) An additional 15 or 30 credit points can be obtained by adding to the programs in (a) or (b) one of the following subjects.	
Physics 3T	15
Physics 3S	30

2. Honours Year

A fourth year honours program is offered for students who have completed at least the single major to a sufficiently high standard.

3. General Education (GE) Subjects (See p. 146)

Astronomy	7.5
Environmental Physics	7.5
Introductory Meteorology	7.5
Physics for Society	7.5

4. Engineering Degrees (See Physics in the Engineering Degree at the end of this School of Physics entry, p. 105)

Physics 1E
Physics 1CE
Physics 2E

Atmospheric Physics and Meteorology 2BT (p.106)

Techniques for Studying Advanced Materials 4

5. Special Unit

Marine Acoustics and Optics 2
(See reference under Oceanography 2)

Introduction

Physics is the systematic study of the basic properties of matter. Its scope ranges from elementary particles at one end of the size scale to galaxies, quasars and the universe itself at the other and from some of the deepest scientific questions of the day to a wealth of practical applications. The three-year major course covers key principles of physics and includes a comprehensive account of the physics of astronomy, meteorology and materials. It provides future officers with the technical versatility and understanding necessary for them to employ and exploit the advanced technology at the core of all modern defence systems and operations.

The course is constructed around four broad *themes* which between them span the field of physics:

- Space, Stars and the Universe
- Earth, Atmosphere and Oceans
- Remote Sensing and Surveillance
- Atoms, Matter and Modern Materials.

Threading through the course, the themes provide a framework of realistic contexts in which to introduce to the student the concepts of physics. In addition they furnish practical examples and applications which reinforce and enhance understanding and display the value, utility and pervasive character of the principles of physics.

The lectures are supplemented by laboratory exercises in each year of study of physics. The experiments are tailored to enhance the conceptualisation of fundamental physical principles while providing essential skills in measurement technique and rigorous analysis of results. Modern desktop computers are available throughout the laboratories in order to provide basic computer skills of the scientific and technical kind.

Level I

Coordinator: Dr P. Lynam

APHY1600 U
Physics 1
C30 F L3 T1 P3
Prerequisite: (See p. 42)

Motion and Ballistics
Staff Contact: Dr D.J. Isbister
S1 L14 T5

Physics has its origins in the clarification of the ideas of force and motion by great scientists: Galileo, Newton and others. These concepts along with those of energy and linear momentum and their conservation laws underlie much of physics and apply in particular to gun recoil, projectiles (artillery shells and rockets) and their impulsion and trajectories. For rotational motion torque and angular momentum are the counterparts of force and linear momentum and have applications to rifling and gyroscopic stabilisation. In addition, rocket and artillery aiming is affected by the rotation of the Earth.

Waves in Optical and Remote Sensing Systems
Staff Contact: Dr G. Robinson
S1 L11 T4

Waves take many different forms; the properties and parameters of the harmonic wave constitute a basis for nearly all wave motion. Important phenomena common to all types of waves include standing waves, refraction, interference and diffraction and the Doppler frequency shift. Among practical applications are channelling of underwater sound and the equivalent ducting of radar waves in the atmosphere. Several factors affect the transmission and absorption of energy with consequences for communications. Light waves are controlled by lenses and mirrors; the optical principles established apply also to lower frequency regions of the electromagnetic spectrum, for example to dish antennas using microwaves and radio waves.

Atomic and Nuclear Physics
Staff Contact: Dr W. Lawson
S1 L14 T4

The dynamics which successfully describe the world of everyday experience do not fare so well in the world of the very small. Failures are evident in the interaction of light with matter and in the detail of the spatial behaviour of atomic particles. Attempts to describe these phenomena result in a wave-particle duality, expressed in the photon or particle-like qualities of light and the wave-like behaviour of particles. From the latter arise the uncertainty principle and the concept of discrete energies, both foreign to normal experience, but pivotal in the atomic realm. Discrete energy levels are a key feature of the pioneering Bohr model for the hydrogen atom and its spectrum and, by extension, for other atoms and their optical and X-ray spectra. Nuclear physics encompasses a regime of considerably decreased size and greatly increased characteristic energy. Unstable nuclei are radioactive; applications have positive aspects, such as medical radiotherapy and radiocarbon dating, and negative aspects in the hazards it presents to life – nuclear energy can be released in a controlled way (reactors) or explosively (bombs).

Thermodynamics of the Terrestrial Environment
Staff Contact: Dr P. Lynam
S2 L14 T5

The nature of the four states of matter and the concepts of pressure and temperature are all closely related to the kinetic theory of the constituent molecules. The gaseous state is governed by laws relating temperature, pressure, volume and quantity of matter. Consideration of the internal energy of a system and how it is affected by heat flow and work is formalised in the First Law of Thermodynamics. Concepts of specific and latent heat link the First Law to the effects of temperature.

These ideas are applicable to a study of the Earth's atmosphere, where gases are in a state of hydrostatic balance which leads to a steady decrease of pressure and density with altitude. The pressure decrease forms the basis of the pressure altimeter, one of the most important instruments in any aircraft. Warming of the atmosphere causes pressures to change and pressure gradients to develop, and these provide the force that drives the winds. The direction of the wind is greatly affected by the Earth's rotation through the phenomenon of Coriolis turning.

The temperature of a planet's surface and atmosphere are determined ultimately by the amount of electromagnetic radiation it receives from the Sun. Absorption, reflection, and emission processes reach an equilibrium at a temperature which differs from planet to planet. Variations in the intensity of these processes with latitude, and as the planet moves in its orbit around the Sun, account for the zonation of climate and for the seasons.

Electromagnetism and Applications
Staff Contact: Dr G. Robinson
S2 L17 T6

Electromagnetism is one of the four fundamental forces of nature. Static electric charges and the nature of the force between them introduce the concept of an electric field. Charges in relative motion experience an additional magnetic force. The laws relating electric charges and currents and electric and magnetic fields, bear the names of Coulomb, Gauss, Ampère and Faraday; examples of their application to devices in common use in everyday life include the photocopier, the loudspeaker, the ignition system in a car engine, motors and generators and, in scientific use, the cathode-ray oscilloscope.

Space Physics and Astrodynamics
Staff Contact: A/Prof R.K. Sood
S2 L8 T2

Questions about the nature of the universe hold a widespread fascination for human beings, the origins of astronomy pre-dating physics. However, it was the application of the physics of Newton which was first successful in describing planetary motion and marked the beginning of rapid progress in the understanding of astronomical observations. An overview of the whole field ranges from the mechanics of orbits and the dynamics of spacecraft, through the origin of the Earth and the Solar system, and planetary motion, to the dynamics of binary stars, the Milky Way Galaxy, clusters of galaxies and ends with the role of fundamental forces and of thermodynamics in the creation of the Universe.

Physics Level I Laboratory Program
Convener: Dr W. Lawson
F 78 hours

The program comprises up to eighteen laboratory experiments, each of three hours duration, relating to and supplementing the Physics Level I lecture courses; occasional experiments take place in the School's research laboratories.

Students acquire an appreciation of the place and utility of computers in modern scientific endeavour by using them routinely for graphing, data gathering, control functions and simulation.

Level II

Coordinator: Dr D.K. Fowler

APHY2600 U
Physics 2

C40 F L4 T1 P3 average
Prerequisite: Mathematics 1

A satisfactory performance is required in **both** the lecture/tutorial component **and** the laboratory component.

APHY2012E
Astrophysics and Thermodynamics of the Universe
Staff contact: Dr R.G. Smith
S1 L26 T6

This unit deals primarily with the nature of stars. It commences with the definition of astronomical coordinate systems and time standards and looks at the development of astronomical navigation. This is followed by sections on the Sun, binary star systems, interstellar gas and dust, star formation, and stellar evolution. Since it is regarded as a representative star, and it is the star that can be studied in most detail, the section on the Sun is a substantial one which focuses on its structure, the solar wind, and solar activity.The binary systems are important for what they can tell us about stellar parameters such as mass, temperature, radius, and luminosity. A treatment of the thermodynamics of stars touches on topics such as the gas laws, the consequences of the different types of quantum-mechanical statistics, and blackbody radiation. The unit concludes with a detailed section on the Milky Way Galaxy, followed by a look at external galaxies, the galactic distance scale, the Hubble constant, and the age of the Universe.

APHY2013 E
Applied Optics and Remote Sensing
Staff contact: A/Prof I.A. Bourne / A/Prof S.J. Campbell
S1 L26 T6

Geometric optics has applications to such important practical devices as telescopes and sighting systems, optical fibres and their uses, and "head-up" displays. The principles of optics are applicable to other types of waves and ray-tracing is used for predictive models of underwater acoustic propagation and radio propagation through the atmosphere. Wave mode propagation concepts transcend the limitations of ray-tracing methods. Other important practical techniques include: time-of-flight

ranging; frequency and phase modulation as used in "chirp" radar; ocean acoustic tomography.

The principles of interference and diffraction apply to the design of sources of electromagnetic and acoustic waves which emit steerable single-lobe beams. Several types of advanced radar and sonar systems are based on these principles.

A set of four equations which govern electromagnetic phenomena were distilled by Maxwell from the many features of electric and magnetic fields. A momentous deduction from these equations is the existence of electromagnetic waves which can pervade free space and matter. The nature of the waves and their interaction with matter have far-reaching consequences, for example in communications and surveillance.

APHY2014 E
Atmospheric Physics and Meteorology
Staff contact: Dr V.A. Drake
S2 L26 T6

Solar radiation is absorbed, scattered, reflected and re-emitted by various components of the Earth's atmosphere and by the surface. The Earth's own thermal radiation is itself absorbed and re-emitted before ultimately escaping to space. These processes shield the surface from harmful radiation by maintaining the ozone layer and warm it through the greenhouse effect; they also maintain the ionosphere and account for the rather complex variation of atmospheric temperature with altitude and for the colour of the sky.

Within the troposphere, i.e. the region to which the familiar phenomena of weather are confined, temperature generally decreases with altitude. The rate at which this decrease occurs determines whether the atmosphere is stable or whether thermally induced updrafts and downdrafts are likely to develop. Water vapour in the atmosphere leads not only to clouds and rainfall but also to release of large quantities of energy in the form of latent heat: it is the fuel which powers storms.

Winds are air masses in motion. They result from atmospheric forces that arise in pressure systems which vary in scale from global to local. Air masses displace each other, bringing alternately warm and cool conditions. Air mass boundaries (or "fronts") are regions of instability and turbulence, and often produce rainfall.

APHY2015 E
Electronic Properties of Materials
Staff contact: Dr D.K.Fowler
S2 L26 T6

Contemporary devices for measurement, control, communications and computing make use of solid materials in which electrons are controlled in various ways for different applications. The ability to exercise such control depends on detailed knowledge of the structure of the material. Techniques used to obtain this structural knowledge for the important electronic materials in present use include x-ray and electron diffraction. Simple models, quantum-mechanically based, establish the properties of electrons in solid materials. Of particular importance are the factors which influence the switching speed of semiconductor devices. Band gap engineering is an important technique, as is modulation doping; both figure in prospects for future technologies. Electronic characteristics and their interaction with light and heat and sound form the basis of other important devices: semiconductor lasers; light-emitting diodes; solar cells; thermoelectric devices; ferroelectrics; piezoelectric sonar transducers.

Physics Level II Laboratory Program
Convener: Dr G.A. Stewart
F 78 hours

A student will carry out a total of sixteen experiments, each of four hours duration, designed to illustrate and extend the scope of the lecture courses, and introduce methods of physical measurement, scientific recording and data analysis.

The formal experiments will be interspersed with seven hours of demonstrations and exercises in each Session to be devoted to mathematical methods for physics; the laboratory timetable is arranged to allow the final two weeks of each Session to be free of laboratory work.

Special Unit

APHY2006 E
Marine Acoustics and Optics 2
Staff contact: Dr G.A. Stewart
S2 L/T26 P18

This unit is a component of AGOC2700 U Oceanography 2 and is available only to students taking that subject. It comprises 21 lectures, 5 tutorials, and 6 3-hour practical classes.

Blue-green lasers are currently employed for airborne depth-sounding of the Australian coastal waters, and powerful satellite-based lasers have been proposed as a possible means of secure communication with submerged submarines. However, sound remains the most effective source of energy for the location and classification of underwater objects. Examples of some important sonar systems include passive sonar buoys and towed arrays, active sidescan sonar, multiple beam sonar and active cylindrical arrays. The physics of beam formation is exploited to obtain bearing information, concentrate projected acoustic energy into a narrow steerable beam, or to minimise the reception of unwanted noise. A system's effectiveness is analysed in terms of the sonar equations. It depends critically on how prevailing oceanographic conditions influence the propagation and attenuation of acoustic energy. In particular, the formation of underwater sound ducts can result in convergence zones of unexpectedly high signal intensity, or shadow zones of unexpectedly low intensity.

Level III

Coordinator: Dr R.W.N. Kinnear

APHY 3600 U
Physics 3
C60 F L/T6 P5 average
Prerequisite: Physics 2

This subject comprises the units described below.

APHY 3031 E
Cosmology and Relativistic Astrophysics
Staff contact: A/Prof R.K. Sood
S1 L/T26

This course builds on the concepts learnt in the Level II course, "Astrophysics and Thermodynamics of the Universe". The end point of the evolution of stars usually results in the formation of objects representing one of three extremely dense states of cosmic matter: white dwarfs, neutron stars, and black holes. The observational evidence for these objects is presented, involving the effects of extremely high gravitational and magnetic fields and temperatures. It is shown that everyday laboratory physics can indeed explain the behaviour of such matter, including the superconducting and superfluid interior of neutron stars, and the thermodynamics and evaporation of black holes. The existence of gravitation waves and attempts at their detection are closely linked with the formation and existence of dense objects in the Universe, which also provide stern tests for general and special relativity.

The dynamics of galaxies in our Universe implies the existence of large amounts of dark matter that we are unable to observe at present. This has important implications for the ultimate fate of the Universe. The history of the Universe is traced back to the Big Bang, when the four fundamental forces were indistinguishable. The role of the four forces in shaping the Universe, and in the formation of galaxies, is discussed. Conditions at the very beginning may explain some of the major puzzles of modern astrophysics. Among these puzzles are the large amount of helium, the absence of significant amounts of anti-matter, and the isotropy, in the present Universe. The existence of the microwave background radiation, and the possible existence of cosmic strings are closely linked to the early evolution of the Universe.

APHY 3032 E
Physics of Advanced Materials
Staff contact: A/Prof D.H. Chaplin / Dr G.A. Stewart
S1 L/T26

This unit builds on the level 2 unit "Electronic Properties of Materials" and explores the further significance of chemical bonding and structural symmetry for mechanical properties such as lubrication and friction, elasticity and plasticity, and strength and hardness. It also considers larger scale influences such as structural defects, deformations, dislocations, grain size, and the nature of a material's surface. Examples dealt with include advanced polymers, the design of super alloys, crystalline and glassy ceramics, composites, corrosion, and thin films. The final section treats the origins of different types of magnetic behaviour and the properties of magnetic materials employed for applications such as permanent air-gap magnets, motors, transformers, magnetic disks and tapes, magneto-optical data storage, and magnetostrictive sonar transducers.

APHY 3033 E
Propulsion Physics
Staff contact: Dr P. Lynam
S1 L/T13

Propulsion systems operate on the conversion of energy in the form of heat into useful work. This process can either occur in a closed system where the working substance is conserved, or in an open system where it is constantly renewed. Hence the unit studies the thermodynamics of heat transfer and engine cycles e.g. Carnot, Diesel, Stirling, Rankine, and turbine engines, fundamentals of fuel cells, chemical, liquid and solid fuels, and explosive propulsion.

APHY 3034 E
Infrared Technology
Staff contact: Dr G. Robinson
S1 L/T13

The radiation laws and the properties of blackbody radiation studied in the Level 2 unit "Astrophysics and Thermodynamics of the Universe" have important applications in the infrared spectrum such as target and background signatures, infrared spectra, atmospheric transmission and countermeasures. The technology of infrared detection includes: telescopes, sensors, focal plane arrays, cryocooled systems, image and signal processors, pointing, scanning, and stabilisation. The principles discussed underly practical infrared systems: general purpose cameras, smart weapons seekers, forward looking infrared sensors (FLIR), infrared search and track systems (IRST), space-based sensors, and weather and environment monitoring systems.

APHY 3035 E
Atmospheric Dynamics
Staff contact: Dr J.R. Taylor/Dr. D.I. Isbister
S2 L/T26

The meteorological equations of motion form the basis of modern weather forecasting. The vorticity equation is the key to understanding and diagnosing vertical motion in the atmosphere. Using these equations, the evolution of the synoptic-scale wind systems found in the Australian region can be understood and their development predicted. Forecasts are based on measurements of the state of the global atmosphere obtained through a worldwide meteorological observing and data-dissemination network, the "World Weather Watch".

The microphysics of water-droplet and ice-crystal formation and growth determines whether and how rapidly clouds develop, and whether precipitation forms. Additional physical processes act on falling precipitation and determine whether and in what form it reaches the ground. Cloud and precipitation development occurs within oganised weather systems such as thunderstorms, mesoscale storm complexes, tropical cyclones and temperate depressions.

APHY 3036 E
Electromagnetic Waves and Remote Sensing
Staff contact: Dr R.W.N. Kinnear
S2 L/T26

The Level Two unit "Applied Optics and Remote Sensing" developed the fundamentals of electromagnetic waves and their propagation in free space. In addition, principles of geometrical optics, interference and diffraction were discussed and reference made to the practical applications of radar and sonar systems. This Level 3 unit treats electromagnetic waves starting from antenna uses in the atmosphere or the oceans and emphasises the effects of the media through which the waves

propagate. The extent and nature of the signal rèduction, reflection, refraction and scattering undergone by the waves determine the true performance of any remote sensing system. Topics covered are: the electromagnetic wave equation in lossy media, attenuation and dispersion; attenuation mechanisms: absorption (vibrational excitation, ohmic losses, skin depth), scattering (Rayleigh scattering, fluctuation models); partial reflection and transmission at a media interface; interaction with the ionosphere. Applications relevant to the Australian Defence Force include atmospheric radio and radar transmission, over-the-horizon radar, surface-to-submarine communication (blue and ELF "windows") and transmission along waveguides and optical fibres.

APHY 3037 E
Laser Physics and Applications
Staff contact: Dr C. Smith
S2 L/T13

Light from lasers has unique properties which result mainly from the organised nature of the emissions from the individual atoms. The light may be prepared to have unequalled wavelength precision and directionality, and extremely high spatial and spectral output power density. Most of these special features are exploited in one or another of many wide-ranging applications. This unit deals with both underlying principles and selected applications. Topics include: principles of operation, continuous and pulsed modes, Q-switching and mode-locking; laser types; low-power applications, e.g. optical discs, fibre-optic communications, holography, spectroscopy, target location and weapon guidance, and battle simulation; high-power applications, e.g. safety, materials working, precision surgery, and nuclear fusion.

APHY 3038 E
Case Studies in Military Physics
Staff contact: A/Prof S.J. Campbell
S2 L/T13

This unit will demonstrate how developments in physics impact on the technology and conduct of warfare. It will consider a selection of significant military events and defence science projects.

Physics Level III Laboratory Program
Convener: Dr R. G.Smith
F 130 hours

In Session 1, students will carry out a selection of experiments designed to exercise and expand on the scope of the lecture courses. More than half of Session 2 is reserved for a research project which each student will conduct in collaboration with a member of the academic staff. Where possible, the topics offered are designed to be of relevance to the Australian Defence Force.

APHY 3609 U
Physics 3S
C30

or

APHY 3610 U
Physics 3T
C15

Additional credit points can be obtained by adding Physics 3T (15 credit points) or Physics 3S (30 credit points) to either a sub major program (Physics 1, Physics 2) or to a single major program (Physics 1, Physics 2, Physics 3). The subjects consist of 26 lectures/tutorials (Physics 3T) and 52 lectures/tutorials (Physics 3S) in each of Session 1 and Session 2. For those students already taking Physics 3, the units will be from the eight units listed below. Students not taking Physics 3 may also select from the units listed above for that subject. With approval of the Head of School, the selection may be expanded by units offered by other schools of the University College.

APHY 3039 E
Applied Electronics
Staff contact: Dr R.G. Smith
L/T13

Components and devices: resistors, capacitors and inductors, diodes and transistors, crystals, operational amplifiers, digital logic gates, microprocessors. Circuits: filters, feedback, amplifiers, oscillators, digital circuits, combinational and sequential logic, control systems. Applications relevant to the Military environment include radio and radar, signal analysis, rangefinders, GPS navigation, and sensor systems.

APHY 3040 E
Aviation Meteorology
Staff contact: Dr V.A. Drake
L/T13

The winds, wind shear and turbulence in the atmospheric boundary layer and their effects on aviation. High altitude weather: jet streams, turbulence in clear air and clouds. Water in the atmosphere, its detection and importance for aviation: weather radar, visibility, fog, and icing.

APHY 3041 E
Computational Physics
Staff contact: Dr R.G. Smith
L/T13

Emphasis is on the use of commercially available software packages for the solution of complex problems.. The techniques include curve fitting, numerical differentiation and integration, solution of sets of differential equations, Fourier series and analysis, correlation, convolution and deconvolution. Applications are selected from applied physics and areas of relevance to the class.

APHY 3042 E
Cosmic Radiation
Staff contact: A/Prof R.K.Sood
L/T13

Interactions of high energy particles and photons with matter: nuclear interactions, detectors for high energy particles, x-rays and gamma-rays. Cosmic ray, x-ray, gamma-ray and neutrino telescopes. The cosmic ray flux at the Earth's surface and at the top of the atmosphere. Effect of cosmic rays on manned high altitude aircraft and on communications satellites. Cosmic rays in the Galactic and intergalactic medium. The origin of cosmic rays.

APHY 3043 E
Quantum Technology
Staff contact: Dr P. Lynam
L/T13

Low- and high-temperature superconductivity. Superconducting junction devices for ultra-low magnetic field measurements, voltage standards and ultrafast digital components. Device engineering on a nanometre scale: quantum wells, dots and lines, resistance standards, atomic force microscope. Noise limits to measurement and instrumentation, quantum cryptography.

APHY 3044 E
Sonar Physics
Staff contact: A/Prof I.A. Bourne
L/T13

Properties of underwater sound. Active sonar: frequency composition of a tone burst, Doppler sonar, the description of acoustic radiation close to its source (cavitation, acoustic streaming) and at far range (beam pattern, shading, directivity, electronic steering). Passive sonar: physical and biological sources of ambient noise, principles of passive sonobuoy systems, acoustic signatures (LOFAR), and towed arrays (FRAZ). Sonar equations.

APHY 3045 E
Plasma and Ionospheric Physics
Staff contact: Dr W. Lawson
L/13

The physical properties of a plasma, the fourth state of matter. Glow discharge tubes, electric arcs and gas welding, and plasma lithography. Nuclear fusion treated as thermonuclear reactions in a plasma, fusion processes and energy generation rates within stars, fusion weapon systems, controlled fusion via magnetic- and inertial confinement. The ionosphere as a plasma: structure and temporal variability, interaction with the solar wind plasma, plasma oscillations, influence on the Earth's magnetosphere, and auroral displays.

APHY 3046 E
Nuclear and Particle Physics
Staff contact: Dr D.K. Fowler
L/T13

Introduction to the properties of the nucleus: size, mass, magnetic moment, parity, strong interaction. Modes of radioactive decay. Nuclear structure: semi-empirical mass equation, shell model, and collective model. Nuclear fission and nuclear power generation, accelerators, nuclear medicine, nuclear weapons, biological effects of radiation. Elementary particles: properties and interactions, quarks, the standard model, unification theory.

Level IV

Coordinators: A/Prof D.H.Chaplin / Dr V.A. Drake

APHY4690 U
Physics 4 (Honours) F/T

APHY4691 H
Physics 4 (Honours) P/T

Students with a special interest and aptitude in physics are encouraged to apply for the honours program. The standard for entry is typically a good CREDIT or better in PHYSICS 3.

The lecture units, typically totalling four in number, will be drawn from:

(a) Solid State Physics 4 (APHY4001 E)
(b) Astrophysics (APHY4002 E)
(c) Microcomputer Applications in Advanced Materials, Astronomy, and/or Meteorology (APHY4003 E)
(d) Experimental Magnetism (APHY4004 E)
(e) Group Theory in Quantum Mechanics (APHY4005 E)
(f) Statistical Mechanics 2 (APHY4006 E)
(g) Nuclear Physics and Hyperfine Interactions (APHY4007 E)
(h) Meteorological Remote Sensing (APHY4009 E)
(i) Stellar Physics (APHY4010)
(j) Small Scale Atmospheric Motions (APHY4011 E)

APHY4692 C
Physics 4 (Combined Honours) F/T

APHY4693 C
Physics 4 (Combined Honours) P/T

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Physics and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete course work as approved by the Head of School.

Physics in the Engineering Degree

The School of Physics provides the compulsory subject APHY1800 U Physics 1E to first year Electrical and Mechanical Engineers and APHY1801 U Physics 1CE to first year Civil Engineers.

APHY1800 U
Physics 1E
F L3 T1 P48
Corequisite: AMAT1800 U

The subject description appears under 1st year Engineering, p.112. The laboratory program consists of sixteen three-hour classes.

APHY1801 U
Physics 1CE
F L3 T1 P24

The lecture component is identical to APHY1800 U. The laboratory program consists of twelve two-hour classes.

APHY2801 U
Physics 2E
S1 L/T34 P21 S2 L/T34 P21
Corequisite: AMAT2800 U
Prerequisites: AMAT1600 U or AMAT1800 U and APHY1600 U or APHY1800 U

A satisfactory performance is required in both the lecture/tutorial component and the practical component.

Second Year Electrical Engineering students take the following units.

APHY2408 E
Physics of Electronic Device Materials
Staff contact: Dr G.A. Stewart
S1 L/T34

Crystal structure of important device materials: conventions for the description of cubic crystal directions, surfaces and planes, x-ray Bragg diffraction as a means of structure determination (and as a foundation for electron matter wave diffraction).

Quantum mechanical description of electrons: wave particle duality, matter waves and the Schrödinger equation, quantum description of free electrons, diffraction of an electron beam, the transmission electron microscope, low energy electron diffraction, applications of the one-dimensional Schrödinger equation (electrons in an infinite potential well, tunnelling through a potential barrier), scanning tunnelling microscope, tunnel diode, modelling of electrons in a periodic potential.

Electrical conductivity: Propagation of electron matter waves in a three-dimensional periodic structure, Pauli Exclusion Principle, models of electrical conduction (free electron Fermi gas model, nearly free electron model), density of states at the Fermi level, Ohm's Law (resistivity, mobility and relaxation time), bands, band gaps, effective mass, holes, extrinsic versus intrinsic semiconductors, Hall effect.

A comparison of the semiconductors Ge, Si and GaAs: band gaps (direct versus indirect), semiconductor lasers and light-emitting diodes, carrier mobilities, high speed versus high field performance, heterostructures and the engineered band gap, implications of modulation-doped structures for device speed.

The properties of magnetic materials employed in electronic devices: diamagnetism versus paramagnetism, quantisation of angular momentum, ferromagnetism and magnetic domains, hysteresis (remanence and coercivity, energy loss per magnetic cycle), magneto-optic data storage, ferrites and amorphous ribbons for inductors, transformer cores, DC amplifiers.

APHY2409 E
Electromagnetic Waves 2E
Staff contact: Dr D.J. Isbister
S2 L/T34

The nature of electromagnetic waves: electromagnetic spectrum and applications, polarisation, plane wave approximation and I-D wave equation. The ray-tracing approximation: criteria for applicability of ray-tracing techniques, refraction of radio, radar and light waves, geometric optics, optical lenses, paraxial approximation and sources of aberration. Interference: the superposition principle, interference of waves from multiple source arrays, Fresnel & Fraunhofer domains, Fourier techniques. Electrostatics in dielectric media: electric field, electrostatic potential, Gauss' law in integral and differential forms, Poisson's & Laplace's equations, uniqueness, method of images, dielectrics, polarisation, displacement field, boundary conditions, applications to simple charge distributions, dipoles, capacitors. Magnetostatics in magnetic media: magnetic field, vector potential Ampere's circuital law in integral and differential forms, magnetic dipoles, magnetisation, magnetic field strength, boundary conditions, applications to conductors, magnets, electromagnets. Propagation of electromagnetic waves: Maxwell's equations, displacement current, constitutive relations, energy density, Poynting vector, plane electromagnetic waves in free space and in dielectric and conducting media, skin effect, reflection and refraction, Fresnel equations.

Special Units

APHY2407 E
Atmospheric Physics and Meteorology 2BT
Staff contact: Dr J.R. Taylor
L15 T3 P12

This unit is a component of AMEC2901 U Aeronautical Engineering 2BT

The atmosphere: properties of dry and moist air, layers of the atmosphere defined by lapse rates, the hydrostatic equation, altimetry. *Energy transfer:* solar and terrestrial radiation; emission, absorption, scattering and reflection within the atmosphere, conduction, convection and advection. *Stability:* the 'parcel' model of stability, and adiabatic lapse rate: the aerological (F160) diagram, temperature inversions. *Clouds:* cloud classification, cloud formation, cloud bases and tops via the aerological diagram. *Concepts of weather and climate:* time scales of changes, the influence of the Earth's orbit and the inclination of its axis of rotation, Milankovitch mechanisms. *Wind:* meteorologically significant forces, equations of motion, wind types, surface winds. *Global circulation patterns:* the transfer of latent and sensible heat from the equator, the equatorial, mid-latitude and polar cells, the influence of ocean currents and large land masses, monsoons, high pressure and low pressure systems. *Air mass boundaries:* polar, warm, cold and occluded fronts. *Local winds:* land and sea breezes, anabatic and katabatic winds, foehn winds. *Precipitation:* forms of precipitation, thunderstorms, tropical cyclones.

APHY4401 E
Techniques for Studying Advanced Materials 4E
L27

This unit is offered to students taking AMEC15901 U Aeronautical Engineering 3BT as an "Options 2" elective unit.

X-ray absorption for tomography and imaging, diffraction techniques to measure composition, structure and stress and for the study of corrosion; electron microscopy to establish defect structures, the existence of microcracks, and microphase compositions, and for forensic studies of failed components; ultrasonic methods for crack and flaw detection.

School of Politics

The School of Politics offers subjects designed to introduce students to the major ideas and issues of politics, both domestic and international. In the first year detailed attention is given to the workings of the Australian political system, to the political theory of Australian democracy, and to Australia's place in international politics.

Upper Level subjects deal with different systems of government in a wide range of countries, the relationships between states, and particular approaches and topics in the study of politics.

All major and sub-major sequences in Politics begin with Politics 1. In completing major or sub-major sequences students have maximum flexibility in selecting their own combination of single session subjects at Upper Level, provided only that they must complete Level II subjects to the value of 40 credit points before counting a subject as a Level III subject, and that subjects completed at Level II shall not be available as Level III options.

The School of Politics also offers a fourth year honours program—consisting of coursework and sub-thesis—which expands and further develops the intellectual skills of our best students.

APOL1600 U
Politics 1
Staff Contact: Dr C. Kukathas
C30 F HPW3
Prerequisite: See p. 42

An Introduction to Politics

This subject introduces students to the study of politics by focusing on Australian politics at the national level. The subject is in three parts. The first examines the major institutions and actors in the Australian political system, including the Constitution, the federal system, the Senate and the House of Representatives, executive government, the bureaucracy, the electoral system, political parties and interest and pressure groups. The second part explores political behaviour and issues such as the purpose and limits of government. The third part treats Australia in its international setting, as part of a world of states with different and sometimes conflicting interests. It looks, in particular, at Australia's relations with allies and near neighbours.

Levels II and III

Upper level subjects in Politics are sessional and may be taken at either Level II or Level III of the BA degree structure. Subjects are worth 20 credit points when taken at Level II, and 30 credit points when taken at Level III. If a subject is taken as a Level II subject, a student must have completed APOL1600 U. If a subject is taken as a Level III subject, a student must have gained 70 credit points in Politics. Students taking a course as a Level III subject will be examined at a higher level than students taking a course as a Level II subject. Students may not count the same subjects at both Level II and Level III. The first subject number refers to Level II, the second subject number to Level III. Similarly, the first credit point number and prerequisite refers to Level II, the second in each case to Level III.

APOL2601 U/3614 U
Politics of Russia
Staff Contact: Dr W. Maley
C20/30 S2 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

The structure and working of the political system of Russia. The subject examines the background to and working through of the revolutions of 1917 and 1991. It examines such topics as the role of political leadership in a totalitarian system drawing examples from the years of Lenin, Stalin, Khrushchev, Brezhnev and the modern era. It also examines such other issues as the role of the Communist Party and other formal and informal groups, the role of the military, the ongoing significance of dissent and human rights, the relevance of law and the Constitution, and the political implications of Russia's domination of ethnic minorities. It traces the political forces at work in Russia up to the present day, and the prospects for ongoing reform.

APOL2602 U/3625 U
Politics of Southeast Asia
Note/s: Not offered in 1997

APOL2603 U/3615 U
Politics of the USA
Staff Contact: Mr M. Mackerras
C20/30 S1 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

An examination of the American Constitution (with special emphasis on the separation of powers); the federal system, including the role of the state and local government; the Supreme Court; and executive-legislative relations. The subject also includes a study of the Congress and the Presidency, as well as the two political parties, presidential elections and the role of the Electoral College. Attention is also given to US foreign policy, with particular emphasis on the dispute about war powers under the Constitution.

APOL2604 U/3618 U
Politics of China
Staff Contact: Dr D. Kelly
C20/30 S2 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

The structure and working of the political system of China. The subject examines the working through of China's revolution before and since the establishment of the People's Republic in 1949. The subject includes such topics as the role of the Communist Party, and other formal and informal political groups. It also examines such issues as political leadership in China, the role of the military, political dissent and opposition, the significance of Marxism-Leninism-Mao Zedong Thought, the tensions between capitalism and socialism, the importance of ethnic minorities, the growing importance of provincial politics, the politics of education and culture, China's irredenta, the prospects for change, and the values and interests involved in policy-making and social control.

APOL2605 U/3605 U
Politics in Japan
Staff Contact: Dr A. G. Mulgan
C20/30 S1 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

This subject studies the institutions, processes and practices of Japanese politics from a broader comparative perspective by relating them to the main theoretical frameworks in the study of political science and political economy. The subject will include an assessment of the Japanese Constitution and its relationship to the actual operations of Japanese political institutions, the distribution of power in the Japanese polity, the character of policy making and electoral processes, the pursuit and protection of vested interests and the role of government in the economy as well as foreign pressure on policy outcomes. A more theoretical understanding of these topics and issues will be sought with reference to models of regulation, corporatism, public choice policy making and others.

APOL2608 U/3617 U
Understanding Revolutions
Note/s: Not offered in 1997

APOL2610 U/3620 U
The Collapse of Communism
Note/s: Not offered in 1997

APOL2611 U/3611 U
The Politics of Australian Defence Policy
Staff Contact: Dr G. Cheeseman
C20/30 S1 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

This subject uses different theoretical perspectives as well as a number of specific case studies to consider what shapes Australia's defence thinking and policies. It begins by examining the cultural, international and domestic political frameworks within which policy is made, and evaluates how these influence and constrain Australia's defence agenda. It then looks at how Australia's defence policies are formulated, covering: the principal institutions, the major actors and interest groups involved, the key decision making processes, and the allocation of resources flowing from budgetary and other considerations.

APOL2613 U/3613 U
Electoral Systems
Staff Contact: Mr M. Mackerras
C20/30 S2 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

An examination of electoral systems used throughout the democratic world. The subject assesses the role of particular systems in shaping political institutions and evaluates their impact on the democratic process. Countries given special attention include Australia, New Zealand, Canada, South Africa, United States, United Kingdom and Ireland. The subject also evaluates electoral systems long used in Western Europe, as well as those employed in the newly-emerging democracies in Eastern Europe.

APOL2614 U/3609 U
Issues and Problems in Australian Foreign Policy
Staff Contact: A/Prof A. Bergin
C20/30 ~~S1~~ HPW3 Not offered in 1997
Prerequisite: APOL1600 U/70 credit points in Politics

This subject examines developments in Australian foreign policy to determine to what extent Australian policies are suited to our regional environment and circumstances. Australia's relations with the Asia-Pacific region are analysed, along with a range of current issues in Australian foreign policy, including human rights, Antarctica, economic cooperation, aid and arms control.

APOL2615 U/3607 U
War in International Politics
Staff Contact: A/Prof W.H. Smith
C20/30 S2 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

This subject focuses on aspects of war in international politics: (i) the causes of war, paying particular attention to the nature of causation in the social sciences; (ii) the analysis of war, giving prominence to the thought of Carl von Clausewitz; (iii) ethics in war, including rules of war and the just war tradition; (iv) major schools of thought about remedies for the recurrence of war, including realism, rationalism and idealism; (v) the future of war in the light of technological, economic and political change.

APOL2616 U/3616 U
The Politics of Indonesia
Note/s: Not offered in 1997

APOL2619 U/3623 U
The Politics of Korea
Staff Contact: Dr D. Kelly
C20/30 S1 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

Although the Korean Peninsula poses one of the most serious security threats in the Asia–Pacific region, it is at the same time economically extremely dynamic. Its strategic importance to Australian political, economic and cultural interests has been underlined in a series of government initiatives, including the 1989 Garnaut Report. The subject provides an introduction to the politics of the Korean Peninsula with particular emphasis on the processes and consequences of economic and political development in South Korea. North Korea is also examined with an emphasis on the security and international relations problems it poses for the south and the region as a whole.

APOL2621 U/3601 U
Security Issues in Southeast Asia
Note/s: Not offered in 1997

APOL2622 U/3626 U
The Politics of International Cooperation
Staff Contact: Dr S. Scott
C20/30 S2 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

International cooperation can be regarded as the process by which states pursuing potentially conflictual policies are able to mediate their positions in a peaceful manner. Explaining how to facilitate international cooperation is the ultimate goal of all studies in international relations.

This subject investigates alternative theoretical approaches to the task through their application to regional issues of concern to Australia. Particular attention is given to case studies in Antarctica and the Asia–Pacific region generally.

APOL2623 U/3627 U
Approaches to Politics
Staff Contact: Dr C. Kukathas
C20/30 S2 HPW3

The basic questions the subject will address are: what are the various ways in which political life may be studied, and what—if anything—is distinctive about the approach of the discipline of political science? In this regard, it asks how political science differs from other social science disciplines, such as history, economics, and sociology. But it will also examine other ways in which political life might be portrayed—for example, in philosophical works, in pamphlets and manifestos, in literature, in film, and in memoirs, as well as in official documents

This subject is a pre-requisite for entry into 4th year honours.

APOL2624 U/3628 U
From International to Global Politics
Staff Contact: Dr P.I Keal
C20/30 S1 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

This course focuses on selected issues in international politics with the underlying aim of assessing challenges to the nature and role of the state. It pays particular attention to the social forces and structures both promoting and impeding the evolution of a global environment, the globalisation of production, debt and sovereignty, trade, international migration, refugees, intervention, and human rights. Case studies will be used to examine these issues and arrive at an understanding first, of the factors that decide between competing values, and second the minimum conditions needed to achieve a just global society.

APOL2625 U/3602 U
Strategic Issues in Northeast Asia
Staff Contact: Dr A. G. Mulgan
C20/30 S2 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics

This course will analyse major strategic developments in Northeast Asia during the Cold War and post-Cold War periods. The most significant shifts in regional alignment will be analysed and their impact on the balance of power assessed. Special attention will be paid to the power configurations of the dominant actors in the region—the United States, China and Japan—as well as the security policies of all the regional states. The interaction of military, diplomatic and economic factors in the key bilateral relationships will also be studied. The course will assess prospects for regional conflict, focussing on territorial disputes and other possible challenges to regional security and stability.

APOL2626 U/3629 U
Culture, Conquest and International Society
Staff Contact: Dr P. Keal
C20/30 S2 HPW3
Prerequisite: APOL1600 U/70 credit points in Politics U

This course examines the themes of culture, conquest, law, and society in the theory and practice of international relations. Its particular concern is the conceptualisation of non-European peoples in the history of international law, in political theory and in related social theory. It relates changing conceptions of sovereign rights to changing conceptions of 'otherness' as a means of understanding the place of non-European peoples in the society of states. In relation to this it is interested in different accounts of the rights of non-Europeans against Europeans, self determination, the role of international law has had in defining the requirements for membership of the society of states, and the idea of international society.

Honours Subjects

All subjects are full year.
Staff Contact: Dr D. Lovell
Prerequisite: APOL2623 U/3627 U Approaches to Politics
Major in Politics.
Credit Average in upper year Politics subjects.
At least one Distinction for an upper year Politics subject.

APOL4690 H
Politics 4 (Honours) F/T
APOL4691 H
Politics 4 (Honours) P/T
HPW4
Students will take four sessional units or two full year units in fields of study to be determined by the Head of School. Subjects will cover issues in political theory; international law; comparative politics and thought of Carl von Clausewitz.
In addition, candidates will complete a sub-thesis of approximately 15,000 words.

APOL4692 C
Politics 4 (Combined Honours) F/T
APOL4693 C
Politics 4 (Combined Honours) P/T

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Politics and the interests of the other School involved, the thesis or project being supervised and examined by the two Schools conjointly. In addition, candidates are required to complete coursework as approved by the Head of School.

First Year Engineering Courses

First year engineering students enrol in separate courses in Aeronautical, Civil, Electrical or Mechanical Engineering. There is, however,considerable commonality with the engineering programs. More than half of the courses are devoted to mathematics, physics and computer science.

For First year prerequisite information see p. 42. Subject descriptions for 1st year appear on p. 112. For 2nd year onwards, descriptions for service subjects are included in the relevant school entry.

Tables of subjects for the four streams are set out below:

Timetables will be provided by the individual Engineering Schools

Aeronautical Engineering

	Subjects	*Lecture Hours*	*Tutorial Hours*	*Practical Hours*	*Total Hours*
AMAT1800 U	Mathematics 1E	108	27	zero	135
APHY1800 U	Physics 1E	81	27	48	156
ACSC1800 U	Computer Science 1E	54	zero	48	102
AMEC1900 U	Aeronautical Engineering 1				
ACHM1402 E	Engineering Materials for Aeronautical Engineers	39	zero	zero	39
AINT1404 E	Engineering Graphical Communications	zero	zero	36	36
AINT1401 E	Statics and Dynamics	54	27	12	93
AMEC1006 E	Workshop Practice (Mechanical/Aeronautical)	zero	zero	50	50
AMEC1004 E	Introduction to Aerospace Design	14	zero	zero	14
AMEC1005 E	Fundamentals of Flight	40	14	zero	54
Total					*679*

Civil Engineering

	Subjects	*Lecture Hours*	*Tutorial Hours*	*Practical Hours*	*Total Hours*
ACHM1801 U	Materials & Environmental Chemistry	54	zero	zero	54
AMAT1800 U	Mathematics 1E	108	27	zero	135
APHY1802 U	Physics 1CE	81	27	24	132
ACSC1800 U	Computer Science 1E	54	zero	48	102
ACMA1800 U	Civil Engineering 1				
AINT1404 E	Engineering Graphical Communications	zero	zero	36	36
AINT1401 E	Statics and Dynamics	54	27	12	93
ACMA1101 E	Introduction to Civil Engineering	13	zero	50	63
Total					*615*

Electrical Engineering

	Subjects	*Lecture Hours*	*Tutorial Hours*	*Practical Hours*	*Total Hours*
AMAT1800 U	Mathematics 1E	108	27	zero	135
APHY1800 U	Physics 1E	81	27	48	156
ACSC1800 U	Computer Science 1E	54	zero	48	102
AELE1800 U	Electrical Engineering 1				
ACHM1401 E	Introduction to Engineering Materials for Electrical Engineering	39	zero	zero	39
AELE1008 E	Circuits & Systems	17	4	6	27
AELE1003 E	Digital Systems 1	20	4	3	27
AELE1005 E	Digital Systems 2	20	4	3	27
AELE1006 E	Electronics 1	20	4	9	33
AELE1009 E	The Electrical Engineering Profession	13	zero	zero	13
AELE1007 E	Workshop Practice (Electrical Engineering)	zero	zero	35	35
Total					*594*

Mechanical Engineering

Subjects	*Hours*	*Lecture*	*Tutorial Hours*	*Practical Hours*	*Total Hours*
AMAT1800 U	Mathematics 1E	108	27	zero	135
APHY1800 U	Physics 1E	81	27	48	156
ACSC1800 U	Computer Science 1E	54	zero	48	102
AMEC1800 U	Mechanical Engineering 1				
ACHM1403 E	Introduction to Engineering Materials	39	zero	zero	39
AINT1404 E	Engineering Graphical Communications	zero	zero	36	36
AINT1401 E	Statics and Dynamics	54	27	12	93
AMEC1007 E	Introduction to the Profession of Mechanical Engineering	27			27
AMEC1006 E	Workshop Practice (Mechanical/Aeronautical)	zero	zero	50	50
Total					*638*

Description of First Year Subjects and Engineering Units

AMAT1800 U
Mathematics 1E
F TH135

A first course in mathematical techniques, matrix algebra, vectors, complex numbers, differentiation, series, integration, differential equations.

Linear algebra; equation systems, determinants, Cramer's rule; matrix algebra, notation, matrix types, matrix inversion; vectors and elementary coordinate geometry; cartesian and plane polar coordinates, parametric equations, curve sketching. Scalar and vector products, triple products, applications to geometry. Complex numbers; z-plane, de Moivre's theorem. Mathematical proof and notation; order and inequalities. Introduction to number systems; mathematical induction. Relations and functions. Limits and continuity; an informal introduction. Differentiation; properties of functions, Rolle's theorem and mean value theorems, slope and concavity of graphs. Stationary points and points of inflexion, local and absolute extreme, applications to curve sketching and problems. Series; convergence, power series, evaluation of elementary functions. Taylor's series. Integration; the definite integral as a sum, properties of integrals, antiderivatives, fundamental theorem of calculus. Elementary functions; circular functions and inverses, logarithm and exponential functions, hyperbolic functions and inverses. Integration techniques; application of integrals; areas, centres of mass, moment of inertia. Improper integrals. Elementary differential equations and applications. Elementary probability theory and applications. Use of graphics calculator.

ACSC1800 U
Computer Science 1E
F TH102

Introduction to computing: functional hardware components, operating systems, networks, email, news, Internet, data and number representation, file organisation, spreadsheets, word processing, applications software. The UNIX operating system. Problem solving methods and algorithm development: programs, flow charts, pseudocode, stepwise refinement, top down design, modularity. Ada programming language: identifiers, variables, input/output, simple data types, assignment statement, expressions, operators, standard functions, procedures, block structure, local and global identifiers, scope, program control, Boolean variables and expressions, loops, user defined types. Elementary structures: arrays, records, serial files, sets, searching and sorting methods. Numeric applications. FORTRAN programming language: introduction and basic programming.

ACHM1800 U
Chemistry 1E
F TH54

The electronic structure explanation of the electrical, mechanical and chemical properties of liquids, solids and gases. Phases of matter. Metals, polymers, concrete, ceramics. The corrosion and degradation of materials. Water, soil and atmospheric chemistry; wastes and hazardous materials. Flames and explosives.

ACHM1801 U
Materials and Environmental Chemistry
F TH 54

Electronic structure of atoms. Electronic and geometical structure of ions and molecules. Structure of metals and solids. Phase changes and phase diagrams. New materials. Electrochemistry and corrosion, degradation. Environmental chemistry. Cement and concrete materials. Explosive materials and processes.

APHY1800 U
Physics 1E and
F TH156

APHY1801 U
Physics 1CE
F TH132
Corequisite: AMAT1800 U

General Physics and Mechanics

Vector applications in mechanics. Dimensions and dimensional analysis. Coordinate systems. Newton's laws of motion, kinematics and dynamics. Momentum, energy, work and power. Rotational dynamics, moment of inertia, angular momentum. Newton's law of gravitation, Kepler's laws. Simple harmonic motion and resonance.

Wave Motion and Optics

Classification of waves, non-dispersive waves and the differential wave equation, harmonic waves, superposition, standing waves, beats, Doppler effect, Huygens' principle, reflection, refraction, lenses, interference, diffraction, resolving power of instruments.

Atomic and Nuclear Physics

Particle aspects of electromagnetic radiation: photoelectric effect, Compton effect, pair production. Wave aspects of particles: de Broglie waves, electron and x-ray diffraction, wave function and quantisation, wave-particle duality. Atomic structure: optical spectra. Bohr theory, atomic energy states, x-ray spectra. The nucleus: constituents, stability, binding energy, radioactivity, nuclear energy.

Properties of Matter and Heat

Elasticity. Hydrostatics, surface tension; hydrodynamics, Bernoulli's equation. Temperature, thermometry. Thermal expansion, equations of state, phase changes. Kinetic theory of gases. First law of thermodynamics, heat capacity, latent heat. Heat transfer processes.

Electricity and Magnetism

Coulomb's law, calculations of electric fields and potentials. Gauss' law, multipoles, conductors and electric currents. Origins of electrical resistance, Ohm's law, electrical measurements. Capacitance. Magnetic induction, motion of charges in electro-magnetic fields. Ampère's law, Biot-Savart law. Constitutive equations. Electro-magnetic induction, Faraday's law, inductance. Displacement current, Maxwell's equations in integral form.

Engineering Units

ACHM1401 E
Introduction to Engineering Materials for Electrical Engineering
TH39

An introductory course on the materials of engineering for Electrical Engineering students presented from a chemical viewpoint. Various topics will be discussed including: Polymers; semiconductors; batteries and fuel cells; the relationship of electrochemical cells to corrosion and corrosion control.

ACHM1402 E
Engineering Materials for Aeronautical Engineers
TH39

The electronic structure explanation of the electrical, mechanical and chemical properties of liquids, solids and gases. Phases of matter. Metals, polymers, ceramics. The corrosion and degradation of materials.

ACHM1403 E
Introduction to Engineering Materials
TH39

The electronic structure explanation of the electrical, mechanical and chemical properties of liquids, solids and gases. Phases of matter. Metals, polymers, ceramics. The corrosion and degradation of materials.

ACMA1101 E
Introduction to Civil Engineering
P63

Introduction to the profession of Civil Engineering. Residential camp involving: field demonstrations, exercises, site visits, lectures.

AELE1003 E
Digital Systems 1
S1 TH27

An introduction to the analysis and design of digital logic circuits; Boolean algebra, combinational logic design, Karnaugh maps, sequential logic circuits, algorithmic state machine approach to the description of digital circuits, analysis of synchronous sequential circuits.

AELE1005 E
Digital Systems 2
S2 TH27

Design of synchronous sequential circuits, implementation using gates, flipflops and ROMs; Logic design using programmable logic arrays. Digital SSI, MSI and LSI building blocks. Introduction to computer architecture.

AELE1006 E
Electronics 1
S2 TH33

Introduction to intrinsic and doped semiconductors. Formation and characteristics of a PN junction diode; Zener and avalanche breakdown. Diode rectifier and simple filter circuits. Regulated power supplies using Zener diodes. Basic construction and characteristics of bipolar junction transistors (BJT); biasing circuits and Q-point selection. DC and graphical analysis of single stage, small signal, low frequency amplifier circuits. Operational amplifiers; ideal and non-ideal performance; introduction to circuit applications.

AELE1008 E
Circuits & Systems
S1 TH27

Electric and magnetic phenomena, including brief historical background; circuit theory: Ohm's Law, resistance and conductance, Kirchoff's voltage and current laws; power; simple DC circuits; superposition, Thevenin's theorem, Norton's theorem, nodal and mesh analysis; capacitance and inductance; concept of frequency; analogue signals; impedance and admittance; phasors; simple AC circuits; measuring instruments (moving coil, DVM, CRO, etc.); computer simulation (e.g., PSpice).

AELE1009 E
The Electrical Engineering Profession
S1 TH13

It is the intention of this subject to provide new students with an overview of the electrical engineering profession, in many of its facets, and to make students aware of the legislative frameworks within which they often have to work. Topics to be covered include: the role of the electrical engineer in society and in the Services; the relationship of electrical engineering to the sciences; engineering ethics; equal employment opportunity and

related issues of equity, confidentiality and privacy; occupational health and safety; industrial democracy.

AMEC1004 E
Introduction to Aerospace Design
Staff Contact: Mr R.B. Heslehurst
S2 TH14

Descriptive material on the following topics: The aircraft as a total system. The basic parts of the aircraft and their functions. The application of mechanical principles in determining the behaviour of an aircraft.

AMEC1005 E
Fundamentals of Flight
Staff Contact: A/Prof S.L. Gai
F TH54

Fundamentals: liquids and gases, viscosity. Aspects of air flows: boundary layers, pressure distributions, lift and drag, turbulence, separation, vortices. Subsonic and supersonic flows: shock waves. Application to aircraft design and performance.

AMEC1007 E
Introduction to the Profession of Mechanical Engineering
F TH27

The nature, scope, functions and professional responsibillities of the Mechanical Engineer.

Students will be introduced to mechanical engineering through a series of case studies which illustrate the wide variety of technologies in which mechanical engineers can become involved. The roles and responsibilities which mechanical engineers take in design, development, operation, maintenance and management will be emphasised.

AELE1007 E
(Electrical) Workshop Practice
TH35

Introduction to soldering and other techniques used in the fabrication of electronic equipment. Site visits, practical exercises.

AMEC1006 E
(Mechanical/Aeronautical) Workshop Practice
TH50

Instruction and practice in the use of hand and machine tools. The production of simple machine parts from drawings supplied.

This will be done in Service Workshops during the May recess.

AINT1401 E
Statics & Dynamics
Staff Contact: Dr B.W. Golley, A/Prof J.P. Baird
TH93

Statics of particles and rigid bodies under two and three-dimensional force systems. Application to trusses, frames and machines. Dry friction, wrapping friction. Distributed forces; centre of gravity and centroid of geometric figures. Moments of inertia. Internal forces in structural members: shear and bending moment diagrams. Principle of virtual work, application to statics of machines. Cables and catenaries.

Kinematics and kinetics of the plane motion of a particle and a rigid body. Equations of motions; work, energy, impulse and momentum.

AINT1404 E
Engineering & Graphical Communications
Staff Contact: Dr M.J. Harrap
TH36

Engineering Drawing as a language of graphical communication. Interpretation and construction of formal Engineering Drawings in accordance with AS1100. Checking and control of drawings. Sketching. Problems in three dimensional geometry. Computer Aided Drawing and computer based data analysis and presentation.

School of Civil Engineering

Civil Engineering takes its name from the division of engineering in the Middle Ages between military and civilian works. The profession of civil engineering was recognized by the formation of the Institution of Civil Engineers (UK) in 1825. In the 19th-century, the broadening scope of engineering led to the division of civilian engineering into civil, mechanical and electrical, the further specializations (aeronautical, chemical, industrial, etc) have developed in the 20th century.

After contracting its sphere of interest over a long period of time, civil engineering is now broadening its scope with the recognition of the wider implications of its effects on modern society. Attention is given both to the interaction between civil engineering and other disciplines and to the effect of civil engineering works on the environment.

Present day civil engineering has maintained strong commonality with military engineering—the design and construction of facilities such as roads, bridges, aerodromes, buildings, earth structures, and the associated planning and management of projects.

The BE course in Civil Engineering in the University College is firmly based on mathematics, computer science, physical science, and the engineering approach to analysis and design. The major subdivisions of the course are: structures; materials of construction, including concrete and soils; the many aspects of water engineering; surveying; the construction of civil engineering works; transportation, and the science and practice of management and project management. Students are encouraged to develop resourceful and innovative attitudes throughout the course, especially in their final year project.

The course is based on subjects which are subdivided into teaching units. To pass a subject it is necessary to obtain a pass in aggregate, and to achieve an acceptable standard in each teaching unit. At the discretion of the Head of the School, a student failing a unit may be required to repeat that unit.

The teaching units are multiples of sessional units consisting of twenty-seven contact hours, normally confined to the first or second half of an academic year. Thus a teaching unit of two sessional units consists of fifty-four contact hours, which may be spread over the whole academic year.

Elective units in the final year will be selected in consultation with the Head of the School. The full range of electives may not be available in any one year.

The Civil Engineering course has been redesigned to encompass a considerable amount of streaming of subject matter. The new course begins in 1997, however, first year only is shown in this handbook. Students may obtain a schedule of second, third and fourth years of the new course from the School Administration Office. Students who enrolled in 1996 will continue under the course as outlined below.

Outline of Second and Later Year Courses and List of Teaching Units

Second Year Course

Subject			*Total Hours*
General Education (see p.143)			54
AMAT2800 U	Mathematics 2E		108
AMAT2801 U	Engineering Mathematics 1E		
AMAT3403 E	Probability 3E	27	
AMAT3404 E	Statistics 3E	27	
ACSC2801 U	Computer Science 2CE		
ACSC2402 E	Numerical Analysis 2CE	54	
ACMA2800 U	Civil Engineering 2		
ACMA 2001 E	Concrete Technology 1	27	
ACMA2002 E	Construction Technology	27	
ACMA2003 E	Fluid Mechanics 1CE	54	
ACMA2004 E	Engineering Geology 1	27	
ACMA2005 E	Hydrology 1	27	
ACMA2006 E	Soil Mechanics	40	
ACMA2007 E	Surveying 1	54	
ACMA2008 E	Materials 1CE	54	
ACMA2009.E	Mechanics of Solids 1CE	54	
AECM3401 E	Engineering Economics	27	
			391
			661
Average contact hours per week			24.5

Third Year Course

Subject			*Total Hours*
General Education			54
ACMA3800 U	Civil Engineering 3		
ACMA3001 E	Structural Analysis 1	81	
ACMA3002 E	Structural Design 1	54	
ACMA3003 E	Surveying 2	27	
ACMA3004 E	Survey Camp	40	
ACMA3005 E	Applied Probability and Statistics for Engineers	27	
ACMA3006 E	Numerical Methods in Engineering	54	
ACMA3007 E	Soil Engineering	81	
ACMA3008 E	Free Surface Hydraulics	27	
ACMA3009 E	Closed Conduit Hydraulics	27	
ACMA3010 E	Coastal Engineering 1	27	
ACMA3011 E	Water Resources	27	
ACSC3402 E	Management Science 3E	27	
ACMA3017 E	Project Management 1	27	
			526
			580
Average contact hours per week			21.5

Final Year Course

Subject			*Total Hours*
ACMA4801 U	Civil Engineering: Project and Seminar		135
	or		
ACMA4802 U	Civil Engineering: Design and Seminar		135
ACMA4803 U	Practical Experience (Civil Engineering)		
ACMA4800 U	Civil Engineering 4		
AECM3402 E	Management for Engineers	27	
ACMA4002 E	Systems Engineering	27	
ACMA4004 E	Structural Analysis 2	54	
ACMA4005 E	Structural Design 2	81	
ACMA4006 E	Transportation Engineering	81	
ACMA4007 E	Concrete Technology 2	27	
ACMA4008 E	Metals Engineering 1	27	
ACMA4009 E	Environmental Engineering	54	
	Elective	27	
ACMA4025 E	Project Management 2	27	
			432
			567
Average contact hours per week			21

Electives

ACMA4010 E	Finite Element Methods	27
ACMA4013 E	Metals Engineering 2	27
ACMA4014 E	Remote Sensing for Civil Engineers	27
ACMA4015 E	Foundation Engineering	27
ACMA4016 E	Structural Analysis 3	27
ACMA4017 E	Surveying 3	27
ACMA4019 E	Engineering Explosives	27
ACMA4020 E	Program and Project Evaluation	27
ACMA4021 E	Computer Tools for Engineering Management	27

Subject Descriptions

AMAT2800 U
Mathematics 2E
F TH108

See subject description under School of Mathematics and Statistics entry (p. 98).

AMAT2801 U
Engineering Mathematics 1E
HPY54

AMAT3403 E
Probability 3E
S1 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3404 E
Statistics 3E
S2 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

ACSC2801 U
Computer Science 2CE

ACSC2402 E
Numerical Analysis 2CE
S1 TH54
Prerequisite: AMAT1600 U or AMAT1800 U and ACSC1600 U or ACSC1800 U
Corequisite: AMAT2800 U

See subject description under School of Computer Science entry (p. 79).

ACMA2800 U Civil Engineering 2
HPY391

ACMA2001 E
Concrete Technology 1
TH27

Cement: Aggregates. Influence of components on both plastic and hardened concrete.

ACMA2002 E
Construction Technology
TH27

Earthwork, concrete, steel, timber, masonry construction. Excavation. Foundation construction. Maritime works. Construction safety. Site visits.

ACMA2003 E
Fluid Mechanics 1CE
TH54

Fluid properties. Forces on fluid elements, systems and control volumes. Fluid statics and dynamics. Fluid momentum. Energy. Equations of motion. Potential flow. Laminar and turbulent flow. Boundary layers, lift and drag. Dimensional analysis. Models.

ACMA2004 E
Engineering Geology 1
TH27

Geological time and structure of earth plate tectonics. Identification of minerals and rocks. Geological structure and mapping. Weathering and erosion processes. Landform evaluation.

ACMA2005 E
Hydrology 1
TH27

Elements of meteorology: Hydrologic cycle; Measurement and analysis of precipitation and run off. Hydrographs.

ACMA2006 E
Soil Mechanics
TH40

Formation of soils, composition, grading, texture, index tests, percentage test, compaction. Flow of water through saturated soils. Effective stress concept. Basic one dimensional consolidation analyses. Strength and deformation of saturated soils.

ACMA2007 E
Surveying 1
TH54

Elementary theory of errors. Levels and levelling. Electronic distance measurement. Theodolites and theodolite traversing. Contour and detail surveys. Satellite positioning. Hydrographic surveying.

ACMA2008 E
Materials 1CE
TH54

Materials science. Grain structure, effect of deformation, recrystallization, hot and cold working. Non-equilibrium relationships in multiphase materials, applications to heat treatment. Behaviour of materials in service: deformation, fatigue, fracture, wear, thermal stress, creep, corrosion, radiation damage. Effects of microstructure and macrostructure on properties. Fracture mechanics. Introduction to ceramic phases and properties. Welding: processes, metallurgy and weldability. Metal removal, surface finishing, joining.

ACMA2009 E
Mechanics of Solids 1CE
TH54

Stress, strain in 2 and 3 dimensions: stress and strain transformations, principal stresses and strains, Mohr's Circles for stress and strain. Hooke's Law and Poisson's Ratio. Statistical determinacy and indeterminacy: temperature stresses, lack of fit, compound structures. Thin walled pressure vessels. Torsion of shafts of circular cross-section. Bending and shear stresses in symmetrical, asymmetrical and compound beams: deflection of beams. Euler buckling: axially and eccentrically loaded columns, non-uniform columns and beam columns. Principle of Virtual Work and Castigliano's Theorems.

AECM3401 E
Engineering Economics
Staff Contact: Dr S. Markowski
TH27

See subject description under School of Economics and Management entry (p. 84).

ACMA3800 U
Civil Engineering 3
HPY526

ACMA3001 E
Structural Analysis 1
TH81

Beam bending. Influence lines. The analysis of trusses. Moment area. Energy theorems. Slope deflection. Moment distribution. Cable structures. Suspension bridges. Force method of analysis. Displacement method of analysis.

ACMA3002 E
Structural Design 1
TH54

Types of loads on structures. Application of the SAA Loading Code, Parts 1,2. Design of steel, concrete, and timber structures. Design of connections in steel and concrete. Simple pre-stressed concrete design.

ACMA3003 E
Surveying 2
TH27

Introduction to photogrammetry. Elements of hydrographic surveying. Map projections and computations on the Australian Map Grid.

ACMA3004 E
Survey Camp
TH40

A one week field camp.

ACMA3005 E
Applied Probability and Statistics for Engineers
TH27

Probabilistic, stochastic and deterministic design. Extreme value distributions. Monte Carlo simulation. Time series analyses. Limit state design. Experimental design. Variability of materials.

ACMA3006 E
Numerical Methods in Engineering
TH54

Errors. Non-linear and linear algebraic equations. Matrix algebra. Numerical integration. Solution of ordinary and partial differential equations. Time series analysis.

ACMA3007 E
Soil Engineering
TH81

Effective stress concept. Saturated and unsaturated soils. Drained and undrained conditions. Soil Strength. Laboratory testing. Earth pressure theory. Retaining structures. Bearing capacity theory. Slope stability. Soil permeability and Darcy's law. Groundwater flow. Aquifer and well hydraulics. Seepage control. Consolidation theory. Settlement analysis. Site investigation and field testing.

ACMA3008 E
Free Surface Hydraulics
TH27

Flow resistance and uniform flow in open channels. Specific energy. Specific thrust. Channel transitions. Gradually varied flow in prismatic and natural waterways. Rapidly varied flow. Flow measurement in open channels. Introduction to sediment transport and the design of stable unlined channels.

ACMA3009 E
Closed Conduit Hydraulics
TH27

Fluid resistance and the flow of real fluids in ducts. Pipe fitting energy losses. Flow measurement in pipes. Pipe systems. Turbo machines. Turbo machine systems. Combined turbo machine systems and pipe systems. Unsteady flow in pipes. Rapidly varied flow in pipes. Cavitation.

ACMA3010 E
Coastal Engineering 1
TH27

Wave theory. Wave transformation. Real wave trains. Wave hindcasting and forecasting. Tides. Nearshore currents. Sediment transport. Coastal protection methods.

ACMA3011 E
Water Resources
TH27

Surface water resources monitoring. Catchment yield and storage design. Storage and river routing. Ground water. Desalination. Hydro-Electric power. Catchment modelling.

ACSC3402 E
Management Science 3E
TH27

Prerequisites: AMAT1800 U and ACSC1800 U

See subject description under School of Computer Science entry (p. 79).

ACMA3017 E
Project Management 1
TH27

This unit offers an overview to project management principles and processes: Introduction to Project Management, Project Information Management, Project Phases, Time Analysis, Estimating, Tendering, Budget Preparation and Cost Management, Quality Management, Risk Management and Occupational Health and Safety, Legal Issues, Industrial Relations, Manpower Planning, Environmental Management, Value Engineering, Project Management Methodologies and Ethics and Professional Project Management.

ACMA4801 U
Civil Engineering: Project and Seminar
F HPY135

Analytical and/or experimental research study on topic selected by student relevant to Civil Engineering. Oral presentation.

ACMA4802 U Civil Engineering: Design and Seminar
F HPY135

Series of minor design exercises and a major design to be selected from a number of possible civil engineering/ military engineering projects. Field investigations and laboratory studies may be involved.

ACMA4800 U
Civil Engineering 4
HPY459

AECM3402 E
Management for Engineers
Staff Contact: Dr G. Manger
TH27

See subject description under School of Economics and Management entry (p.84).

ACMA4002 E
Systems Engineering
TH27

Systems approach to formulation and modelling of engineering problems in design and construction. System optimisation. Decision analysis.

ACMA4004 E
Structural Analysis 2
TH54

Further topics in stiffness analysis, stability of bars in compression, plastic analysis, non-linear analysis. Dynamics. Computer applications. Approximate methods of analysis.

ACMA4005 E
Structural Design 2

TH81

Series of short sessions requiring feasibility studies and preliminary designs of a range of civil engineering structures. A major design on a selected topic to be completed.

ACMA4006 E
Transportation Engineering
TH81

Transport systems planning, design and evaluation. Traffic engineering practice. Geometric design of roads and airfields. Structural design of unsealed, rigid and flexible road and airfield pavements. Pavement maintenance and management.

ACMA4007 E
Concrete Technology 2
TH27

Variability of concrete. Concrete mix design procedures with and without additional cementitious materials. Multiphase theory of elastic behaviour. Deformation of concrete and its serviceability. Durability—physical and chemical deterioration. Nondestructive testing. Concrete for special purposes and modern developments in concrete technology.

ACMA4008 E
Metals Engineering 1
TH27

Characteristics and types of modern steels, aluminium alloys and other metals used in building and construction. Fatigue and fracture. Fracture safe design. Fracture mechanics. Welding in structural engineering. Quality assurance testing and inspection. Corrosion protection systems. Codes and standards.

ACMA4009 E
Environmental Engineering
TH54

Air pollution, water pollution, thermal pollution. Dispersion and diffusion. Radiation. Environmental impact statements. Biological and ecological systems. Environmental monitoring. Characteristics of water and waste water. Analysis of water and waste water. Waste water quality and quantity. Sewer hydraulics and design. Treatment and disposal processes.

ACMA4025 E
Project Management 2
TH27

The activities and responsibilities of the project manager, the application of the range of skills associated with contract development, tendering and administration and an awareness of key contract law issues are taught in this unit. The unit covers: Development of the Project Brief, Documentation Management, Estimating, The Tender Process—Administration and Evaluation, Budget Preparation, Cost Management and Claims Processing, Resource Planning, Law of Tort, Law of Contract, Insurance Law, Arbitration/Mediation/ADR, Contract Forms, Risks and Responsibilities.

Electives

ACMA4010 E
Finite Element Methods
TH27

Introduction to the finite element method. Application of finite element and finite difference techniques to the solution of problems in civil engineering.

ACMA4013 E
Metals Engineering 2
TH27

Selection of metals, fabrication methods and treatment processes for specialised and high technology applications. Fracture mechanics analysis and testing; applications to engineering case studies. Case studies of procedure and operator qualification for welding fabrication, quality assurance and quality control. Case studies of corrosion protection systems application in large engineering structures.

ACMA4014 E
Remote Sensing for Civil Engineers
TH27

Electromagnetic radiation, platforms, sensors, image analysis. Applications to regional planning, site surveys, feature recognition, topographic mapping and environmental monitoring.

ACMA4015 E
Foundation Engineering
TH27

Foundations of structures: types, basis of selection, design and analysis. Treatment of foundation soils, consolidation and allowable settlement of foundations. Limit state design.

ACMA4016 E
Structural Analysis 3
TH27

Introduction to theory of elasticity. Theory of thin plates. Experimental stress analysis. Use of package programs.

ACMA4019 E
Engineering Explosives
TH27

Explosives, demolition theory. Blasting equipment and accessories. Initiation, electric, non-electric. Quarrying methods and design. Underwater techniques. Theory of shaped charges. Safety. Drilling and blasting. Specialised blasting techniques. Design of structures against blast.

ACMA4020 E
Program and Project Evaluation
TH27

Logic framework; formative and summative evaluation; implementation analysis; economic and financial evaluation; cost effectiveness and cost utility analysis; tools and techniques for structured analysis.

ACMA4021 E
Computer Tools for Engineering Management
TH27

Introduction to the use of a range of micro-computer based decision support tools in the context of engineering analysis, including spreadsheet, database, PERT/CPM, Monte Carlo modelling, analysis network, hyper-text and personal information management.

School of Electrical Engineering

Electrical Engineering is much the youngest of the three major, now traditional, branches of engineering represented in the University College. It has its origin in the turning to practical use of the discoveries of Faraday, Ampere, Maxwell and a number of other eminent 19th century physicists. It has remained the most strongly science-oriented branch of engineering.

At first it had its major impact by providing the means for the generation, distribution and utilisation of electric power. However, while this remains an important sub-area of the whole subject, the last three decades particularly have seen a rapid and extensive diversification into the fields of computers and control as well as electronics and communications, and beyond them into such areas as biology, medicine and space technology. It is now true to say that there are very few areas of civilised activity which have remained untouched by the ideas and products of modern electrical engineering. The absorption of recent scientific development has been very rapid and has demanded a fully developed scientific outlook on the part of electrical engineers for a proper understanding of the problems involved. Many devices, scarcely more than laboratory prototypes a decade ago, are now in widespread use as fully engineered hardware.

The BE course in Electrical Engineering is built on a foundation of mathematics, computing science and physical science. A small component of electrical engineering is introduced in the first year, with progressively larger components in second and third year. The final year is devoted exclusively to electrical and electronic subjects.

The electrical engineering component of the BE course is organised in sessional units. Most sessional units comprise two contact hours per week of lecture, tutorial and practical work given in a single session. To pass a subject it is necessary to obtain a pass in aggregate and to achieve an acceptable standard in each sessional unit. At the discretion of the Head of School a student failing a unit may be required to repeat that unit.

Outline of Second and Later Year Courses and List of Sessional Units.

Second Year Course

	Unit Name	*Total*	*Hours*
AMAT2800 U	Mathematics 2E		108
ACSC2802 U	Computer Science 2EE		94
ACSC2401 E	Numerical Analysis 2E	40	
ACSC2404 E	Data Structures 2EE	54	
APHY2801 U	Physics 2E		110
APHY2408 E	Physics of Electronic Device Materials	55	
APHY2409 E	Electromagnetic Waves 2E	55	
General Education subjects			54
AELE2800 U	Electrical Engineering 2		216
Students taking this subject will do all 8 sessional units listed below:			
AELE2001 E	Electronics 2	27	
AELE2003 E	Digital Systems 3	27	
AELE2007 E	Computer Design	27	
AELE2009 E	Circuit Theory	27	
AELE2010 E	Electronics Design Laboratory 1	27	
AELE2011 E	Signals and Systems	27	
AECM3401 E	Engineering Economics	27	
AECM3402 E	Management for Engineers	27	
			582
Average contact hours per week			21.6

Third Year Course

	Unit Name	*Total*	*Hours*
AMAT3800 U	Mathematics 3E		108
AMAT3401 E	Complex Analysis 3E	27	
AMAT3402 E	Differential Equations 3E	27	
AMAT3403 E	Probability 3E	27	
AMAT3404 E	Statistics 3E	27	
General Education subjects			54
AELE3800 U	Electrical Engineering 3		432
Students taking this subject will do all sessional units listed below:			
AELE3013 E	Materials and Devices	27	
AELE3014 E	Control Theory 1	27	
AELE3016 E	Power Electronics 1	27	
AELE3017 E	Communications 1	27	
AELE3018 E	Electromagnetics 1	27	
AELE3019 E	Optoelectronics 1	27	
AELE3020 E	Control Theory 2	27	
AELE3021 E	Microcomputer Interfacing	127	
AELE3022 E	Electromechanics 2	27	
AELE3023 E	Communications 2	27	
AELE3024 E	Electromagnetics 2	27	
AELE3025 E	Electronics 3	27	
ACSC3402 E	Management Science 3E	27	
ACMA3017 E	Project Management 1	27	
AECM3402 E	Management for Engineers	27	
AMEC4030 E	Maintenance Management and Logistics	27	
			594
Average contact hours per week			22

Final Year Course

	Unit Name	*Total Hours*
AELE4800 U	Electrical Engineering 4	432
AELE4801 U	Electrical Engineering: Project, Thesis and Specialist Lectures	196
AELE4802 U	Practical Experience (Electrical Engineering)§	
		628
Average contact hours per week		23.3

In each year a sub-set of the units listed below will be offered. Students taking Electrical Engineering 4 will select twelve units, subject to the approval of the Head of the School, to make a balanced course within their chosen streams. All students will do a laboratory course, AELE4080 E, which will count as four units.

	Unit Name	*Total Hours*
AELE4008 E	Antennas	27
AELE4011 E	Optical Wave Guides	27
AELE4016 E	Digital Signal Processing	27
AELE4018 E	Television Systems	27
AELE4021 E	Computer Architecture	27
AELE4022 E	Artificial Intelligence	27
AELE4024 E	Speech Processing	27
AELE4025 E	Simulation	27
AELE4036 E	VLSI Design	27
AELE4041 E	Radar Cross-Section Analysis	27
AELE4043 E	Radar Signal Processing	27
AELE4045 E	Software Engineering	27
AELE4046 E	Image Processing	27
AELE4051 E	Remote Sensing	27
AELE4052 E	Communications Systems	27
AELE4054 E	Microwaves	27
AELE4055 E	Microcomputer Interfacing 2	27
AELE4056 E	Microcomputer Interfacing 3	27
AELE4057 E	Lasers	27
AELE4058 E	Data Networks 1	27
AELE4059 E	Data Networks 2	27
AELE4060 E	Optoelectronics 2	27
AELE4061 E	Active and Digital Filter Synthesis	27
AELE4062 E	Digital Electronics 2	27
AELE4063 E	Electromechanics 3	27
AELE4064 E	Electromechanics 4	27
AELE4065 E	Variable Speed Drives 1	27
AELE4066 E	Variable Speed Drives 2	27
AELE4067 E	Digital Communications 1	27
AELE4068 E	Power Systems 1	27
AELE4069 E	Power Systems 2	27
AELE4070 E	Power Electronics 2	27
AELE4071 E	Control Theory 3	27
AELE4072 E	Computer Control Theory	27
AELE4073 E	Military Communications	27
AELE4074 E	Stochastic Control Theory	27
AELE4075 E	Adaptive Control Theory	27
AELE4076 E	Guided Weapons Electronics	27
AELE4077 E	Digital Communications 2	27
AELE4078 E	Occasional Option 1	27
AELE4079 E	Occasional Option 2	27
AELE4080 E	Laboratory Work	108
AELE4081 E	Radar and Navigational Aids	27
AELE4082 E	Electronics 4	27
AMEC4401 E	Mechanical Technology (2 units)	54
AMEC4402 E	Dynamics of Machinery 1	27
AMEC4403 E	Dynamics of Machinery 2	27

§ See Rule 6 of the BE Degree Rules

Subject Descriptions

AMAT2800 U
Mathematics 2E
TH108
Prerequisite: AMAT1800 U

See subject description under School of Mathematics and Statistics entry (p. 98).

ACSC2802 U
Computer Science 2EE
TH98
Prerequisites: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

See subject description under School of Computer Science entry (p. 79).

ACSC2401 E
Numerical Analysis 2E
S1
Prerequisites: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

See subject description under School of Computer Science entry (p. 79).

ACSC2404 E
Data Structures 2EE
S1
Prerequisite: ACSC1600 U or ACSC1800 U

See subject description under School of Computer Science entry (p. 79).

APHY2801 U
Physics 2E
F TH110
Prerequisites: AMAT1600 U or AMAT1800 U and APHY1600 U or APHY1800 U
Corequisite: AMAT2800 U

A satisfactory performance is required in both the lecture/tutorial component and the practical component.

APHY2408 E
Physics of Electronic Device Materials
S1

See subject description under School of Physics entry (p. 106).

APHY2409 E
Electromagnetic Waves 2E
S2

See subject description under School of Physics entry (p. 106).

AELE2800 U
Electrical Engineering 2
TH243

AELE2001 E
Electronics 2
TH27

Basic construction and characteristics of field-effect transistors (JFET and MOSFET); biasing circuits and Q-point selection. Introduction to small signal models, analysis of small signal amplifiers. Regulated power supplies.

AELE2003 E
Digital Systems 3
TH27

Electronic circuit design and characteristics for various logic families including TTL, CMOS and ECL. Input and output circuit structures, speed and power properties. Full interpretation of IC data sheets including electrical properties for gates through to VLSI devices.

AELE2007 E
Computer Design
TH27

Computer organisation, comparative architecture of CPUs viewed from CISC and RISC design philosophies. Introduction to machine level programming. Parallel computer buses, handshaking, control, data flows. Serial databuses, LANs, collision prevention and protocols.

AELE2009 E
Circuit Theory
TH27

Revision of circuit theorems; source transformation, superposition, Thevenin's theorem, Norton's theorem, maximum power transfer; energy storage elements, capacitors and inductors; natural response of RL and RC circuits; forced response of RL and RC circuits; complete response of RLC circuits; sinusoidal steady-state and phasor analysis revisited; mutual inductance and transformers; polyphase systems, real and reactive power; computer-aided analysis (e.g., PSpice, Matlab, and Maple).

AELE2010 E
Electronics Design Laboratory 1
TH27

This unit comprises a series of electronic circuit design exercises which the students undertake both individually and in small groups. Initially students are required to complete the design and calculate component values for a number of analogue and digital circuits that perform a relatively simple and well defined task. These may include, for example, power supply circuits, voltage and power amplifiers, differential amplifiers, active filters, ADC and DAC circuits etc. The final circuit is designed, constructed and tested by each student and a report written in the usual way. Groups of students then combine to undertake the design of a more substantial and multi-faceted electronic circuit specified only by way of a brief user requirement. As before, the resulting circuit design is implemented in hardware in prototype form and tested for compliance with the user specification.

AELE2011 E
Signals and Systems
TH27

Laplace transform methods; complete solutions, partial fraction expansions, simple and multiple poles and zeros; convolution, transfer functions; Bode diagrams; Fourier series and transform; two-port networks; introduction to network synthesis; op-amps and active filters; computer-aided filter design (e.g., Matlab); network topology; graphs, trees and links, loops, meshes and node pairs, duality.

AECM3401 E
Engineering Economics
TH27

See subject description under School of Economics and Management entry (p. 84).

AECM3402 E
Management for Engineers
TH27

See subject description under School of Economics and Management entry (p. 84).

AMAT3800 U
Mathematics 3E
TH108

AMAT3401 E
Complex Analysis 3E
S1

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3402 E
Differential Equations 3E
S2

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3403 E
Probability 3E
S1

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3404 E
Statistics 3E
S2

See subject description under School of Mathematics and Statistics entry (p. 99).

AELE3800 U
Electrical Engineering 3
TH432

AELE3013 E
Materials and Devices
TH27

Semiconductors; band structure, Fermi energy, carrier transport, generation and recombination processes, Hall effect and its applications. Quantitative theory of PN junction devices; space-charge capacitance, diffusion capacitance, switching effects. The metal-semiconductor barrier, ohmic contacts. Characteristics and applications of varactor, tunnel and Schottky diodes. Theory of the BJT, Ebers-Moll equations, temperature, voltage and frequency limitation, switching effects, IC realization.

AELE3014 E
Control Theory 1
TH27

The concept of a system. State space and transfer function models for linear time invariant systems.

Feedback, open loop and closed loop systems. The solution to state equations. The stability of linear systems. The Routh Hurwitz stability criterion. The root locus design method. The Nyquist stability criterion. Nyquist and Bode plots.

AELE3016 E
Power Electronics 1
TH27

Introduction to devices; characteristics, protection and drive circuits. Relationship between devices and passive components; d.c./d.c. converters, controlled rectifiers and inverters.

AELE3017 E
Communications 1
TH27

Representation of signals. Convolution, system impulse response and transfer function; correlation detection. Fourier series and Fourier transform. Transmission through linear systems. Noise in circuits and communications systems. Noise figure and noise temperature. Equivalent input noise temperature of two ports. Signal to noise ratio.

AELE3018 E
Electromagnetics 1
TH27

Plane Waves: as solutions of Maxwell's equations, in conducting media, reflection and refraction. Energy flow, the complex Poynting vector. Unguided propagation: propagation in free space, propagation in the presence of the earth, surface and space waves, earth curvature, diffraction, ducting. Fresnel zones, tropospheric scattering, ionospheric propagation, atmospheric and rain effects. Antennas: radiation pattern, directivity, gain, impedance; short dipole, aperture, antennas, arrays.

AELE3019 E
Optoelectronics 1
TH27

The electromagnetic spectrum; wave and particle nature of light, Planck's black body radiation law. Detection processes in the visible and infra-red. Principles of operation and characteristics of photon detection devices, photoconductive cells, PIN and avalanche photodiodes, phototransistors, photoemissive devices and pyroelectric detectors. Noise in photon detectors. Introduction to the technology of optical fibre systems, light sources, fibre characteristics, comparison of detectors for optical communication.

AELE3020 E
Control Theory 2
TH27

Introduction to frequency domain design of single-input/ single-output control system. Stability and robustness conditions for Bode, Nyquist, Inverse Nyquist and Nichols Plots. Control system sensitivity: Bode's equal area and gain-phase relationships. Design of PID, lead, lag and lead-lag compensators. Design of two degree of freedom control systems. The Horowitz control system design method.

AELE3021 E
Microcomputer Interfacing 1
TH27

Introduction to the organization of the Z80 microprocessor, review of instruction set and assembly language concepts. Input/output interfacing, the Intel 8255 Programmable Peripherals Interface (PPI). Interfacing of keyboards, displays, ADCs and DACs. An introduction to interrupts.

AELE3022 E Electromechanics 2
TH27

Equivalent circuit of a non-ideal single phase transformer. Steady state analysis of the three phase induction machine: equivalent circuits and machine characteristics. Operational aspects of a single phase induction machine. Steady state analysis of synchronous machines: equivalent circuit and characteristics. Introduction to: single phase series motor, brushless d.c. motor and stepping motor.

AELE3023 E
Communications 2
TH27

Amplitude modulation; double sideband and single sideband techniques. Vestigal sideband. Envelope and coherent detection. Quadrature carrier multiplexing. Frequency translation and multiplexing. Phase and frequency modulation. Single tone and multi-tone FM. Noise performance, FM threshold effects and pre-emphasis. FM spectra., Narrow band FM.

AELE3024 E
Electromagnetics 2
TH27

Transmission lines: distributed circuits, travelling waves, standing waves, input impedance, terminations, surges, the Smith Chart, impedance matching. Guided Waves: non-uniform plane waves, modes, TE and TM waves, rectangular wave guides, losses, resonant cavities. Optical transmission: the step-index fibre, the weak guidance approximation, the single-mode fibre, the parabolic profile, multimode fibres, illumination, Gaussian beams.

AELE3025 E
Electronics 3
TH27

Small signal models of devices, including hybrid p and h-parameter model; Miller effect. Frequency response of amplifiers; multistage amplifiers; effects of feedback on amplifiers; oscillators. Differential amplifiers; wave shaping circuits; properties and applications of operational amplifiers. Electronic circuit analysis and design using computer aids.

AECM3402 E
Management for Engineers
TH27

See subject description under School of Economics and Management entry (p. 84).

ACSC2403 E
Management Science 3E
TH27

See subject description under School of Computer Science (p. 79).

ACMA3017 E
Project Management 1
TH27

See subject description under School of Civil Engineering entry (p. 117).

AMEC4030 E
Maintenance Management and Logistics
TH27

See subject description under School of Aerospace and Mechanical Engineering entry (p.131).

AELE4800 U
Electrical Engineering 4
TH432

AELE4008 E
Antennas
TH27

A review of antenna fundamentals and definitions; current element, radiation pattern, directivity and gain, reciprocity, impedance, polarisation. Dipoles, arrays, long-wire antennas. Aperture antennas; planar antennas, rectangular, circular, horn antennas, paraboloidal reflector antennas, slots, slot arrays. Receiving antennas; reciprocity, effective area, Friis transmission formula, noise, noise temperature.

AELE4011 E
Optical Wave Guides
TH27

Introduction to optical fibres, basic waveguide equations, wave and ray optics, the step-index fibre, the graded-index fibre, fabrication of optical fibres, fibre measurements, packaging of optical fibres, source coupling, splices and connectors, fibre systems.

AELE4016 E
Digital Signal Processing
TH27

Discrete time signals; relationship to continuous signals—sampling considerations. Nyquist frequency and Shannon's sampling theorem; spectral and time aliasing; relationship between integral and discrete Fourier transforms (DFT); fast Fourier (FFT) and current technology; spectral leakage; discrete convolution; circular convolution; filtering and convolution with DFT; overlap-block method of 'continuous' DFT filtering; z-transform and its relation to Laplace and Fourier transforms; realization of digital filters; simple lattice digital filter realizations; FIR filter design; IIR filter design; Butterworth and Chebyshev filter as an element in digital filter design; identification of signal as a means of digital filter design; adaptive filter design.

AELE4018 E
Television Systems
TH27

Physiological aspects of television, television standards, colour systems with particular reference to the PAL system. Television equipment; cameras, transmitters, receivers, video recorders. Information systems using the domestic television receiver: teletext, viewdata. Facsimile.

AELE4021 E
Computer Architecture
TH27

The design of digital systems using the latest VLSI building blocks and methods. Components include integer and floating point units, microcontrollers and ALU's, multipliers, multiplier-accumulators for digital signal processing, FIFO memories, CAMs, DRAMs, VRAMs, SRAMs, 32-bit processors which are tailored as general, RISC, DSP or graphics processors, PALS, gate arrays and custom devices.

AELE4022 E
Artificial Intelligence
TH27

Introduction to AI; history of AI development; Perception MACSYMA, PROSPECTOR; pattern recognition. Expert systems; building an expert system; languages-LIPS, PROLOG; inductive logic; ways of writing expert systems; the inference structure. Examples of expert systems; VLSI design. Inherent difficulties; non numerical computation. Heuristic methods; the operation of heuristic search methods; application to robotics. Pattern recognition; simple introduction; cluster analysis; factor analysis; discriminating function; linear and non-linear techniques; classification of patterns; examples in electronic diagnosis, remote computer fault diagnosis. Introduction to neural networks. Application of neural networks to artificial intelligence problems.

AELE4024 E
Speech Processing
TH27

Models for speech processing, digital representation of speech, homomorphic speech processing, linear predictive coding of speech, digital speech processing for man-machine communication by voice.

AELE4025 E
Simulation
TH27

Simulation as a methodology in the analysis of large scale systems. Importance of simulation. Comparison of simulation with mathematical analysis, advantages and disadvantages. Interpretation of simulation results. Accuracy and propensity indications. Elements of simulation techniques—simulation of simple deterministic systems described by a set of intego-differential equations and/or algebraic equations. Simulation of stochastic systems. Random number generation techniques. Monte Carlo simulation techniques. Simulation of queuing systems. Generation of probability functions. Application of simulation techniques. Examples include Forrester's industrial and world dynamic models. Computer network simulations.

AELE4036 E
VLSI Design
TH27

The need for semicustom and custom design chips—economics, speed, security. nMOS process. DC and AC characteristics of MOSFET. Logic design using MOSFET. Mead-Conway design rules for nMOS process. nMOS fabrication process. Aspects of system design involving MOSFET—speed-area tradeoff, regular design, PLA.

Self-timed systems. Computer-aided design techniques. Application of design and diagnostic programs. cMOS process. Characteristics of cMOS transistors. Latch up. Simple cMOS circuit designs. cMOS fabrication process. cMOS design rules. Semicustom design vs full custom design. Gate arrays. Brief introduction to computer-aided design of VLSI circuits methodology.

AELE4041 E
Radar Cross-Section Analysis
TH27

Asymptotic methods: geometrical optics, geometrical theory of diffraction, diffraction by edges and convex surfaces, caustics. Moment methods: electric and magnetic field integral equations, linear spaces and basis functions, singularities, hybrid techniques.

AELE4043 E
Radar Signal Processing
TH27

Sources of uncertainty in radar: receiver, atmospheric and galactic noise, target scintillation and glint, clutter, propagation effects, fading, eclipsing, sidelobes, chaff. The radar equation: minimum detectable signal, system losses, coherent and incoherent integration of pulses. Spectra of noise and signals. Detection of radar signals in noise: matched-filter receiver, correlation detection, detection criteria, probability of detection, automatic detection, CFAR receiver. Digital processing of radar data, discrete Fourier transform, track-while-scan techniques. Extraction of information and waveform design: range and range-rate resolution, multiple target resolution, ambiguity diagram, optimum waveforms, pulse compression. Synthetic aperture radars: resolution, optimum array length, PRF selection. Phase coding techniques: periodic and random binary sequences, decoding, noise and clutter performance, ambiguity diagram, time-sidelobe suppression. Frequency coding techniques: generation and decoding, resolution properties, sidelobe reduction.

AELE4045 E
Software Engineering
TH27

The emphasis is on the practical application of software engineering techniques. The course is laboratory oriented using personal workstations such as the Macintosh II. High level language programming will be done with languages which support good software engineering methodologies (i.e. MODULA-2 or ADA). Real time and system oriented activities may be explored. A software project will comprise about half of the work for the course.

AELE4046 E
Image Processing
TH27

Continuous and discrete image characterization, two-dimensional digital signal processing; two-dimensional discrete Fourier transforms (DFT) and fast Fourier transform (FFT); digital image capture and display; applications—remote sensing, medical, forensic, astronomical, digital television, film animation, scene synthesis for flight and other simulators; image enhancement; colour definition—physiological description of 3D colour space—hue, saturation, intensity—uniform colour space; geometric transformations (rotation, general warping, perspective projection); image restoration and reconstruction; image coding and data compression.

AELE4051 E
Remote Sensing
TH27

Planck's black body radiation law and its application to wave-length selection in remote imaging; high and low resolution optical sensors including multispectral line scanners and CCD push broom arrays; passive microwave and synthetic aperture radar sensor technology; reflectance and scattering characteristics of the earth's surface and cultural features; effect of the atmosphere on imaging; sources of image distortion; overview of past, present and future imaging systems including the Landsat, SPOT, NOAA and GMS optical satellite platforms, free flying satellite and space shuttle based radar and microwave sensors, sensor arrangements planned for the international Space Station; applications of remote sensing imaging technology to target detection, assessment of earth resources and atmospheric monitoring.

AELE4052 E
Communications Systems
TH27

Review of signal characteristics including bandwidth requirements of common data and message types in voice, picture and data transmission. Closed transmission media and their signal handling capabilities, including a review of dispersion and attenuation characteristics, and the determination of signal bandwidth. Systems to be considered will include open wire, coaxial cable and optical fibre channels. Open transmission systems and design considerations including microwave radio and link budget calculations, satellite communications systems, ULF, ELF and VLF transmission, cellular radio and net radio systems, troposcatter systems.

AELE4054 E
Microwaves
TH27

Field theory of transmission lines, rectangular and circular wave guides, impedance, power flow, attenuation. Ferrite media. Devices and components; directional coupler, matched terminators, tuners, wavemeters, filters, attenuators, circulators, isolators. Oscillators and amplifiers; klystrons, magnetrons, travelling wave tubes, solid state oscillators, parametric amplifiers. Stripline; directional couplers, hybrid rings, ferrite resonant cavities, stubs, phase shifters.

AELE4055 E
Microcomputer Interfacing 2
TH27

Bi-directional data transfer. The Zilog Z80 PIO; multilevel interrupts, control mode. IEEE 488 and RS 232-C interface standards. Serial I/O using the Intel 8251 Programmable Communication Interface (PCI) and Zilog Serial Communications Controller (SCC). The design of a stand-alone microcomputer system.

AELE4056 E
Microcomputer Interfacing 3
TH27

An introduction to the control of equipment using a personal computer; hardware and software aspects of

the Macintosh II computer, parallel and serial communications, interfacings ADCs and DACs, data acquisition and control tasks, designing simple I/O cards for the Macintosh II.

AELE4057 E
Lasers
TH27

Interaction of radiation with matter; spontaneous and stimulated emission, coherent radiation. Line broadening mechanism. Population inversion and pumping schemes, threshold conditions for oscillation. Design and principles of operation of maser and laser systems. Laser applications involving beam directionality alignment, ranging, guidance systems. Applications involving laser power, spot size, power density, Q-switching techniques. Laser holography; type of holograms and their application for non-destructive testing and information storage.

AELE4058 E
Data Networks 1
TH27

Introduction to data networks, the ISO OSI reference model. Public networks, CCITT standards X25 and X21, private networks, local area networks, practical examples.

AELE4059 E
Data Networks 2
TH27

Design methodologies for data networks with special consideration given to topology, reliability, throughput, delay, routing, flow control, CSMA/CD based networks.

AELE4060 E
Optoelectronics 2
TH27

Formation and detection of optical images in the visible and infra-red; low light level imaging devices, light valves, image intensifiers. Principles of operation and construction of active and passive display devices; CRT, plasma, electroluminescent, vacuum fluorescent, liquid crystal. Addressing techniques, encoding and data organisation, scanned displays, matrix displays, integrated electro-optic displays.

AELE4061 E
Active and Digital Filter Synthesis
TH27

Analog filter approximation theory, Butterworth, Chebyshev, Elliptic, and Bessel approximations. Implementation using op-amps. Digital filter introduction, z-transforms. Bilinear transformation. Implementation of digital filter approximations. Ladder network. Implementation of wave digital filters. Practical problems associated with digital filter implementations.

AELE4062 E
Digital Electronics 2
TH27

The overall design requirements of digital system including signal propagation, reflection and crosstalk. Printed circuit board design and methodology of circuit layout. Inter -board signal transmission problems and back plane design. Output commutation of flip-flop devices and metastability of memory devices. Design of large multi-megabyte dynamic memory cards for computer systems.

AELE4063 E
Electromechanics 3
TH27

Machines analysis based on state space representation. Application to a.c. machines; transient analysis.

AELE4064 E
Electromechanics 4
TH27

Analysis of synchronous generators for power generation; steady state, subtransient and transient models. Control of synchronous generators; solid state exciters and load frequency control.

AELE4065 E
Variable Speed Drives 1
TH27

Dynamic model of a.c. and d.c. machines, control strategies; fieldweakening and armature control (d.c. machines) and field-orientated control (a.c. machines). Microprocessor implementation of these strategies.

AELE4066 E
Variable Speed Drives 2
TH27

Special drive configurations: switched reluctance drives and permanent magnet brushless d.c. drives.

AELE4067 E
Digital Communications 1
TH27

Pulse-amplitude and pulse-time modulation. Pulse Code Modulation; methods of analogue to digital and digital to analogue conversion, uniform and non-uniform quantisation, quantisation noise, delta modulation. The channel; the memoryless channel, bandwidth, distortion, white and narrowband noise. Channel encoding; information and entropy, coding throughput. Digital transmission and reception; matched filter, decision theory. Baseband systems; intersymbol interference, equalisation, performance, M-ary systems.

AELE4068 E
Power Systems 1
TH27

Introduction to power systems; networks, transmission and distribution. Power system components; transmission lines, generators and three phase transformers. Steady state analysis of power systems; symmetrical and asymmetrical faults, power flow, load frequency control, transmission losses.

AELE4069 E
Power Systems 2
TH27

Analysis of power systems; steady state and transient stability. Economic dispatch and unit commitment. Protection and reliability.

AELE4070 E
Power Electronics 2
TH27

Converter topologies: three phase controlled rectifiers, a.c. controllers, current and voltage source inverters.

AELE4071 E
Control Theory 3
TH27

Revision of fundamental state space concepts for single-input-single-output systems. Multi-input-multi-output control systems in state-space representation and in transfer matrix representation. Controllability, observability and state-space decompositions. Relationship between state-space representation and transfer matrix representations. Decoupling as a method for designing controllers for a multivariable control system. Decoupling conditions. Relationship with system inverse. Design of controllers for multivariable systems using Rosenbrock's inverse Nyquist array method, and using the characteristic locus method. Model matching problems. Conditions for model matching.

AELE4072 E
Computer Control Theory
TH27

The computer as an element in a control loop. State space and shift operator representation of discrete time systems. The z-transform. Sampling of continuous time systems. Selection of sampling interval. Stability of discrete time systems. The bilinear transformation. The Jury-Blanchard test. The Nyquist stability test for discrete time systems. Root locus in discrete time. Approximation of continuous controllers by a digital control system. Digital PID controllers. Pole placement controller design techniques. Introduction to system identification.

AELE4073 E
Military Communications
TH27

Information theory and coding and statistical theory of detection. Comparison of military versus civilian communication systems with emphasis on consideration of reliability, graceful degradation, invulnerability, flexibility, security, capacity and quality.

AELE4074 E
Stochastic Control Theory
TH27

Introduction to Gauss-Markov model as a model for real-life uncertain systems. Gaussian noise as an approximation of real-life uncertainty. Formulation of linear-quadratic-Gaussian (LQG) problem. Solution of LQG problem. Kalman filtering as an estimation device. Design of controllers incorporating the Kalman filter, and/or reduced-order filter. Bellman's dynamic programming as a means to solving stochastic control problems; formulation and solution. Certainty-equivalence principle, and its applications.

AELE4075 E
Adaptive Control Theory
TH27

Introduction to adaptive control systems, the need for an adaptive control method. A simple gain adaptation as an example of adaptive control. Stability analysis using Lyapunov functions, construction of simple Lyapunov functions. Application of Lyapunov function in the design of adaptive controller for continuous time systems. Discrete time adaptive control, self-tuning controller design. Minimum variance and pole assignment design strategies. Robustness of adaptive controllers. Design issues.

AELE4076 E
Guided Weapons Electronics
TH27

Advantages and disadvantages of guided and unguided weapons. Missile guidance system, with consideration of guidance laws and sources of guidance information. Seekers covering both the acoustic and electromagnetic spectrum. Counter measures as used by and against missiles.

AELE4077 E
Digital Communications 2
TH27

Amplitude Shift Keying (ASK); spectrum, modulators and demodulators, performance, M-ary ASK. Frequency Shift Keying (FSK); spectrum, modulators and demodulators, performance, M-ary FSK. Phase Shift Keying (PSK); spectrum modulators and demodulators, performance, quadrature PSK (QPSK), M-ary PSK. Timing and synchronisation, clock recovery. Design comparisons.

AELE4078 E
Occasional Option 1
TH27

The syllabus for this unit changes from one occasion to the next, allowing the presentation of a modern topic by a visiting academic of eminence or a special lecture course on a trial basis. Prerequisite units may be specified by the Head of School.

AELE4079 E
Occasional Option 2
TH27

The syllabus for this unit changes from one occasion to the next, allowing the presentation of a modern topic by a visiting academic of eminence or a special lecture course on a trial basis. Prerequisite units may be specified by the Head of School.

AELE4080 E
Laboratory Work
TH108

There will be a program of practical work common to all streams equivalent in duration to four sessional units and spread uniformly throughout the year.

AELE4081 E
Radar and Navigational Aids
TH27

Fundamental radar concepts; pulse width, PRF and resolution considerations; ambiguities. The radar equation and the concept of radar cross section. CW and frequency modulated radar. Doppler effect, moving target indication (MTI) and pulse Doppler radar. Chirped radar systems and pulse compression. Side looking radar and imaging radar. Aperture synthesis and synthetic aperture radar. Over the horizon radar. Bistatic techniques and secondary radar. Radar system components and signal processing. Navigation aids. Distance and bearing indicators (NDB, DME, VOR and TACAN). Global systems (LORAN and OMEGA). Instrument and microwave landing systems. Satellite navigation systems.

AELE4082 E
Electronics 4
TH27

Power amplifiers and tuned amplifiers; analogue multipliers; voltage controlled oscillators; phase locked loops. Modulation and demodulation circuits. Analogue filters; poles and zeros, stability, implementation with operational amplifiers and lumped elements.

AMEC4401 E
Mechanical Technology (2 Units)
TH54

See subject description under School of Aerospace and Mechanical Engineering entry (p. 142).

AMEC4402 E
Dynamics of Machinery 1
TH27

See subject description under School of Aerospace and Mechanical Engineering entry (p. 143).

AMEC4403 E
Dynamics of Machinery 2
TH27

See subject description under School of Aerospace and Mechanical Engineering entry (p.143).

AELE4801 U
Electrical Engineering: Project, Thesis and Specialist Lectures
HPY196

The project will take the form of a minor piece of research or investigation, a feasibility study or design, or a comprehensive literature review chosen from a list of topics selected or approved by the Head of School. Where appropriate, these topics may be of a military nature. Group effort may be permitted in appropriate cases.

In each case a staff member will be nominated as a supervisor to provide guidance and general supervision during the project and preparation of the thesis. Evidence of sufficient progress may be required from time to time. The thesis, which typically will have a length of about 5000 words, is to be presented in the prescribed format not later than the first day of examinations. Students should arrange to have their theses typed. Arrangements will be made for theses of outstanding merit to be bound and deposited in the school library.

During the year students will be required to participate in a series of specialist lectures and seminars. Specialist lectures will normally take the form of attendance by students on six to ten occasions during the year at nominated meetings of the local professional societies. Shortly after the May recess and early in the third term each student will be required to lead a seminar on their project topic attended by other students taking this course and members of staff.

Units offered to Aerospace and Mechanical Engineering

AELE2403 E
Principles of Electronics Technology
TH27

An applications based course covering the following topics. DC circuit analysis, simple DC circuits, DC measurements, DC power sources. The ideal operational amplifier (Op-Amp); non-ideal Op-Amp performance; examples of Op-Amp circuits. Transducer types; applications in measurement systems. Basic principles of digital electronics. Digital data acquisition systems; digital-to-analogue and analogue-to-digital converters.

AELE2404 E
Principles of Electrical Technology
TH27

An applications based course covering the following topics. Introduction to AC circuit analysis. Magnetic fields and circuits; electrical, magnetic and mechanical interaction, transformers, generators and motors. DC machines; commutation, control of speed, torque and generated voltage. AC power systems; single and three phase. Principles of AC and PM synchronous and induction motors. Drive systems. AC measurements.

School of Aerospace and Mechanical Engineering

The School presents three degree programs:

1	Bachelor of Engineering in Mechanical Engineering	Course Code 4423
2	Bachelor of Engineering in Aeronautical Engineering	Course Code 4424
3	Bachelor of Technology in Aeronautical Engineering	Course Code 4430

Bachelor of Engineering in Mechanical Engineering

Mechanical engineering is that branch of engineering that is concerned with machines and the production of power, and particularly with forces and motion. It became a separate branch of engineering in the early 1800s, when steam power began to be used in manufacture and transportation.

'One can identify four functions that are common to all branches of mechanical engineering. The first is the understanding of and dealing with the bases of mechanical science. These include dynamics, concerning the relationship between forces and motion, such as vibration; automatic control: thermodynamics, dealing with the relations among the various forms of heat, energy, and power; fluid flow; heat transfer; lubrication; and properties of materials.

Second is the sequence of research, design, and development. This function attempts to bring about the changes necessary to meet present and future needs. Such work requires not only a clear understanding of mechanical science and an ability to analyse a complex system into its basic factors, but also the originality to synthesise and invent.

Third is production of products and power, which embraces planning, operation, and maintenance. The goal

is to produce the maximum value with the minimum investment and cost while maintaining or enhancing longer term viability of the enterprise or the institution.

Fourth is the coordinating function of the mechanical engineer, including management, consulting, and, in some cases marketing.

In all of these functions there is a long continuing trend towards the use of scientific instead of traditional or intuitive methods. Operations research, value engineering and reliability centred maintenance are typical titles of such new rationalised approaches. Creativity, however, cannot be rationalised. The ability to take the important and unexpected step that opens up new solutions remains in mechanical engineering, as elsewhere, largely a personal and spontaneous characteristic'.

(The above description was adapted from the Encyclopedia Britannica).

The Mechanical Engineering degree course leads to the Bachelor of Engineering degree, and Pass and Honours classifications are determined at the conclusion of the course. The first two years of the course have been designed to meet the requirements not only of the Mechanical Engineering students but also of prospective students of Naval Architecture and Industrial Engineering who will transfer to the University's Kensington campus at the end of their second year.

Descriptions of the subjects which comprise the second and later years of the degree course are given below. Specialisation in Mechanical Engineering begins in second year and increases as the degree course progresses. At the final year level, individual projects and a large number of elective subjects are offered permitting further specialisation in particular areas although the full range of electives may not always be available. Up to four electives may be selected from subjects offered in other schools subject to the approval of the Heads of Schools concerned.

During the first and second years of the course, students will go on appropriate industrial visits.

The first year course is described on p 112.

Outline of Second and Later Year Courses and List of Teaching Units

Second Year Course

Subject			*Total Hours*
AMAT2800 U	Mathematics 2E		108
ACSC2804 U	Computer Science 2ME		80
ACSC2401 E	Numerical Analysis 2E	40	
ACSC2403 E	Numerical Linear Algebra 2E	40	
AMEC2800 U	Mechanical Engineering 2		447
AMEC2001 E	Thermodynamics 1	52	
AMEC2002 E	Dynamics of Mechanical Systems 1	65	
AMEC2003 E	Design 1	78	
AMEC2004 E	Fluid Mechanics 1	54	
AMEC2005 E	Mechanical Engineering Laboratory 1	54	
AMEC2006 E	Mechanics of Solids 1	48	
AMEC2007 E	Materials 1	42	
AELE2403 E	Principles of Electronics Technology	27	
AELE2404 E	Principles of Electrical Technology	27	
			635
Average contact hours per week			23.5

Third Year Course

Subject			*Total Hours*
Four General Education subjects			108
AMAT3800 U	Mathematics 3E		108
AMAT3401 E	Complex Analysis 3E	27	
AMAT3402 E	Differential Equations 3E	27	
AMAT3403 E	Probability 3E	27	
AMAT3404 E	Statistics 3E	27	
AMEC3800 U	Mechanical Engineering 3		409
AMEC3005 E	Materials 2	27	
AMEC3008 E	Mechanical Engineering Lab. 2	46	
AMEC3009 E	Thermodynamics 2	27	
AMEC3028 E	Dynamics of Mechanical Systems 2	13	
AELE3014 E	Control Theory 1	27	
AELE3020 E	Control Theory 2	27	
AMEC3027 E	Design 2	54	
AMEC3029 E	Mechanics of Solids 2	67	
AMEC3030 E	Fluid Mechanics 2	54	
AMEC3014 E	Instrumentation	13	
ACSC3402 E	Management Science 3E	27	
ACMA3017 E	Project Management 1	27	
			625
Average contact hours per week			23.1

Final Year Course

Subject			*Total Hours*
AMEC4802 U	Practical Experience (Mechanical Engineering)*		
AMEC4801 U	Mechanical Engineering: Project and Thesis		216
AMEC4800 U	Mechanical Engineering 4		425
Compulsory units:			
AMEC4001 E	Thermodynamics 3	27	
AMEC4030 E	Maintenance Management and Logistics Engineering	27	
AMEC4032 E	Mechanical Engineering Laboratory 3	27	
AMEC4033 E	Fluid Mechanics 3	27	
AMEC4034 E	Mechanics of Solids 3	27	
AMEC4035 E	Dynamics of Mechanical Systems 3	27	
AMEC4056 E	Design 3	54	
AECM3401 E	Engineering Economics	27	
AECM3402 E	Management for Engineers	27	
			641
Average contact hours per week			23.7

Elective units
(A minimum of 155 hours of units to be selected)

AMEC4006 E	Acoustic Noise	27
AMEC4007 E	Advanced Design	27
AMEC4008 E	Advanced Mechanisms	27
AMEC4009 E	Applied Elasticity and Plasticity	27
AMEC4010 E	Applied Optics	27
AMEC4011 E	Approximate Methods for Partial Differential Equations	27
AMEC4012 E	Boundary Layers and Separated Flows	27
AMEC4013 E	Classical and Statistical Thermodynamics	27
AMEC4014 E	Compressible Flow	27
AMEC4015 E	Control Theory	27
AMEC4016 E	Energy Studies	27
AMEC4017 E	Impact Mechanics	27
AMEC4018 E	Marine Engineering	27
AMEC4020 E	Naval Architecture	27
AMEC4021 E	Random Vibrations and Signal Analysis	27
AMEC4023 E	Thermal Performance and Energy Consumption in Buildings	27
AMEC4024 E	Tribology	27
AMEC4026 E	Occasional Elective	27
AMEC4028 E	Digital Control Using Microprocessors	27
AMEC4029 E	Chaos and Non-linear Dynamics	27
AMEC4031 E	Analysis of Structural Vibration	27

Subject to pre-requisites, the following aeronautical engineering electives may also be available.

AMEC3023 E	Composites and Adhesives	14
AMEC3025 E	Rotary Wing 1	27
AMEC3026 E	Rotary Wing 2	27
AMEC4046 E	Composite Mechanics	13
AMEC4047 E	Experimental Stress Analysis	13
AMEC4049 E	Missile Design	27
AMEC4050 E	Orbital Mechanics	27
AMEC4055 E	Structural Joining Methods	13

* See Rule 6 of the BE Degree Rules.

Subject Descriptions

AMAT2800 U
Mathematics 2E
TH108

See subject description under School of Mathematics and Statistics entry (p. 98).

ACSC2804 U
Computer Science 2ME

ACSC2401 E
Numerical Analysis 2E
S1 TH40

See subject description under School of Computer Science entry (p. 79).

ACSC2403 E
Numerical Linear Algebra 2E
S2 TH40

See subject description under School of Computer Science entry (p. 79).

AMEC2800 U
Mechanical Engineering 2
TH460

AMEC2001 E
Thermodynamics 1
Staff Contact: A/Prof J.C.S. Lai
TH52
Prerequisite: AINT1401 E

Fundamental laws of thermodynamics. Thermodynamic properties of fluids. Reciprocating engines and compressors: cycle analysis, construction, performance. Vapour power cycles. Gas power cycles.

AMEC2002 E
Dynamics of Mechanical Systems 1
Staff Contact: Dr N.R. Mudford
TH65
Prerequisite: AINT1401 E

Kinematics and kinetics of planar link mechanisms: methods of determining the velocity and acceleration of link members, inertial loads, crank-effort diagrams, fluctuation of energy and angular velocity, flywheels. Vibration of linear single degree of freedom systems: linearization, modelling of damping, free and forced response of undamped and damped systems, convolution integral. Laplace transform methods, transfer functions, numerical solutions. Whirling of shafts. Balancing: rotating and reciprocating masses. Vibration: sources, isolation and control.

AMEC2003 E
Design 1
Staff Contact: Dr H.M. Williamson
TH78
Prerequisite: AINT1401 E
Corequisite: AMEC2006 E

Introduction to design principles and the design process with examples and emphasis on machine elements and the influence of manufacturing processes on design. Theories of failure including crack propagation theory and uniaxial fatigue design theory. Example topics include: screw threads, bolted connections, belt drives, clutches, brakes, sliding bearings, ball and roller bearings, springs, shafting, keys and couplings, welding connections and structural design.

AMEC2004 E
Fluid Mechanics 1
Staff Contact: A/Prof J.C.S. Lai
TH54

Physical properties of fluids, fluid statics, kinematics of a flow field. Continuity, energy and momentum equations in one dimension. Introduction to laminar and turbulent flow, boundary layer, transition and flow separation, jets and wakes. Dimensional analysis: dynamic similitude and modelling. Introduction to compressible flow.

AMEC2005 E
Mechanical Engineering Laboratory 1
Staff Contact: Ms K. Vassilopoulos
TH54

Fundamentals of experimental work; resolution, repeatability, confidence, accuracy. Production of engineering reports. Engineering measurement tools. Basic application in fluid mechanics, solid mechanics, thermodynamics, materials science and dynamics.

Industrial visits: Relevant visits will be arranged.

AMEC2006 E
Mechanics of Solids 1
Staff Contact: Dr O. Kayali
TH48
Prerequisite: AINT1401 E

Stress, strain in 2 and 3 dimensions: stress and strain transformation, principal stresses and strains, Mohr's Circles for stress and strain. Hooke's Law and Poisson's Ratio. Statical determinacy and indeterminacy: temperature stresses, lack of fit, compound structures. Thin walled pressure vessels. Torsion of shafts of circular cross-section. Bending and shear stresses in symmetrical, asymmetrical and compound beams: deflection of beams, Euler buckling: axially and eccentrically loaded columns, non-uniform columns and beam columns. Principle of Virtual Work and Castigliano's Theorems.

AMEC2007 E
Materials 1
Staff Contact: Dr A.R. Watson, Dr S.R. Yeomans
TH42
Prerequisite: ACHM1402 E or ACHM1403 E

Materials science. Grain structure, effect of deformation, recrystallisation, hot and cold working. Non-equilibrium relationships in multiphase materials, applications to heat treatment. Behaviour of materials in service: deformation, fatigue, fracture, wear, thermal stress, creep, corrosion, radiation damage. Effects of microstructure and macrostructure on properties. Fracture mechanics. Introduction to ceramic phases and properties. Welding: processes, metallurgy and weldability. Metal removal, surface finishing, joining.

AELE2403 E
Principles of Electronics Technology
TH27

See subject description under School of Electrical Engineering entry (p. 127).

AELE2404 E
Principles of Electrical Technology
TH27

See subject description under School of Electrical Engineering entry (p. 127).

AMAT3800 U
Mathematics 3E

AMAT3401 E
Complex Analysis 3E
S1 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3402 E
Differential Equations 3E
S2 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3403 E
Probability 3E
S1 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3404 E
Statistics 3E
S2 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMEC3800 U
Mechanical Engineering 3
TH409

AMEC3005 E
Materials 2
Staff Contact: Dr A.R. Watson
TH27

Further studies of materials science. Ferrous and non-ferrous materials. Other important non-metallic materials. Crack analysis. Creep.

AMEC3008 E
Mechanical Engineering Laboratory 2
Staff Contact: Dr M.J. Harrap
TH46

A series of integrated laboratory experiments covering the theoretical work covered in the units of AMEC3800 U Mechanical Engineering 3.

AMEC3009 E
Thermodynamics 2
Staff Contact: Dr M.J. Harrap
TH27
Prerequisite: AMEC2001 E

Heat pump and refrigeration cycles. Combustion processes. Properties of mixtures. Air-conditioning.

AMEC3028 E
Dynamics of Mechanical Systems 2
Staff Contact: Mr I.W. Linnett
TH13
Prerequisite: AMEC2002 E

Modelling lumped and distributed parameter systems, linear and non-linear, linearization, response of linear systems. Vibration of multiple degree of freedom systems, matrix and state vector methods, for lumped and distributed systems.

AELE3014 E
Control Theory 1
TH27

See subject description under School of Electrical Engineering entry (p. 121).

AELE3020 E
Control Theory 2
TH27

See subject description under School of Electrical Engineering entry (p. 122).

AMEC3027 E
Design 2
Staff Contact: Dr H.M. Williamson
TH54
Prerequisites: AMEC2003 E and AMEC2006 E

Design of rotating and reciprocating machine assemblies and components with consideration of: combinations of stresses, uniaxial and multiaxial fatigue failure, critical speeds, materials of manufacture and manufacturing methods. Design for manufacture including quality assurance issues with consideration of interchangeable manufacture, standardisation, unit and selective assembly, tolerance specification, conditions of fit, economics, probability, group analysis, inspection of workpieces and gauge design. CAD tools will be used where appropriate.

AMEC3029 E
Mechanics of Solids 2
Staff Contact: Dr A.R. Watson
TH67

Equations of three-dimensional theory of elasticity. Torsion of non-circular shafts. Thick walled pressure vessels. Stress concentrations. Introduction to numerical methods of stress and strain analysis. Rotating variable thickness discs. Plate theory: circular plates with symmetric loading. Elastic stability of rings and tubes. Introduction to plasticity theory. Introduction to finite element stress analysis.

AMEC3030 E
Fluid Mechanics 2
Staff Contact: Prof R.K. Duggins
TH54
Prerequisite: AMEC2004 E

Laminar and turbulent pipe flow; losses in pipes and fittings, networks. Unsteady flow, surging, pressure waves including water hammer. Introduction to fluid devices. The Navier–Stokes Equations. Transition and flow separation. Jets and wakes. Boundary layer theory; momentum integral equation, solution by assumed profiles for laminar and turbulent boundary layers; skin friction, drag coefficient. Rotational and irrotational motion: circulation, lift, Magnus effect; vorticity, flow in a curved path, forced and free vortices. Compressible flow; shock waves and flow through convergent-divergent nozzles.

AMEC3014 E
Instrumentation
Staff Contact: Dr M.J. Harrap
TH13
Prerequisites: AELE1001 E and AMAT2800 U

Instrumentation systems and their applications.

ACSC3402 E
Management Science 3E
TH27

See subject description under School of Computer Science entry (p. 79).

ACMA3017 E
Project Management 1
TH27

See subject description under School of Civil Engineering entry (p. 117).

AMEC4801 U
Mechanical Engineering: Project and Thesis
TH216

The project will take the form of a minor piece of research or investigation, a major feasibility study or design, or a comprehensive literature review. Project Management techniques will be adopted in the implementation and assessment of the project.

AMEC4800 U
Mechanical Engineering 4
TH425

AMEC4001 E
Thermodynamics 3
Staff Contact: Dr N.R. Mudford
TH27
Prerequisite: AMEC3009 E

Heat transfer by conduction, convection and radiation. Fourier's law of heat conduction, one dimensional steady conduction through composite plain and tubular walls. Steady conduction with internal heat generation. Numerical solution of two dimensional steady conduction. Unsteady conduction; numerical solution in one dimension, quenching. Forced convection heat transfer in laminar and turbulent flow, the Reynolds analogy. Free convection. Dimensional analysis. Radiation heat transfer for black and grey bodies.

AMEC4030 E
Maintenance Management and Logistics Engineering
Staff Contact: Dr H.M. Williamson
TH27
Corequisites: AMAT3403E and AMAT3404E

Maintenance management principles: maintenance strategies, repair/replacement decision making, condition monitoring, maintenance management information systems.

Logistics engineering: logistics concepts, statistics of reliability, availability, maintainability, repairability, life-cycle costing, logistic support analysis, supply support factors.

AMEC4032 E
Mechanical Engineering Laboratory 3
Staff Contact: Dr K. Shankar
TH27
Prerequisites: AMEC2005 E and AMEC3008 E

Advanced experiments in engineering.

AMEC4033 E
Fluid Mechanics 3
Staff Contact: Prof R.K. Duggins
TH27
Prerequisite: AMEC2001 E

Internal flows, nozzles and diffusers. Cascade aerodynamics. Fluid mechanics of axial and centrifugal compressors, fans and pumps. Axial flow turbines—gas,

steam and hydraulic. Performance calculations of turbomachines.

AMEC4034 E
Mechanics of Solids 3
Staff Contact: Dr A.R. Watson
TH27

Dislocations and slip in crystalline materials. Fracture; tensile and shear. Fracture mechanics: Griffith theory; fracture toughness, plane strain and plain stress, experimental methods and results. Failure under steady, alternating and impulsive loading in various environments including high temperatures.

AMEC4035 E
Dynamics of Mechanical Systems 3
Staff Contact: Mr I.W. Linnett
TH27
Prerequisites: AELE3014 E and AELE3020 E

Dynamics: computer aided analysis of vibrations in machinery. Random vibrations and model testing. Control: system accuracy and stability, performance specification and design; process controllers and servomechanisms; controller selection and settings; introduction to computer control.

AMEC4056 E
Design 3
Staff Contact: Dr H.M. Williamson
TH54
Prerequisites: AMEC3027 E and AMAT3800 U

Design as an integrating activity, especially including human factors and the professional responsibility of the engineer. The management of design and specification processes, including aspects of total quality management. The application of computer methods in the design of machinery such as reciprocating and rotating components including transmission gearing and pressure vessels. Selected topics in the analysis of stress, deflection, vibration and fatigue, in the context of optimal design.

AECM3401 E
Engineering Economics
TH27
Staff Contact: Dr S. Markowski

See subject description under School of Economics and Management entry (p. 84).

AECM3402 E
Management for Engineers
Staff Contact: Dr G. Manger
TH27

See subject description under School of Economics and Management entry (p. 84).

Elective units

AMEC4006 E
Acoustic Noise
Staff Contact: A/Prof J.C.S. Lai
TH27

Physical acoustics: the wave equation, solution of the wave equation, comparison with vibration having finite degrees of freedom. Sound: sound pressure level, physiological response to sound, threshold of hearing and threshold of pain, maximum permissible levels of sound exposure. Noise attenuation and control. Noise: statistical properties of noise, response of systems to noise, correlation functions and transfer, frequency response functions. Machinery noise: generation of vibration in machines, acceptable levels and methods of control. Radiation of sound from vibrating machinery.

AMEC4007 E
Advanced Design
Staff Contact: Dr H.M. Williamson
TH27
Prerequisite: AMEC 3027 E

Design philosophy and methodology: problem formulation, problem analysis, solutions, evaluation, specification. Computer aided design and the use of software and data base for design analysis, evaluation and optimisation. Design project.

AMEC4008 E
Advanced Mechanisms
Staff Contact: Dr A.R. Watson
TH27

Advanced kinematics; velocity and acceleration analysis of complex planar mechanisms. Inflection circle, Euler-Savary equations, Cubic of Stationary Curvature, Burmester points. Synthesis. Introduction to analysis and synthesis of three dimensional mechanisms.

AMEC4009 E
Applied Elasticity and Plasticity
Staff Contact: Dr A.R. Watson
TH27

Topics in applied elasticity and plasticity involving analytical and numerical methods, selected from impact mechanics, energy methods, finite difference and finite element techniques, fracture mechanics, plasticity problems including bending, torsion, pressure vessels and rotating discs, limit analysis, forming processes, creep and shakedown.

AMEC4010 E
Applied Optics
Staff Contact: A/Prof J.P. Baird
TH27

Light as electromagnetic radiation. Geometric and wavefront optics. Polarisation. Interference and Coherence. Reconnaissance and image enhancement. Light sources. Non-destructive testing in fluids; visualisation of density and temperature, velocimetry. Non-destructive testing in solids; photoelasticity, holography.

AMEC4011 E
Approximate Methods for Partial Differential Equations
Staff Contact: Dr J.F. Milthorpe
TH27

Laplace's equation. Finite difference approximations and error estimations. Relaxation methods. Convection, stability. Implicit methods: Gaussian elimination, conjugate gradient method. Variational and Galerkin finite element methods. Boundary integral methods.

AMEC4012 E
Boundary Layers and Separated Flows
Staff Contact: Dr J.F. Milthorpe
TH27
Prerequisite: AMEC3016 E or AMEC3030 E

Dynamics of viscous flow and Prandtl's boundary layer approximation. Blasius and Falkner-Skan solutions and approximate methods. Stability and transition. Tollmien-Schlichting and Taylor-Gortler instabilities. Turbulent boundary layers, jets and wakes. Recent theories of organised motion in turbulent flows. Boundary layer control for low drag and high lift. Circulation control. Aerodynamic noise.

AMEC4013 E
Classical and Statistical Thermodynamics
Staff Contact: A/Prof J.P. Baird
TH27

Classical theory: Maxwell's relations, determination of entropy and enthalpy, change of phase, availability. Statistical thermodynamics: probability, systems of independent particles, internal energy and specific heat, entropy.

AMEC4014 E
Compressible Flow
Staff Contact: Prof R.K. Duggins
TH27
Prerequisite: AMEC3016 E or AMEC3030 E

Introduction to one-dimensional flow. Waves in one-dimensional frictionless flow; waves in two-dimensional flows; supersonic nozzles and diffusers. Method of characteristics and two-dimensional numerical methods. Small perturbation theory and linearised equations. Real gas flows: Introduction to hypersonic flows, rarefied and reactive gas dynamics. Measurements in compressible flow.

AMEC4015 E
Control Theory
Staff Contact: Mr I.W. Linnett
TH27
Prerequisites: AELE3014 E and AELE3020 E, or AMEC3020 E

Further studies in the analysis and design of control systems; correlation of frequency and transient responses, system identification, phase plane and state space analyses, non-linear and discrete time systems, Liapunov stability analyses, optimal and adaptive systems. stochastic signal analysis. Computer modelling of control systems. Logic and computer control systems.

AMEC4016 E
Energy Studies
Staff Contact: Dr M.J. Harrap
TH27
Prerequisite: AMEC2001 E and AMEC3009 E

Energy resources and economics. Energy availability and conversion. Direct conversion: thermoelectric engine, thermionic converter, magnetohydrodynamic engine, photo-voltaic effect and solar cell, fuel cell. Nuclear energy: fission and fusion.

AMEC4017 E
Impact Mechanics
Staff Contact: Dr A.R. Watson
TH27

One-dimensional elastic stress waves in long uniform rods, theory and applications. Plane impulsive motion of rigid bodies and structures. Impact of a solid on to a liquid surface, ricochet. Liquid impact against a rigid surface, lined cavity charge explosives. Elastic-plastic stress waves in bars. High speed forming. Hyper-velocity impact.

AMEC4018 E
Marine Engineering
TH27

Ship resistance and propulsion. Propellers, their design and performance. Ship manoeuvrability. Alternative propulsion systems and associated equipment.

AMEC4020 E
Naval Architecture
TH27

Ship hydrodynamics and stability. Principles of ship design. Structural loading and response.

AMEC4021 E
Random Vibrations and Signal Analysis
Staff Contact: Mr I.W. Linnett
SS HPS27
Prerequisite: AMAT3403 E

Random vibrations: probability distributions, joint probability, correlation, Fourier analysis and spectral density; excitation and response relations for linear systems, transmission of random vibrations and narrow band processes. Digital spectral analysis: discrete Fourier transforms, the FFT, pseudo-random processes and multi-dimensional spectral analysis. Applications: response of systems to stationary random excitation, network analysis, vibration interpretation, predictive maintenance and balancing analysis; noise analysis and reduction, spectral signatures, production and structural testing and modal analysis.

AMEC4023 E
Thermal Performance and Energy Consumption in Buildings
Staff Contact: Dr M.J.Harrap
TH27
Prerequisite: AMEC4001 E

The environment and human comfort. Steady state heating load calculations for buildings. Dynamic building thermal performance; models, response factor methods, comparison with steady state model. Energy consumption; building materials, orientation, plant, heating strategies.

AMEC4024 E
Tribology
Staff Contact: Mr I.W. Linnett
TH27
Prerequisite: AMEC4035 E

Introduction to tribology. Surface topography, contact of surfaces, friction of metals, elastomers and other materials. Tribological properties of materials, wear and abrasion. Rolling motion, lubricants; hydrodynamic, boundary, elastohydrodynamic and hydrostatic lubrication, internal friction. Applications from the manufacturing, automotive, transportation, bearing design and other fields.

AMEC4026 E
Occasional Elective
TH27

The syllabus may change from one occasion to the next, allowing the presentation of a modern topic by a visiting

academic of eminence or a special lecture course on a trial basis.

AMEC4028 E
Digital Control using Microprocessors
Staff Contact: Dr M.J.Harrap
TH27
Prerequisites: AMAT2800 U and AMEC3028 E, or AMEC3020 E

The design and analysis of digital control systems with implementation using microprocessors. Discrete time signals. Z transform techniques. Methods of analysis and design. Digital control algorithms. Microprocessors and interfacing. Practical exercises using the 6502 microprocessor and peripherals.

AMEC4029 E
Chaos and Non-linear Dynamics
Staff Contact: A/Prof J.P. Baird and A/Proj J.C.S. Lai
TH27
Prerequisite: AMEC2900 U or AMEC2901 U, or AMEC2800 U

Linear and non-linear oscillators. Trajectories in phase space. Stability and bifurcation of maps. Strange attractors. Subharmonic cascade. Poincare sections. Fourier spectrum. Lyapunov exponents. Fractal properties. Examples of dynamical chaos and engineering applications.

AMEC4031 E
Analysis of Structural Vibration
Staff Contact: A/Proj J.C.S. Lai
TH27
Prerequisite: AMEC4035 E or AMEC4041 E

Vibration analysis through experiment and simulation: review of basic linear structural vibration theory, lumped parameter formulation of vibration problems in matrix equations, theory and practice of experimental modal testing, finite element modelling of structural vibrations.

Bachelor of Engineering in Aeronautical Engineering

Aerospace engineering, which can be considered to be a specialised field of mechanical engineering, is the study of the design, development, or operation of a machine, a contrivance, or a vehicle operating in the earth's atmosphere or in outer space.

The design of a flight vehicle is quite complex and demands a knowledge of many engineering disciplines such as aerodynamics, propulsion systems, structural design, materials, avionics, and stability and control systems. Maintaining and operating a flight vehicle requires an understanding of materials, reliability and maintenance, structural analysis for necessary repairs, together with a knowledge of the disciplines within the design process.

The Aeronautical Engineering program, which until 1993 saw students leave the Academy at the end of their second year to complete their degrees elsewhere, has been revised so that the four years are now presented within the University College.

The course has been designed to meet the needs of the Australian Defence Force as Australia's largest aircraft operator and covers the design, and reliability and maintenance of fixed and rotary wing aircraft.

The Aeronautical Engineering degree course leads to the Bachelor of Engineering degree, and Pass and Honours classifications are determined at the conclusion of the course.

During the first and second years of the course, students will go on appropriate industrial visits.

The first year course is described on p. 112.

Outline of Second and Later Year Courses and List of Teaching Units

Second Year Course

Subject			*Total Hours*
AMAT2800 U	Mathematics 2E		108
ACSC2803 U	Computer Science 2AE		40
ACSC2401 E	Numerical Analysis 2E	40	
AMEC2900 U	Aeronautical Engineering 2		461
AMEC2009 E	Aeronautical Engineering Laboratory 1	67	
AMEC2010 E	Aerodynamics 1	54	
AMEC2011 E	Aircraft Design 1	78	
AMEC2012 E	Flight Mechanics 1	54	
AELE1001 E	Intro. to Electrical and Electronic Engineering	66	
AMEC2007 E	Materials 1	42	
AMEC2006 E	Mechanics of Solids 1	48	
AMEC2001 E	Thermodynamics 1	52	
			609
Average contact hours per week			22.6

Third Year Course

Subject			*Total Hours*
Two General Education subjects			54
AMAT3800 U	Mathematics 3E		108
AMAT3401 E	Complex Analysis 3E	27	
AMAT3402 E	Differential Equations 3E	27	
AMAT3403 E	Probability 3E	27	
AMAT3404 E	Statistics 3E	27	
AMEC3900 U	Aeronautical Engineering 3		472
Compulsory Units			
AMEC3015 E	Aeronautical Engineering Laboratory 2	54	
AMEC3016 E	Aerodynamics 2	54	
AMEC3017 E	Aircraft Design 2	54	
AMEC2008 E	Aerospace Materials	13	
AMEC3018 E	Aircraft Propulsion	27	
AMEC3019 E	Aircraft Structures 1	54	
AMEC3020 E	Flight Mechanics 2	27	
AMEC4030 E	Maintenance Management and Logistics Engineering	27	
ACSC3402 E	Management Science 3E	27	

ACMA3017 E	Project Management 1	27
		634

Average contact hours per week 23.5

Elective units: 108 hours of units to be selected from Options 1.

Options 1

AMEC3022 E	Aircraft Systems	27
AMEC3023 E	Composites & Adhesives	14
AMEC3014 E	Instrumentation	13
AMEC3024 E	Maintenance and Repair of Aircraft	27
AMEC3025 E	Rotary Wing 1	27
AMEC3026 E	Rotary Wing 2	27

Final Year Course

Subject		*Total Hours*
Two General Education subjects		54
AMEC4902 U	Practical Experience (AeronauticalEngineering)*	
AMEC4901 U	Aeronautical Engineering Project and Thesis	216
AMEC4900 U	Aeronautical Engineering 4	344

Compulsory Units

AMEC4037 E	Aerodynamics 3	27
AMEC4038 E	Aeronautical Engineering Laboratory 3	27
AMEC4039 E	Aircraft Design 3	27
AMEC4040 E	Aircraft Structures 2	27
AECM3401 E	Engineering Economics	27
AMEC4041 E	Flight Mechanics 3	27
AECM3402 E	Management for Engineers	27
		614

Average contact hours per week 22.7

Elective units: A minimum of 155 hours of units to be selected from Options 2.

Options 2

AMEC4006 E	Acoustic Noise	27
AMEC4044 E	Aeroelasticity	27
AMEC4031 E	Analysis of Structural Vibration	27
AMEC4045 E	Applications of Fatigue and Fracture Mechanics	27
AMEC4012 E	Boundary Layers and Separated Flows	27
AMEC4029 E	Chaos and Non-Linear Dynamics	27
AMEC4046 E	Composite Mechanics	13
AMEC4015 E	Control Theory	27
AMEC4028 E	Digital Control Using Microprocessors	27
AMEC4047 E	Experimental Stress Analysis	13
AMEC4048 E	Machine Condition Monitoring	13
AMEC4019 E	Mechanics of Fracture	27
AMEC4049 E	Missile Design	27
AMEC4026 E	Occasional Elective	27
AMEC4050 E	Orbital Mechanics	27
AMEC4021 E	Random Vibrations and Signal Analysis	27
AMEC4051 E	Rapid Action Repair	13
AMEC4052 E	Rotary Wing 3	27
AMEC4053 E	Rotary Wing 4	27
AMEC4054 E	Structural Analysis	13
AMEC4055 E	Structural Joining Methods	13
APHY4401 E	Techniques for Studying Advanced Materials 4E	27

* See Rule 6 of the BE Degree Rules.

Subject Descriptions

AMAT2800 U
Mathematics 2E
TH108

See subject description under School of Mathematics and Statistics entry (p. 98).

ACSC2803 U
Computer Science 2AE
ACSC2401 E
Numerical Analysis 2E
S1 TH40
Prerequisites: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

See subject description under School of Computer Science entry (p. 78).

AMEC2900 U
Aeronautical Engineering 2
TH461
AMEC2009 E
Aeronautical Engineering Laboratory 1
Staff Contact: Ms K. Vassilopoulos
TH67

Laboratory Work: Fundamentals of experimental work; resolution, repeatability, confidence, accuracy. Report writing. Engineering measurement tools. A range of experiments in aerodynamics, solid mechanics, thermodynamics, materials science and dynamics.

Flight Laboratory: Estimation and measurement of aircraft performance in various flight configurations. Performance estimates will be based on manufacturer's airframe data, engine data and physical measurements of the dimensions of the test aircraft. Estimation and measurement of aircraft dynamic behaviour in level flight.

Industrial visits: Relevant visits will be arranged.

AMEC2010 E
Aerodynamics 1
Staff Contact: A/Prof J.C.S. Lai
TH54

Physical properties of fluids, fluid statics, kinematics of a flow field. Continuity, energy and momentum equations in one dimension. Introduction to laminar and turbulent flow, boundary layer, transition and flow separation, jets and wakes. Dimensional analysis: dynamic similitude and modelling. Introduction to compressible flow.

AMEC2011 E
Aircraft Design 1
Staff Contact: Mr R.B. Heselhurst
TH78
Prerequisite: AINT1401 E
Corequisite: AMEC2006 E

Introduction to aircraft design principles and the design process with examples and emphasis on machine elements and the influence of manufacturing processes on design. Aircraft component design and analysis. Engineering ethics. Theories of failure including crack propagation theory and uniaxial fatigue design theory. Example topics include: screw threads, bolted connections, clutches, sliding bearings, ball and roller bearings, springs, and welded connections.

AMEC2012 E
Flight Mechanics 1
Staff Contact: Dr K. S. Shankar
TH54
Prerequisites: AINT1401 E and AMEC1005 E

Performance: Straight and level flight. Drag and power curves. Climbing flight. Gliding flight. Range and endurance. Take-off and landing. Calculation runway length.

Vibrations of a single degree of freedom system: natural frequencies, damping, critical damping, dynamic response. Equation of directional motion of an aircraft: directional stability. Equation of rolling motion of an aircraft: rolling stability. Equation of stick-fixed longitudinal motion of an aircraft: longitudinal stability, phugoid motion, short period oscillation.

AELE1001 E
Introduction to Electrical and Electronic Engineering

This unit consists of the following 2 units—

AELE2403 E
Principles of Electronics Technology
S1 TH27

See subject description under Electrical Engineering entry (p. 127).

AELE2404 E
Principles of Electrical Technology
S2 TH27

See subject description under Electrical Engineering entry (p. 127).

AMEC2007 E
Materials 1
Staff Contact: Dr A.R. Watson and Dr S.R. Yeomans
TH42
Prerequisite: ACHM1402 E or ACHM1403 E

Materials science. Grain structure, effect of deformation, recrystallisation, hot and cold working. Non-equilibrium relationships in multiphase materials, applications to heat treatment. Behaviour of materials in service: deformation, fatigue, fracture, wear, thermal stress, creep, corrosion, radiation damage. Effects of microstructure and macrostructure on properties. Fracture mechanics. Introduction to ceramic phases and properties. Welding: processes, metallurgy and weldability. Metal removal, surface finishing, joining.

AMEC2006 E
Mechanics of Solids 1
Staff Contact: Dr O. Kayali
TH48
Prerequisite: AINT1401 E

Stress, strain in 2 and 3 dimensions: stress and strain transformation, principal stresses and strains, Mohr's Circles for stress and strain. Hooke's Law and Poisson's Ratio. Statical determinacy and indeterminacy: temperature stresses, lack of fit, compound structures. Thin walled pressure vessels. Torsion of shafts of circular cross-section. Bending and shear stresses in symmetrical, asymmetrical and compound beams: deflection of beams, Euler buckling: axially and eccentrically loaded columns, non-uniform columns and beam columns. Principle of Virtual Work and Castigliano's Theorems.

AMEC2001 E
Thermodynamics 1
Staff Contact: A/Prof J.C.S. Lai
TH52

Fundamental laws of thermodynamics. Thermodynamic properties of fluids. Reciprocating engines and compressors: cycle analysis, construction, performance. Vapour power cycles. Gas power cycles.

AMAT3800 U
Mathematics 3E

AMAT3401 E
Complex Analysis 3E
S1 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3402 E
Differential Equations 3E
S2 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3403 E
Probability 3E
S1 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3404 E
Statistics 3E
S2 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMEC3900 U
Aeronautical Engineering 3
TH472

AMEC3015 E
Aeronautical Engineering Laboratory 2
Staff Contact: Dr M.J. Harrap
TH54

Laboratory work: Advanced experiments in aeronautical engineering. Subsonic and supersonic wind tunnels, force measurements and strain gauges.

Flying Experience: 10 hours flying in a light aircraft with a qualified instructor.

AMEC3016 E
Aerodynamics 2
Staff Contact: A/Prof S. L. Gai and Dr J.F. Milthorpe
TH54
Prerequisite: AMEC2010 E

Fundamentals of incompressible flow; Stream function and velocity potential. Complex potential. Kutta-Joukowski

theorem of lift. Blasius theorems. Thin aerofoil theory and conformal transformation. Finite wing theory. Low aspect ratio wings. Panel methods.

AMEC3017 E
Aircraft Design 2
Staff Contact: Mr R.B.Heslehurst
TH54
Prerequisites: AMEC2011 E and AMEC2006 E and AMEC2010 E
Corequisites: AMEC2012 E and AMEC3018 E

Detailed design of major aircraft components. Airframe and system integration design. Aircraft fabrication and production procedures and techniques. Computation of aerodynamic, performance and dynamic effects on a specific design. Structural design. Complete the preliminary design (vertical design project). Design and build competition. Engineering ethics and flight safety.

AMEC2008 E
Aerospace Materials
Staff Contact: Dr A.R. Watson
TH13

Fabrication processes. Review of common aerospace materials—ferrous and non-ferrous alloys. Materials selection and specification.

AMEC3018 E
Aircraft Propulsion
Staff Contact: Prof R.K. Duggins
TH27
Prerequisite: AMEC2001 E

Types of gas turbines; basic relations. Turboprop, turbofan, turbojet, and ramjet configurations. The fluid mechanics and thermodynamics of axial compressors, centrifugal compressors, fans and turbines. Combustion. Performance calculations of aircraft propulsion systems.

AMEC3019 E
Aircraft Structures 1
Staff Contact: Mr M. Tahtali
TH54
Prerequisite: AMEC2006 E

Application of statics and mechanics of solids theory to aircraft structures. Theory of shear flow in thin-walled structures and semi-monocoque structures. Thin-walled structures in torsion and warping conditions. Introduction to theories and methods of structural analysis. Fundamentals of finite element analysis theory and application. Introduction to plate and shell structural theory.

AMEC3020 E
Flight Mechanics 2
Staff Contact: Dr V. Sharma
TH27
Prerequisite: AMEC2012 E

Stick-free longitudinal stability: stick force gradient. Reduction of control forces: balanced control surfaces, servo operated controls.

AMEC4030 E
Maintenance Management and Logistics Engineering
Staff Contact: Dr H.M. Williamson
TH27
Corequisites: AMAT3403 E and AMAT3404 E

Maintenance management principles: maintenance strategies, repair/replacement decision making, condition monitoring, maintenance management information systems.

Logistics engineering: logistics concepts, statistics of reliability, availability, maintainability, repairability, life-cycle costing, logistic support analysis, supply support factors.

ACSC3402 E
Management Science 3E
TH27
Prerequisite: AMAT1800 U and ACSC1800 U
Corequisite: AMAT2800 U

See subject description under School of Computer Science entry (p. 79).

ACMA3017 E
Project Management 1
TH27

See subject description under School of Civil Engineering entry (p. 117).

AMEC4901 U
Aeronautical Engineering Project and Thesis
TH216

The project takes the form of a minor piece of research or investigation, a major feasibility study or design, or a comprehensive literature review. Project management techniques are adopted and assessed in the implementation of the project.

AMEC4900 U
Aeronautical Engineering 4
TH344

AMEC4037 E
Aerodynamics 3
Staff Contact: Prof R. K. Duggins and A/Prof S.L.Gai
TH27
Prerequisite: AMEC3016 E

Waves in one and two dimensional flows. Supersonic nozzles and diffusers. Methods of characteristics and two-dimensional numerical methods. Small perturbation theory and linearised equations. Slender body theory. Transonic flow. Numerical techniques. Measurements and testing.

AMEC4038 E
Aeronautical Engineering Laboratory 3
Staff Contact: A/Prof J.P.Baird
TH27
Prerequisite: AMEC3015 E

The design, planning and implementation of advanced experiments in aeronautical engineering.

AMEC4039 E
Aircraft Design 3
Staff Contact: Mr R.B.Heslehurst
TH27
Corequisite: AMEC3017 E

Details of military and civilian airworthiness and certification requirements and legal issues in aircraft design. Damage tolerant and fatigue design concepts. Aircraft costing and scheduling. Maintainability and reliability design. Introduction to helicopter and V/STOL design.

AMEC4040 E
Aircraft Structures 2
Staff Contact: Dr K. Shankar
TH27
Prerequisites: AMEC3019 E and AMEC2008 E

Theory of plates and shells. Finite element methods and computer application. Structural instability and flexibility. Stress concentrations around holes and cutouts. Thermoelasticity. Structural analysis of sandwich constructions.

AECM3401 E
Engineering Economics
TH27
Staff Contact: Dr S. Markowski

See subject description under School of Economics and Management entry (p. 84).

AMEC4041 E
Flight Mechanics 3
Staff Contact: Dr V. Sharma
TH27
Prerequisite: AMEC3020 E

Vibrations of a multiple degree of freedom system: eigenvalues, eigenvectors, damping, dynamic response. Products of inertia. Lateral dynamic stability: Dutch roll, spinning. Stability in asymmetric configurations.

AECM3402 E
Management for Engineers
TH27

See subject description under School of Economics and Management entry (p. 84).

Options 1

AMEC3022 E
Aircraft Systems
Staff Contact: Mr R.B. Heslehurst
TH27
Prerequisite: AMEC1004 E

General arrangements of aircraft systems. Purpose of various aircraft systems. Design of mechanical type aircraft systems. Overview of non-mechanical type aircraft systems. Design of systems integration.

AMEC3023 E
Composites and Adhesives
Staff Contact: Dr K. Shankar
TH14
Prerequisite: AMEC2007 E

Composite material and adhesives terminology and technology. Chemistry of composite material constituents and adhesives. Manufacturing processes of constituents and components. Fundamentals of mechanics, design and durability of composite materials and bonded structures.

AMEC3014 E
Instrumentation
Staff Contact: Dr M.J. Harrap
TH13
Prerequisites: AELE1001 E and AMAT2800 U

Instrumentation systems and their applications.

AMEC3024 E
Maintenance and Repair of Aircraft
Staff Contact: Mr R.B. Heslehurst
TH27
Prerequisites: AMEC2008 E and AMEC3023 E

Defining maintenance and repair of aircraft structures and systems. Detail of maintenance activities. Design and analysis of repair schemes. Advanced methods of maintenance and repair. Management of maintenance and repair activities.

AMEC3025 E
Rotary Wing 1
Staff Contact: A/Prof S.L. Gai
TH27
Prerequisite: AMEC2010 E or AMEC2004 E

Basic helicopter configurations and rotor systems. Actuator disc and blade element theories. Rotor aerodynamics in vertical and forward flight. Rotor ground effect. Auto-rotation.

AMEC3026 E
Rotary Wing 2
Staff Contact: Dr J.F. Milthorpe
TH27
Prerequisite: AMEC3025 E

Dynamics of rotor blade motion and control. Blade flapping motion. Blade lagging motion. Rotor blade design considerations. Configurations, rotor types, types of helicopter control. Conventional helicopter. Tilt rotor.

Options 2

AMEC4006 E
Acoustic Noise
Staff Contact: A/Prof J.C.S. Lai
TH27

Physical acoustics: the wave equation, solution of the wave equation, comparison with vibration having finite degrees of freedom. Sound: sound pressure level, physiological response to sound, threshold of hearing and threshold of pain, maximum permissible levels of sound exposure. Noise attenuation and control. Noise: statistical properties of noise, response of systems to noise, correlation functions and transfer, frequency response functions. Machinery noise: generation of vibration in machines, acceptable levels and methods of control. Radiation of sound from vibrating machinery.

AMEC4044 E
Aeroelasticity
Staff Contact: Dr J.F. Milthorpe
TH27
Prerequisites: AMEC2010 E and AMEC3016 E and AMEC2012 E and AMEC3020 E
Corequisite: AMEC4041 E

Review theory of vibration. Application of vibration analysis to structures. Examine the forces on an aircraft, the accompanying motion and response of the structure. Develop aeroelasticity phenomenon theories.

AMEC4031 E
Analysis of Structural Vibration
Staff Contact: A/Prof J.C.S. Lai
TH27
Prerequisite: AMEC4035 E or AMEC4041 E

Vibration analysis through experiment and simulation: review of basic linear structural vibration theory, lumped parameter formulation of vibration problems in matrix equations, theory and practice of experimental modal testing, finite element modelling of structural vibrations.

AMEC4045 E
Applications of Fatigue and Fracture Mechanics
Staff Contact: Dr H.M. Williamson
TH27
Prerequisites: AMEC2006 E and AMEC2011 E or AMEC2003 E
Corequisite: AMEC4019 E

After reviewing the theory of fracture mechanics (Griffith cracks, plane strain, plane stress and intermediate cases) the subject proceeds to develop skills in the application of fracture mechanics to engineering fracture and fatigue problems. Topics include the prediction of crack growth rates and residual strength, damage tolerant design philosophy and the role of non-destructive inspection.

AMEC4012 E
Boundary Layers and Separated Flows
Staff Contact: Dr J.F. Milthorpe
TH27
Prerequisite: AMEC3016 E or AMEC3030 E

Dynamics of viscous flow and Prandtl's boundary layer approximation. Blasius and Falkner-Skan solutions and approximate methods. Stability and transition. Tollmien-Schlichting and Taylor-Gortler instabilities. Turbulent boundary layers, jets and wakes. Recent theories of organised motion in turbulent flows. Boundary layer control for low drag and high lift. Circulation control. Aerodynamic noise.

AMEC4029 E
Chaos and Non-linear Dynamics
Staff Contact: A/Prof J.P. Baird and A/Prof J.C.S. Lai
TH27
Prerequisite: AMEC2900 U or AMEC2901 U or AMEC2800 U

Linear and non-linear oscillators. Trajectories in phase space. Stability and bifurcation of maps. Strange attractors. Subharmonic cascade. Poincare sections. Fourier spectrum. Lyapunov exponents. Fractal properties. Examples of dynamical chaos and engineering applications.

AMEC4046 E
Composite Mechanics
Staff Contact: Dr K. Shankar
TH13
Prerequisites: AMEC2006 E and AMEC3023 E

Review composite materials technology and properties. Theory of composite micromechanics. Mechanics of composite materials. Design of composite structures, including structural analysis. Effect of damage, fatigue and the environment on mechanical properties.

AMEC4015 E
Control Theory
Staff Contact: Mr I.W. Linnett
TH27
Prerequisites: AELE3014 E and AELE3020 E, or AMEC3020 E

Further studies in the analysis and design of control systems; correlation of frequency and transient responses, system identification, phase plane and state space analyses, non-linear and discrete time systems, Liapunov stability analyses, optimal and adaptive systems. stochastic signal analysis. Computer modelling of control systems. Logic and computer control systems.

AMEC4028 E
Digital Control using Microprocessors
Staff Contact: Dr M.J. Harrap
TH27
Prerequisites: AMAT2800 U, and AMEC3010 E or AMEC3020 E

The design and analysis of digital control systems with implementation using microprocessors. Discrete time signals. Z transform techniques. Methods of analysis and design. Digital control algorithms. Microprocessors and interfacing. Practical exercises using the 6502 microprocessor and peripherals.

AMEC4047 E
Experimental Stress Analysis
Staff Contact: Dr K. Shankar
TH13
Prerequisites: AMEC2008 E and AMEC3019 E

Specify the requirements of experimental stress analysis. Review elasticity fundamentals. Theory and application of strain gauges, photoelasticity, interferometry and other optical methods. Experimental stress analysis project.

AMEC4048 E
Machine Condition Monitoring
Staff Contact: Dr M.J. Harrap
TH13
Prerequisite: AMEC2012 E
Corequisite: AMEC3014 E

Historical perspective. Sources of vibration in machines. Machine vibration measurement and instrumentation. Analysis and interpretation of machine vibration. Prediction of failure. Case studies.

AMEC4019 E
Mechanics of Fracture
Staff Contact: Dr A.R. Watson
TH27
Prerequisite: AMEC2007 E

Dislocations and slip in crystalline materials. Fracture; tensile and shear. Fracture mechanics: Griffith theory; fracture toughness, plane strain and plane stress, experimental methods and results. Failure under steady, alternating and impulsive loading in various environments including high temperatures.

AMEC4049 E
Missile Design
Staff Contact: Dr J.F. Milthorpe
THS27
Corequisite: AMEC4037 E or AMEC4033 E

Aerodynamics and dynamics of slender bodies and wings. Spin and fin stabilisation of projectiles, trajectories and manoeuvre capabilities. Layout, structure, control, propulsion and their integration with other systems.

AMEC4026 E
Occasional Elective
TH27

The syllabus may change from one occasion to the next, allowing the presentation of a modern topic by a visiting

academic of eminence or a special lecture course on a trial basis.

AMEC4050 E
Orbital Mechanics
Staff Contact: Dr J.F. Milthorpe
TH27
Prerequisite: AMEC3016 E or AMEC3030 E

A vector mechanical two-body treatment of ballistic missile and spacecraft trajectories. Orbital determination of in plane and out of plane orbital changes. Position and velocity as a function of time and rendezvous. Vehicle accuracy and launch errors.

AMEC4021 E
Random Vibrations and Signal Analysis
Staff Contact: Mr I.W. Linnett
TH27
Prerequisite: AMAT3403 E

Random vibrations: probability distributions, joint probability, correlation, Fourier analysis and spectral density; excitation and response relations for linear systems, transmission of random vibrations and narrow band processes. Digital spectral analysis: discrete Fourier transforms, the FFT, pseudo-random processes and multi-dimensional spectral analysis. Applications: response of systems to stationary random excitation, network analysis, vibration interpretation, predictive maintenance and balancing analysis; noise analysis and reduction, spectral signatures, production and structural testing and modal analysis.

AMEC4051 E
Rapid Action Repair
Staff Contact: Mr R.B. Heslehurst
TH13
Prerequisites: AMEC3019 E
Corequisites: AMEC4040 E and AMEC4054 E and AMEC4046 E

Define the principles and requirements of rapid action repair. Review aircraft structural design analysis methods and damage assessment techniques. Develop repair design schemes to structures and systems based on technician skills and the availability of materials and equipment. Determine repair application methods.

AMEC4052 E
Rotary Wing 3
Staff Contact: Dr V. Sharma
TH27
Prerequisite: AMEC3026 E

Performance—hover and vertical flight, forward flight and climbing forward flight. Trim, stability and control. Aerodynamics design considerations. Engine performance. Winged and tandem rotor helicopter performance.

AMEC4053 E
Rotary Wing 4
Staff Contact: Dr V. Sharma
TH27
Prerequisite: AMEC4052 E

Stability and control of rotor blade motion. Control power and sensitivity. Response to control inputs. Gust response. Transition to autorotation in forward flight.

AMEC4054 E
Structural Analysis
Staff Contact: Mr R.B. Heslehurst
TH13
Prerequisite: AMEC3019 E
Corequisites: AMEC4046 E and AMEC4040 E

Review aircraft structural design analysis methods. Evaluate classical and simple methods of structural analysis. Develop damage assessment techniques. Assess damage criticality.

AMEC4055 E
Structural Joining Methods
Staff Contact: Mr R.B. Heslehurst
TH13
Prerequisites: AMEC2013 E or AMEC2011 E or AMEC2003 E

Corequisite: AMEC3023 E

Theory of load transfer in structural joints. Detailed analysis of mechanically fastened and adhesively bonded joints. Joint design fundamentals and practices. Joint structural analysis. Durability and environmental effects.

APHY4401 E
Techniques for Studying Advanced Materials 4E
TH27
Prerequisite: AMEC2007 E

See subject description under School of Physics entry (p. 106).

Bachelor of Technology in Aeronautical Engineering

The program shown below is a standard program, ie. that which can be completed in a minimum time. A student may be granted an extension of time to complete this course, and this often necessitates a non-standard program, which is drawn up by the Aerospace and Mechanical Engineering School.

Before completing their academic studies students must complete 20 days of approved practical experience, which must be done in one block with one employer. The Head of School may require students to maintain an approved record to be returned to the School to obtain credit for the work experience.

The first year of the Bachelor of Technology Degree in Aeronautical Engineering is identical with the first year of the Bachelor of Engineering Degree in Aeronautical Engineering. Descriptions of the subjects that comprise the second and third years of the degree course are given below. A choice of options in the third year allow some specialisation within the degree. This Bachelor of Technology course and the Bachelor of Engineering Degree course in Aeronautical Engineering have been designed so that a graduate with the Bachelor of Technology Degree may, under normal circumstances, articulate to the Bachelor of Engineering in Aeronautical Engineering degree course with 18 months of additional study. Details of the standard articulation program are given later in this handbook.

During the first and second years of the course, students will go on appropriate industrial visits.

Outline of Second and Later Year Courses and List of Teaching Units

Second Year Course

Subject			*Total Hours*
AMAT2800 U	Mathematics 2E		108
Two General Education subjects			54
AMEC2901 U	Aeronautical Engineering 2BT		464
AMEC2010 E	Aerodynamics 1	54	
AMEC2009 E	Aeronautical Engineering Laboratory 1	67	
AMEC2013 E	Aircraft Design 1A	51	
APHY2407 E	Atmospheric Physics and Meteorology 2BT	30	
AMEC2012 E	Flight Mechanics 1	54	
AELE1001 E	Intro. to Electrical and Electronic Engineering	66	
AMEC2007 E	Materials 1	42	
AMEC2006 E	Mechanics of Solids 1	48	
AMEC2001 E	Thermodynamics 1	52	
			626
Average contact hours per week			23.2

Third Year Course

Subject			*Total Hours*
AMEC3902 U	Aero Project		108
AMEC3903 U	Practical Experience (Tech-Aero)*		
Two General Education subjects			54
ACSC2803 U	Computer Science 2AE		40
ACSC2401 E	Numerical Analysis 2E	40	
AMAT3802 U	Mathematics 3BT		54
AMAT3403 E	Probability 3E	27	
AMAT3402 E	Differential Equations 3E	27	
AMEC3901 U	Aeronautical Engineering 3BT		364
AMEC3016 E	Aerodynamics 2	54	
AMEC3015 E	Aeronautical Engineering Laboratory 2	54	
AMEC2008 E	Aerospace Materials	13	
AMEC3018 E	Aircraft Propulsion	27	
AMEC3021 E	Aircraft Structures 1A	27	
AMEC4030 E	Maintenance Management and Logistics Engineering	27	
ACSC3402 E	Management Science 3E	27	
ACMA3017 E	Project Management 1	27	
			620
Average contact hours per week			23

Elective units: 108 hours of units to be selected from Options 1 or 2 subject to prerequisites requirements.

Options 1

AMEC3022 E	Aircraft Systems	27
AMEC3023 E	Composites & Adhesives	14
AMEC3014 E	Instrumentation	13
AMEC3024 E	Maintenance and Repair of Aircraft	27
AMEC3025 E	Rotary Wing 1	27
AMEC3026 E	Rotary Wing 2	27

Options 2

AMEC4006 E	Acoustic Noise	27
AMEC4045 E	Applications of Fatigue and Fracture Mechanics	27
AMEC4012 E	Boundary Layers and Separated Flows	27
AMEC4029 E	Chaos and Non-Linear Dynamics	27
AMEC4046 E	Composite Mechanics	13
AMEC4047 E	Experimental Stress Analysis	13
AMEC4048 E	Machine Condition Monitoring	13
AMEC4019 E	Mechanics of Fracture	27
AMEC4026 E	Occasional Elective	27
AMEC4050 E	Orbital Mechanics	27
AMEC4021 E	Random Vibrations and Signal Analysis	27
AMEC4052 E	Rotary Wing 3	27
AMEC4053 E	Rotary Wing 4	27
AMEC4055 E	Structural Joining Methods	13
APHY4401 E	Techniques for Studying Advanced Materials 4E	27

* See Rule 6 of the BTech Degree Rules.

Subject Descriptions

AMAT2800 U
Mathematics 2E
TH108

See subject description under School of Mathematics and Statistics entry (p. 98).

AMEC2901 U
Aeronautical Engineering 2BT
TH464

Except for Aircraft Design 1A, and Atmospheric Physics and Meteorology 2BT, the rest of the units of Aeronautical Engineering 2BT are the same as those within Aeronautical Engineering 2.

AMEC2013 E
Aircraft Design 1A
Staff Contact: Mr R.B. Heslehurst
TH51
Prerequisite: AINT1401 E
Corequisite: AMEC2006 E

Introduction to aircraft design principles and the design process with examples and emphasis on machine elements and the influence of manufacturing processes on design. Aircraft component design and analysis. Engineering ethics.

APHY2407 E
Atmospheric Physics and Meteorology 2BT
TH30

See subject description under School of Physics entry (p. 106).

AMEC3902 U
Aero Project
TH108

The project will take the form of a minor piece of research or investigation, a feasibility study, or a literature review.

Project management techniques will be adopted and assessed in the implementation of the project.

ACSC2803 U
Computer Science 2AE

ACSC2401 E
Numerical Analysis 2E
S1 TH40

See subject description under School of Computer Science entry (p. 79).

AMAT3802 U
Mathematics 3BT

AMAT3403 E
Probability 3E
S1 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMAT3402 E
Differential Equations 3E
S2 TH27

See subject description under School of Mathematics and Statistics entry (p. 99).

AMEC3901 U
Aeronautical Engineering 3BT
TH256

In Aeronautical Engineering 3BT, except for the unit Aircraft Structures 1A, the rest of the units are common to those in Aeronautical Engineering 3. Descriptions of the units within Options 1 and 2 are the same as listed under Aeronautical Engineering 3 and 4 respectively.

AMEC3021 E
Aircraft Structures 1A
Staff Contact: Dr K. Shankar
TH27
Prerequisite: AMEC2006 E

Application of statics and mechanics of solids theory to aircraft structures. Theory of shear flow in thin-walled structures and semi-monocoque structures. Thin-walled structures in torsion and warping conditions.

Standard Articulation

Graduates who have a Bachelor of Technology degree in Aeronautical Engineering from this University may, under normal circumstances, articulate to a Bachelor of Engineering degree with 18 months additional study. Set out below is the Standard Articulation Program. Please note that the options previously completed in the Bachelor of Technology degree will not be available to the student in the Articulation Program and selection will be subject to the approval of the Head of School. Prerequisite requirements will apply.

Subject		*Total Hours*
AMEC4901 U	Aeronautical Engineering Project and Thesis	216
AMEC4902 U	Practical Experience (Aeronautical Engineering)*	
AMAT4801 U	Mathematics 4BT	54
AMAT3401 E	Complex Analysis 3E (S1) 27	
AMAT3404 E	Statistics 3E (S2) 27	
AMEC4903 U	Aeronautical Engineering 4BT	479

Compulsory Units

AMEC4037 E	Aerodynamics 3	27
AMEC4038 E	Aeronautical Engineering Laboratory 3	27
AMEC4042 E	Aircraft Design 1B	27
AMEC3017 E	Aircraft Design 2	54
AMEC4039 E	Aircraft Design 3	27
AMEC4040 E	Aircraft Structures 2	27
AMEC4043 E	Aircraft Structures 1B	27
AECM3401 E	Engineering Economics	27
AMEC3020 E	Flight Mechanics 2	27
AMEC4041 E	Flight Mechanics 3	27
AECM3402 E	Theory of Management	27
		749
Average Contact hours per week		18.7

Elective units: 155 hours (minimum) of units to be selected from Options 1 or 2 subject to prerequisite requirements.

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* See Rule 6 of the BE Degree Rules.

Apart from the subject Mathematics 4BT and the units Aircraft Design 1B and Aircraft Structures 1B, the rest of the units in Aeronautical Engineering 4BT, including the Options 1 and 2, are the same as those in the third and fourth years of the Bachelor of Engineering degree course in Aeronautical Engineering, details of which are given earlier in this handbook.

AMEC4042 E
Aircraft Design 1B
Staff Contact: Mr R.B. Heslehurst
TH27

Theories of failure including crack propagation theory and uniaxial fatigue design theory. Example topics include: Screw threads, bolted connections, clutches, sliding bearings, ball and roller bearings, springs, and welded connections.

AMEC4043 E
Aircraft Structures 1B
Staff Contact: Dr K. Shankar
TH27
Prerequisite: AMEC2006 E
Corequisite: AMEC2008 E

Introduction to theories and methods of structural analysis. Fundamentals of finite element analysis theory and application. Introduction to plate and shell structural theory.

Units offered to Electrical Engineering

AMEC4401 E
Mechanical Technology
TH54

Machine Elements–kinematics and dynamics of simple link mechanisms, cams, screws and geared systems; energy fluctuations in machines.

Imperfections of models: distributed inertia, friction, flexibility, non-linearity, hysteresis and backlash

Wear, abrasion, bearings and lubrication.

Vibration–excitation and isolation; vibrations in rotating machines, balancing.

Acoustics–effects of noise and vibration, acoustic wave equation, sound pressure level and sound power level,

acoustic and vibration instrumentation, principles of acoustic noise and vibration control, acoustic noise of electrical machines.

Fluid Power–pneumatic and hydraulic systems: pumps and compressors, valves, actuators and transducers; analogue controllers, servos, their transfer functions and operational characteristics. Logic components, sequencing; fluidics. Interfacing with electrical and electronic systems.

Thermofluids–absolute temperature, first and second laws of thermodynamics, entropy, thermal efficiency, power and heat pump cycles; steam and gas turbines. Real and ideal fluids, fluid statics, Bernouilli and momentum equations, pumps, impulse and reaction turbines.

Introduction to heat transfer.

Measuring and monitoring in mechanical systems.

Matching of mechanical and electrical components.

AMEC4402 E
Dynamics of Machinery 1
TH27
AMEC4403 E
Dynamics of Machinery 2
TH27

The syllabus for each of the above units will consist of one of the following five areas, chosen in consultation with the Head of School taking into account global student preference and the availability of teaching resources. All five may not be available for selection each year.

Students enrolled in both Dynamics of Machinery 1 and Dynamics of Machinery 2 must choose different areas for each unit.

Machine Components and Dynamics

Machine components as load bearing elements. Mechanisms of failure in machine components.

Condition monitoring of electrical and mechanical machines.

Vibration in multiple degree of freedom systems: Lumped and distributed parameter systems. Lagrangian formulation of the equation of motion. Principal and normal coordinates. Matrix formulation, determination of modes, forced responses, transmission of force and motion. State vector, transfer matrix techniques. Applications to electrical machines and their environment.

Power transmissions.

Vibration Problems in Machinery

Modal testing as an analytic and diagnostic tool and its applications to structure and machines.
Identification of the source of vibration and its transmission path. General techniques for amelioration of vibration problems.
Case studies (taken from the Services environment where possible) will be used as examples and for assignments.

Random Vibrations and Signal Analysis

Random vibrations: probability distributions, joint probability, correlation; Fourier analysis and spectral density; excitation and response relations for linear systems, transmission of random vibrations.
Digital spectral analysis: DFTs, EFTs; pseudo-random processes and multi-dimensional spectral analysis.
Applications: system response to stationary random excitation; network analysis; vibration interpretation; predictive maintenance and balancing analysis; noise .

Three Dimensional Mechanisms—Robotics

Mechanisms in three dimensions: closed and open chain mechanisms—robots. Kinematics: spacial descriptions, kinematics and inverse kinematics, velocities and static forces, trajectory generation. Dynamics: dynamic forces and dynamic simulation; position, force and position-force control; introduction to robotic programming.

Rotating Machinery & Non-linear Dynamics

Rotating machinery: critical speeds, balancing of rigid and flexible rotors, gyroscopic effects; examples—frame vibrations in electrical machines, helicopter rotor and propeller vibrations.
Self-excited vibrations: stability criteria, source of self-excited vibrations—friction, hysteresis, oil films in bearings, aerodynamic effects, gyroscopic coupling.
Nonlinear systems: examples of nonlinear systems; nonlinear springs, nonlinear damping, equivalent viscous friction; direct integration, approximate methods for free vibrations, forced nonlinear vibration, subharmonic resonance; stability analysis; piecewise-linear systems; numerical solution techniques.

General Education subjects

The general education requirements for the BA and BSc degrees are specified in rules 6 and 7 of the degree rules. For the BE degree the general education requirements are shown in Schedules E2 and E3 for each of the degree streams (see p. 51).

Table of General Education subjects

The following list shows the General Education subjects offered and the degree courses in which they are available (A—Arts, S—Science, E—Engineering and Technology).

GENZ0501 U	The World of Chemistry	A
GENZ0502 U	Chemistry and Life	A
GENZ0503 U	Chemistry in Defence and Peace	A
GENZ1501 U	Engineering the Environment	S,A
GENZ8501 U	Computers and Society	S
GENZ8502 U	Information Technology in Organisations	A
GENZ1001 U	Competition and Innovation	S,E
GENZ1002 U	Macroeconomic Growth and Stability	S,E
GENZ1003 U	Leadership Studies	S,E
GENZ2001 U	Telecommunications: Principles, Systems and Policy	A
GENZ5001 U	Writing and the Media	S,E
GENZ5002 U	Issues in Modern Australian Literature and Film	S,E
GENZ5003U	Literature and Modern War	S,E
GENZ5004 U	Science and the Literary Imagination	S,E
GENZ5005 U	Australian Literature and Film	S,E
GENZ5006 U	American Literature	S,E
GENZ4501 U	The First World War: Image and Reality	S,E

GENZ4502 U	Rats, Lice and History	S,E
GENZ4503 U	Suakin to Saigon: A Survey of Australian Military History	S,E
GENZ4504U	Black-White Relations in Australia	S,E
GENZ4505 U	Japan in the Modern World	S,E
GENZ4506 U	The American Civil War	S,E
GENZ4507 U	Australia in the Twentieth Century	S,E
GENZ3501 U	Marine Environment	A,E
GENZ3502 U	Marine Resources	A,E
GENZ5503 U	The World of Mathematics	A
GENZ5501 U	Presenting and Analysing Data in the Social Sciences	A
GENZ5502 U	Statistical Modelling in the Social Sciences	A
GENZ2501 U	Mechanics of Flight 1	S,A
GENZ2502 U	Mechanics of Flight 2	S,A
GENZ6001 U	Physics for Society	A
GENZ6002 U	Astronomy	A
GENZ6003 U	Introductory Meteorology	A
GENZ6004 U	Environmental Physics	A
GENZ4001 U	Why Politics Matters	S,E
GENZ4002 U	Issues in Contemporary Australian Politics: foreign policy dimensions	S,E

Descriptions of subjects

CHEMISTRY

GENZ0501 U
The World of Chemistry
Staff Contact: Dr H.A. McKenzie
S1 or 2 C7.5 HPW2

This subject concentrates on the relationship between chemistry and planet earth today and, starting with the elements in the solar system and on the earth, how that relationship arose. It deals with several topics of importance to service personnel as well as to Australia: water, its role in technology and society and the need for purification; the future of the world's resources, problems of pollution and overuse of resources; the use of fossil fuels and chemicals in the development of smog, acid rain and the destruction of the ozone layer.

GENZ0502 U
Chemistry and Life
Staff Contact: Dr H.A. McKenzie
S1 or 2 C7.5 HPW2

This subject is concerned with how our knowledge of chemistry has developed, as well as its applications to the life sciences. The topic includes the study of how benefits and risks are assessed, and of the various types of laws needed to govern the use of water, pharmaceuticals and fuels; trace-elements in the human body as well as their essentiality and toxicity; organic substances and life; general nutritional needs, including vitamins. The subject also touches diet, diabetes, cancer and coronary heart disease in relation to health and nutrition; food preservation, storage and transport for the Defence Forces; forensic science and the justice system with particular emphasis on problems of interpretation.

GENZ0503 U
Chemistry in Defence and Peace
Staff Contact: Dr H.A. McKenzie
S1 or 2 C7.5 HPW2

This topic entails an analysis of the benefits and risks of using chemical knowledge to improve the lot of humanity and the problems of regulatory laws in peace and conventions in war. The subject is approached by taking a chemical view of matter, in particular the structure of the nuclear atom. This leads to a study of nuclear reactions, radioactive dating methods, nuclear reactors, nuclear weapons, and the global problem of nuclear waste. It also covers the manufacture and properties of metals and alloys (particularly for defence equipment) and problems of corrosion; the organic chemical industry, especially the petrochemical industry, and the implications in peace and war; explosives; solar energy and the genesis of the elements; the principles of defence against chemical weapons; current conventions banning usage; a brief look at the future.

CIVIL ENGINEERING

GENZ1501 U
Engineering the Environment
Staff Contact: Dr A.T. Webb
S2 C7.5 HPW2

Since prehistoric times humans have endeavoured to improve their lot by tampering with the natural environment - river courses have been altered, mountains have been moved, seas have been turned to land. Without these changes there would have been no advance in civilisation. But such advancement sometimes comes at a price including impact on other societies and damage to the larger environment. The course will examine, via several historical examples, the benefits and disbenefits of major engineering events. Topics will be selected from Roman roads, the polders of the Netherlands, impact of public health engineering, the political power of water, protecting the coast, fossil fuel power generation, mechanisation and agriculture, developments in materials and technology.

COMPUTER SCIENCE

GENZ8501 U
Computers and Society
Staff Contact: Mr D. Munro
S1 C7.5 HPW2

Computers are an integral part of most people's lives in a modern society. Most often the computers which they use are buried inside other products and services. Anyone who has made a phonecall, sent a fax, ordered pizza or used an ATM has used a computer. This course surfaces and makes explicit the role of computers and the computing profession within the general topic areas of: - Safety and Reliability; Electronic Communities; Privacy and Social Control; Organisations and Worklife; and Ethics and Professional Responsibilities.

GENZ8502 U
Information Technology in Organisations
Staff Contact: Mr D. Hart
S2 C7.5 HPW2

This subject aims to give an overview of the technology and use of computer based information systems in modern organisations. Emphasis is placed on describing and explaining the technology and terminology of computers and software. Ways in which information systems are built using computers to support modern organisations such as the Australian Defence Force are introduced. Basic practical experience will be given in the use of typical office automation applications such as word processors, graphics packages, spreadsheets and personal databases. Students will be briefly exposed to typical computer operating systems and programming in a third generation programming language.

ECONOMICS AND MANAGEMENT

GENZ1001 U
Competition and Innovation
Staff Contact: Dr O.K. Tam
S1 C7.5 HPW2

This subject offers an introduction into how people and business organisations make economic decisions. It examines demand and supply and examines the operation of the market in coordinating decisions and resolving conflicts. It also introduces students to an understanding of production and costs, with attention to the role of science and technology in innovation. All theoretical concepts are explained using case study materials and policy applications.

GENZ1002 U
Macroeconomic Growth and Stability
Staff Contact: Prof W.E. Kasper
S2 C7.5 HPW2

This subject builds upon microeconomic analysis to examine the large contemporary economic issues at national and international levels. The fundamentals of the process of economic growth are developed (including, the mobilisation of factors of production, institutional settings, the role of openness to international trade). The problems of macroeconomic instability and the role of monetary and other stabilisation policies in an open economy are analysed, with attention to contemporary Australian and international issues and to implications for Defence.

GENZ1003 U
Leadership Studies
Staff Contact: Dr J. Warn
S1 C7.5 HPW2

Within contemporary approaches to management, leadership is understood as integral to management activity. This subject provides a critical treatment of leadership studies within the context of contemporary management scholarship. Different conceptualisations of leadership and organisations are examined within the context of different organisational settings. A framework is thereby provided for the critical examination of different modes of leadership, and for understanding the adaptation of leadership to changing organisational and cultural environments.

ELECTRICAL ENGINEERING

GENZ.2001 U
Telecommunications: Principles, Systems and Policy
Note/s: Not offered in 1997

ENGLISH

GENZ5001 U
Writing and the Media
Staff Contact: Mr J. Doyle
S2 L2 C7.5 HPW2

This course aims to improve students' understanding of the writer's role in print and non-print media, such as newspapers, magazines and books, as well as film and television. It begins with an introduction to the issues which the writer confronts in the media, such as ethics and the manipulation of information and images, with particular reference to the Australian context. It then introduces students to the different forms of media; in this section, students will have the opportunity to practice and develop their own writing skills. Following this, the course moves into a series of thematic modules. The central module looks at different media representations of leadership.

GENZ5002 U
Issues in Modern Australian Literature and Film
Note/s: Not offered in 1997

GENZ5003 U
Literature and Modern War
Note/s: Not offered in 1997

GENZ5004 U
Science and the Literary Imagination
Note/s: Not offered in 1997

GENZ5005 U
Australian Literature and Film
Note/s: Not offered in 1997

GENZ5006 U
American Literature
Staff Contact: Dr H. Neilson
S1 L2 C7.5 HPW2

Through the study of some short works of fiction, essays and film texts, this subject will introduce students to different perspectives on the United States in the twentieth century.

HISTORY

GENZ4501 U
The First World War: Image and Reality
Staff Contact: Dr R. Prior
S2 C7.5 HPW2

This subject will investigate key issues in First World War studies—morale and discipline, nationalism, obedience and mutiny, patriotism, propaganda and truth—through the medium of film. The course will consist of one week in which films will be shown and the following week a paper will be delivered on the main issues brought out by the film.

GENZ4502 U
Rats, Lice and History
Staff Contact: Mr C. Glyn-Daniel

S1 C7.5 HPW2

The intention of this subject is to introduce non-historians to the rôle of major and usually epidemic diseases in the development of human societies over the past 2000 years. A series of case studies from ancient Rome to AIDS in the modern world will be undertaken.

OCEANOGRAPHY

GENZ3501 U
Marine Environment
Staff contact: Dr R. Nunes Vaz
S1 C7.5 HPW2

The physical environment of the oceans and its impact on society. A discussion of the structure and motion of the oceans and the interaction with the atmosphere, as well as the ocean's role in weather, climate, and economics.

GENZ3502 U
Marine Resources
Staff contact: Dr C. Hearn
S2 C7.5 HPW2

A discussion of resources of the oceans. These include fisheries, fossil fuels, energy sources such as tides and ocean thermal energy, desalinisation and mariculture. The environmental importance of coastal regions, estuaries and coral reefs. Threats to the marine environment from human activities, marine pollution, overfishing, change in land use and coastal and offshore engineering.

MATHEMATICS AND STATISTICS

GENZ5503 U
The World of Mathematics
Note/s: Not offered in 1997

GENZ5501 U
Presenting and Analysing Data in the Social Sciences
Staff Contact: Ms B. Anderson
S1 C7.5 HPW3

Decision-making in our society now usually involves the presentation of a great deal of information, often in the form of statistics. It is essential to have an understanding of the uses and abuses of basic statistics, from the presentation of data to the use of confidence intervals. This course explores basic data analysis, initially using students' own class data—height, weight, beer consumption etc., using a computer for graphical work and to carry out statistical calculations. Students will work in pairs on a project for which they collect their own data.

GENZ5502 U
Statistical Modelling in the Social Sciences
Staff Contact: Ms B. Anderson
Note/s: This subject follows on from AMAT.0501 U.
C7.5 S2 HPW3

In today's world we all need to understand the language of statistics, whether in reading the newspaper, or reading or writing reports conveying quantitative information. This subject aims to give students some understanding of basic hypothesis testing, regression and time series using a computer package for graphical work and statistical calculation. Students will work in pairs on a project putting their coursework into practice.

AEROSPACE AND MECHANICAL ENGINEERING

GENZ2501 U
Mechanics of Flight 1 (Aircraft Aerodynamics)
S1 C7.5 TH27
Prerequisites: HSC or equivalent in Physics and Mathematics

Properties of liquids and gases. International Standard Atmosphere (ISA). Bernoulli's equation.

Boundary layers and drag

Lift and circulation. Flow over aerofoils and wings.

GENZ2502 U
Mechanics of Flight 2 (Aircraft Performance)
S2 C7.5 TH27
Prerequisites : GENZ2501 U

Basic flight theory. Steady level, climbing and gliding flight. Take-off and landing. Turning flight. Aircraft propulsion. Elements of stability and control.

PHYSICS

GENZ6001 U
Physics For Society
Staff Contact: Dr P.W. Thompson
C7.5 S1 HPW2

Science is an integral part of our culture, so it is useful to examine the scientific method and the purpose of science. We can also look at the importance and impact on today's society of many of the major discoveries in physics. These range from aspects of the world of everyday experience to physics beyond experience. Among the topics to be considered will be Mechanics & Relativity; Light, Optics, Lasers & Holography; Temperature & Heat; Electricity & Magnetism; the Atom, Nuclear Energy & Radioactivity.

GENZ6002 U
Astronomy
Staff Contact : Dr C. H. Smith
C7.5 S2 HPW2

Since the beginning of history people have looked up at the sky and wondered The stars moon and planets are our constant and enduring companions. In this course we first look at the solar system in some detail, how it formed and how it has evolved the similarities and differences between the planets. We look at the search for life in the solar system and then the wider scale SETI (Search for Extra-Terrestrial Intelligence) program. Then we learn how a star is formed, its life and then its eventual demise This includes study of the characteristics of a white dwarf neutron star and black hole. Next we see the place of the sun in the Milky Way and compare our galaxy with other types of galaxy Finally, we consider current Cosmological theories about the beginning of the Universe, the "Big Bang", and try to see our place in the grand scheme of the Cosmos.

GENZ6003 U
Introductory Meteorology
Staff Contact: Dr D.K. Fowler / Dr R.W.N. Kinnear

C7.5 S1 HPW2

The subject will be presented in the context of weather and climate influences on human activities such as aviation and shipping, communications, military operations, habitation, comfort and health.

Variation of Sun's heating over the Earth. Global circulation. Vertical structure of the atmosphere, temperature profile, ozone layer, ionosphere, boundary layers. Atmospheric moisture: droplet formation and growth clouds and precipitation. Forces affecting air masses: pressure gradients geostrophic flow mid-latitude cyclones and anticyclones, fronts tropical cyclones. Thunderstorms. Land and sea breezes, anabatic and katabatic flow, Foehn winds. Severe weather, natural disasters, pollution.

GENZ6004 U
Environmental Physics
Staff Contact: Dr J. R. Taylor
C7.5 S2 HPW2

Society today is faced with a multitude of environmental problems many of which cannot be properly assessed without a reasonable knowledge of the basic physical principles underlying them. This subject will present these physical principles in the context of understanding a selection of global scale environmental problems including the enhanced greenhouse effect and its possible consequences such as global warming, sea-level rise and the need to exploit alternative energy sources; ozone depletion and the contribution of human activities through the release of chlorofluorocarbons (CFCs) and stratospheric flying aircraft; the release and transport of ionising radiation into the environment resulting from both peaceful and military uses of nuclear energy. Some or all of these global problems will have direct impacts on the physical environment in which the Australian Defence Force operates; the physics behind these impacts will also be examined.

POLITICS

GENZ4001 U
Why Politics Matters
Staff Contact: Dr D. W. Lovell
C7.5 S1 HPW2

This subject will explore the impacts of politics upon our everyday lives as we go about our business as citizens, as members of the ADF, and as professional scientists and engineers. What are our political obligations as citizens, and can we trust politicians? What is the legal role of the armed forces, and why should they obey governments? How is defence policy made? Why does government regulation of professional activities constantly increase? If the subject occurs in a year with a federal election, it will examine the development of the election campaign with particular reference to domestic issues. Students will thus be introduced in a practical way to the mechanics, limitations and frustrations of the Australian political system.

GENZ4002 U
Issues in Contemporary Australian Politics: foreign policy dimensions

Staff Contact: Dr D. W. Lovell
C7.5 S2 HPW2

This subject will focus on issues taken from contemporary political debate, highlighting the foreign policy dimensions. The following questions indicate the sorts of issues covered. Is Australia's immigration intake appropriate? If Australia becomes a republic, will our relations with Asia improve? Is Australia's approach to environmental issues in our region hypocritical? Does Australia's defence strategy send the wrong messages to our neighbours? How should Australia deal with human-rights violations in neighbouring countries (or trading partners)? If the subject occurs in a year with a federal election, it will examine the development of the election campaign with particular reference to foreign policy issues. Students will not only become more knowledgeable about particular issues, but they will be able to understand how such issues develop and are resolved (or why they remain unresolved).

Asian Languages

The opportunity exists for 2nd and 3rd year students enrolled in the BA or BSc programs to study an Asian language (Chinese, Indonesian, Japanese). Students wishing to enrol in an Asian language require permission from the Commandant and the Rector.

Students may apply to enrol in Bahasa Indonesia at the Australian National University or in Japanese or Chinese at the University of Canberra. Successfully completed Asian language subjects will be counted as Arts subjects towards the BA and BSc degrees:

first-year sessional subjects	15 credit points each
second-year sessional subjects	20 credit points each
third-year sessional subjects	30 credit points each

Students intending to apply for enrolment in 1998 should contact Student Administration by September 1997.

Asia–Pacific Studies

The Asia–Pacific Studies program offers BA students the opportunity to concentrate a significant proportion of their academic attention, after their first year of study, on the countries and cultures of the Asia–Pacific region. To achieve a sub-major in Asia–Pacific Studies it will be necessary for students to have gained at least 70 credit points from subjects with a substantial Asia–Pacific emphasis. These should include at least one of the two interdisciplinary core units. In addition, students could take the other Asia–Pacific interdisciplinary subject and/or two discipline-based Asia–Pacific subjects to make up their 70 credit points. The Asia–Pacific Studies sub-major can be built on any Schedule A or Schedule AS subjects at Level I (i.e. English, History, Politics, Economics, Geography).

In 1997, three interdisciplinary 'core' subjects will be offered, two single session subjects at second or third year level ('Asia–Pacific Culture: China' – 20/30 credit points, and 'War and Society in the Asia-Pacific' – 20/30 credit points) and last a one session subject at third-year level ('Asia–Pacific Issues: Economics, Politics and Society' – 30 credit points). Outlines of these three interdisciplinary core subjects are given below:

Core Subjects (Inter-Disciplinary)

AINT2601 U/3602 U
Asia–Pacific Culture: China
Staff Contact: Dr S. Lone (History), Mr J. Doyle (English)
S1 C20/30 HPW4
Prerequisite: 120 credit points in Level I subjects, and at least 20 credit points in any other approved Asia-Pacific subject

This subject will integrate the disciplines of History and English to examine aspects of Asia–Pacific culture. In 1997 the subject will explore Chinese experience in the 20th century. It will achieve this through a combination of lectures outlining historical themes and tutorials incorporating Chinese literary and visual works which illustrate and amplify these themes. In this way, students will obtain a fuller understanding of the dialogue between politics, society and culture. Themes to be considered will include the compatibility of official and popular morality, the nature of violence, the role of women within the changing social system, and the political education of youth.

AINT2603 U/3603 U
War and Society in the Asia–Pacific
Staff Contact: Mr J. Doyle (English), A/Prof C. Thayer (Politics)
S2 C20/30 HPW4
Prerequisite: 120 credit points in Level I subjects, and at least 20 credit points in any other approved Asia-Pacific subject

This subject is a study of the inter-relationship between War and Society within a selection of nations, their oponents and allies, within the Asia Pacific region. It focuses on the specifics of the historical, political and strategic issues arising from the circumstances preceding conflict, and their evolution during and after conflict. Consideration of their cultural products, for example in their literary and cinematic handling of warfare and its social effects on both the military and wider communities will also be studied.

AINT2604 U/3604 U
Asia–Pacific Studies: Occasional Option
Note/s: Not offered in 1997

AINT3601 U
Asia–Pacific Issues: Economics, Politics and Society
Staff Contact: Dr O. K. Tam (Economics and Management) Dr D. Kelly (Politics)
S2 C30 HPW4
Prerequisite: AECM1601 U and APOL1600 U and 40 credit points at Level II from any School participating in the Program.

This subject is offered from the School of Economics and Management and the School of Politics. It examines the major issues of current economic and political developments in selected countries in East and Southeast Asia. Theories and relevant empirical studies in the economics of the transformation of economic systems, marketisation, internationalisation, and growth; and in the politics of regime transition, social reform and democratisation will be introduced. Questions thus raised will be considered from different perspectives.

In addition to the core subjects listed, a number of single-discipline subjects may be offered in the Asia–Pacific Studies Program at 2nd/3rd year levels. They include the following:

Discipline-Based Courses

The following subjects for second or third year undergraduates are indicative of the range of subjects in particular schools which may form part of an Asia–Pacific Studies sub-major. Not all subjects are necessarily available in a particular year. Prospective students should check the availability of particular subjects under the School entry:

English

Images of the Asia-Pacific
Literature of Australia and the Asia-Pacific Region—Imagined Homelands
Commonwealth Literature

Geography and Oceanography

The Geography of Development

History

East Asia Between Tradition and Modernity
Social Change in East Asia
Southeast Asia: Revolution, Nation and Society
History of the Pacific Basin

Politics

Politics of Indonesia
Politics of Korea
Politics of Southeast Asia
Politics of China
Politics in Japan
Security Issues in Southeast Asia

Economics and Management

International Trade
International Economic Theory and Policy
Asia-Pacific Economies
Capitallism, Socialism and Economic Growth

Asian Languages

Undergraduate students who are studying Asian languages at university level may wish to have these subjects counted towards the sub-major in Asia–Pacific Studies.

Graduate Study

Opportunities exist in the University College for study and research at postgraduate level leading to the award of the following degrees, diplomas and certificates of the University. Registration for postgraduate candidature is open to both civilian and defence force personnel.

The conditions and rules governing the award of postgraduate programs available at the University College are set out at the end of this section. Candidates are advised to study the conditions and rules applicable to their program.

Research Degrees

Awarded for research and require the preparation and submission of a thesis embodying the results of an original investigation or design.

Degree	*School*	*Course code*
PhD	Aerospace and Mechanical Engineering	
	- Aerospace	1663
	- Mechanical	1661
	Chemistry	1871
	Civil Engineering	1631
	Computer Science	1885
	Economics and Management	1541
	Electrical Engineering	1643
	English	1201
	Geography and Oceanography	1081
	History	1241
	Mathematics and Statistics	1881
	Physics	1892
	Politics	1321
MA(Honours)	Economics and Management	2271
	English	2281
	Geography	2301
	History	2321
	Politics	2401
ME	Aerospace and Mechanical Engineering	2691
	Civil Engineering	2651
	Electrical Engineering	2663
MSc	Chemistry	2911
	Computer Science	2925
	Geography and Oceanography	2041
	Mathematics and Statistics	2921
	Physics	2931

Program Identifiers for Research Degrees

The research degrees listed below have been allocated a program identifier which includes a School alphabetic prefix and a four digit suffix of '9000' (full time) and '9001' (part time) followed by the code 'R' (Research).

School	*Research program*
Aerospace/Mechanical Engineering	AMEC 9000R/9001R
Chemistry	ACHM 9000R/9001R
Civil Engineering	ACMA 9000R/9001R
Computer Science	ACSC 9000R/9001R
Economics and Management	AECM 9000R/9001R
Electrical Engineering	AELE 9000R/9001R
English	AENG 9000R/9001R
Geography and Oceanography	AGOC 9000R/9001R
History	AHIS 9000R/9001R
Mathematics and Statistics	AMAT 9000R/9001R
Physics	APHY 9000R/9001R
Politics	APOL 9000R/9001R

Coursework Degrees, Diplomas and Certificates

Candidates in these courses are required to attend formal lectures and/or seminars and, where applicable, submit a project report or sub-thesis. MA (Pass) degree students undertaking a sub-thesis must complete it within the maximum period of candidature for the degree. Most courses are usually of two sessions duration full-time or four sessions duration for a part-time course.

Coursework courses marked with * have been revised or established commencing 1997 (University approval pending).

Program	*Course*	*Course code*
MA	English	8171
MDefStud	Interdisciplinary	9900
MDefStud	(Distance Education)	9901
MEngSc*	Civil Engineering	8557
MEngSc*	Electrical Engineering	8558
MInfSc*	Information Science	8556
MMgtStud*	Interdisciplinary	8396
Grad Dip*	Civil Engineering	5801
Grad Dip	Defence Studies	5910
Grad Dip*	Electrical Engineering	5811
Grad Dip*	Management Studies	5821
Grad Dip*	Information Science	5831
Grad Cert*	Civil Engineering	7392
Grad Cert*	Electrical Engineering	7393
Grad Cert*	Information Science	7394
Grad Cert*	Management Studies	7391

Listed below are the pre-1997 equivalents of the revised courses and the pre-1997 course codes. Current students in the pre-1997 courses may choose to remain in their course or transfer to the new course equivalent. Subjects in the pre-1997 courses are identified by (10CP) after the subject title. Students remaining in the pre-1997 courses must enrol in the 10CP subjects. Students enrolling in the new courses must enrol in 8CP Level 1 subjects or 12CP Level 2 subjects (as specified in the course requirements).

Program	*Course*	*Course code*
MEngSc	Civil Engineering	8611
MEngSc	Electrical Engineering	8505
MInfSc	Information Science	8555
MMgtStud	Interdisciplinary	8395
Grad Dip	Civil Engineering	5800
Grad Dip	Electrical Engineering	5810
Grad Dip	Management Studies	5820
Grad Dip	Information Science	5830
Grad Cert	Information Science	7390

Master of Arts Degree at Pass Level MA

8171 English

Course Structure and Requirements

Candidates for the award of the MA degree in English at pass level must complete over a period of at least two sessions full-time (maximum enrolment period four sessions) or four sessions part-time (maximum enrolment period six sessions), one of the following programs.

1. Four Sessional subjects and a sub-thesis.

or

2. Six Sessional subjects.

It is expected that candidates who seek to complete the MA Pass degree in one year's full-time study will enrol in four sessional subjects and a sub-thesis.

Except for the sub-thesis, the following subjects involve a two or three hour seminar.

No.	*Title*	*Session*
Electives		
AENG8100	Sub-Thesis (English)	F
AENG8201	Australian Literature since 1960	—
AENG8202	Australian Literary Movements and Controversies	—
AENG8204	C20 Literary Theory	—
AENG8206	One Hundred Years of Women's Writing	—
AENG8207	Aboriginal Literatures and Themes—Unaipon to Recent Oral Testimony Material	S2
AENG8208	One Hundred Years of Australian Women's Writing	—
AENG8209	Australian War Literature of the Twentieth Century	—
AENG8210	Scholarship, Bibliography and Editing	—
AENG8211	Literary Modernism in Context: 1900—1920	—
AENG8212	Special Study: William Blake	S1
AENG8213	Post-Colonial Literature	S1
AENG8214	Travelling Abroad	S1
AENG8215	Australian Literature: The Canon and its Contexts	S2
AENG8216	American Fiction and Film	S2

9900 Master of Defence Studies MDefStud

The Master of Defence Studies is a coursework degree. Most of the work undertaken for the degree is associated with regular weekly attendance at seminars.

Entry Requirements

The course is normally open to graduates who have at least a major sequence in a discipline appropriate to the defence studies program.

Course Structure and Requirements

The Master of Defence Studies course requires candidates to complete over a period of at least two sessions full-time or four sessions part-time one of the two patterns of study listed below.

Either:

1. Complete coursework subjects to the value of 120 credit points chosen from the available options.

or

2. Complete coursework subjects to the value of 100 credit points chosen from the available options and an approved research project of not more than 12,000 words on a topic deemed suitable by the Subject Authority in Economics and Management, History or Politics.

5910 Graduate Diploma in Defence Studies GradDipDefStud

Candidates are required to complete 80 credit points of formal coursework from the subjects available in the Master of Defence Studies program. A research project option is not available.

The maximum number of credit points that may be taken in a single School is 60.

Defence Studies - Elective Subjects

Each of the subjects listed below - apart from the research project - involves a two hour seminar each week throughout the session, written work and an examination, and is equivalent to 20 credit points. The research project is equivalent to 20 credit points.

No.	*Title*	*Session*
AECM8245	Global Changes in Economy and Society: Security and Defence Perspectives	S1
AECM8246	Asia-Pacific Political Economy : Security and Defence Perspectives	S2
AECM8106	Research Project - Economics and Management	S1,S2
AHIS8202	Problems in the History of Australian Defence and Foreign Policy	S2
AHIS8203	A History of Pre-Nuclear Military Thought	S2
AHIS8204	Contemporary Warfare	S1
AHIS8205	The ASEAN States, the SW Pacific and Australia: Political and Defence Issues since 1945	S1
AHIS8206	Air Power and National Strategy: An Historical Perspective	S1
AHIS8207	Intelligence and National Security	S2
AHIS8101	Research Project - History	S1,S2
APOL8201	Australian Foreign Policy: Contemporary Issues	S1
APOL8202	Legal and Moral Problems of International Violence	S1
APOL8203	The Vietnam War, 1954–75: American, Australian and Vietnamese Perspectives*	S2
APOL8206	Changing Concepts of Security	S1
APOL8209	Australian Defence and Security after the Cold War*	S2
APOL8211	Northeast Asia: The Changing Regional Balance	S2
APOL8212	Politics of the United Nations	S2
APOL8214	International Security Regimes	S1
APOL8101	Research Project - Politics	S1,S2

A range of credit point sessional subjects from other disciplines is also available to candidates with an appropriate undergraduate background. Students need to have all programs approved by the Course Coordinator.

9901 Defence Studies by Distance Education

The College is continuing a 3-year pilot distance education program to Defence serving and civilian personnel in particular locations. Subjects marked with an * are being offered in 1997 (see pp 175-6 for details).
Candidates are advised to study the Conditions for the Award of Higher Degrees.

8557 Master of Engineering Science (Civil Engineering) MEngSc

8558 Master of Engineering Science (Electrical Engineering) MEngSc

Candidates may qualify for the Master of Engineering Science degree by full-time study over 2 academic sessions or part-time study over 4 academic sessions. The maximum periods of candidature are 4 and 8 sessions respectively. There are 2 sessions each year.

The degree may be obtained in either Civil Engineering or Electrical Engineering by a course of study predominantly in the School of Civil Engineering or the School of Electrical Engineering respectively.

Entry Requirements

Entry to the Master of Engineering Science is available to students who hold an appropriate four-year undergraduate degree from the University of New South Wales or an appropriate Graduate Diploma from the University of New South Wales, or equivalent qualifications from a recognised tertiary institution. In special cases entry may be granted to candidates with professional experience deemed equivalent to the academic requirements on the recommendation of the Head of School.

Course Structure

Students will be required to complete a minimum of 120 credits of formal coursework from Level 2 subjects. The course comprises 10 Level 2 subjects worth 12 credit points each. The project subjects carry 24 credits and 36 credits respectively and may be undertaken in place of 2 or 3 Level 2 subjects at the discretion of the Head of School.

With the approval of the Head of School, students may elect to take up to 40% of the required Level 2 subjects from other comparable postgraduate programs.

Under exceptional circumstances, the Head of School may require a candidate to undertake two Level 1 subjects in place of a single Level 2 subject as part of the formal coursework requirement for the degree.

All programs are subject to the approval of the Head of the School in which the candidate is enrolled.

8611 Pre-1997MEngSc Civil Engineering
8505 Pre-1997 MEngSc Electrical Engineering

The Pre-1997 Master of Engineering Science programs require the completion of 12 subjects worth 10 credit points each.

5801 Graduate Diploma in Civil Engineering GradDipCivEng

5811 Graduate Diploma in Electrical Engineering GradDipElecEng

The Graduate Diploma in Civil Engineering or Electrical Engineering is specially designed for students with an undergraduate degree in the same or a related field who wish to develop an advanced understanding of Civil Engineering or Electrical Engineering (as appropriate). The degree is intended to provide engineering professionals with professional academic qualifications.

The diploma may be obtained in either Civil Engineering or Electrical Engineering by a course of study predominantly in the School of Civil Engineering or the School of Electrical Engineering respectively.

Entry Requirements

Entry to the Graduate Diploma in Civil Engineering or Electrical Engineering is available to candidates with an undergraduate degree in the same or a related discipline. In special cases entry may be granted to candidates with professional experience deemed equivalent to the academic requirements on the recommendation of the Head of School. Candidates with a Graduate Certificate in Civil Engineering or Electrical Engineering from The University of New South Wales, or equivalent qualifications from a recognised tertiary institution, may apply for admission to the Graduate Diploma.

Course Structure

Students will be required to complete 84 credit points of formal coursework from Level 1 and Level 2 Civil Engineering or Electrical Engineering postgraduate coursework subjects. The course comprises 3 Level 1 subjects worth 8 credit points each and 5 Level 2 subjects worth 12 credit points each. It is expected that full-time students will complete the course in two sessions and that part-time students will complete in four sessions.

With the approval of the Head of School, students may elect to take up to 40% of the required Level 1 and Level 2 subjects from other comparable postgraduate programs.

Further Study

Students who have completed the requirements for the Graduate Diploma but have not taken out the qualification are eligible to apply for articulated entry in the Master of Engineering Science in Civil Engineering or Electrical Engineering within four years of completion of the Graduate Diploma. Students articulating into the Master of Engineering Science in Civil Engineering or Electrical Engineering will need to complete a minimum of 5 Level 2 subjects in order to be eligible for the Master of Engineering Science in Civil Engineering or Electrical Engineering.

Students who have been awarded the Graduate Diploma are eligible to apply for entry in the Master of Engineering Science in Civil Engineering or Electrical Engineering within four years of completion of the Graduate Diploma. Students who have been awarded a Graduate Diploma will normally need to complete 7 Level 2 subjects in order to be eligible for the Master of Engineering Science in Civil Engineering or Electrical Engineering.

All programs are subject to the approval of the appropriate Head of School.

5800 Pre-1997 GradDipCivEng
5810 Pre-1997 GradDipElecEng

The Pre-1997 Graduate Diploma in Engineering programs require the completion of 8 subjects worth 10 credit points each.

7392 Graduate Certificate in Civil Engineering GradCertCivEng

7393 Graduate Certificate in Electrical Engineering GradCertElecEng

The Graduate Certificate in Civil Engineering or Electrical Engineering is specially designed for students with an undergraduate degree or established profession in another field who wish to gain an understanding of Civil Engineering or Electrical Engineering. The degree is intended to assist professionals in coming to terms with modern technology and its use. Mature students wishing to retrain may use the Graduate Certificate as a first degree in a full postgraduate program leading up to the Master of Engineering Science in Civil Engineering or Electrical Engineering.

The certificate may be obtained in either Civil Engineering or Electrical Engineering by a course of study predominantly in the School of Civil Engineering or the School of Electrical Engineering respectively.

Entry Requirements

Entry to the Graduate Certificate in Civil Engineering or Electrical Engineering is available to candidates with an

undergraduate degree. In special cases entry may be granted to candidates with professional experience deemed equivalent to the academic requirements on the recommendation of the Head of School.

Course Structure

Students will be required to complete 40 credit points of formal coursework from Level 1 Civil Engineering or Electrical Engineering postgraduate coursework subjects. The course comprises 5 Level 1 subjects worth 8 credit points each . Each subject is 84 Postgraduate Assessable Hours (PAH) in length. It is expected that full-time students will complete the course in one session and that part-time students will complete in 2 sessions.

With the approval of the Head of School, students may elect to take up to 20% of the required Level 1 subjects from other comparable postgraduate programs.

Further Study

Students who have completed the requirements for the Graduate Certificate but have not taken out the qualification are eligible to apply for articulated entry in the Graduate Diploma in Civil Engineering or Electrical Engineering within four years of completion of the Graduate Certificate. Students articulating into the Graduate Diploma in Civil Engineering or Electrical Engineering will need to complete a minimum of 5 Level 2 subjects in order to be eligible for the Graduate Diploma in Civil Engineering or Electrical Engineering.

Students who have been awarded the Graduate Certificate are eligible to apply for entry in the Graduate Diploma in Civil Engineering or Electrical Engineering within four years of completion of the Graduate Certificate. Students who have been awarded a Graduate Certificate will normally need to complete 1 Level 1 subject and 5 Level 2 subjects in order to be eligible for the Graduate Diploma.

All programs are subject to the approval of the Head of the School in which the candidate is enrolled.

Level 1 and Level 2 subjects available in the School of Civil Engineering

NOTE:

Except where specified otherwise, Level 1 subjects have a value of 8 credit points each and Level 2 subjects have a value of 12 credit points each.

Not all of the subjects listed will be available in 1997. Students proposing to enrol should check availability with the School at the earliest possible date.

No.	*Title*
Level 1 Subjects#	
ACMA8245	Introduction to Structural Analysis
ACMA8246	Materials of Construction
ACMA8247	Environmental Engineering Fundamentals
ACMA8248	Introduction to Geotechnical Engineering
ACMA8249	Introduction to Hydraulic Engineering
ACMA8250	Introduction to Blast Loading
ACMA8251	Occasional Elective 1 (8 credit points)
ACMA8252	Occasional Elective 2 (8 credit points)
ACMA8253	Occasional Elective 3 (8 credit points)
Level 2 Subjects	
ACMA8254	Foundation Engineering
ACMA8255	Site Investigations
ACMA8256	Basic Finite Elements
ACMA8257	Applied Soil Mechanics
ACMA8258	Finite Elements in Structural Analysis
ACMA8259	Structural Engineering Materials 1 (Concrete Technology)
ACMA8260	Reinforced Concrete
ACMA8261	Prestressed Concrete
ACMA8262	Structural Dynamics
ACMA8263	Structural Engineering Materials 2 (Metals)
ACMA8264	Coastal and Ocean Engineering
ACMA8265	Civil Engineering Elective
ACMA8266	Coastal and Seabed Dynamics
ACMA8267	Transportation Planning
ACMA8268	Special Elective 1
ACMA8269	Special Elective 2
ACMA8270	Special Elective 3
ACMA8271	System Dynamics Modelling§
ACMA8272	Integrated Project Management Systems
ACMA8273	Project Management Body of Knowledge
ACMA8274	Project Systems Modelling
ACMA8104	Project Report (24 credit points)*
ACMA8105	Project Report (36 credit points)*

Not normally available to students enrolled in 8557 MEngSc

* Not available to students enrolled in 5801 GradDipCivEng

§ Quotas apply to this subject

Level 1 and Level 2 Subjects available in the School of Electrical Engineering

Except where specified otherwise, Level 1 Subjects have a value of 8 credit points each and Level 2 subjects have a value of 12 credit points each.

Not all of the subjects listed will be available in 1997. Students proposing to enrol should check availability with the School at the earliest possible date.

No.	*Title*
Level 1 Subjects	
AELE8254	Introduction to Optoelectronic Systems
AELE8255	Analogue Communications
AELE8256	Digital Signal Processing
AELE8257	Communications Systems
AELE8258	Television and Image Transmission Systems
AELE8259	Occasional Elective 1
AELE8260	Occasional Elective 2
AELE8261	Occasional Elective 3
Level 2 Subjects	
AELE8262	Airborne Radar
AELE8263	Digital Design
AELE8264	Digital Video Communications
AELE8265	Kalman Filtering

AELE8266	Mobile Communications
AELE8267	Antennas
AELE8268	Introduction to Digital Image Processing
AELE8269	Digital Image Restoration
AELE8270	Digital Communications
AELE8271	Advanced Digital Signal Processing Techniques
AELE8272	Robotics
AELE8273	Data Security
AELE8274	Advanced Data Networks
AELE8275	Spaceborne Imaging Technology
AELE8276	Linear Systems
AELE8277	Software Engineering
AELE8278	Neural Networks
AELE8279	Adaptive Antenna Arrays
AELE8280	Electrical Engineering Elective
AELE8281	Special Elective 1
AELE8282	Special Elective 2
AELE8283	Special Elective 3
AELE8284	Special Elective 4
AELE8285	Communications and Information Systems*
AELE8286	Fundamentals of Surveillance Technologies*
AELE8103	Project Report (24 credit points)†
AELE8104	Project Report (36 credit points)†

* Not available to students enrolled in MEngSc 8558 Electrical Engineering or GradDip 5811 Electrical Engineering

† Not available to students enrolled in GradDip 5811 Electrical Engineering

8556 Master of Information Science MInfSc

The Master of Information Science is designed for students who wish to develop an advanced understanding of information technology. The degree aims to provide information technology professionals with an opportunity for professional upgrading or an extension of qualifications and experience.

Entry requirements

Entry to the Master of Information Science is available to students who hold an undergraduate degree with Honours in a related discipline, or a Graduate Diploma in Information Science, from The University of New South Wales, or equivalent qualifications from a recognised tertiary institution. In special cases entry may be granted to candidates with professional experience deemed equivalent to the academic requirements on the recommendation of the Head of the School of Computer Science.

Course structure

Students are required to complete 120 credit points of formal coursework from Level 2 Information Science postgraduate subjects. Level 2 subjects are worth 12 credit points each. A project worth 24 credit points may be undertaken in place of two Level 2 subjects at the discretion of the Head of School.

Under exceptional circumstances, the Head of School may require a candidate to undertake two Level 1 subjects in place of a single Level 2 subject.

With the approval of the Head of School, students may elect to take up to 20% of the subjects from other comparable postgraduate programs.

It is expected that full-time students will complete the course in two sessions and part-time students in four sessions.

8555 Pre-1997 MInfSc

The pre-1997 Master of Information Science requires the completion of 120 credit points of formal coursework. Each subject in this program is worth 10 credit points. A project worth 30 credit points may be taken in place of 3 coursework subjects, at the discretion of the Head of School. Up to one third of the non-project subjects may be taken from other comparable postgraduate programs. Minimum periods of candidature are three sessions of full-time study or six sessions of part-time study. Maximum periods of candidature are 5 and 8 sessions respectively.

5831 Graduate Diploma in Information Science GradDipInfSc

The Graduate Diploma in Information Science is specially designed for students with an undergraduate degree in the same or a related field who wish to develop an advanced understanding of information technology. The degree is intended to provide information technology professionals with professional academic qualifications.

Entry requirements

Entry to the Graduate Diploma in Information Science is available to candidates with an undergraduate degree in the same or a related discipline. In special cases entry may be granted to candidates with professional experience deemed equivalent to the academic requirements on the recommendation of the Head of School. Candidates with a Graduate Certificate in Information Science from The University of New South Wales, or equivalent qualifications from a recognised tertiary institution, may apply for admission to the Graduate Diploma.

Course structure

Students are required to complete 84 credit points of formal coursework from Level 1 and Level 2 Information Science postgraduate subjects. The course comprises 3 Level 1 subjects worth 8 credit points each and 5 Level 2 subjects worth 12 credit points each.

With the approval of the Head of School, students may elect to take up to 20% of the required Level 1 and Level 2 subjects from other comparable postgraduate programs.

It is expected that full-time students will complete the course in two sessions and part-time students in four sessions.

Further study

Students who have completed the requirements for the Graduate Diploma but have not taken out the qualification

are eligible to apply for articulated entry in the Master of Information Science within four years of completion of the requirements for the Graduate Diploma. Students articulating into the Master of Information Science will need to complete 5 Level 2 subjects to be eligible for the Master of Information Science.

Students who have been awarded the Graduate Diploma are eligible to apply for entry in the Master of Information Science within four years of completion of the Graduate Diploma. Students who have been awarded a Graduate Diploma will need to complete 7 Level 2 subjects to be eligible for the Master of Information Science.

5830 Pre-1997 GradDipInfSc

The Pre-1997 Graduate Diploma requires candidates to complete 80 credit points of formal coursework, comprising 8 subjects worth 10 credit points each. The subjects ACSC8223 *Introduction to Information Systems* and ACSC8209 *Databases and Database Management* must be included in the program. Minimum periods of candidature are two sessions of full-time study or four sessions of part-time study. Maximum periods of candidature are 4 and 6 sessions respectively.

7394 Graduate Certificate in Information Science GradCertInfSc

The Graduate Certificate in Information Science is specially designed for students with an undergraduate degree or established profession in another field who wish to gain an understanding of information technology. The degree is intended to assist professionals in coming to terms with modern technology and its use. Mature students wishing to retrain may use the Graduate Certificate as a first degree in a full postgraduate program leading up to the Master of Information Science.

Entry requirements

Entry to the Graduate Certificate in Information Science is available to candidates with an undergraduate degree. In special cases entry may be granted to candidates with professional experience deemed equivalent to the academic requirements on the recommendation of the Head of School.

Course structure

Students are required to complete 40 credit points of formal coursework from Level Information Science postgraduate subjects. The course comprises 5 Level 1 subjects worth 8 credit points each.

It is expected that full-time students will complete the course in one session and part-time students in two sessions.

The full-time course is available in the first session only. Students wishing to commence in the second session may enrol as part-time students only.

Further study

Students who have completed the requirements for the Graduate Certificate but have not taken out the qualification are eligible to apply for articulated entry in the Graduate Diploma in Information Science within four years of completion of the requirements for the Graduate Certificate. Students articulating into the Graduate Diploma program will need to complete 5 Level 2 subjects to be eligible for the Graduate Diploma.

Students who have been awarded the Graduate Certificate are eligible to apply for entry in the Graduate Diploma in Information Science within four years of completion of the Graduate Certificate. Students who have been awarded a Graduate Certificate will need to complete 1 Level 1 subject and 5 Level 2 subjects to be eligible for the Graduate Diploma.

7390 Pre-1997 GradCertInfSc

The Pre-1997 Graduate Certificate requires candidates to complete 40 credit points of formal coursework, comprising 4 subjects worth 10 credit points each. The subject ACSC8223 *Introduction to Information Systems* must be included in the program. Minimum periods of candidature are one session of full-time study or two sessions of part-time study. Maximum periods of candidature are 2 and 4 sessions respectively.

Schedules of Subjects

Subjects are divided into two levels: Level 1 Graduate Certificate/Graduate Diploma subjects, and Level 2 Graduate Diploma/Masters subjects. Level 1 subjects involve a minimum of 84 Postgraduate Assessable Hours (PAH) of study, and are worth 8 credit points. Level 2 subjects involve a minimum of 126 PAH, and are worth 12 credit points.

No.	*Title*	*Session*
Level 1: Graduate Certificate/Graduate Diploma Subjects		
ACSC8230	Systems Analysis and Design	S1
ACSC8231	Introduction to Telecommunications	S1
ACSC8232	Introduction to Management Science*	S1
ACSC8233	Information Technology Applications	S1
ACSC8234	Introduction to Programming	S1,S2
ACSC8246	Introduction to Database Systems	S1
ACSC8259	Introduction to Information Systems*	S1,S2
Level 2: Graduate Diploma/Masters Subjects		
ACSC8229	Research Methods in Information Systems	S2
ACSC8235	Information Systems Development	S2
ACSC8236	Telecommunications Management	S2

ACSC8237	Object Oriented Programming	S1
ACSC8238	Software Project Management	S2
ACSC8239	Management Science Techniques	S1
ACSC8240	Decision Support Systems	S2
ACSC8241	Systems Programming	S2
ACSC8242	C^3I Systems	S1
ACSC8243	Data Networks	S2
ACSC8244	Knowledge Based Systems	S2
ACSC8245	Computer Security and Cryptography	S1
ACSC8247	Information Resource Management	S1
ACSC8248	Computer Graphics	S2
ACSC8249	Operating Systems	S1
ACSC8250	Software Engineering and Ada	S2
ACSC8251	Special Topic 1	
ACSC8252	Special Topic 2	
ACSC8253	Special Topic 3	
ACSC8254	Special Topic 4	
ACSC8255	Systems Planning	S2
ACSC8256	Computer Speech Processing	S2
ACSC8257	Document Processing Systems	S2
ACSC8258	User Interface Construction	S2
ACSC8260	Information Management	S1
ACSC8261	Machine Learning	S2
ACSC8262	Advanced Topics in Database Management	S2
ACSC8263	Evolutionary Computation	S2
ACSC8105	Project (24 credit points)	S1, S2
ACSC8264	Special Elective (Information Systems)*	SS

* Not normally available to Information Science students.

Management Studies Program

Following a review of the Management Studies programs, a new program structure has been introduced as from 1997. Students in the previous program may continue in that program or can transfer to the new program.

The new structure includes a Graduate Certificate and allows articulation from the Graduate Certificate through to the Masters degree.

Students wishing to change to the new program will be required to satisfy all the requirements of the new program.

Students in the old program wishing to remain in that program should consult the convenor regarding their specialisation subjects availability.

8396 Master of Management Studies MMgtStud

Management Studies encompasses the decision-making processes and techniques by which private and public sector organisations may make most effective use of their resources. The program adopts perspectives on management drawn from economics, engineering, information science and law, and develops skills of quantitative and qualitative analysis relevant to addressing management problems.

The award is offered through an interdisciplinary program supplied by the Schools of Economics and Management, Civil Engineering, Electrical Engineering, Computer Science and Aerospace and Mechanical Engineering and is intended to provide managers with professional academic qualifications from a minimum of one of the following streams: Human Resource Management [HRM], Logistics Management [LogMgt], Military Technology [MilTech], Project Management (ProjMgt) and Technology Management (TechMgt).

The **Master of Management Studies** is designed for students who wish to develop an advanced understanding of management. Candidates with extensive appropriate professional experience deemed equivalent to the academic requirements may apply for entry. Such applications will be considered on their merits.

Students will be required to complete 120 credits of formal coursework from Level 2 Management Studies subjects worth 12 credit points each.

The option of completing a research project is available to candidates who attain a high standard of achievement.

8395 Pre-1997 MMgtStud

The Pre-1997 Master of Management Studies degree requires the completion of 80 credit points which shall include subjects that form a single area of specialisation totalling at least 20 credit points. Each subject in this program is worth 10 credit points. The option of completing a sub-thesis is only available to candidates with a high credit average. Approval for enrolling in a sub-thesis resides with the Management Studies Standing Committee.

Specialisations for pre-1997 Masters students only:
Information Systems
Project Management
Technology Management

5821 Graduate Diploma in Management Studies GradDipMgtStud

The **Graduate Diploma in Management Studies** course is aimed at students with some practical and/or theoretical experience in management. The goal is to produce in graduates an understanding of the fundamental principles involved in the successful management of resources of all kinds — physical, human, intellectual, technological and financial. Mastery of certain disciplinary foundations will be essential to the achievement of this goal.

The award requires the completion of 84 credit points of formal coursework comprising 3 Level 1 subjects worth 8 credit points each and 5 level 2 subjects worth 12 credit points each.

At the Graduate Diploma level students may undertake studies free of streaming. Conversely, students may

include a stream provided that pre-requisite knowledge is satisfied.

Candidates wishing to articulate their Graduate Diploma in Management Studies program to the Masters degree, may apply for articulated entry in the Master of Management Studies within four years of completion of the requirements of the Graduate Diploma. Students articulating into the Master of Management Studies will need to complete 5 Level 2 subjects, from a specialist stream, in order to be eligible for the Master of Management Studies.

Students who have been awarded the Graduate Diploma are eligible to apply for entry in the Master of Management Studies within four years of completion of the Graduate Diploma. Students who have been awarded a Graduate Diploma will normally need to complete 7 Level 2 subjects, 4 from a specialist stream, in order to be eligible for the Master of Management Studies.

5820 Pre-1997 GradDipMgtStud

Candidates must complete a program of formal coursework comprising 40 credit points from Schedule A subjects and 40 credit points from Schedule B subjects.

7391 Graduate Certificate In Management Studies GradCertMgtStud

The course is intended to provide students who have little background in management with an opportunity to pursue study in this area. Graduates will develop key foundations essential to successful management.

The Graduate Certificate in Management Studies requires the completion of 40 credit points of formal course work, consisting of 5 Level 1 coursework subjects worth 8 credit points each.

Students who hold a Graduate Certificate in Management Studies from The University of New South Wales or equivalent qualifications from a recognised tertiary institution are required to complete a minimum of 1 Level 1 subject and 5 level 2 subjects to be eligible for the award of Graduate Diploma.

Streams exist within the Management Studies program. Each stream consists of a group of 4 Level 2 subjects. In some cases more than 4 subjects may be available in a stream; students will be able to select the 4 most appropriate to their interests from a given stream. Some Level 2 subjects are unaliged to streams.

Level 2 subjects are listed under the appropriate stream heading with unaligned subjects listed separately.

Subjects are divided into two levels: Level 1 Graduate Certificate/Graduate Diploma subjects attracting 8 credit points each and Level 2 Graduate Diploma/Masters subjects attracting 12 credit points each.

No.	*Title*	*Session*
Level 1: Graduate Certificate/Graduate Diploma Subjects		
AECM8252	Introduction to Applied Statistics	S1,2
AECM8253	Microeconomics for Managers	S1,2
AECM8254	Organisational Behaviour*	S1,2
ACSC8259	Introduction to Information Systems	S1,2
ACSC8232	Introduction to Management Science	S1

* Previously titled Foundations of Management

Level 1: Graduate Diploma/ Masters Subjects unaligned with Streams		
AECM8248	Organisation Development and Change#	S1
AECM8250	Finance and Investment Appraisal	S2
AECM8255	Australian Government Process	S1
AECM8260	Introduction to Project Management	S1
AECM8107	Research Project (24 credit points)	
ACMA8104	Project Report (24 credit points)	
ACMA8268	Special Elective 1	
AECM8261	Special Elective 1#	S2
AECM8262	Special Elective 2	
ACSC8264	Special Elective (Information Systems)#	SS

Level 2: Graduate Diploma/Masters Stream Subjects
All stream subjects can be taken individually and unaligned to streams provided prerequisite knowledge is satisfied.

Human Resource Management		
AECM8247	Leadership in Organisations#	S2
AECM8251	Human Resource Management	S2
AECM8257	Strategic Planning and Implementation	S1
AECM8261	Special Elective 1#	S2
Logistics Management Stream		
AECM8256	Logistics Management	S1
AECM8257	Strategic Planning and Implementation	S1
AMEC8203	Engineering Logistics#	S2
ACSC8264	Special Elective (Information Systems)#	SS
Military Technology Stream**		
AINT8804	Firepower	S1
AINT8805	Vehicles and Mobility	S2
AELE8285	Communications & Information Systems	S1
AELE8286	Fundamentals of Surveillance Technology	S2

Non-ATSOC students who wish to enrol in these subjects should consult the Program Coordinator and the ATSOC Director.

Project Management Stream		
AECM8263	Legal Process and Procedures	S1,2
ACMA8271	System Dynamics Modelling	S2
ACMA8272	Integrated Project Management Systems	S1
ACMA8273	Project Management Body of Knowledge	S1
ACMA8274	Project Systems Modelling#	SS
Technology Management Stream		
AECM8249	Technology Management: Case Studies	S2
AECM8257	Strategic Planning and Implementation	S1
AECM8258	Technology Management: Innovation Theory and Economic Analysis#	S2
AECM8259	Technology Management: Technology Strategy and Human Resource Aspects#	S1

** Masters Candidates undertaking the Military Technology Stream must complete one other specialist stream.

# Denotes subjects which have prerequisite/corequisite requirements. (Refer to the Subject Details section.)

Australian Technical Staff Officers' Course

The Australian Technical Staff Officers' Course is an Australian Army course, conducted at the University College, designed to prepare students to take up technical staff appointments in the ADF. The twelve month full-time course requires students (nominated by Army) to complete a specific program within either the Graduate Diploma in Management Studies or the related Masters course. In addition to completing the Management Studies program, students undertake additional studies not offered by the University College plus a number of industrial visits.

No.	*ATSOC Subjects**
AINT8804	Firepower*
AINT8805	Vehicles and Mobility*
AELE8285	Communications & Information Systems
AELE8286	Fundamentals of Surveillance Technologies

* It should be noted that these subjects will each be taught as a 4 week full-time course.

Graduate Study

Subject Descriptions

This section contains descriptions of the graduate subjects offered by University College. The subjects are in alphabetical School order:

- Civil Engineering
- Computer Science
- Economics and Management
- Electrical Engineering
- English
- Geography and Oceanography
- History
- Politics
- Interdisciplinary Subjects (University College)

Identification of Graduate Subjects and Units by Numbers

A *subject* is defined by the Academic Board of the University as 'a unit of instruction approved by the University as being a discrete part of the requirements for a course offered by the University'.

A *unit* at University College is a component of a subject.

The University uses numbers to identify subjects and units, and these are allocated by the Registrar. At University College the system of numbering is based on the following:

- Each subject and unit has a unique subject identifier comprising an alphabetic prefix and a numeric suffix together with a separate alphabetic subject code.
- The authority offering a subject or unit, normally a School, is indicated by an alphabetic prefix.
- The particular graduate subject or unit is identified by four digits.
- Graduate coursework subjects and units have an '8' as the first digit of the suffix to the subject identifier.
- Each identifying number is allocated to one subject or one unit only.

The identifying alphabetic prefixes for each of the Schools are set out below.

AMEC	Aerospace and Mechanical Engineering (including Aeronautical Engineering)
ACMA	Civil Engineering
AELE	Electrical Engineering
AECM	Economics and Management
AENG	English
AHIS	History
APOL	Politics
ACHM	Chemistry
ACSC	Computer Science (including Information Systems)
AGOC	Geography and Oceanography
AMAT	Mathematics and Statistics
APHY	Physics
AINT	University College (Interdisciplinary)

Prerequisites and Corequisites

To be eligible to enrol in a particular subject in the University College a student must meet any prerequisites and corequisites which may be prescribed for it.

Information Key

The following is the key to the information which may be supplied about each subject:

- S1 (Session 1); S2 (Session 2)
- F (Session 1 *plus* Session 2, i.e. full year)

- S1 and S2 (offered in both sessions)
- SS (single session, but session not known at time of publication)
- L (Lecture, followed by hours per week)
- T (Laboratory/Tutorial, followed by hours per week)
- HPW (hours per week)
- C (Credit points).

Aerospace & Mechanical Engineering

AMEC8203 (12CP)
Engineering Logistics

AMEC8202 (10CP)
Engineering Logistics
~~S2~~ C10 Not offered in 1997
(For the Management Studies Program)

Prerequisites

AECM8252/8229	Introduction to Applied Statistics (or equivalent)
AECM8256/8233	Logistics Management (or equivalent)

Statistics of reliability, quantitative measures of reliability, maintainability and availability. Integrated Logistic Support (ILS), Logistic Support Analysis (LSA), tools and procedures - Failure modes. Effects and Criticality Analysis (FMECA), Fault Tree Analysis (FTA), Level of Repair Analysis (LORA), spares assessment techniques, configuration management, life-cycle costing.

Civil Engineering

Level 1 Subjects

ACMA8245
Introduction to Structural Analysis
SS C8

Properties of sections, centroids of area, second moments of area. Normal and shear stresses and strains, stress-strain relationships, Hooke's Law, moduli of elasticity and rigidity, Poisson's ratio, strain energy. Beams in bending, determination of stresses and deflections in statically determinate beams. Analysis of statically determinate trusses. Introduction to the stiffness method.

ACMA8246
Materials of Construction
SS C8

Nature and characteristics of materials used in engineering construction. Concrete making materials, mix design, strength and durability characteristics. Structural concrete. Metals as structural materials. Materials science, structure-property relationships, failure modes, joining. Other materials.

ACMA8247
Environmental Engineering Fundamentals
SS C8

Environmental resource, sustainability principles, the principal issues, economics of the environment, the scientific foundation of pollutant dispersal and environmental impact, monitoring, strategies for minimisation in design, the engineer's environmental responsibility.

ACMA8248
Introduction to Geotechnical Engineering
SS C8

Special characteristics of soil as an engineering material. Effective stress principle and the interaction between the solid and water components of soil. Compaction and earth work. Shear strength of soil, the influence of drainage, load duration and effective stress history. Seepage in soil. The interaction between seepage and mechanical behaviour of soil. Introduction to deformation theory for soils.

ACMA8249
Introduction to Hydraulic Engineering
SS C8

Fluid statics and dynamics, boundary layers, lift and drag, flow in ducts, pipe network analysis, flow in open channels, sediment transport.

ACMA8250
Introduction to Blast Loading
SS C8

Introduction to explosives. Blast waves. Blast wave interactions with solid surfaces. Internal blast loads. Underwater explosions. Groundshock. Introduction to blast resistant design. Use of computer packages.

ACMA8251
Occasional Elective 1
SS C8

An occasional Level 1 elective given by a member of staff, external lecturer(s) or visitor(s) on a topic of immediate relevance to civil engineering.

ACMA8252
Occasional Elective 2
SS C8

An occasional Level 1 elective given by a member of staff, external lecturer(s) or visitor(s) on a topic of immediate relevance to civil engineering.

ACMA8253
Occasional Elective 3
SS C8

An occasional Level 1 elective given by a member of staff, external lecturer(s) or visitor(s) on a topic of immediate relevance to civil engineering.

Level 2 Subjects

ACMA8254
Foundation Engineering (12CP)

ACMA8201
Foundation Engineering (10CP)
SS C12

Limit state design of foundations. Review of field and laboratory testing. Stability and conventional settlement analysis of isolated footings, combined footings. Allowable settlements. Design of isolated footings. Piling systems. Piling code. Design piles and pile groups. Case studies.

ACMA8255
Site Investigations (12CP)

ACMA8205
Site Investigations (10CP)
SS C12

Remote sensing. Presentation of data. Drilling technology in soils and rocks. Drilling mud. Field testing onshore and offshore, vane, CPT, SPT, camkometer, plate bearing. Geophysical techniques. Other techniques for soils and rocks. Field measurements of displacement, settlement, rotation, strain, force, pore pressure. Measurement of *in-situ* stresses in rocks. Field measurements of permeability. Case studies.

ACMA8256
Basic Finite Elements (12 CP)

ACMA8208
Basic Finite Elements (10CP)
SS C12

Calculus of Variations, energy principles, global approximation methods. Solution of Laplace and Poisson's equations in one and two dimensions. Solution of two dimensional problems in solid mechanics. Numerical integration, isoparametric elements.

ACMA8257
Applied Soil Mechanics (12 CP)

ACMA8209
Applied Soil Mechanics (10CP)
SS C12

Failure mechanisms of solid and rock slopes. Analyses of slope failures. Field instrumentation. Stabilisation of slopes. Case studies. Design and construction. Retaining structures. Analysis and design of gravity, gabion, reinforced earth, sheet pile, and miscellaneous systems. Numerical analysis of earth pressures. Anchors. Embankments on soft soils.

ACMA8258
Finite Elements in Structural Analysis (12CP)

ACMA8210
Finite Elements in Structural Analysis (10CP)
SS C12

Stiffness analysis of structures. Variational principles in solid mechanics. Application of finite elements for two and three dimensional stress analysis, plate bending and stability.

ACMA8259
Structural Engineering Materials 1 (Concrete Technology) (12CP)

ACMA8212
Structural Engineering Materials 1 (Concrete Technology) (10CP)
SS C12

Microstructure, strength, deformation and durability of cement paste and concrete. Effects of chemical admixtures on cement paste and concrete properties. Thermodynamics of deformation. Constitutive relationships. Behaviour of concrete materials under sustained, repeated, dynamic, tensile and multiaxial loadings. Ferro-cement. Probabilistic and statistical aspects of concrete. Mix design to fulfil functional criteria.

ACMA8260
Reinforced Concrete (12CP)

ACMA8213
Reinforced Concrete (10CP)
SS C12

Methods of analysis and design of reinforced concrete members for bending, compression, combined bending and compression, shear and torsion. Analysis and design of flat slabs and plates. Optimum design of reinforced concrete members and structures. Creep and shrinkage effects in concrete structures. Serviceability requirements.

ACMA8261
Prestressed Concrete (12CP)

ACMA8214
Prestressed Concrete (10CP)
SS C12

Analysis and design of prestressed concrete elements. Design of statically indeterminate structures, composite structures. Deflections.

ACMA8262
Structural Dynamics (12CP)

ACMA8215
Structural Dynamics (10CP)
SS C12

Analysis of lumped mass systems with various degrees of freedom. Vibration of beams, frames and plates. Free vibration. Dynamic response of multi degree-of-freedom systems. Approximate methods of solution. Finite element applications.

ACM8263
Structural Engineering Materials 2 (Metals) (12CP)

ACMA8216
Structural Engineering Materials 2 (Metals) (10CP)
SS C12

Metals as structural materials. Modern steels. Structural aluminium alloys. Brittle fracture. Fatigue. Corrosion and corrosion protection. Weldability of metals. Residual stresses and distortion. Weld quality. Non-destructive testing. Weld design. Specifications.

ACMA8264
Coastal and Ocean Engineering (12CP)

ACMA8226
Coastal and Ocean Engineering (10CP)
SS C12

Wave theories, wave transformation, real wave trains, wave data collection and analysis, generation and decay of wind waves, wave hindcasting, operational and design wave estimation, tides and storm surges, wave induced sediment transport (inshore and offshore regions), sensitivity of estuaries and coastal inlets to engineering works, wave forces on structures, investigation and design of harbours and coastal and offshore projects, response of moored ships to wave action and design of

mooring systems, numerical and physical models in coastal and ocean engineering. Case studies. Note: All topics will be discussed. Topics of specific interest will be selected by students and an in-depth treatment will be presented.

ACMA8265
Civil Engineering Elective (12CP)

ACMA8227
Civil Engineering Elective (10CP)
SS C12

An occasional elective on a civil engineering topic, selected according to the specific expertise and experience of visitors to the School of Civil Engineering.

ACMA8266
Coastal and Seabed Dynamics (12CP)

ACMA8228
Coastal and Seabed Dynamics (10CP)
SS C12

Flow resistance in unidirectional flow, sediment properties, sediment transport in unidirectional flow, initiation of sediment movement and bed friction under oscillatory flows, longshore sediment transport, surf zone infragravity waves, coastal inlets, coral cays.

ACMA8267
Transportation Planning (12CP)

ACMA8229
Transportation Planning (10CP)
SS C12

Traffic analysis (existing and new methods and techniques); microcomputers in traffic design (development of traffic system models); transport and economics, environmental impacts and community involvement in transport planning.

ACMA8268
Special Elective 1 (12CP)

ACMA8231
Special Elective 1 (10CP)
SS C12

An occasional elective given by a member of staff plus external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

ACMA8269
Special Elective 2 (12CP)

ACMA8232
Special Elective 2 (10CP)
SS C12

An occasional elective given by a member of staff plus external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

ACMA8270
Special Elective 3 (12CP)

ACMA8233
Special Elective 3 (10CP)
SS C12

An occasional elective given by a member of staff plus external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

ACMA8271
System Dynamics Modelling (12CP)

ACMA8236
System Dynamics Modelling (10CP)
S2 C12

System Dynamics is both a conceptual framework for understanding complex systems and a suite of tools and techniques for analysing systems. It embodies four essential characteristics: a focus on circular or feedback causality, rather than linear causality; a focus in interdependent relationships rather than independent factors; a perspective of internal, rather than external locus of control and a shift from correlational to operational thinking. Fundamental of System Dynamics are feedback and change over time.

The subject focuses on the application of System Dynamics in strategic and corporate management, with an emphasis on Defence. However, the subject has wide applicability across technical, environmental and social systems.

ACMA8272
Integrated Project Management Systems (12CP)

ACMA8241
Integrated Project Management Systems (10CP)
SS C12

This unit focuses on the specification development, implementation and management of facility project information management systems. The nexus between corporate planning and facility planning requires techniques for organisation analysis, functional congruence and space requirements. A review of the ORBIT 2:1 study adds formality to this process. Genetic algorithms are introduced for optimal location analysis and space optimisation. Functional affinity, stack and block and simulation techniques are used to model space use. The design of integrated facility project information systems includes CAD layering standards plus data dictionaries. Property portfolio information systems, maintenance management systems and intelligent facility information systems are reviewed.

ACMA8273
Project Management Body of Knowledge (12CP)

ACMA8242
Project Management Body of Knowledge (10CP)
S1 C12

This unit focuses on the distinctive nature of project management in Defence, the public sector generally and

higher corporate levels of the private sector where the project manager is orchestrating (rather than controlling) a political, bureaucratic, technical and contractual environment. The course ranges broadly across key facets of project management, such as quality management, configuration management, risk management and contract management.

ACMA8274
Project Systems Modelling (12CP)

ACMA8243
Project Systems Modelling (10CP)
S2 C12
Prerequisite: ACMA8273/8242 Project Management Body of Knowledge

This unit focuses on structured approaches to modelling and evaluating the management, design, production and life-cycle of projects and facilities under conditions of uncertainty. The range of project management tools available are dynamics, monitoring and control techniques to achieve time, cost and quality constraints, reporting and presentation, modelling, cost planning, project economics, feasibility, contract strategies, work planning and co-ordination, contract administration, negotiations, computer systems, etc.

ACMA8104
Project Report (24 credit points) (24CP)

ACMA8105
Project Report (36 credit points) (36CP)

Computer Science

The following subjects can be selected for inclusion in a MInfSc program. Not all subjects may be available in any one year. However, should the demand be high for a specific subject in any year, then attempts will be made to make that subject available in that year.

Level 1 Subjects

ACSC8230
Systems Analysis and Design
Staff Contact: Mrs M. Fergusson
S1 C8

The aim of this course is to introduce students to the principles of structured methods that are appropriate for analysing the business requirements of an organisation and for developing the requirement into a specification as the basis for system design. In addition, the course examines the design process of an Information System and how structured methods can be used to produce a design specification for the construction of software which meets business requirements.

ACSC8231
Introduction to Telecommunications
Staff Contact: Mrs M. Fergusson
S1 C8

The subject introduces students to the principle components of telecommunications. These cover: telecommunication architectures and standards, concept and issues in data and multimedia communications, network fundamentals, local and wide area networks, network management, applications of techniques and technology and future directions.

ACSC8232
Introduction to Management Science (8CP)
Staff Contact: Prof C. Newton
S1 C8

This introductory subject examines the quantitative techniques of management science. An introduction to the analytical method is presented together with discussion of the various models include linear programming, network analysis, queuing and inventory modelling, simulation and game theory. Examples will illustrate the application of the models.

ACSC8233
Information Technology Applications
Staff Contact: Mrs J. Backhouse
S1 C8

Introduction to operating systems - DOS, Windows & UNIX; Basic computer hardware and functions; common applications - word processing, spreadsheets, WWW browsers; Information systems - types, relationship to the organisation, development methodologies; Current issues - outsourcing, interoperability, client/server.

ACSC8234
Introduction to Programming
Staff Contact: Mr A. Quaine
S1 and S2 C8

A first course in computer programming using the ANSI C/C++ programming system in either the UNIX or Windows environments. The C/C++ programming language: Objects, Lvalues, expressions, loop constructs, memory aggregates and unions, pointers and arrays, structures. Program structuring strategies: Local, global and static classes, external declarations, prototypes and header files, file scope, encapsulation techniques. Explicit linkage in dynamic memory: lists, queues, binary trees, recursive algorithms, Hashing. Standard i/o, file processing. Computer architecture: Boolean logic, data representation, byte and word addressing, function call and interface paradigms, parameter passing, stack frames, local and global referencing. Debugging techniques. Low level presentation mechanisms. Introduction to C++: iostreams, reference parameters, classes, function encapsulation, overloading, exception handling.

ACSC8246
Introduction to Database Systems (8CP)

ACSC8209
Introduction to Database Systems (10CP)
Staff Contact: Mr D. Hart
S1 C8

Introduces and concentrates on modern relational systems. Data analysis and modelling using the entity-relationship technique. Basic relational theory. Dependencies and normal forms (up to 4NF). Database languages: relational algebra, SQL and QBE. Triggers/ rules and procedures. Performance considerations: file

types and indexing. Transactions and concurrency control. Basic application construction. Introduction to distributed databases.

ACSC8259
Introduction to Information Systems (8CP)

ACSC8223
Introduction to Information Systems (10CP)
Staff Contact: Dr S. Sampath
S1 and S2 C8

The subject takes a management approach to Information Systems. It will present a framework for thinking about and improving the management of information through design and implementation of effective, high-quality Information Systems. The subject offers an approach to the process of managing information in organisations taking technological changes into account. The content of the subject will identify the need for different types of Information Systems in organisations, through an evaluation of options to meet the needs. A range of software, hardware and computer mediated communication needs for the management of organisations will be discussed in detail. System development methodologies, system modelling, data modelling and project management will also be covered. A practical experience of using different personal productivity software will be covered in the laboratory work.

Level 2 Subjects

ACSC8229
Research Methods in Information Systems (12CP)
Staff Contact: Mrs M. Fergusson
S2 C12

The unit objective is to provide students undertaking research with an understanding of basic frameworks in research. The unit covers research techniques for gathering information, developing a research proposal and evaluating research carried out by others. Major areas include scientific and interpretivist approaches, design, survey methods and instruments, case study, field study, experimentation, data collection and analysis. The principal skills imparted are in carrying out the research processes, and in the written and oral presentation of results.

ACSC8235
Information Systems Development (12CP)
Staff Contact: SQNLDR G. Shaw
S2 C12

This course aims to provide an understanding of the elements of information systems development. The course covers a range of methodologies, tools and techniques that can be used In ISD including Soft Systems Methodology, Object Oriented Analysis and Design and Prototyping. The focus of the course is on developing an appreciation of the role, strengths and weaknesses, and application of a range of 'non - traditional' approaches to ISD. Students are assumed to have completed either ACSC8230 Systems Analysis and Design or to have completed a course on Structured Analysis and Design in their undergraduate studies.

ACSC8236
Telecommunications Management (12CP)
Staff Contact: Mrs M. Fergusson
S2 C12

The subject covers a review of the current telecommunications technology, and current issues facing the ITT manager. These include service bundling, pricing and charging of services, private and public network services, deregulation, managing and designing interoperable systems, network planning and management issues, and globalisation.

ACSC8237
Object Oriented Programming (12CP)
Staff Contact: Mr A. Quaine
S1 C12
Prerequisite: ACSC8234

This course emphasises the data abstraction and encapsulation techniques which introduce object orientation, using the C++ programming language in either the UNIX or Windows environments. Examples concentrate on the class construct, and explore function and operator overloading, scope, object constructors and destructors, the this pointer, the friend concept, free store allocation and deallocation, file input/output streams, operator concatenation using reference arguments, templates, and exception handling. Class derivation and inheritance syntax lead to polymorphism, and an explanation of the virtual function mechanism for dynamic binding, then multiple inheritance, virtual base classes and reuseability. A multi-file strategy for suite development using multiple classes and templating is presented. Other object oriented languages such as Smalltalk and Java will be more briefly explored.

ACSC8238
Software Project Management (12CP)
Staff Contact: LCDR G. Millar
S2 C12

Basic software project management concepts, project evaluation, project planning, software estimation, risk management, project scheduling, project tracking, software metrics, development life cycles, requirement analysis, system design, code testing, implementation, configuration control, software quality control.

ACSC8239
Management Science Techniques (12CP)

ACSC8202
Management Science Techniques (10CP)
Staff Contact: Mr D. Hoffman
S1 C12

Examines the techniques of Management Science, emphasising their application and deployment in the analytical decision-making process. Topics included are decision theory and analysis, statistical analysis, game theory, linear and nonlinear programming, dynamic programming, inventory management, reliability and replacement strategies, search techniques, and stochastic processes. Forecasting and modelling techniques and applications. Evaluation of component and system maintainability, system support and reliability. Inventory models, stock control, cost models, risk management.

ACSC8240
Decision Support Systems (12CP)

ACSC8203
Decision Support Systems (10CP)
Staff Contact: Prof C. Newton
S2 C12

Addresses the principles and practice of decision support systems. Areas addressed are the design, development and applications of decision support systems. Conceptual framework, cognitive styles, evaluating and using Decision Support Systems (DSS), DSS architectures, data base management systems, model-base management systems, problem solving and decision-making tools, brainstorming, operations research tools, artificial intelligence techniques, dialogue generation and management software, man-machine interfaces, adaptive design approach, knowledge acquisition, applications and case studies.

ACSC8241
Systems Programming (12CP)

ACSC8204
Systems Programming (10CP)
Staff Contact: Mr A. Quaine
S2 C12

Systems programming based on the UNIX operating system and the C programming language. The UNIX environment, text editing, hierarchical file system, protection and permissions, command features, pipes, filters, and tees, programming tools. Shells, shell programming, process hierarchy, system management. C programming language, functions, pointers, linked structures, hash addressed storage, binary trees. System interface, file access functions, input—output, process spawning and control, signals and interrupts, process communication, interlanguage linking.

ACSC8242
C ³ I Systems—Design, Management and Operation (12CP)

ACSC8205
C ³ I Systems—Design, Management and Operation (10CP)
Staff Contact: CMDR C. Cooper
S1 C12

Investigates the design, implementation, operation, and management of command, control, communications, and intelligence systems. Design aspects, systems theory and approach, management considerations. Fighting and support units. Command and control carried out by commanders, decision-making teams, and supporting staff cells. Distributed processors and databases, partition and replication, data ownership and management. Sensors for collection of information, intelligence, and messages. Communications systems, electromagnetic spectrum. Radio communications, signals, information theory, propagation, frequency management. Trunk communications. Communications EW, electronic support measures, electronic counter counter-measures. Satellite communications. Security and integrity of information systems. Reliability and survivability. Reconfiguration. Fall back procedures and graceful degradation. Management of command and control systems in the field. Deployment. Configuration management in the field. Data fusion. Interoperability. Speech compression. Decision- making methodology, tactical decision making, mathematical methods. Applications and case studies.

ACSC8243
Data Networks (12CP)

ACSC8206
Data Networks (10CP)
Staff Contact: Mr W. Toomey
S2 C10

Investigates the design, implementation, operation and management of data networks. The OSI Reference Model. Data Transmission concepts. Transmission media: twisted pair, coaxial cable, fibre-optic cable, radio waves. Data encoding: modulation; clocking; error detection. The data link layer. Local area networks: ring, bus, tree and star LANs; medium access; LAN standards. Networking techniques: circuit switching; packet switching; routing; flow control; congestion control. Internetworking: requirements; addressing; bridging; routing. Transport protocols: types of service; connection management; reliability; congestion control. Network applications: terminal access; electronic mail; data distribution; data presentation. TCP/IP and the Internet: architecture and design; protocols; the Domain Name System; scalability. Novell IPX/SPX and SMB: architecture and design; protocols. Network management: structure of management information; ASN.1; SNMP. Network security: cryptography; authentication; social issues. Network design. High-speed networks: broadband ISDN, ATM, frame relay; design issues; implementation issues.

ACSC8244
Knowledge Based Systems (12CP)

ACSC8207
Knowledge Based Systems (10CP)
Staff Contact: Dr R. McKay
S2 C10

Theorem proving, resolution, OPS-5. Inferencing, inexact reasoning, knowledge representation, knowledge acquisition, automatic rule induction, consistency maintenance. Expert systems shells, knowledge engineering languages. Support tools, knowledge based editors, explanation facilities. Meta-knowledge.

ACSC8245
Computer Security and Cryptography (12CP)

ACSC8208
Computer Security and Cryptography (10CP)
Staff Contact: Dr L. Brown
S1 C10

Computer security overview; Historical cryptography. Modern private key block ciphers, modern cryptanalysis, stream ciphers. Number theory, public key ciphers. Digital Signatures, hash functions. Key Management. Application examples: PEM, PGP, SNMP. User authentication. Trusted computer systems: risk analysis techniques. Evaluation criteria: TCSEC, ITSEC, Common Criteria.

ACSC8247
Information Resource Management (12CP)

ACSC8210
Information Resource Management (10CP)
Staff Contact: LCDR G. Millar
S1 C12

Forces shaping the management of IR, managing emerging technologies, IT-enabled business transformation, strategic IS planning, business process reengineering, strategic alignment, IT investment, information architecture, outsourcing, change management.

ACSC8248
Computer Graphics (12CP)

ACSC8211
Computer Graphics (10CP)
Staff Contact: Dr G. Freeman
S2 C12

Modern topics in computer graphics: graphics hardware, output primitives, scan conversion, 2D and 3D modelling, perspective views of visible surfaces, interactive devices and modes, X windows, X-lib and toolkit, Postscript, colour perception and choice, rendering techniques.

ACSC8249
Operating Systems (12CP)

ACSC8212
Operating Systems (10CP)
Staff Contact: Mr W. Toomey
S1 C12

Investigates the design, implementation, operation and management of operating systems, with UNIX and Windows NT as example systems. History of operating systems. Processes: process environment; system calls; process control blocks; pre-emption and scheduling. Input/Output: devices and the machine architecture; device drivers; interrupt handling; device independent operations. Memory Management: partitions; paged architecture; design issues. Virtual Memory Management: paging, paging algorithms; page sharing. File Systems: application interface; disk layout; performance and reliability issues. Interprocess Communication and Synchronisation: critical sections; solutions; semaphores; synchronisation with the operating system. Operating system security. Operating System Performance.

ACSC8250
Software Engineering and ADA (12CP)

ACSC8213
Software Engineering and ADA (10CP)
Staff Contact: CMDR C. Cooper
S2 C12

Introduces the programming language ADA. Advanced functions and procedures. Parameter passing in, out, in-out. Problem solving through modularisation. ADA packages. The concept of information hiding. Top-down and bottom-up development and testing. Private declarations. Problem solving by abstraction. Private data types and user-defined operations. Problem solving in real-time systems, tasks, inter-task communication, task synchronisation.

ACSC8251
Special Topic 1 (12CP)

ACSC8214
Special Topic 1 (10CP)

ACSC8252
Special Topic 2 (12CP)

ACSC8215
Special Topic 2 (10CP)

ACSC8253
Special Topic 3 (12CP)

ACSC8220
Special Topic 3 (10CP)

ACSC8254
Special Topic 4 (12CP)

ACSC8221
Special Topic 4 (10CP)

Occasional topics of relevance in the areas of Computer Science or Information Systems given by visitors or external lecturers or members of staff.

ACSC8255
Systems Planning (12CP)

ACSC8216
Systems Planning (10CP)
Staff Contact: Dr E. Lewis
S2 C12

Gathering user requirement and knowledge acquisition. Preparing specifications. Information management, organisational analysis, software engineering. Logical design of modules, systems structure. Conventional and soft systems analysis. Planning process (SDLC, prototyping etc). Feasibility studies and computer support proposals. Capacity planning, measurement of capacity performance, software matrices. Evaluation of options and tenders.

ACSC8256
Computer Speech Processing (12CP)

ACSC8218
Computer Speech Processing (10CP)
Staff Contact: Dr F. Clermont
S2 C10

Introduces the fundamental concepts of computer speech processing: speech digitisation; sampling theorem; wideband speech coding; human speech production; fundamentals of phonetics; time-domain speech analysis; prosody; frequency-domain speech analysis; fundamentals of signal processing; homomorphic analysis; formant synthesis; fundamentals of speech perception; text-to-speech synthesis; linear-predictive coding; narrow-band speech coding; isolated-word recognition; pattern matching; hidden Markov models; artificial neural networks; speaker recognition; speech understanding systems.

ACSC8257
Document Processing Systems (12CP)

ACSC8219
Document Processing Systems (10CP)

Staff Contact: Dr R. McKay
S2 C12

Introduction and Historical Perspectives—manuscript, block printing, typesetting, illustration, printing. Modern Printing Technology—typesetting, illustration, printing. Structured Languages—TeX, LaTex, Troff; Hybrid Languages; Markup Languages; Page Layout Languages. Mathematics, music, pictographic and script languages. Structured Documents, Hypertext and Hypermedia—SGML, DSSSL and HyTime, and their relation to CALS. Distributed Documents—HTML and WWW. Future Directions—on-line document design, storage technologies, data compression, document transmission.

ACSC8258
User Interface Construction (12CP)

ACSC8222
User Interface Construction (10CP)
Staff Contact: Dr G. Freeman
S2 C12

Human factors in user-interface design; graphical user interface construction; methods for implementing command languages; hypertext interfaces.

ACSC8260
Information Management (12CP)

ACSC8224
Information Management (10CP)
Staff Contact: Dr E. Lewis
S1 C12

This subject provides an detailed coverage of the planning for an organisational information system, the role of a computer centre and its administration, management of information systems development, the management issues of security, the development of information systems personnel, the social and legal environment and the role of the information systems executive. The subject gives the student a broad perspective of the management issues involved and provides detailed examples of the critical elements, and relates these to real world installations. As such, it draws upon methodologies which may have been introduced in other subjects and illustrates their application in the Systems Management environment.

ACSC8261
Machine Learning (12CP)

ACSC8225
Machine Learning (10CP)
S2 C12
Staff Contact: Dr R. Pearson

This subject is an introductory course to machine learning. No prior knowledge about artifical intelligence is assumed. The unit consists of the following components: an introduction to artifical intelligence and machine learning; stochastic learning methods; propositional learning methods; relational and other learning methods. A comparative study of different learning methods will also be presented in this unit.

ACSC8262
Advanced Topics in Database Management (12CP)

ACSC8227
Advanced Topics in Database Management (10CP)
Staff Contact: Dr J. Yang
S2 C12
Prerequisite: ACSC8246

This subject introduces students to new developments in object-oriented database management. Students are expected to understand the needs for OODB, the basic concepts of OO, and the requirements of OODB. Students are required to practise on an OODB, ODE, to understand how these OO concepts can be used to best effect.

ACSC8263
Evolutionary Computation (12CP)

ACSC8226
Evolutionary Computation (10CP)
Staff Contact: Dr X. Yao
S2 C10

Evolutionary computation is the study of computational systems which use ideas and get inspirations from natural evolution. This unit is devoted to the theory and applications of such systems. Major topics covered in the unit include genetic algorithms, genetic programming, evolution strategies, and evolutionary programming. All these algorithms assume littte prior knowledge about the problem to be solved and thus are applicable to a wide range of problems. The unit concentrates on applying evolutionary algorithms to optimisation (both combinatorial and numerical) and machine learning.

ACSC8264
Special Elective (Information Systems) (12CP) [In 1997 - Information Support Systems for Logistics]
SS C12

ASCS8105
Project (24 credit points)
Staff Contact: Prof C. Newton
S1,S2 C24

A supervised project carried out in consultation with an appropriate member of the School. Topics for projects will be elicited from staff of the School, Government departments, local organisations, and the students themselves. Topics will be chosen in consultation with staff of the School.

Economics and Management

Level 1 Subjects

AECM8252
Introduction to Applied Statistics (8CP)

AECM8229
Introduction to Applied Statistics (10CP)
Staff Contact: Dr A.M.M.Masih S1, Dr J.R. Warn S2
S1 and S2 C8
This subject gives students a basic knowledge of statistical methods as used in economics and management. The emphasis throughout is on the

application of methods and understanding the results obtained. Basic computer packages are introduced.

AECM8253
Microeconomics for Managers (8CP)

AECM8230
Microeconomics for Managers (10CP)
Staff Contact: A/Prof J. Bennett S1, Dr S. Markowski S2
S1 and S2 C8
An introduction to microeconomics with special attention given to managerial applications. Topics covered include supply and demand behaviour, oligopoly and monopoly in the Australian context, industrial decision making, and the role of the Australian government in regulating the microeconomic environment.

AECM8254
Organisational Behaviour (8CP)

AECM8231
Organisational Behaviour (10CP)
Staff Contact: Dr H.B. Cheah S1, *Dr G. Manger* S2
S1 and S2 C8
This subject develops the theoretical foundations needed for the study of the behaviour of individuals and groups within organisational structures, and the interactions that occur between the individual, the group, and the organisation. Students will examine the generalisations about human behaviour that underlie management concepts and practices and develop the conceptual framework needed to assess the effectiveness and efficiency of these management practices. The subject draws upon the management literature and the research findings of social and organisational psychology to develop both theoretical perspectives and applied knowledge.

Level 2 Subjects

AECM8245
Global Changes in Economy and Society: Security and Defence Perspectives (20CP)
Staff Contact: Prof W.E. Kasper
S1 C10

The objective of this subject is to offer students an understanding of the complex demographic, technical, political, institutional and economic interactions that typically occur in the process of economic development. The subject provides insights into national and international security and defence issues in the context of global changes in economy and society.

The subject is wide-ranging and students are encouraged in project work to focus - in a global context - on the effects of economic change on defence and security analysis and policy for a particular region or nation.

AECM8246
Asia-Pacific Political Economy: Security and Defence Perspectives (20CP)
Staff Contact: Prof W.E. Kasper
S2 C20

The subject examines economic transformation in the Asia-Pacific region and the impact of these changes in the international economy upon national and international security and defence analysis and policy for the region. It reviews the economic histories, current and future economic and industrial strengths, and major economic policy debates in the countries of East Asia and the Pacific region, including Australia and New Zealand. It investigates the ways in which the emergence of the Asia-Pacific economy impinges upon international relations, and the security and defence implications of regional economic transformation.

The subject is wide-ranging and students are encouraged in project work to focus on particular issues such as conflicts (and resolution of conflicts) over natural resources, trade access, and factor mobility (including migration); different processes for opening-up economies, such as China and Vietnam; different adaptations of institutions of society in the face of economic transformations, such as in Indonesia, Malaysia, and Australia etc.

AECM8247
Leadership in Organisations (12CP)
Staff Contact: Dr J.R. Warn
S2 C12
Prerequisite: AECM8254/8231, or equivalent

The various ways in which leadership has been understood in academic and practitioner media are identified and examined. The subject develops an understanding of leadership as a holistic process that involves influencing people both inside and outside the organisation. This foundation is used to develop an investigative framework for the analysis of leadership in a variety of organisations - private and public, civilian and military. This framework allows the analysis and integration of the concepts of leadership, management, command, and authority. The dynamics of interpersonal influence processes are investigated, with particular attention given to the broader conceptualisations of leadership style, such as "transformational" and "transactional" leadership.

The subject involves extensive exposure to academic and practitioner literatures, and assessment will include a significant research-based component comprising case studies of selected organisations involving a variety of research methods.

AECM8248
Organisation Development and Change (12CP)
Staff Contact: Dr H.B. Cheah
S1 C12
Prerequisite: AECM8254/8231, or equivalent

The subject focuses on the process of development and change within organisations. It examines the principal characteristics of and differences between effective or healthy and ineffective or dysfunctional organisations. Organisation development is a systemwide application of behavioural science knowledge to the planned development and reinforcement of organisational strategies, structures, and processes for improving organisational effectiveness. Students learn how to diagnose organisation performance, and how to plan, implement and evaluate the effectiveness of organisation change. They study how organisational performance can be improved through the implementation of a change

process guided by behavioural science knowledge, methods and techniques.

The management of the process of changing organisation strategies, structure and culture is applied to both profit and non-profit organisations, including the Defence organisation in Australia. Assessment includes a significant research-based component comprising case studies of selected effective and dysfunctional organisations.

AECM8249
Technology Management: Case Studies (12CP)
Staff Contact: A/Prof P.H.Hall
S2 C12
Prerequisites: AECM8252/8229, ACSC8259/8223, AECM8253/8230, AECM8254/8231, or equivalent

This subject offers perspectives on the practice of technology management through case studies conducted in engineering or information systems contexts. The case studies address issues which are covered by more general analysis of principles and processes in other components of the Technology Management stream. The subject is designed to raise awareness of generic questions at the level of particular cases and to illustrate general principles through specific management experience.

AECM8250
Finance and Investment Appraisal (12CP)

AECM8221
Finance and Investment Appraisal (10CP)
Staff Contact: Dr G. Manger
S2 C10

The subject introduces investment evaluation techniques under conditions of risk and uncertainty, both for public and private enterprises. Topics covered include standard techniques such as discounted cash flow and cost benefit analysis and financial statement analysis; the capital asset pricing model; security evaluation models; and corporate finance and financial institutions in Australia. Budgetary systems such as the Financial Management Improvement Approach are also discussed. Assessment will include a significant research-based component in Finance and Investment Appraisal.

AECM8251
Human Resource Management (12CP)

AECM8222
Human Resource Management (10CP)
Staff Contact: Dr H.B. Cheah
S2 C10

This subject examines the theory and practice of human resources management. It provides students with an appreciation of the role of human resources within an organisation, and studies the manner in which the management of people in the workplace affects organisational performance. Assessment will include a significant research-based component in Human Resources Management.

AECM8255
Australian Government Process (12CP)

AECM8232
Australian Government Process (10CP)
Staff Contact: Mr A. Thompson
S1 C8

The aim of the subject is to examine, both in theory and practice, how the decision making process within government and its agencies is managed. The analysis builds on different theoretical models of policy and decision making and uses case studies to apply those models to decision making, with particular reference to the Defence organisation. The subject considers the Budget and the Budget process, including fiscal and management effects of 'program management and budgeting', and the development of policy and program evaluation and accountability. Assessment will include a significant research-based component in Australian Government Process issues.

AECM8256
Logistics Management (12CP)

AECM8233
Logistics Management (10CP)
Staff Contact: Dr S. Markowski
S1 C12

In this subject students examine the basic concepts and techniques of logistics management within the framework of an integrated logistics system. Various civilian and military applications are considered such as systems engineering; reliability, availability and maintainability of systems; systems effectiveness; safety; operational requirements and logistics planning, and life cycle costing. Assessment will include a significant research-based component in Logistics Management.

AECM8257
Strategic Planning and Implementation (12CP)

AECM8237
Strategic Planning and Implementation (10CP)
Staff Contact: A/Prof P.L. Robertson
S1 C12

In this subject, the setting of strategic priorities is considered in an Australian context. Following an introduction to and evaluation of formal planning techniques, the subject focuses on the analysis of organisational strategies and capabilities, the relationship between public policy and implementation, and the management of strategic change. Assessment will include a significant research-based component in Strategic Planning and Implementation.

AECM8258
Technology Management: Innovation Theory and Economic Analysis (12CP)

AECM8238
Technology Management: Innovation Theory and Economic Analysis (10CP)
Staff Contact: A/Prof P.H. Hall
S2 C12
Prerequisite: AECM8253/8230 or equivalent

This subject presents an overview of perspectives on the nature of technology and of processes leading to technological innovation. This provides the basis for

economic analysis of technological competition involving the generation and diffusion of new technology, nationally and globally. The nature and influence of government technology policy are examined. Assessment will include a significant research-based component in Technology Management, Innovation Theory and Economic Analysis.

AECM8259
Technology Management: Technology Strategy and Human Resource Aspects (12CP)

AECM8239
Technology Management: Technology Strategy and Human Resource Aspects (10CP)
Staff Contact: A/Prof P.L. Robertson
S1 C12
Prerequisites: AECM8254/8231 or equivalent, and AECM8257/8237 or equivalent

This subject focuses on the development and implementation of technology strategies. It takes an organisational perspective on integrating technology strategy with other elements of corporate activity. It includes analysis of the management problems associated with successful product and process innovation, appropriate organisational forms for facilitating innovation, the nature of the relationships between users and developers of innovation, and human resource issues arising when technology strategy is implemented. Sectoral and inter-sectoral differences in technology strategy are examined, and national innovation strategy discussed. Assessment will include a significant research-based component in Technology Management, Strategy and Human Resources Aspects.

AECM8260
Introduction to Project Management (12CP)

AECM8242
Introduction to Project Management (10CP)
Staff Contact: Dr G. Manger
S1 C12

This subject introduces project management as a distinct area of management in a broader organisational context. It identifies the components of project management and the associated management tools and procedures. It examines the roles and responsibilities of project managers in the context of—project selection, initiation and organisation, forecasting, planning and scheduling, budgeting, risk management, communication and monitoring, control and evaluation, reporting, auditing, and project termination.

Note: This subject is to be offered both in daytime and evening classes in First Session 1997.

AECM8261
Special Elective 1 (12CP) [In 1997 - Case Studies in Public Sector Human Resource Management]

AECM8243
Special Elective 1 (10CP) [In 1997 - Case Studies in Public Sector Human Resource Management]
Staff Contact: Mr A. Thompson
S2 C12

AECM8262
SpecialElective 2 (12CP)

AECM8244
SpecialElective 2 (10CP)
SS C12

AECM8263
Legal Process and Procedures (12CP)

AECM8235
Legal Process and Procedures (10CP)
Staff Contact: Mr S. Fridman
S1 and S2 C12

This subject is designed to provide students with an introduction to the Australian legal system and the substantive areas of law affecting contractual relationships. The subject study begins with an introduction to legal reasoning, processes and sources of law. The legal framework under which business and government operate is then examined covering selected topics, such as the court system and fundamentals of constitutional, administrative, equity, property, trust, tort and corporate law.

The major emphasis covers the law of contract (the formation, interpretation, discharge and enforcement of contracts, particularly government contracts). Legislation affecting contractual relationships such as environmental, planning, trade practices and insurance will also be covered. The subject provides a basis for examining contract negotiation, standard forms of agreement, the administration of contract variations, dispute resolutions, including commercial arbitration and alternatives.

AECM8106
Research Project - Economics and Management (20CP)
S1,S2 C20

Masters students may apply to undertake a Research Project on a topic in the area of Defence Studies with the approval of the Economics and Management Subject Austhority, provided always resources are available. The normal prerequisite will be a Distinction average over three subjects. The project topic will be determined by special consultation with the Subject Authority and the student. The total length should not exceed 12,000 words.

AECM8107
Research Project (24CP)

An option of completing a research project of c.12,000 words spanning two sessions and attracting 24 credit points is available to candidates in the Masters program with a superior academic record. Approval for enrolling in a research project, including the research project topic, resides with the Management Studies Standing Committee, with the prior endorsement of the appropriate Head of School. This project will not form part of a specialist stream being undertaken by the student.

The option is available only to candidates who achieve either:
(a)an average of 70 per cent or better in the first year of a part-time Masters course; or
(b) an equivalent or better result, as determined by the Committee, in their management-related entry qualifications.

Direct entry candidates may also be admitted to the research project at the discretion of the Committee on the recommendation of the appropriate Head of School (subject authority) or the Course Co-ordinator.

Electrical Engineering

Level 1 Subjects

AELE8254
Introduction to Optoelectronic Systems
SS C8

The electromagnetic spectrum, the nature of light, black body radiation. The detection process in the visible and infrared spectrum. Operation and characteristics of photon detection devices, photoconductive cells, photodiodes, phototransistors, photoemissive devices and pyroelectric detectors. Effects of noise. Light emitting diodes and diode lasers. Introduction to optical communication systems. A project will comprise approximately one third of the course.

AELE8255
Analogue Communications
SS C8

Fourier series, Fourier and power spectrum., properties of the Fourier transform. Impulse response and transfer function. Random processes, autocorrelation, power spectral density, white and narrowband noise, signal to noise ratio. Amplitude modulation, double, single and vestigial sideband, modulators and demodulators, coherent detection, envelope detection, superheterodyne receiver, performance. Angle modulation, frequency modulation, phase modulation, narrowband FM, modulators and demodulators, pre-emphasis, system comparisons.

AELE8256
Digital Signal Processing
SS C8

Discrete time systems, Nyquist frequency and Shannon's sampling theorem, aliasing. Fourier Transform, Discrete Fourier Transform, Fast Fourier Transform, spectral leakage. Discrete and circular convolution. The z-transform and its relationship with the Fourier and Laplace transforms. Digital filters, filter realisation, design of finite impulse response and infinite impulse response filters, design of digital filters from analogue filters. Digital signal processing hardware. A project will comprise approximately one third of the course.

AELE8257
Communications Systems
SS C8

Review of signal characteristics. Closed transmission media; open wire, coaxial cable and optical fibre; dispersion and attenuation characteristics. Design issues in open transmission systems; microwave radio, satellite communications, ULF, ELF and VLF transmission, cellular radio, net radio, troposcatter systems. Link budget analysis. This course will include a major design exercise.

AELE8258
Television and Image Transmission Systems
SS C8

The physiology of the human viewer and its impact on television system design, analogue television standards, colour television systems, PAL. Television equipment, cameras, transmitters, receivers, video recorders. An introduction to digital image and video transmission. A project will comprise approximately one third of the course.

AELE8259
Occasional Elective 1
SS C8

The syllabus for this subject changes from one occasion to the next, allowing the presentation of a relevant topic by a visiting academic or a special lecture course on a trial basis.

AELE8260
Occasional Elective 2
SS C8

The syllabus for this subject changes from one occasion to the next, allowing the presentation of a relevant topic by a visiting academic or a special lecture course on a trial basis.

AELE8261
Occasional Elective 3
SS C8

The syllabus for this subject changes from one occasion to the next, allowing the presentation of a relevant topic by a visiting academic or a special lecture course on a trial basis.

Level 2 Subjects

AELE8262
Airborne Radar (12CP)
SS C12

Detection and ranging: pulsed operation, the range equation, detection probability, pulse compression, FM ranging. Doppler information: spectrum of a pulse train, ambiguities, the ambiguity function, digital filters, measuring range rate. Ground return: sources of ground return, clutter and target spectra, clutter with range and Doppler ambiguities, choice of PRF. Categories of PRF: low PRF, high PRF, medium PRF. Tracking: Angle tracking, range tracking, Doppler tracking, filtering. High resolution mapping: resolution requirements, synthetic array radar, SAR design, ISAR and Doppler beam sharpening.

AELE8263
Digital Design (12CP)
SS C12

A laboratory-based course where modern computer aided software tools (Mentor) are used to design digital circuits and systems. Activities include schematic circuit capture, use of hardware description languages (ie VHDL), state machine design, programmable logic design, simulation and the development of actual hardware targeted to field programmable gate array circuits (Xilinx). Several simple exercises will lead to a project chosen by the student.

AELE8264
Digital Video Communications (12CP)
SS C12

Numerical representation of visual information, Huffman, run length and arithmetic coding techniques, pulse code modulation - distortion measures, intra and interframe predictive coders, motion estimation and compensation schemes, delta modulation and derivatives, transform encoding, hybrid techniques, subband, vector quantization and quadtree schemes, video coding standards, network issues and error resilience.

AELE8265
Kalman Filtering (12CP)
SS C12

Review of probability, random variables and random signals. Linear systems subject to random inputs. The discrete time Kalman Filter. Applications of the discrete time Kalman Filter. The continuous time Kalman Filter. Smoothing and Prediction. The Extended Kalman Filter and factorization algorithms. Application to global positioning systems.

AELE8266
Mobile Communications (12CP)
SS C12

A selection of topics from an introduction to the concepts of mobile communications, fundamentals of multiple access schemes and channel allocation methods; description of various system configurations; understanding of mobile radio environment, propagation conditions, cochannel interference and design parameters; methods of capacity improvement, outage probability and handoff reduction; and performance analysis.

AELE8267
Antennas (12CP)

AELE8202
Antennas (10CP)
SS C12

A selection of topics from: a review of basic wire, aperture, surface wave, wide band and frequency independent antennas; conformal and adaptive arrays; tolerance theory.

AELE8268
Introduction to Digital Image Processing (12CP)

AELE8204
Introduction to Digital Image Processing (10CP)
SS C12

Digital image processing as 2D digital signal processing; image input/output devices; the sampling theorem; grey-level enhancement and grey-level histogram; colour vision and colour representation and display; multispectral operations; warping, both linear and nonlinear; spatial frequencies and the 2D discrete Fourier transform; filtering in spatial and Fourier domains; other transforms including the wavelet transform; brief discussion leading to image registration and image restoration and the future of machine vision.

AELE8269
Digital Image Restoration (12CP)

AELE8205
Digital Image Restoration (10CP)
SS C12

Imaging system response; concept of degradation through convolution by point-spread function (PSF); natural degrading systems - defocus, motion blur and atmospheric turbulence; restoration as deconvolution, and the importance of noise; inverse filter and the Wiener filter; iterative image restoration and the role of optimisation and linear programming; speckle astronomy and phase restoration; maximum entropy deconvolution; super resolution; position-dependent PSF and warping/image registration methods; tomographic reconstruction; applications in medical imaging, law-enforcement, astronomy.

AELE8270
Digital Communications (12CP)

AELE8211
Digital Communications (10CP)
SS C12

Review of mathematics of communication theory, analogue to digital and digital to analogue conversion, source encoding, baseband digital transmission, digital modulation techniques (ASK, FSK, PSK), coherent and incoherent detection, performance comparisons, synchronisation and timing extraction, channels coding, error correction and error detection, linear block codes (Hamming, Golay, BCH and RS), convolutional encoding and Viterbi decoding, link analysis.

AELE8271
Advanced Digital Signal Processing Techniques (12CP)

AELE8213
Advanced Digital Signal Processing Techniques (10CP)
SS C12

Review of basic theory: discrete time signals and systems, Fourier theory and related theorems, sampling, multi-rate sampling and reconstruction, quantisation, time/frequency resolution, Z transform and related theorems, Laplace transform. Topics selected from: signal analysis, one-dimensional filter structure design (FIR, IIR, ARMA) with implementation on DSP hardware (processing in real-time), multi-rate structures, introduction to two-dimensional structures including array filters and beamformers, introduction to Kalman filtering, introduction to signal estimation, finite precision arithmetic effects.

AELE8272
Robotics (12CP)

AELE8219
Robotics (10CP)
SS C12

Classification of robots; dynamical models of a manipulator arm; flexible and rigid arms analysis; control of a manipulator arm; design of adaptive controllers; sliding-mode controls.

AELE8273
Data Security (12CP)

AELE8221
Data Security (10CP)
SS C12

Fundamentals of error-correcting codes, linear block codes, cyclic codes, convolutional codes, burst-error correction codes, decoding algorithms; concepts of cryptography, classic systems, block and stream ciphers, public-key systems, digital signatures, secure speech techniques.

AELE8274
Advanced Data Networks (12CP)

AELE8222
Advanced Data Networks (10CP)
SS C12

Topological design of data networks; public data protocols, X.25; local area networks, ethernet; design of a local area network; metropolitan area networks, DQDB; fibre distributed data interface; point to point protocol; Broadband ISDN concepts and protocols, switching, loss mechanisms; performance of a data network.

AELE8275
Spaceborne Imaging Technology (12CP)

AELE8230
Spaceborne Imaging Technology (10CP)
SS C12

Planck's blackbody radiation law, atmospheric transmission and atmospheric windows. Wavelength ranges available for earth imaging and corresponding energy-matter interaction mechanisms. Detectors in the visible and reflective infrared regimes. Imaging spectrometry. Thermal detectors. Passive and active microwave sensing of earth surface features, including synthetic aperture radar methods. Spaceborne imaging systems including Landsat MSS and TM, Spot HRV, SIR A,B,C, ERS-1, JERS-1, Radarsat and aircraft systems. Image processing methods used in support of image interpretation.

AELE8276
Linear Systems (12CP)

AELE8231
Linear Systems (10CP)
SS C12

State space models. The solution to state equations. The state transition matrix. Internal stability and Lyapunov stability. Controllability and observability. Realizability and minimal realizations. Input-output Stability. Controller and observer forms. Linear feedback. State observation and observers. Polynomial fraction descriptions. Applications of polynomial fraction descriptions.

AELE8277
Software Engineering (12CP)

AELE8235
Software Engineering (10CP)
SS C12

A laboratory-based course involving a number of software design and coding exercises that lead to a software project chosen by the student. Software engineering principles are taught through the use of a graphical object oriented programming tool called Prograph. The emphasis of the course is that of software design using appropriate class and inheritance within various re-useable software components.

AELE8278
Neural Networks (12CP)

AELE8236
Neural Networks (10CP)
SS C12

Introduction to artificial neural networks, historical development and comparison with natural neural networks; the artificial neuron or processing element, as a correlator; multi-layer networks and the role of a nonlinear activation function; multilayer perceptron, with back-propagation training; gradient-descent versus higher-order training; radial basis function networks; matrix associative memory; Hopfield net as associative memory; competitive learning networks; Carpenter and Grossberg Adaptive Resonance Theory; Kohonen self-organising feature map; applications of neural networks in signal, image processing and machine vision, including associative memory, supervised and unsupervised classifiers and pattern recognition.

AELE8279
Adaptive Antenna Arrays (12CP)

AELE8238
Adaptive Antenna Arrays (10CP)
SS C12

A selection of topics from: introduction to optimal array processing, array signal representation, narrowband and broadband processor structures, element space and beamspace processing in time domain as well as in frequency domain, adaptive algorithms, spatial spectral analysis.

AELE8280
Electrical Engineering Elective (12CP)

AELE8247
Electrical Engineering Elective (10CP)
SS C12

An occasional elective on an electrical engineering topic, selected according to the specific expertise and experience of visitors to the School of Electrical Engineering.

AELE8281
Special Elective 1 (12CP)

AELE8248
Special Elective 1 (10CP)
SS C12

An occasional elective given by a member of staff or external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

AELE8282
Special Elective 2 (12CP)

AELE8249
Special Elective 2 (10CP)
SS C12

An occasional elective given by a member of staff or external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

AELE8283
Special Elective 3 (12CP)

AELE8250
Special Elective 3 (10CP)
SS C12

An occasional elective given by a member of staff or external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

AELE8284
Special Elective 4 (12CP)

AELE8251
Special Elective 4 (10CP)
SS C12

An occasional elective given by a member of staff or external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

AELE8285
Communications and Information Systems (12CP)

AELE8252
Communications and Information Systems (10CP)
SS C12

This subject provides an overview of the fundamental elements required to provide telecommunication services and management information systems. Communication topics include: fundamentals of electric signals; modulation and multiplexing techniques; management of the electromagnetic spectrum and acts controlling its use; video signals and systems; radio wave propagation; basic antenna theory; receiver and transmitter design; types of communications systems; and local and wide area networks. The fundamentals of information systems are presented including: information processing concepts and architectures; operating systems; data bases; software languages and development; and the storage, retrieval and management of information.

Students undertaking this subject are expected to have a background in introductory trigonometry.

AELE8286
Fundamentals of Surveillance Technologies (12CP)

AELE8253
Fundamentals of Surveillance Technologies (10CP)
SS C12

This subject includes an overview of the technologies and systems utilised in ground, airborne and spaceborne surveillance systems. Topics include an examination of the portions of the electromagnetic spectrum used for surveillance; optics fundamentals; image intensification techniques; thermal imaging; non-imaging infra-red systems; fundamentals of lasers; laser systems; fundamentals of RADAR; RADAR systems and their employment; ground, spaceborne and airborne imaging systems; camouflage and concealment techniques; and counter measures.

Students undertaking this subject are expected to have a background in introductory trigonometry and the equivalent of senior high school to first year university physics.

AELE8103
Project Report (24 credit points)
C24

Research project plus report in approved form.

AELE8104
Project Report (36 credit points)
C36

Research project plus report in approved form.

English

AENG8100
Sub-thesis
Staff Contact: Mr J. Doyle
F C40

Students who choose to write a sub-thesis as part of their MA (Pass) program must submit the chosen topic for approval by the Head of School. It is expected that the thesis will normally be c.15,000 words in length.

AENG8201
Australian Literature Since 1960
Note/s: Not offered in 1997

AENG8202
Australian Literary Movements and Controversies
Note/s: Not offered in 1997

AENG8204
C20 Literary Theory
Note/s: Not offered in 1997

AENG8206
One Hundred Years of Women's Writing
Note/s: Not offered in 1997

AENG8207
Aboriginal Literatures and Themes—Unaipon to Recent Oral Testimony Material
Staff Contact: Dr D. Headon
S2 C20

This subject studies the emergence and recent consolidation, of Black literature (and themes) in this country. The attitude towards Aboriginality of both Black and White writers/speakers is compared and contrasted, with the complex social and ideological differences obvious in the last decade receiving particular emphasis.

AENG8208
One Hundred Years of Australian Women's Writing
Note/s: Not offered in 1997

AENG8209
Australian War Literature of the Twentieth Century
Note/s: Not offered in 1997

AENG8210
Scholarship, Bibliography and Editing
Note/s: Not offered in 1997

AENG8211
Literary Modernism in Context: 1900—1920
Note/s: Not offered in 1997

AENG8212
Special Study: William Blake
Staff Contact: Professor G.E. Bentley
S1 C20

This course will provide a special study of the poetry and engraved art of William Blake. The course will discuss a wide selection of Blake's poetry and engraved books and place them in a wider contextual study of English Romanticism.

AENG8213
Post-Colonial Literature
Staff Contact: Dr P. Kelly
S1 C20

This course begins with six weeks on readings of literatures from two countries, introducing issues of colonial/post-colonial status and transitions, and the cultural and political conditions that pertain to them. This engagement with primary material attempts to stimulate an interactive dialogue between fiction and theory, thus preparing for six succeeding weeks of explorations in postcolonial theory. Various theoretical texts and excerpts from Australian and other fiction will be used to explore and problematise the theories.

AENG8214
Travelling Abroad: Representing the Foreign
Staff Contact: A/Prof. P. Eggert
S1 C20

LIke autobiography, travel writing has been until recently the poor relation to the major literary genres. Lately there has been a shift from a model of travel writing where the writer is 'our' representative in the foreign place to a model which sees the foreign as always already 'written' in pre-existing discourses. These and other issues will be discussed in reference to a range of travel writing about various countries since the early 19th century.

AENG8215
Australian Literature: The Canon and its Contexts
Staff Contact: A/Prof S. Lever
S2 C20

This course will examine some apparently canonical texts in Australian literature, alongside texts which challenge their position. The course aims to identify the kinds of values which have established the existing canon. It will consider the contextual and historical elements in the formation of a canon, and give attention to the cultural changes which lead to changes in the valuing of literature. The course will give students a sound knowledge of some highly-regarded Australian texts and the context of discussion about them, as well as a familiarity with lesser-known developments in literature. In 1997 the course will concentrate on the development of a canon of prose fiction, with Henry Handel Richardson, Christina Stead and Patrick White serving as the canonical authors. As a result it will look particularly at writing in the period from the late 1920s to the 1960s.

AENG8216
American Fiction and Film
Staff Contact: Dr H. Neilson
S2 C20

This course aims to introduce students to the changing role and conceptions of Christianity in the United States of America, as reflected in the various treatments of religion in American fiction and film. Discussion will also be focussed on the related issue of ancestry. The course will begin with Hawthorne's *The Scarlet Letter* and the 1995 film loosely based upon it, and then continue with an examination of a range of novels, novellas, and stories from C19 and C20, together with a number of films which complement those texts. The course will conclude with a discussion of Harold Bloom's *The American Religion: The Emergence of the Post-Christian Nation* .

Geography and Oceanography

AGOC8201
Strategic Geographical Issues in Australia's Neighbourhood
Note/s: Not offered in 1997

AGOC8202
Comparative Strategic Geography
Note/s: Not offered in 1997

History

AHIS8202
Problems in the History of Australian Defence and Foreign Policy
Staff Contact: A/Prof J. McCarthy
S2 C20

This subject examines the development of defence and foreign policy, Deakin's defence policy before World War I, the Singapore strategy, the formation of the Department of External Affairs, changes in defence and foreign policy

during the Second World War, Evatt and the United Nations, the formation of Anzus and Seato, the policy of forward defence, the impact of the Guam doctrine, Britain's withdrawal East of Suez and Australia's relationships with regional states. The subject concludes with an examination of the policies pursued by the Whitlam government.

AHIS8203
A History of Pre-Nuclear Military Thought
Staff Contact: Prof P. Dennis
S2 C20

The subject surveys the development of military theory from the mid C18 to the mid C20 by looking at the works of a number of writers. Their work is placed in the context of the prevailing theory and practice of the time, and their influence or lack of influence is assessed.

AHIS8204
Contemporary Warfare
Staff Contact: A/Prof J.Grey
S1 C20

This subject is intended to provide students with a heightened understanding of the development of warfare in the period since 1945. The subject is historically based and thematically organised, and examines the theory and practice of counter-insurgency, limited war, mid-intensity conflict, logistics, and the application of technology, before lifting the focus to encompass the relationship between recent wars and wider issues such as military-media relations, the growth of higher defence organisations, and the constraints of the laws of war and international agreements on freedom of operations. The subject is international in conception, but will focus on specifically Australian and regional concerns at various points.

AHIS8205
The ASEAN States, the South West Pacific and Australia: Political and Defence Issues since 1945
Staff Contact: Dr R. Thompson
S1 C20

This subject examines recent and contemporary history in the regions contiguous to Australia that have been regarded as important for Australia's external defence and foreign policies since the Second World War: the ASEAN states, with the exception of Vietnam, and the South Pacific islands. Developments in these regions affecting Australian defence interests will receive particular attention. These will include the rise of independence movements in South East Asia, the achievements and ongoing struggles for independence in the South Pacific, interrelationships of the newly independent states of the regions and the growth and impact in the regions of the economic and political interests of outside powers to 1996.

AHIS8206
Air Power and National Strategy: An Historical Perspective
Staff Contact: A/Prof J. McCarthy
S1 C20

The subject attempts to analyse the theoretical, doctrinal and practical application of air power from the first powered flight to the present day in both a global and regional setting.

AHIS8207
Intelligence and National Security
Staff Contact: Dr F. Cain
S2 C20

This subject studies the development and use of intelligence in questions of national security, particularly during the years of the Cold War. While emphasising the manner in which Australia has become involved in the international intelligence community and its contemporary role, the subject examines the development and use of intelligence in relation to the national security of such countries as the USA , UK, USSR, France and Israel. The subject is based on historical analysis, and focuses on questions relating to intelligence such as technology, accountability, alliances and governmental responsibility.

AHIS8101
Research Project - History
S1,S2 C20

Masters students may apply to undertake a Research Project on a topic in the area of Defence Studies with the approval of the History Subject Authority, provided always resources are available. The normal prerequisite will be a Distinction average over three subjects. The project topic will be determined by special consultation between the Subject Authority and the student. **The total length should not exceed 12,000 words.**

Politics

APOL8201
Australian Foreign Policy: Contemporary Issues
Staff Contact: A/Prof A. Bergin
S1 C20

This subject explores the complex problems and issues facing Australian foreign policy-makers. The course aims to see how well Australian foreign policy is adapted to our regional circumstances. Among the topics to be addressed are Asia-Pacific security, human rights, trade, aid, environmental issues, Antarctica and Australia's bilateral and multi-lateral relations.

APOL8202
Legal and Moral Problems of International Violence
Staff Contact: A/Prof W.H. Smith
S1 C20

This subject analyses some of the legal and moral problems raised by violence, actual and potential, among states. After considering the nature of violence and the relationship between politics, law and morality, a number of major topics are examined: conscription for war and conscientious objection; the just war and aggression; the rules of warfare (non-combatant immunity and war crimes); intervention and irregular violence; and the use of force by the United Nations.

APOL8203
The Vietnam War, 1954–75: American, Australian and Vietnamese Perspectives
Staff Contact: A/Prof C.A. Thayer
S2 C20
Note/s: Also offered by Distance Education in S1 1997

This subject is an examination of the nature and course of the war in Vietnam from the Geneva settlement in 1954 to the Ho Chi Minh campaign in 1975. Selected topics are examined from differing official and scholarly perspectives. These include: the origins and changing nature of the war; selected aspects of the military strategies of opposing forces (eg people's war/counter-insurgency; air war and North Vietnam's response); and Australian military operations in Phuoc Tuy province.

APOL8206
Changing Concepts of Security
Staff Contact: Dr P. Keal
S1 C20

This subject considers different ways of understanding the nature of security in the context of post-Cold War international politics. It is particularly interested in non-military threats to security and the transformation of the international system. Attention is given to different referents of security, 'globalisation', the reasons for and implications of the decline of major states, cultural factors, the UN, the growing desperation of the world's poor, environmental issues, international migration, gender, and other issues that determine how security can be understood. The over-riding aim is to arrive at an understanding both of the contemporary international system - as the context for security studies - and the meaning and requirements of security.

APOL8209
Australian Defence and Security After the Cold War
Staff Contact: Dr G. Cheeseman
S2 C20

Note/s: Also offered by Distance Education in S2 1997

This subject is concerned with how well Australia is adjusting its defence and security thinking to the post-Cold War and postmodern world. It examines some of the debates taking place within the academic and policy communities over the implications of the end of the Cold War for the Asia Pacific, and the place of military power and armed forces in the coming century. It then critically examines Australia's basic defence and security policies for the 1990s and beyond. Are the prescriptions contained in the 1993 *Strategic Review* and the 1994 defence White Paper relevant and appropriate to Australia's future needs? Does Australia need to alter its basic approach to security and defence, and if so, in what ways? The final part of the course considers a number of specific organisational and policy issues.

APOL8211
Northeast Asia: The Changing Regional Balance
Staff Contact: To be advised
S2 C20

This subject undertakes a comprehensive strategic assessment of the Northeast Asian region in the post-Cold War period focussing on the principal sources of threat and uncertainty in the region. Central to the course is an analysis of the changing regional roles of the major powers - the United States, China and Japan - and the factors shaping their influence and interaction. Key bilateral relationships are examined, including the US-Japan security alliance, and problems of divided states such as China-Taiwan and North and South Korea. Attention is given to prospects for nuclear proliferation focussing on North Korea, the potential for territorial disputes amongst regional states and the likely evolution of regional security dialogue and cooperation. The course also assesses the security implications of the region's economic dynamism.

APOL8212
Politics of the United Nations
Staff Contact: Dr W. Maley
S2 C20
This subject examines a range of issues relating to the origin, structure and operations of the UN. It is divided into three sections. The first examines the role of supranational organisations in a world of nation-states, and the historical context in which the UN emerged. The second explores the principal roles assumed by the UN and its specialised agencies, and assesses how effective the UN system has been in performing these roles. The third section investigates the challenges confronting the UN in the post-Cold-War world, with special emphasis on peacekeeping, the Good Offices of the Secretary-General, and the contribution of the UN to the crafting of democratic institutions.

APOL8214
International Security Regimes
Staff Contact: Dr S. Scott
S1 C20

The steady growth in the number of international regimes is one obvious aspect of the process of globalisation. Regimes are sets of principles, norms and rules by which states deal with issues of mutual concern. Examples of such regimes in the security field include those concerned with weapons of mass destruction and the non-militarisation of certain parts of the world.

This subject will begin by studying characteristics common to most regimes such as the process of regime evolution, political and legal readings of the treaty establishing the regime, regime implementation and enforcement, and theoretical attempts to account for regime outcomes. The subject will then focus on selected security regimes including chemical and biological weapons, nuclear non-proliferation, conventional weapons, transfer of military technology, Antarctica and Outer Space, and the law of the sea. While those chosen will be of importance to Australia, this course will primarily adopt a global perspective on the expanding range of international security regimes.

APOL8101
Research Project - Politics
S1,S2 C20

Masters students may apply to undertake a Research Project on a topic in the area of Defence Studies with the approval of the Politics Subject Authority, provided always

resources are available. The normal prerequisite will be a Distinction average over three subjects. The project topic will be determined by special consultation between the Subject Authority and the student. **The total length should not exceed 12,000 words.**

Interdisciplinary Studies

AINT8804
Firepower (Military Technology Subject) (12CP)

AINT8802
Firepower (Military Technology Subject) (10CP)
C12

This subject provides an overview of the technical factors which affect the use of explosives and propellants, armour materials, guns, guided weapons and light weapons. Topics include ballistics, gun design, gun fire control, warhead design (including for guided weapons) and the penetration of armour.

AINT8805
Vehicles and Mobility (Military Technology Subject) (12CP)

AINT8803
Vehicles and Mobility (Military Technology Subject) (10CP)

C12

This subject provides an overview of the technical factors which affect vehicle design, including armoured fighting vehicles and helicopters. Topics include vehicle mechanics, propulsion and handling, aerial vehicle propulsion, vehicle power supply systems, plus an overview of terra-mechanics, mobility and counter-mobility, and reliability.

Conditions for the Award of Higher Degrees

The conditions governing the award of higher degrees available in the University College are set out below. Where the conditions apply generally in the University, reference to a faculty implies the University College.

Doctor of Philosophy (PhD)

1. The degree of Doctor of Philosophy may be awarded by the Council on the recommendation of the Higher Degree Committee of the University College (hereinafter referred to as the Committee) to a candidate who has made an original and significant contribution to knowledge.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor with Honours from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment as a candidate for the degree.

Enrolment

3. (1) An application to enrol as a candidate for the degree shall be lodged with the Postgraduate Office at least one calendar month before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised closing date.

(2) In every case before making the offer of a place the Committee shall be satisfied that agreement has been reached between the School and the applicant on the topic area, supervision arrangements, provision of adequate facilities and any coursework to be prescribed and that these are in accordance with the provisions of the guidelines for promoting postgraduate study within the University.

(3) An approved candidate shall be enrolled either as a full-time or a part-time student.

(4) A full-time candidate will present the thesis for examination no earlier than three years and no later than five years from the date of enrolment and a part-time candidate will present the thesis for examination no earlier than four years and no later than six years from the date of enrolment, except with the approval of the Committee.

(5) The candidate may undertake the research as an internal student i.e. at a campus, teaching hospital, or other research facility with which the University is associated, or as an external student not in attendance at the University except for periods as may be prescribed by the Committee.

(6) An internal candidate will normally carry out the research on a campus or at a teaching or research facility of the University except that the Committee may permit a candidate to spend a period in the field, within another institution or elsewhere away from the University provided that the work can be supervised in a manner satisfactory to the Committee. In such instances the Committee shall be satisfied that the location and period of time away from the University are necessary to the research program.

(7) The research shall be supervised by a supervisor and where possible a co-supervisor who are members of the academic staff of the School or under other appropriate supervision arrangements approved by the Committee. Normally an external candidate within another organisation or institution will have a co-supervisor at that institution.

Progression

4. The progress of the candidate shall be considered by the Committee following report from the School in accordance with the procedures established within the School and previously noted by the Committee.

(i) The research proposal will be reviewed as soon as feasible after enrolment. For a full-time student this will normally be during the first year of study, or immediately following a period of prescribed coursework. This review will focus on the viability of the research proposal.

(ii) Progress in the course will be reviewed within twelve months of the first review. As a result of either review the Committee may cancel enrolment or take such other action as it considers appropriate. Thereafter, the progress of the candidate will be reviewed annually.

Thesis

5. (1) On completing the program of study a candidate shall submit a thesis embodying the results of the investigation.

(2) The candidate shall give in writing to the Postgraduate Office two months' notice of intention to submit the thesis.

(3) The thesis shall comply with the following requirements:

(a) it must be an original and significant contribution to knowledge of the subject;

(b) the greater proportion of the work described must have been completed subsequent to enrolment for the degree;

(c) it must be written in English except that a candidate in the Faculty of Arts and Social Sciences may be required by the Committee to write a thesis in an appropriate foreign language;

(d) it must reach a satisfactory standard of expression and presentation;

(e) it must consist of an account of the candidate's own research but in special cases work done conjointly with other persons may be accepted provided the Committee is satisfied about the extent of the candidate's part in the joint research.

(4) The candidate may not submit as the main content of the thesis any work or material which has previously been submitted for a university degree or other similar award but may submit any work previously published whether or not such work is related to the thesis.

(5) Four copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the four copies of the thesis submitted for examination and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

Examination

6. (1) There shall be not fewer than three examiners of the thesis, appointed by the Committee, at least two of whom shall be external to the University.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the thesis and shall recommend to the Committee one of the following:

(a) the thesis merits the award of the degree.

(b) the thesis merits the award of the degree subject to minor corrections as listed being made to the satisfaction of the Head of School.

(c) the thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the Higher Degree Committee, the thesis would merit the award of the degree.

(d) the thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) the thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) if the performance in the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to submit the thesis for re-examination as determined by the Committee within a period determined by it but not exceeding eighteen months.

(4) after consideration of the examiners' reports and the results of any further examination of the thesis, the Committee may require the candidate to submit to written or oral examination before recommending whether or not the candidate be awarded the degree. If it is decided that the candidate not be awarded the degree the Committee shall determine whether or not the candidate be permitted to resubmit the thesis after a further period of study and/or research.

Fees

7. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Arts at Honours Level (MA(Hons))

1. The degree of Master of Arts at Honours level may be awarded by the Council on the recommendation of the Higher Degree Committee of the University College (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation. The degree shall be awarded either with the grade of Honours Class 1 or with the grade of Honours Class 2. A candidate for the award of the degree at Honours level shall not be awarded the degree at Pass level.

Qualifications

2. (1) A candidate for the degree shall have been awarded at a standard not below Honours Class 2 an appropriate degree of Bachelor from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Postgraduate Office at least one calendar month before commencement of the session in which enrolment is to begin or, where applicable, by the advertised closing date.

(2) In every case, before making the offer of a place the Committee shall be satisfied that initial agreement has been reached between the School and the applicant on the topic area, supervision arrangements, provision of adequate facilities and any coursework to be prescribed and that these are in accordance with the provisions of the guidelines for promoting postgraduate study within the University.

(3) The candidate shall be enrolled as either a full-time or a part-time student.

(4) A full-time candidate will present the thesis for examination no earlier than 1.5 years and no later than 3 years from the date of enrolment and a part-time candidate will present

the thesis for examination no earlier than 2 years and no later than 4 years from the date of enrolment, except with the approval of the Committee.

(5) The candidate may undertake the research as an internal student i.e. at a campus, teaching hospital, or other research facility, with which the University is associated, or as an external student not in attendance at the University except for periods as may be prescribed by the Committee.

(6) An internal candidate will normally carry out the research on a campus or at a teaching or research facility of the University except that the Committee may permit a candidate to spend a period in the field, within another institution or elsewhere away from the University provided that the work can be supervised in a manner satisfactory to the Committee. In such instances the Committee shall be satisfied that the location and period of time away from the University are necessary to the research program.

(7) The research shall be supervised by a supervisor or supervisors who are members of the academic staff of the School or under other appropriate supervision arrangements approved by the Committee. Normally an external candidate within another organisation or institution will have a co-supervisor at that institution.

Progression

4. The progress of the candidate shall be considered by the Committee following report from the School in accordance with the procedures established within the School and previously noted by the Committee.

(i) The research proposal will be reviewed as soon as feasible after enrolment. For a full-time student this will normally be during the first year of study, or immediately following a period of prescribed coursework. This review will focus on the viability of the research proposal.

(ii) Progress in the course will be reviewed within twelve months of the first review. As a result of either review the Committee may cancel enrolment or take such other action as it considers appropriate. Thereafter, the progress of the candidate will be reviewed annually.

Thesis

5. (1) On completing the program of study a candidate shall submit a thesis embodying the results of the investigation.

(2) The candidate shall give in writing to the Postgraduate Office two months' notice of intention to submit the thesis.

(3) The thesis shall present an account of the candidate's own research. In special cases work done conjointly with other persons may be accepted, provided the Committee is satisfied as to the candidate's part in the joint research.

(4) The candidate may also submit any work previously published whether or not such work is related to the thesis.

(5) Three copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the three copies of the thesis submitted for examination and is free to allow it to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

Examination

6. (1) There shall be no fewer than two examiners of the thesis, appointed by the Committee, at least one of whom shall be external to the University unless the Committee is satisfied that this is not practicable.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the thesis and shall recommend to the Committee that:

(a) The thesis merits the award of the degree either with Honours Class 1 or with Honours Class 2.

(b) The thesis merits the award of the degree either with Honours Class 1 or with Honours Class 2 subject to minor corrections as listed being made to the satisfaction of the Head of the School; or

(c) The thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the Higher Degree Committee, the thesis would merit the award of the degree.

(d) The thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) The thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance in the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the same thesis and submit for further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(4)The Committee shall, after consideration of the examiners' reports and the results of any further examination, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate not be awarded the degree, the Committee shall determine whether or not the candidate be permitted to resubmit the thesis after a further period of study and/or research.

Fees

7. A candidate shall pay such fees as may be determined from time to time by Council.

Master of Engineering (ME) and Master of Science (MSc)

1. The degree of Master of Engineering or Master of Science by research may be awarded by the Council on the recommendation of the Higher Degree Committee of the University College (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation.

Qualifications

2. (1) A candidate for the degree shall have been awarded at a standard not below Honours Class 2 an appropriate degree of Bachelor from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such examination or carry out such work as the Committee may prescribe.

Enrolment

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Postgraduate Office at least one calendar month before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised starting date.

(2) In every case, before making the offer of a place the Committee shall be satisfied that initial agreement has been reached between the School and the applicant on the topic area, supervision arrangements, provision of adequate facilities and any coursework to be prescribed and that these are in accordance with the provisions of the guidelines for promoting postgraduate study within the University.

(3) The candidate shall be enrolled as either a full-time or a part-time student.

(4) A full-time candidate will present the thesis for examination no earlier than 1.5 years and no later than 3 years from the date of enrolment and a part-time candidate will present the thesis for examination no earlier than 2 years and no later than 5 years from the date of enrolment, except with the approval of the Committee.

(5) The candidate may undertake the research as an internal student i.e. at a campus, teaching hospital, or other research facility with which the University is associated, or as an external student not in attendance at the University except for periods as may be prescribed by the Committee.

(6) An internal candidate will normally carry out the research on a campus or at a teaching or research facility of the University except that the Committee may permit a candidate to spend a period in the field, within another institution or elsewhere away from the University provided that the work can be supervised in a manner satisfactory to the Committee. In such instances the Committee shall be satisfied that the location and period of time away from the University are necessary to the research program.

(7) The research shall be supervised by a supervisor or supervisors who are members of the academic staff of the School or under other appropriate supervision arrangements approved by the Committee. Normally an external candidate within another organisation or institution will have a co-supervisor at that institution.

Progression

4. The progress of the candidate shall be considered by the Committee following report from the School in accordance with the procedures established within the School and previously noted by the Committee.

(i) The research proposal will be reviewed as soon as feasible after enrolment. For a full-time student this will normally be during the first year of study, or immediately following a period of prescribed coursework. This review will focus on the viability of the research proposal.

(ii) Progress in the course will be reviewed within twelve months of the first review. As a result of either review the Committee may cancel enrolment or take such other action as it considers appropriate. Thereafter, the progress of the candidate will be reviewed annually.

Thesis

5. (1) On completing the program of study a candidate shall submit a thesis embodying the results of the investigation.

(2) The candidate shall give in writing to the Postgraduate Office two months' notice of intention to submit the thesis.

(3) The thesis shall present an account of the candidate's own research. In special cases work done conjointly with other persons may be accepted, provided the Committee is satisfied about the extent of the candidate's part in the joint research.

(4) The candidate may also submit any work previously published whether or not such work is related to the thesis.

(5) Three copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the three copies of the thesis submitted for examination and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

Examination

6. (1) There shall be no fewer than two examiners of the thesis, appointed by the Committee, at least one of whom shall be external to the University unless the Committee is satisfied that this is not practicable.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the merits of the thesis and shall recommend to the Committee that:

(a) The thesis merits the award of the degree.

(b) The thesis merits the award of the degree subject to minor corrections as listed being made to the satisfaction of the Head of the School.

(c) The thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the Higher Degree Committee, the thesis would merit the award of the degree.

(d) The thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) The thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance in the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the

same thesis and submit to further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(4) The Committee shall, after consideration of the examiners' reports and the results of any further examination, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate not be awarded the degree the Committee shall determine whether or not the candidate be permitted to resubmit the thesis after a further period of study and/or research.

Fees

7. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Arts at Pass Level (MA)

1. The degree of Master of Arts at Pass Level may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall normally be lodged with the Postgraduate Office at least two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) A candidate for the degree shall be required to undertake such formal subjects and, except in exceptional circumstances, pass at the first attempt such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Defence Studies (MDefStud)

1. The degree of Master of Defence Studies at Pass level may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. A candidate for the degree shall have been awarded

(1) an appropriate degree with Honours or a Graduate Diloma in a related discipline from The University of New South Wales or a qualification considered equivalent from another

university or tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee); or

(2) a degree at pass level from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution which includes a major in a relevant field of study with results at credit level or better in two final year sessional subjects (or equivalent); in addition candidates must be graduates of at least three years standing or have a minimum of three years full-time work experience;

(3) in exceptional cases persons with other academic and/or professional qualifications and extensive work experience of a relevant nature may be permitted to enrol for the degree.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Postgraduate Office at least two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) The program of advanced study shall total a minimum of 120 credit points. The maximum number of credit points for coursework subjects that may be taken in a single School is 80.

(3) A student shall be permitted to continue in the degree after failure in one subject In the event of a further failure a student shall not be permitted to continue in the degree unless circumstances justifying continuation can be demonstrated to the Higher Degree Committee of the University College.

(4) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(5) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

The rules that appear in the remainder of this section of the handbook apply to new programs introduced in 1997. Candidates who choose to remain in the pre-1997 programs should refer to the 1996 handbook for rule information.

Master of Engineering Science (MEngSc)
Master of Information Science (MInfSc)
Master of Management Studies (MMgtStud)

1. The degree of Master of Engineering Science, Master of Information Science or Master of Management Studies may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate four-year degree of Bachelor or Bachelor with Honours, or a Graduate Diploma in a related discipline from The University of New South Wales or a qualification considered equivalent from another tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Postgraduate Office two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) A candidate for the degree shall undertake such formal subjects and pass such assessment as prescribed.

(3) The program of advanced study shall total a minimum of 120 credit points. The number of credit points allocated for each subject shall be determined by the Committee on the recommendation of the appropriate Head of School. A 24/36 credit point project report shall be submitted for examination in accordance with the requirements of the appropriate Head of School and shall be assessed as a formal subject.

(4) A candidate's proposed program shall be approved by the appropriate Head of School prior to enrolment. For the purposes of this requirement the appropriate Head of School shall normally be the Head of School providing supervision of the project report or, if there is no project report, the major field of study.

(5) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate. A Head of School may specify that a candidate shall be required to pass at the first attempt all examinations prescribed by the Committee.

(6) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and eight sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

Fees

6. A candidate shall pay such fees as may be determined from time to time by the Council.

Graduate Diploma Rules

1. A Graduate Diploma may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

2. (1) A candidate for the diploma shall have been awarded an appropriate degree of Bachelor or a Graduate Certificate from The University of New South Wales or a qualification considered equivalent from another tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee).

(2) An applicant who has obtained suitable credit points in the equivalent Master's program of the University College but has not taken out the Master's degree will be given advanced standing as if those credit points had been obtained while enrolled in the Graduate Diploma program.

(3) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the diploma.

(4) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

3. (1) An application to enrol as a candidate for the diploma shall be made on the prescribed form which shall be lodged with the Postgraduate Office at least two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) A candidate for the diploma shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The program of advanced study shall total a minimum of 84 credit points or, in the case of Defence Studies, 80 credit points.. The number of credit points allocated for each subject shall be determined by the Committee on the recommendation of the Head of School.

(4) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

In the case of Defence Studies, candidates shall be permitted to continue after failure in one subject. In the event of a further failure a candidate will be excluded unless circumstances justifying continuation can be demonstrated to the Committee.

(5) No candidate shall be awarded the diploma until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Graduate Certificate

1. A Graduate Certificate may be awarded by the Council to a candidate who has satisfactorily completed a program of study.

Qualifications

2. (1) A candidate for the Certificate shall have been awarded a degree of Bachelor from The University of New South Wales or a qualification considered equivalent from another tertiary institution.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the Certificate.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the Certificate shall be made on the prescribed form which shall be lodged with the Postgraduate Office at least two calendar months before the commencement of the session in which enrolment is to begin, or, where applicable, by the advertised date.

(2) A candidate for the Certificate shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The program of study shall total a minimum of 40 credit points. The number of credit points allocated for each subject shall be determined by the Committee on the recommendation of the appropriate Head of School.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the Certificate until the lapse of one full-time or four part-time academic session from the date of enrolment. The maximum period of candidature shall be two full-time or four par-.time academic sessions from the date of enrolment. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

LENGTH OF THESES

The length of a doctoral thesis normally should not exceed 100,000 words of text and that of a masters research thesis 75,000 words.

PREPARATION AND SUBMISSION OF PROJECT REPORTS AND THESES FOR HIGHER DEGREES

1. (1) Every candidate for the degree of Master or Doctor in which a report on a project or a thesis is required shall submit the required copies of the project report or thesis in accordance with the Schedule below.

(2) All copies shall contain:

(a) a short abstract comprising no more than 350 words. The abstract shall indicate:

—the problem investigated;

—the procedures followed;

—the general results obtained;

—the major conclusions reached;

but shall not contain any illustrative matter, such as tables, graphs or charts.

(b) the following statement signed by the candidate:

'I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement is made in the text.'

(c) a data sheet containing a declaration relating to the disposition of the project report or thesis in accordance with the University's Policy with respect to the Use of Project Reports and Higher Degree Theses (see below) and a short abstract of not more than 350 words for provision to Dissertations Abstract International and other relevant databases.

2. (1) All copies shall be in either 1 1/2 or double-spaced typescript. The paper used shall be of good quality and sufficiently opaque for normal reading and microfilming/microfiching purposes. Type size shall be not less than 22-point (and 10-point for footnotes) in a legible, preferably sanserif font.

(2) The size of the paper shall approximate International Standards Organization paper size A4 (297 mm x 210 mm) or the size commonly called quarto except for illustrative material such as drawings, maps and printouts, on which no restriction is placed.

(3) The margins on each sheet shall be not less than 40 mm on the left-hand side, 20 mm on the right-hand side, 30 mm at the top and 20 mm at the bottom.

(4) There shall be a title sheet showing the title, author's name, degree and year of submission.

(5) Pages or leaves shall be numbered consecutively.

(6) Unless otherwise specifically permitted by the supervisor, diagrams, charts, etc shall be included, where possible with the text, otherwise they must be clearly referred to in the text, numbered and folded for insertion in a pocket on the back cover of the theses binding. All loose material shall be marked with the candidate's name, initials, and degree for which for work is submitted in such a way that it can readily be linked with the project or thesis. Folded diagrams or charts included in the text shall be arranged so as to open out to the top and left. Photographic prints shall be securely fixed. They shall either be printed on single weight printing paper, preferably not glazed, or mounted on cartridge paper for binding.

(7) Where permission has been obtained for the separate binding of drawings they shall be of International Standards Organization paper size A1 (841 mm x 594 mm) and shall have a margin at least 40 mm on the left-hand side to permit binding. They shall be bound together by a row of clips on the left-hand side and shall have a clear sheet of drawing paper on top and underneath. On the top sheet shall be printed the words 'The University of New South Wales—..... of ..... degree' and a description of the project or thesis, and underneath that, the year of submission. On the bottom right-hand corner should be printed the name of the candidate. Drawings may be originals on cartridge

paper or black and white prints. They should be suitably coloured where appropriate and extra work may be added in ink to original drawings.

(8) Any variation to the requirements (1-7) shall be approved by the supervisor in consultation with the Registrar and the University Librarian.

3. (1) One copy of every thesis submitted to the Postgraduate Office is for deposit in the University Library. The Library deposit copy shall be presented in a permanent and legible form in original typescript, printed copy, laser printed copy, computer printed copy of letter quality using a new carbon ribbon or good photocopy of one of these. Faded, dirty or faint copies are not acceptable.

(2) The copies shall be bound in accordance with (3) below to allow their transmission to examiners without the possibility of their disarrangement.

(3) Prior to the award of the degree the candidate shall ensure that the Library deposit copy is bound in boards, covered with buckram. The bound volume shall be lettered on the spine as follows:

(a) At the bottom and across—UNSW, or if the volume is too thin for this— U
NSW

(b) 70 mm from the bottom and across, with the degree and year of submission of the thesis, for example— MSc
1987

(c) Evenly spaced between the statement of the degree and year and the top of the spine the name of the author, initials first and then the surname, reading upwards in one line.

No further lettering or any decoration is required on the spine or anywhere on the binding. In the binding of theses or project reports which include mounted photographs, folded graphs etc., leaves at the spine shall be packed to ensure even thickness of the volume. The Library copy shall be bound by one of a panel of approved bookbinders, each of whom is aware of the University's requirements. Names of approved bookbinders may be secured from the Postgraduate Office.

Schedule

1. Degrees and course codes for which candidates are required to submit 4 copies of a thesis to the Postgraduate Office:

Doctor of Philosophy	1000—1990

2. Degrees and course codes for which candidates are required to submit 3 copies of a thesis to the Postgraduate office:

Master of Arts at honours level—by thesis	2271—2401
Master of Science—by thesis	2041—2931
Master of Engineering—by thesis	2651—2691

3. Degrees and course codes for which candidates may be required to submit 2 copies of a research project, project report or sub-thesis to a Head of School (- any variation to this requirement will be advised by Head of School):

Master of Arts (Pass)	8171
Master of Defence Studies	9900
Master of Engineering Science—by 36 credit point project	8557—8558
Master of Information Science—by 36 credit point project	8556
Master of Management Studies	8396

Note: This schedule may be varied from time to time as the University adds new courses, deletes old ones or amends the conditions of existing degrees.

Policy with respect to the Use of Higher Degree Project Reports, Research Projects and Theses

The University holds that a project report or thesis submitted for a higher degree and retained in the Library should be retained not only for record purposes but also, within copyright privileges of the author, should be public property and accessible for consultation at the discretion of the Librarian.

In order to ascertain the wishes of candidates for a higher degree regarding the use to which their project report or thesis may be put, they are required to complete a disposition form (obtainable from the Postgraduate office). Candidates wishing, or requiring for reasons of sensitivity, to restrict the accessibility of a project report, research project or thesis will need to apply in writing to the Registrar at UNSW for permission.

Academic Prizes

Undergraduate University College Prizes

The following table summarises the undergraduate prizes awarded by the University College. In addition to the Boards of Studies prizes and the privately endowed prizes listed below, each of the academic Schools may award prizes for outstanding performance by undergraduate students.

General

Board of Studies in Humanities and Social Sciences Prize

V $250

C The most distinguished performance by an officer cadet in the first year of the Bachelor of Arts course.

Board of Studies in Humanities and Social Sciences Prize

V $250

C The most distinguished performance by an officer cadet in the second year of the Bachelor of Arts course.

Board of Studies in Humanities and Social Sciences Prize

V $250

C The most distinguished performance by an officer cadet in the third year of the Bachelor of Arts course.

Board of Studies in Science Prize

V $250

C The most distinguished performance by an officer cadet in the first year of the Bachelor of Science course.

Board of Studies in Science Prize

V $250

C The most distinguished performance by an officer cadet in the second year of the Bachelor of Science course.

Board of Studies in Science Prize

V $250

C The most distinguished performance by an officer cadet in the third year of the Bachelor of Science course.

Board of Studies in Engineering Prize

V $250

C The most distinguished performance by an officer cadet in the first year of the Bachelor of Engineering or Bachelor of Technology (Aeronautical) course.

Board of Studies in Engineering Prize

V $250

C The most distinguished performance by an officer cadet in the second year of the Bachelor of Engineering or Bachelor of Technology (Aeronautical) course.

Board of Studies in Engineering Prize

V $250

C The most distinguished performance by an officer cadet in the third year of the Bachelor of Engineering course.

The Science Prize (British Aerospace Australia)

V $250

C The most distinguished performance by an officer cadet in the three years of the Bachelor of Science course.

The A.H. Corbett Prize (Institution of Engineers ACT Branch)

V $200 and Bronze Medal

C The top graduate in engineering

The ACT Housing Trust Prize

V $300

C The best essay, project or thesis related to social or urban planning issues by an officer cadet in the Bachelor of Arts, Bachelor of Science or Bachelor of Engineering course.

Aeronautical Engineering

The Air Vice Marshal Noble Prize (Royal Aeronautical Society Canberra)

V $100 and Perpetual Trophy

C Distinguished performance by an officer cadet in fourth year Aeronautical Engineering.

The L.W. Gairns Memorial Prize and Trophy

V $100 and Perpetual Trophy

C The best performance by an officer cadet in the final year of the Bachelor of Technology (Aeronautical) degree.

Chemistry

Royal Australian Chemical Institute Prize

V $100

C Outstanding performance by an officer cadet in third year Chemistry studies.

Civil Engineering

The Wing Commander John Yeaman Prize (Dr J. Yeaman)

V $250 and Silver Medal

C The best performance by an officer cadet in the teaching unit Transportation Engineering in ACMA3800 U Civil Engineering 3.4

The AISC Steel Design ~~Prize~~ Award

V ~~$200~~ of books and software

C The best performance by an ~~officer cadet~~ student in the steel design components of the teaching unit ACMA3002 E Structural Design 1 in ACMA3800 U Civil Engineering 3 and ACMA 3001E Structural Analysis 1

The Institute of Explosives Engineers Prize

V $150

C The best performance in the teaching unit ACMA4019E Engineering Explosives in ACMA4800 U Civil Engineering 4.

Computer Science

The Second Year Computer Science Prize (Ansett)

V Books to the value of $100

C The best performance by an officer cadet in second year Computer Science.

The Second Year Information Systems Prize (Australian Computer Society)

V $100

C The best performance by an officer cadet in second year Information Systems.

The Most Outstanding Computing Project Prize (Cisco Systems)

V $1000

C The most outstanding project submitted for ACSC3025 E Computer ~~Science~~ Project 3 or ~~ACSC.3011 E Information Systems Project 3.~~

The Highly Commended Computing Project Prize (Cisco Systems)

V $600

C The highly commended project submitted for ACSC3025 E Computer ~~Science~~ Project 3 or ~~ACSC3011 E Information Systems Project 3.~~

The Commended Computing Project Prize (Cisco Systems)

V $400

C The commended project submitted for ACSC3025 E Computer ~~Science~~ Project 3 or ~~ACSC.3011E Information Systems~~ Project 3.

Electrical Engineering

The Rockwell Australia Limited Award

V $170 and a plaque

C The best performance by an officer cadet in Electrical Engineering 1.

The Siemens—Plessey Award in Electrical Engineering (Communications and Electronics)

V $250

C The best overall performance in all four years of the electrical engineering program by a student undertaking a speciality in communications and/or electronics.

The Institution of Radio and Electronic Engineers Australia (Canberra Division) Prize

V $200 and one year's membership of the Institution

C The best performance in laboratory work and thesis by a final year electrical engineering student.

The IEE Prize (Institution of Electrical Engineers)

V £75

C The best performance in fourth year options including power, power electronics and machines.

English

The E. R. Bryan Prize

V $80

C Distinguished performance by a first year officer cadet in English 1.

The Professor Grahame Johnston Prize

V Books to the value of $100

C The best performance by an officer cadet in Australian Literature.

The Barry Andrews Shakespeare Prize

V $100

C The best performance by an officer cadet in Shakespeare and/or renaissance drama studies.

The Dorothy Green Prize

V $200

C The best essay by an officer cadet on Australian Literature.

The Creative Writing Prize

V $1000

C The best examples of creative writing by officer cadets.

History

The Allen & Unwin History Prize

V $200

C The Best performance by an officer cadet in History 1.

The L. C. F. Turner Prize

V $100

C Outstanding performance in History.

The Military Historical Society of Australia Prize

V $200 and membership of the Society

C The best essay by a second year officer cadet on a military history topic.

Management

The Australian Institute of Management Prize

V $300

C Outstanding performance in undergraduate Management studies.

Mathematics

The R. J. A. Barnard Memorial Prize

V $100

C Outstanding performance by an officer cadet in three years of Mathematics.

Oceanography

The Alan Carter Prize

V Books, Atlas or Chart to the value of $100

C The best performance by a first year officer cadet in Oceanography 1.

Physics

The Sir Leslie Martin Prize

V $100

C Distinguished performance by a first year officer cadet in first year Physics.

The Australian Institute of Physics Prize (ACT Branch)

V $100 and one year's membership of the Institute

C Distinguished performance by an officer cadet in second year Physics.

Graduate University College Prizes

The Defence Studies Prize (Petro Fedorczenko Legacy)

V Books to the value of $200

C The most outstanding academic record of a student completing the Master of Defence Studies course.

The Oxford University Press Master of Arts (English) Prize

V $200

C The most outstanding performance by a student in the Master of Arts English course.

The Master of Information Science Computer Associates Prize

V $1000

C The most outstanding overall performance of a student completing the Master of Information Science degree.

The Ria de Groot Prize

V $150

C The best female postgraduate student graduating from the University College.

The Royal Aeronautical Society Canberra Graduate Prize

V $150 and medal

C Excellence and a significant contribution in a field of aeronautical science by a student completing a Master's or PhD degree in the University College.

Information regarding prizes may be obtained from the Director, Student Administration.

Timetables

Arts and Science Courses

Arts and Science students must select their programs to meet the requirements of the degree rules given on pp. 45-46 and to be generally on the lines of the sample programs illustrated on pp. 56-57. A student's program for any year must also be compatible with a timetable of subjects published in this section.

Students should read the subject descriptions for their chosen subjects and note the commitments for lectures, tutorials, laboratory and field work. Where a subject offers a choice of units, they should select those they wish to take, while noting corequisites and prerequisites.

For the purpose of the timetable, all the subjects offered in the Arts and Science courses are grouped in five blocks, designated A, B, C, D and E. There are 45 periods in each teaching week and one of the letters is assigned to each of them:

Period No.	1	2	3	4	5	6	7	8	9
Monday	MIL*	A	E	D	C	B	A	A	A
Tuesday	B	A	E	D	C	B	B	B	B
Wednesday	C	B	A	E	D	C	C	C	C
Thursday	D	C	B	A	E	D	D	D	D
Friday	E	D	C	B	A	E	E	E	E

**Period 1 Mondays is allocated for military training.*

The subjects grouped in block A are scheduled in some of the periods marked A, subjects grouped in block B are scheduled in some of the periods marked B, and so on. The scheduled periods include lectures and in some cases may include tutorials and laboratory classes (although generally tutorials and laboratory classes are arranged automatically).

Students must choose their subjects for the year from up to four of the blocks; the remaining block will be reserved for periods of military training and English Communication. When making their selections, students should note the following:

1. When a Level II or Level III subject is selected, it is generally not possible to take another subject from the same block.

2. A choice of units must be made when this is indicated in a subject description.

3. Where a subject is grouped in two different blocks, either block may be selected. The choice of block may be influenced by the units of the subject offered in each block. It may be possible to choose units from both blocks.

4. The laboratory periods for a particular subject need not be taken in the same block as the lectures in that subject. Laboratory periods and tutorials must be chosen so that they do not clash with classes for other subjects selected.

5. If possible one of periods 4, 5 and 6 each day should be kept free for a lunch break.

The timetable of subjects grouped into the five blocks is given at the end of this section.

The locations of all lectures, tutorials and laboratory classes will be posted on the South Lecture Block notice board.

Session 1 and whole year subjects—Thursday 27 February 1997

Session 2 and whole year subjects—Thursday 17 July 1997

Honours students at all levels should consult the relevant Schools for times of honours classes.

Engineering Courses

For each of the Engineering streams, the programs for the first three years are prescribed, but there is a choice of General Education subjects in the second and third years. Some elective units are available in the fourth year.

Engineering timetables were not available for inclusion in the handbook. Timetables will be provided by individual schools.

Military Training Program

All officer cadets are required to undertake a maximum of six (6) periods per week military training, which includes an average of one hour per week of English Communication. It will be necessary when planning your personal timetable to nominate a block for this purpose. A detailed military training program will be available to officer cadets before the commencement of the academic year.

Personal Timetables

There is a blank timetable frame on the last page of this handbook. Students are strongly advised to use the blank to record their own personal timetables. The personal timetable will serve not only as a reminder but also as a check against clashes, especially tutorial clashes.

Any student who finds difficulty in selecting subjects or in making up a personal timetable is invited to seek assistance from Student Administration.

Period Times

Times for periods are as follows:

Period	
1	8.00 – 8.50 am
2	9.00 – 9.50 am
3	10.10 –11.00 am
4	11.10 –12.00 md
5	12.10 – 1.00 pm
6	1.10 – 2.00 pm
7	2.10 – 3.00 pm
8	3.10 – 4.00 pm
9	4.10 – 5.00 pm

Timetable of Arts and Science Subjects for 1997

BLOCK A

Field of Study	*Subject/Level/Unit*		*Session(F)*	*M*	*T*	*W*	*Th*	*F*
Mathematics	Mathematics 1		F	2	2	3	4	
Chemistry	2A		F	2	2	3	4	5t
English	2A	Literature of the Renaissance	1	7				
		C18–C19 British Literature	2	7				
	2/3 Options							
		Literature and Society in England in the 1930s	1	2		3		
		Images of the Asia-Pacific	1		2			5
		Reading and Writing Short Fiction	1	8			4	
		Commonwealth Literature	2		2			5
		Literature of the Great War	2	8			4	
		Modern Women Writing	2	2		3		
Geography	2A/B	Remote Sensing Applications	1		2		4	
Mathematics	2A/B	Statistics 2	1	7,8		3	4	
		Probability 2	2	7		3	4	
Economics and Management	3	Asia-Pacific Economies	1	2	2	3		
		Quantitative Analysis	2	2	2	3		
		Human Resource Management	2	7			4	5
Oceanography	3	*	F	2	2	3	4	5
Physics	3/S/T	*	F	2	2	3	4	5
Politics	2/3	Politics of Australian Defence Policy	1	2		3		
		From International to Global Politics	1	7	3		4	5
		~~The Politics of Korea~~	~~1~~	~~7~~			~~4~~	
		~~Issues and Problems in Australian Foreign Policy~~	~~1~~	~~7~~			~~4~~	
		Culture Conquest and International Society	2	7	2		4	5
		War in International Politics	2	2 7		3	4	
	Security	~~Strategic~~ Issues in ~~North~~east Asia	1 2	2 7		3	4	
Computer Science	GE	Computers and Society	1					
	GE	Information Technology in Organisations	2	workshop only				

Notes:

* indicates a choice of units.

F indicates full-year subject.

t indicates at least one tutorial at this time.

BLOCK B

Field of Study	*Subject/Level/Unit*		*Session(F)*	*M*	*T*	*W*	*Th*	*F*
Economics and Management	Economics 1		F	6	6 *or* 7	2		
Geography	Geography 1		F		1		3	4
Oceanography	Oceanography 1		F		1		3	4
Economics and Management		Intermediate Microeconomics	1		6	2		4
		Introduction to Corporate and Government Accounting	1	6	1		3	
		Intermediate Macroeconomics	2		6	2		4
		Management Accounting	2	6	1			4
Mathematics	2A/B	Core Mathematics 2 Linear Algebra	1	6	6	2t		
		Mathematical Modelling 2	1		1		3	4t
		Core Mathematics 2 Multivariable Calculus	2	6	6	2t		
		Differential Equations 2	2		1		3	4t
History	2/3	The American Civil War	2		7,8		3	
		The Great War	1	6	1	2		
		East Asia: Between Tradition and Modernity	2		7,8		3	
		European Powers 1870–1914	2		7,8		3	
		International Naval History	2		7,8		3	
		Southeast Asian History	2	6	1			4
Chemistry	3B		F	6t	1	2	3	4
Computer Science Information Systems	3A/C	Information Systems Core A3	1		1		3	
		Information Systems Core B3	1			2		4
		Database 3	1	6	6			
		Human Computer Interaction 3	1	6	6			
		Information Systems Engineering 3	2			2		4
		Human Factors 3	2		1		3	
Asia-Pacific Studies	Economics/Politics		1		7,8			3
Civil Engineering	GE	~~Engineering the Environment~~	~~2~~		1		3	
English	2H	Seminar	F		8,9			
English	GE	American Literature	1	6		2		
	GE	Writing and the Media	2	6		2		
Geography	GE	Marine Environment	1	6		2		
	GE	Marine Resources	2	6		2		
Politics	GE	Why Politics Matters	1	6		2		
	GE	Issues in Contemporary Australian Politics	2	6		2		

t indicates at least one tutorial at this time

BLOCK C

Field of Study	*Subject/Level/Unit*		*Session(F)*	*M*	*T*	*W*	*Th*	*F*
History	History 1		F		5	6	2	
Physics	Physics 1		F	5		1		3
Economics and Management		Quantitative Methods	1	5		7	2	
		International Trade	2	5		7	2	
		Organisational Behaviour	2		5	6	2	
Geography	2A	Geomorphology	2		5		2	
	2B	Social Geography	1			1		3
	2A/B	Biogeography	1		5		2	
	2A/B	Geography of Economic Activity	2			1		3
Physics	2		F	5	5	1	2	3

BLOCK C (continued)

Field of Study	*Subject/Level/Unit*		*Session(F)*	*M*	*T*	*W*	*Th*	*F*
Computer Science	3A/C	Software Engineering 3	1		5		2	
Information Systems		Management Science Techniques 3	1			1		3
		Artificial Intelligence 3	1			1		3
		Data Networks 3	1	5		6		
		Systems Administration 3	2			1		3
		Fourth Generation Languages 3	2		5		2	
Chemistry	3A		F	5	5	1	2	3
English	3A	Radical Cousins: C19 American and Australian Writers : Part A (Core)	1		5			
		Post-Colonial Literature in English : Part B (Core)	2		5			
	3H	Seminar	F			8,9		
	2/3 Options							
		Romanticism and Revolution	1	5		6		
		C19 Australian Literature	1			1	2	
		Shakespeare	1			7		3
		C20 American Literature	2	5		6		
		Occasional Option 2 (African-American Literature)	2			1	2	
		Travel Writing	2			7		3
Mathematics	GE	Presenting and Analysing Data in the Social Sciences	1	5		7,8		
	GE	Statistical Modelling in the Social Sciences	2	5		7,8		
Chemistry	GE	The World of Chemistry	1			1		3
	GE	Chemistry and Life	2			1		3

BLOCK D

Field of Study	*Subject/Level/Unit*		*Session(F)*	*M*	*T*	*W*	*Th*	*F*
Computer Science	Computer Science 1		F		4		1	2
	Information Systems 1		F		4		1	2
Politics	Politics 1		F	4			6	
Chemistry	2B		F	4	4		1	2
Computer Science	2A/B	Information Systems Core A2	1		4		1	
Information Systems		Personal Support Systems 2	1	4				2
		Numerical Analysis 2	1	4				2
		C^3I Systems 2	1			5	6	
		Information Systems Core B2	2	4			6	
		Management Science Techniques 2	2		4		1	
		Numerical Linear Algebra 2	2	4				2
		Data Communications 2	2			5		2
Oceanography	2		F	4	4		1	2
Physics	2	Marine Acoustics and Optics 2 (Oc 2)	2			5	1	
History	2A/3	Sea and Seafarers	1		4		7,8	
		Soviet History	1		4		7,8	
		Social Change in East Asia	1	4		5		2
		Colonial Australia	1			5	1	2
		Modern Australia: Politics and Culture	2		4		7,8	
		Revolts and Counter Insurgency	2			5	1	2
Geography	3A/B/C		F	4	4	5	1,6	2
Mathematics*	3A/B/C	Differential Equations 3	1		4		8,9	
		Continuum Mechanics 3	1	4			6,7	
		Statistical Modelling 3	1	4		5	6	
		Waves 3	1			5	1	2
		Viscous Fluid Dynamics 3	2	4			6,7	
		Industrial Mathematics 3	2		4		8,9	
		Multivariate Statistics 3	2	4		5	6	
		Advanced Mathematical Techniques 3	2			5	1	2

BLOCK D (continued)

Field of Study	*Subject/Level/Unit*		*Session(F)*	*M*	*T*	*W*	*Th*	*F*
Physics	GE	Introductory Meteorology	1	4		5		
	GE	~~Environmental Physics~~	2	~~4~~		~~5~~		
Mechanics of Flight	GE	Aircraft Aerodynamics	1				1	2
	GE	Aircraft Performance	2				1	2

* Some units may not be offered. See School for details.

BLOCK E

Field of Study	*Subject/Level/Unit*		*Session(F)*	*M*	*T*	*W*	*Th*	*F*
Chemistry¥	Chemistry 1		F	3	3		5	1
English¥	English 1		F	3		4		6
Computer Science	2A/B	Computer Science Core A2	1	3			5	
Information Systems		Comparative Programming Languages 2	1		3			1
		Knowledge Based Systems 2	1		3			1
		Decision Analysis 2	1			4		6
		Computer Science Core B2	2	3			5	
		Computer Systems Architecture 2	2		3			1
		Computer Graphics 2	2			4		6
		Artificial Intelligence 2	2			4		6
Politics	2/3	Politics in Japan	1			4		6
		Politics of USA	1		3			1
		Approaches to Politics	2	3			5	
		Politics of Russia	2			4		6
		~~The Politics of International Co-operation~~	~~2~~		~~3~~			~~1~~
		Electoral Systems	2		3			1
		Politics of China	2					
Economics and Management	3	Organisational Management	1		3		5	6
		Advanced Economic Theory & Policy	1	3		4		1
		Resource Economics	2		3		5	6
		International Economic Theory & Policy	2	3		4		1
		Logistics Management	2	3		4		1
Geography	3A/B/C	*	F	3	3	4	5	1
Mathematics	3A/B/C	Statistical Forecasting 3	1	3		4		1
		Linear Models and Experimental Design 3	1		3		5	7
		Generalised Linear Models 3	2	3		4		1
		Modern Techniques in Data Analysis 3	2		3		5	7
Physics	3/S/T	*	F	3	3	4	5	1
Asia-Pacific Studies	Asia-Pacific Issues		1 2		3			6,7
	Asia-Pacific Culture		2 1		3			6,7
History	GE	Rats, Lice and History	1	3				6
	GE	The First World War: Images and Reality	2	3				6
Economics	GE	Leadership Studies	1	3				6
	GE	Competition and Innovation	1		3			7
	GE	Macroeconomic Growth and Stability	2	3				6
Physics	GE	Physics for Society	1		3		5	
	GE	Astronomy	2		3		5	

* See School for details.
¥ Students wishing to undertake both these subjects should contact the Schools.

Information for Students

Information for Students

Much of the material below has been reproduced from or adapted from the section General Information: Rules and Procedures in the current ***Calendar*** *of The University of New South Wales.*

Equal Opportunity in Education

Under the Federal Racial Discrimination Act (1975) and Sex Discrimination Act (1984), Disability Discrimination Act (1992) and the New South Wales Anti-Discrimination Act (1977), the University is required not to discriminate against students or prospective students on the grounds of sex, marital status, pregnancy, race, nationality, national or ethnic origin, colour, homosexuality or disability. Under The University of New South Wales Act (1989), the University declares that it will not discriminate on the grounds of religious or political affiliations, views or beliefs.

University Commitment to Equal Opportunity in Education

As well as recognising its statutory obligations as listed, the University will eliminate discrimination on any other grounds which it deems to constitute disadvantage. The University is committed to providing a place to study free from harassment and discrimination, and one in which every student is encouraged to work towards her/his maximum potential. The University further commits itself to course design, curriculum content, classroom environment, assessment procedures and other aspects of campus life which will provide equality of educational opportunity to all students.

Course Content, Curriculum Design, Teaching and Assessment, and Printed Material

The College will monitor course content (including titles), teaching methods, assessment procedures, written material (including study guides and handbook and Calendar entries) and audiovisual material to ensure that they are not discriminatory or offensive and that they encourage and facilitate full participation in education by disadvantaged people.

Harassment Policy

The University is committed to ensuring freedom from harassment for all people working or studying within the institution. It will continue to take action, including disciplinary action, to ensure that freedom from harassment is achieved.

Enrolment in the University

On their entry to the Academy officer cadets must enrol formally as undergraduate students in the University College of The University of New South Wales. Acceptance as a member of the University for all students implies an undertaking on the part of each student to observe the regulations, by-laws and other requirements of the University in accordance with the declaration he or she signs at the time of enrolment. Such regulations, etc, are published in the current Calendar of The University of New South Wales.

First year students are required to attend an enrolment session before the academic year begins, at a place and time to be advised.

Before entering the second and later years students will be required to re-enrol with Student Administration. Enrolment information for all students at the University College is kept on the University's student data base. Any enquiries about enrolment should be directed to Student Administration.

New and re-enrolling postgraduate students will be advised in January of each year of the enrolment details.

Change of Course

New first year students enter the Academy on the understanding that they will take up the places allotted to them in particular courses of study. In exceptional circumstances a student may be permitted to enrol in a different course, provided there is a vacancy and provided he or she is appropriately qualified.

It may be possible for a student to transfer from one course to another at the end of the first year provided that he or she is appropriately qualified. A student permitted to transfer will either re-enrol as a first year student in the new course or enrol as a second year student but with a restricted choice of program.

Students seeking to change course should consult their Divisional Officer in the first instance. Changes of course are not permitted after 31 March.

Variations in Enrolment (including Withdrawal)

All undergraduate and postgraduate students wishing to vary the programs for which they have enrolled must make application on the form available from Student Administration.

Applications to withdraw from subjects may be submitted at any stage of the academic year, but applications lodged with Student Administration after the following dates will result in the applicants being regarded as failing the subjects concerned, except in special circumstances:

(a) Session One subjects: 31 March

(b) Whole Year subjects: end Week 3 of Session 2

(c) Session Two subjects: 31 August

(See Dates to Note for the actual dates in the current year).

A student who withdraws from a teaching unit of an engineering subject after the middle of the session for a single session unit or after the beginning of Session 2 for a whole year unit will usually be regarded as having failed in that unit.

Applications to withdraw from units must be made in writing to the relevant Head of School at least a week before the deadline in either case.

Applications for enrolment in additional subjects must be submitted to Student Administration by the end of March for whole year and Session 1 subjects and by the end of the first week in August for Session 2 subjects. (See Dates to Note for the actual dates in the current year).

Students who withdraw from their courses for any reason are required to notify Student Administration in writing. A student who withdraws without giving such notification may be regarded as failing all subjects in which he or she is enrolled, and also risks infringing the University's re-enrolment rules.

Each application for a variation in enrolment received before the end of Week 7 of each Session will be acknowledged by the University in the *Confirmation of Enrolment Program* notice.

A student's program of study must be compatible with the published timetable of classes. The onus is on the student to inform Student Administration if there is any incompatibility.

It is emphasised that failure to attend for any assessment procedure or to lodge any material stipulated as part of an assessment procedure, in any subject in which a student is enrolled will be regarded as failure in that assessment procedure unless written approval to withdraw from the subject without failure has been obtained from the University.

Attendance at Classes

Students are expected to be regular and punctual in attendance at all classes in the courses and subjects in which they are enrolled.

If through illness or other unavoidable cause a student is prevented from attending classes for an extended period or is otherwise unable to meet the course requirements, he or she may be excused by the Director, Student Administration for not attending classes for a period of up to one month. Explanations of absences or requests for permission to be absent for such causes must be made in writing to the Director, Student Administration and, when appropriate, accompanied by a medical certificate. If the period of absence includes an examination or other form of assessment, this should be stated in the student's application.

The onus is upon the student to advise the relevant member of staff of unavoidable absences from classes.

In certain circumstances, a student who is repeating a subject may be exempted from attending some classes in that subject.

If students attend less than eighty per cent of their possible classes they may be refused final assessment.

Examinations

The annual examinations in the University College are held in October—November. Mid-year examinations are held for most subjects in June—July.

A provisional timetable indicating the dates and times of examinations is issued well in advance of each examination period and will be posted on the notice-board in the foyer of the South Lecture Block. Students are advised to study the provisional timetable, and they must notify Student Administration immediately of any clashes in their examination programs.

The final timetable indicating the dates, times, locations and authorised aids is published approximately two-three weeks before the examination period begins. Copies will be available in the Library and at the Student Enquiry Counter. Instructions to Candidates are issued with the final timetable. All students are expected to read the instructions before the examinations begin, and to observe them.

Misreading the timetable is not an acceptable excuse for a student who fails to attend an examination.

In the assessment of student's progress, consideration is given to work in laboratory and class exercises and to any term or other tests given during the year, as well as to performance in written examinations.

Use of Computers and Electronic Calculators in Examinations

The use of computers or electronic calculators may be permitted in examinations conducted within the University. Computers and electronic calculators which are authorised by the University for this purpose MUST be *hand-held, internally powered and silent.* Computers are distinguished from electronic calculators for this purpose by the existence of a full alphabetic keyboard. Computers will not be permitted in examinations for which an electronic calculator has been specified. When an electronic calculator is permitted in an examination, any programmable memory on it must be cleared prior to entering an examination room.

The University does not provide computers or electronic calculators of any kind described in this rule for use in examinations although some Schools may make them available in special circumstances.

N.B. This policy is under review with changes expected to take effect in 1997. Students will be advised of any changes affecting their particular academic discipline.

Conduct of Examinations

Examinations are conducted in accordance with the University's rules and procedures, as follows:

1. Candidates are required to obey any instruction given by an examination supervisor for the proper conduct of the examination.

2. Candidates are required to be in their places in the examination room not less than ten minutes before the time of commencement.

3. No bag, pencil case, mobile telephone or other communications equipment, writing paper, blotting paper, manuscript or book, other than a specified aid, is to be brought into the examination room.

4. Candidates are required to bring their student ID card to each examination and place it on the left hand top corner of their desk for the duration of the examination.

5. Candidates shall not be admitted to an examination after thirty minutes from the time of commencement of the examination.

6. Candidates shall not be permitted to leave the examination room before the expiry of thirty minutes from the time the examination commences.

7. Candidates shall not be re-admitted to the examination room after they have left it unless, during the full period of their absence, they have been under approved supervision.

8. Candidates shall not by any improper means obtain, or endeavour to obtain, assistance in their work, give, or endeavour to give, assistance to any other candidate, or commit any breach of good order.

9. All answers must be in English unless otherwise stated. Foreign students who have the written approval of the Director, Student Administration may use standard linguistic dictionaries.

10. Smoking, eating and drinking are not permitted during the course of examinations.

11. A candidate who commits any infringement of the rules governing examinations is liable to disqualification at the particular examination, to immediate expulsion from the examination room and to such further penalty as may be determined in accordance with the By-laws.

Academic Misconduct

Students are reminded that the University regards academic misconduct as a very serious matter. Students found guilty of academic misconduct are usually excluded from the University for two years. Because of the circumstances in individual cases the period of exclusion can range from one session to permanent exclusion from the University.

The following are some of the actions which have resulted in students being found guilty of academic misconduct in recent years: use of unauthorised aids in an examination, submitting work for assessment knowing it to be the work of another person; improperly obtaining prior knowledge of an examination paper and using that knowledge in the examination; failing to acknowledge the source of material in an assignment.

Examination Results

The results of formal examinations are published by Student Administration in July and in early December, and posted on notice-boards in the University College. Students also receive individual notifications of their results from the University.

Passes in subjects are graded as follows:

High Distinction	an outstanding performance
Distinction	a superior performance
Credit	a good performance
Pass	an acceptable level of performance
Satisfactory	satisfactory completion of a subject for which graded passes are not available
Pass Conceded	may be granted provided that a student's overall performance is considered to warrant such a concession; it will allow progression to another subject for which the first is a prerequisite.
Pass Terminating	may be granted provided a student's overall performance is considered to warrant such a concession; it does not allow progression to another subject for which the first is a prerequisite.

Review of a Result

A student may make application in writing to the Director, Student Administration for the review of a result.

A review of a result may take one of two forms:

1. **Checking a mark** - an administrative check that all marks have been included in the final composite mark;

2. **Reassessment** - an academic re-assessment of a piece of work.

In either case the review may result in the mark going up or down.

The application must be submitted not later than fifteen working days after the return of the piece of work or from the date of issue of the *Notification of Results of Assessment* form, whichever is earlier.

All marked written work returned to students must be kept in case it is needed for re-marking.

Checking a Mark

The subject authority shall ensure that all components of the assessment have been assessed and a mark assigned. This is not a reassessment of a student's standard of knowledge and understanding of, and skills in, the subject. It is rather a search for arithmetic error in arriving at the composite mark and for gross and obvious error in assignment of marks in components of the final composite mark.

Reassessment

Students may apply to have a piece of work re-marked, but must first discuss their performance in it with the subject examiner. If students still have reason to believe that the mark they have received does not reflect their performance they may apply for reassessment. Students are required to give reasons to justify their request. Where insufficient reasons are given the Assessment Executive Committee of the University College may decline to take action.

Special Consideration

Any students who believe that their performance in a subject, either during session or in an examination, has been adversely affected by sickness or any other reason should inform Student Administration and ask for special consideration in the determination of their standing.

Such requests should be made in writing as soon as practicable after the occurrence and in any event no more than seven days after the final examination in a subject.

When submitting a request for special consideration a student should provide a medical certificate or other appropriate evidence to support it.

Further Assessment

Deferred examinations are not granted in the University College.

In special circumstances, such as medical or compassionate grounds, a student may be granted further assessment in a subject.

Further assessment may be given by a subject authority at his or her discretion at any time before the meeting of the relevant assessment committee. Further assessment in a subject may also be awarded to a student by the Assessment Committee. In such cases the students will be notified to contact the subject authorities concerned, and they should do so at the earliest opportunity.

Students awarded further assessment by the Assessment Committee for Session 2 or whole year subjects will normally be given a minimum of four weeks' notice of the deadline for such assessment. All such assessment must be finalised before the commencement of the following academic year.

Restrictions upon Re-enrolling

The University's rules governing re-enrolment require students who have records of failure to show cause why they should be permitted to re-enrol.

Repeated Failure Rule

1. Students shall be required to show cause why they should be allowed to repeat a subject which they have failed more than once. Where the subject is prescribed as part of the course they shall also be required to show cause why they should be allowed to continue that course.

General Rule

2. (1) Students shall be required to show cause why they should be allowed to repeat a subject they have failed if the relevant Assessment Committee so decides on the basis of previous failures in that subject or in a related subject. Where the subject is prescribed as part of the course they shall also be required to show cause why they should be allowed to continue that course.

(2) Students shall be required to show cause why they should be allowed to continue their course if the relevant Assessment Committee so decides on the basis of their academic record.

The Session—Unit System

3. (1) Students who infringe the provisions of Rule 1 at the end of Session 1 of any year will be allowed to repeat the subject(s) (if offered) and/or continue the course in Session 2 of that year, subject to the rules of progression in the course.

(2) Such students will be required to show cause at the end of the year, except that students who infringe Rule 1 at the end of Session 1, and repeat the subjects in question in Session 2, and pass them, will not be required to show cause on account of any such subjects.

Exemption from Rules by Faculties

4. (1) An Assessment Committee may, in special circumstances, exempt students from some or all of the provisions of Rule 1.

(2) Such students will not be required to show cause under such provisions and will be notified accordingly by the Director, Student Administration.

Showing Cause

5. (1) Students wishing to show cause must apply for special permission to re-enrol. Application should be made on the form available from Student Administration and must be lodged with the Director, Student Administration by the date specified.

(2) Each application shall be considered by the Admissions and Re-enrolment Committee of the University College which shall determine whether the cause shown is adequate to justify the granting of permission to re-enrol.

Appeal

6. (1) Students who are excluded by the Admissions and Re-enrolment Committee from a course and/or subjects under the provisions of the Rules have the right of appeal. A Re-enrolment Appeal Committee of the University's Academic Board will be constituted for the purpose of hearing such appeals..

(2) This Committee will have a membership of five and will be chaired by a senior member of the Academic Board nominated by the President. The remaining members of the Committee will preferably have had experience on a faculty Admissions and Re-enrolment Committee but will not be currently serving as members of such committees and need not be members of the Academic Board.

The decision of the Committee shall be final.

(3) The notification to students of a decision upheld by an Admissions and Re-enrolment Committee of the Academic Board to exclude them from re-enrolling in a course and/or subject shall indicate that they may appeal against that decision to the re-enrolment Appeal Committee. The appeal must be lodged with the Registrar within fourteen days of the date of notification of exclusion; in special circumstances a late appeal may be accepted at the discretion of the chairman of the Appeal Committee. In lodging such an appeal with the Registrar students should provide a complete statement of all grounds on which the appeal is based.

(4) The Re-enrolment Appeal Committee shall determine appeals after consideration of each appellant's academic record, application for special permission to re-enrol, and stated grounds of appeal. Students may elect to appear before the Committee and/or be represented.

Exclusion

7. (1) Students who are required to show cause under the provisions of Rule 2 and either do not attempt to show cause or do not receive special permission to re-enrol from the Admissions and Re-enrolment Committee (or the Re-enrolment Appeal Committee on appeal) shall be excluded, for a period not in excess of two years, from re-enrolling in the subjects and courses on account of which they were required to show cause. Where the subjects failed are prescribed as part of any other course (or courses) they shall not be allowed to enrol in any such course.

(2) Students required to show cause under the provisions of Rule 1 who either do not attempt to show cause or do not receive special permission to re-enrol from the Admissions and Re-enrolment Committee (or the Re-enrolment Appeal Committee on appeal) shall be excluded for a period not in excess of two years, from re-enrolling in any subject they have failed twice. Where the subjects failed are prescribed as part of a course they shall also be excluded from that course. Where the subjects failed are prescribed as part of any other course (or courses) they shall not be allowed to enrol in any such course.

(3) Students who are required to show cause under the provisions of Rules 1 or 2, and do not receive special permission to re-enrol may be excluded under one of the following categories:

(a) One year with automatic re-admission.

(b) Two years without automatic re-admission.

Students excluded under (b) will be advised by the Registrar of courses of action they may take to improve their chances of re-admission.

Re-admission after Exclusion

8. (1) Excluded students may apply for re-admission after the period of exclusion has expired.

(2) (a) Applications for re-admission to a course should be made to the Universities Admissions Centre before the closing date for normal applications in the year prior to that in which re-admission is sought. Such applications will be considered by the Admissions and Re-enrolment Committee of the relevant faculty or board of studies.

(b) Applications for re-admission to a subject should be made to the Registrar before 30 November in the year prior to that in which re-admission is sought. Such applications will be considered by the relevant subject authority.

(3) Applications should include evidence that the circumstances which were deemed to operate against satisfactory performance at the time of exclusion are no longer operative or are reduced in intensity and/or evidence of action taken (including enrolment in course/s) to improve capacity to resume studies.

(4) Students who apply during their second year of exclusion to be re-admitted the following year to a course or subject, and are unsuccessful, will have the right to appeal against the decision to the Re-enrolment Appeal Committee.

Restructions and Definitions

9. (1) These rules do not apply to students enrolled in programs leading to a higher degree or graduate diploma.

(2) A subject is defined as a unit of instruction identified by a distinctive subject identifier.

Student Records

Academic records of students in the University College are kept on the University's student data base. Students may obtain transcripts of their own records on application in writing to Student Administration.

Change of Address

A student must give notice of any change of postal address to Student Administration, on the form obtainable from the Student Enquiry counter, Administration Building.

All communications from the University will be addressed to students at their Session address at the University College, except in the case of results of assessment if any students have requested them to be sent to vacation addresses.

Notice-boards

From time to time academic Schools post notices which inform students about assignments, tests, tutorial groups, seminars, etc. Students are expected to be acquainted with the notices that concern them.

Admission to Degree

The University College Conferring of Degrees Ceremonies are held each year in December.

Students whose current program of study will enable them to complete all requirements for the degree should lodge with Student Administration the form Application for Admission to Degree by the second Friday in October. Forms are available from the Student Enquiry counter on the first floor of the Administration Building.

Students who have indicated on their enrolment form that they are potential graduands are forwarded an application form with their Confirmation of Enrolment Program in September. Students who do not complete an application form will not graduate.

Details concerning the Conferring of Degrees Ceremonies will be forwarded to all potential graduands in November.

Academic Dress

Information about the University College's academic dress requirements are available from the Director, Student Administration.

Advice

Students seeking advice on any matters are invited to contact one of the Student Counsellors.

Students who wish to discuss their courses and related matters are welcome to call on a member of the Student Administration staff.

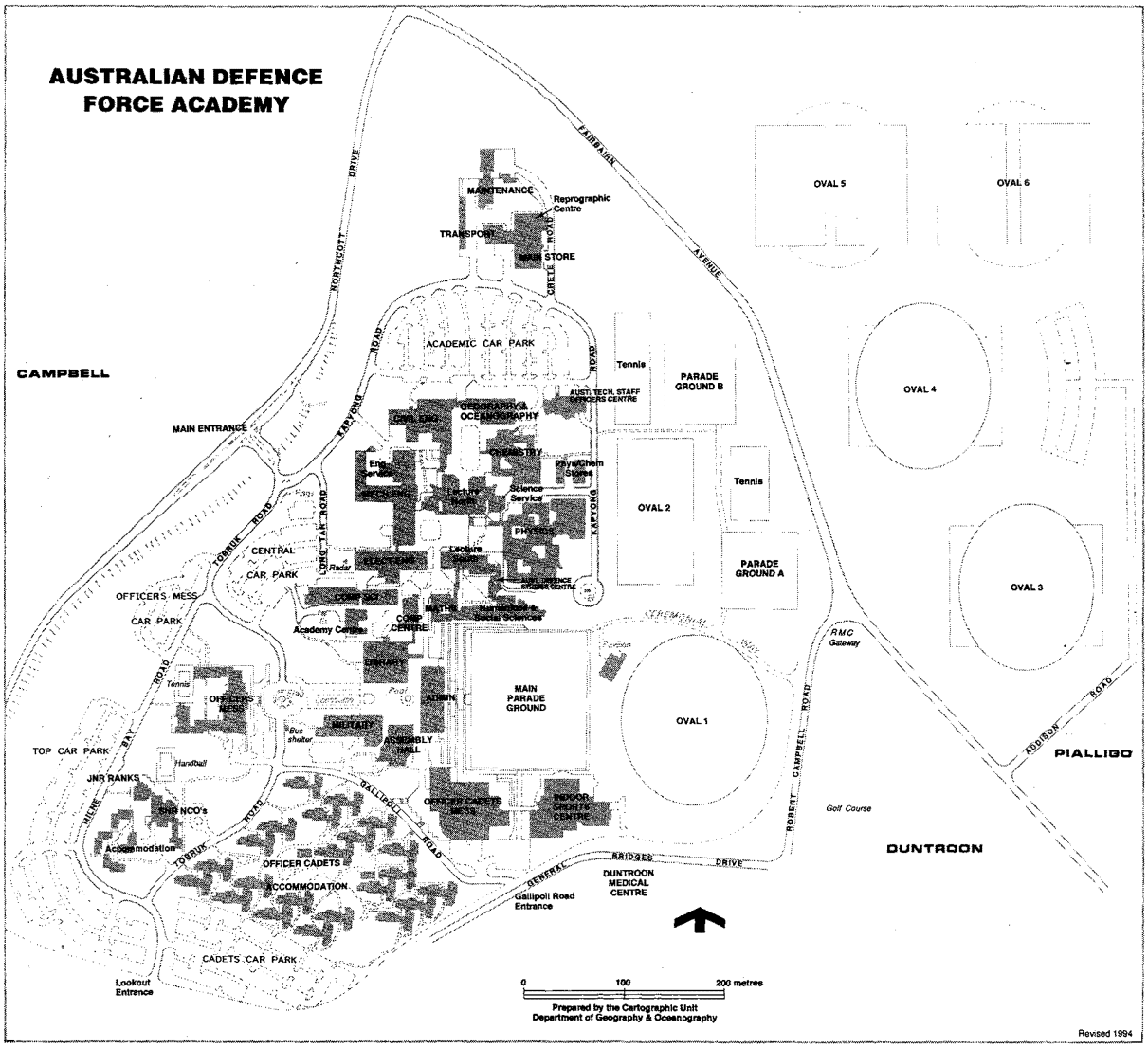
Index

Academic Board 31
Academic Dress 208
Academic Prizes 191
Academy Council 19
Admission 41
Admission to Degree 208
Admissions and Re-enrolment Committee 32
Advanced Student Squadron 22
Advice 208
Agreement between the Commonwealth of Australia and The University 13
Asian Languages 147
Asia-Pacific Studies 147
Assessment Committees 32
Attendance at classes 204
Australian Defence Force Academy
—establishment 7
Australian Technical Staff Officers' Course 158
Boards of Studies 32
Calendar for 1998 9
Change of Address 208
Change of course 203
Common Military Training 23
Contents, Table 3
Corps of Officer Cadets 22
Counselling Services 44
Course programs, undergraduate 55
Coursework Masters Degrees
—MA English 150
—Defence Studies 150
—MEngSc Civil 151
—MEngSc Elec 151
—MInfSci 154
—MMgtStud 156
Dates to note 11
Defence Force Staff 21
Degree Rules 45
Educational qualifications for admission 41
English Communications Program 44
Enrolment 203
Entry qualifications 41
Equal Opportunity in Education 203
Examinations
—academic misconduct 205
—conduct of examinations 205
—examination results 205
—further assessment 206
—review of a result 206
—special consideration 206
—use of computers and electronic calculators ... 205
Executive Committee of Academic Board 31
Facilities and services 43
Graduate Certificates
—Engineering Science 152
—Information Science 155
—Management Studies 157
Graduate Diplomas
—Civil Engineering 152
—Electrical Engineering 152
—Defence Studies 151
—Information Science 154
—Management Studies 156
Graduate study 149
Graduate Subject Descriptions 158
Graduation Requirements, Corps 25
Handbook Guide 39
Harassment 203
Higher Degree Committee 32
Higher degrees, conditions
—PhD 179
—MA (Hons) 181
—MA 185
—MDefStudies 185
—ME 183
—MEngSc 186
—MInfSc 186
—MMgtStud 186
—MSc 183
—Diplomas 187
—Certificates 188
—Thesis preparation 189
Information for students 203
Information Technology Services Centre, The 43
Language study 147
Library 43
Military organisation 22
Military education and training 21
Military Training Wing 21
Preface 7
Public Holiday compensation 12
Records, student 208
Research Degrees 149
Restrictions upon re-enrolling 206
Rules for the degrees

—BA and BSc 45
—BA with Honours 49
—BE 49
—BSc with Honours 49
—BTech 52
Schedules of subjects
—BA and BSc 46
—BE 50
—BTech 53
Sessional Break Activities 24
Single Service Training 29
Sport 25
Staff
—Defence Force 21
—University College 33
Student Counsellors 44
Subject descriptions, undergraduate
—Aeronautical Engineering 134
—Aerospace and Mechanical Engineering 127
—Bachelor of Technology (Aero) 140
—Chemistry 67
—Civil Engineering 114
—Computer Science 72
—Economics 80
—Electrical Engineering 119
—Engineering 1st year 111
—English 84
—General Education Subjects 143
—Geography 88
—History 91
—Information Systems 72
—Management 80
—Mathematics 96
—Mechanical Engineering 127
—Oceanography 90
—Physics 99
—Politics 107
Subject descriptions, graduate 158
—Aerospace and Mechanical Engineering 159
—Civil Engineering 159
—Computer Science 162
—Economics and Management 166
—Electrical Engineering 170
—English 173
—Geography and Oceanography 174
—History 174
—Interdisciplinary Studies 177
—Politics 175
Summary of subjects and units 61
Timetables 195
Undergraduate course codes 55
Undergraduate programs 55
—BA 56
—BE 58
—BSc 57
—BSc/BE 52
—BTech 59
Unisearch Ltd 44
University College
—Staff 33
—Structure 31
University of New South Wales, The 8
Variations in Enrolment 204
Voluntary Extra-Curricular Activities 28
Withdrawal from subjects 204

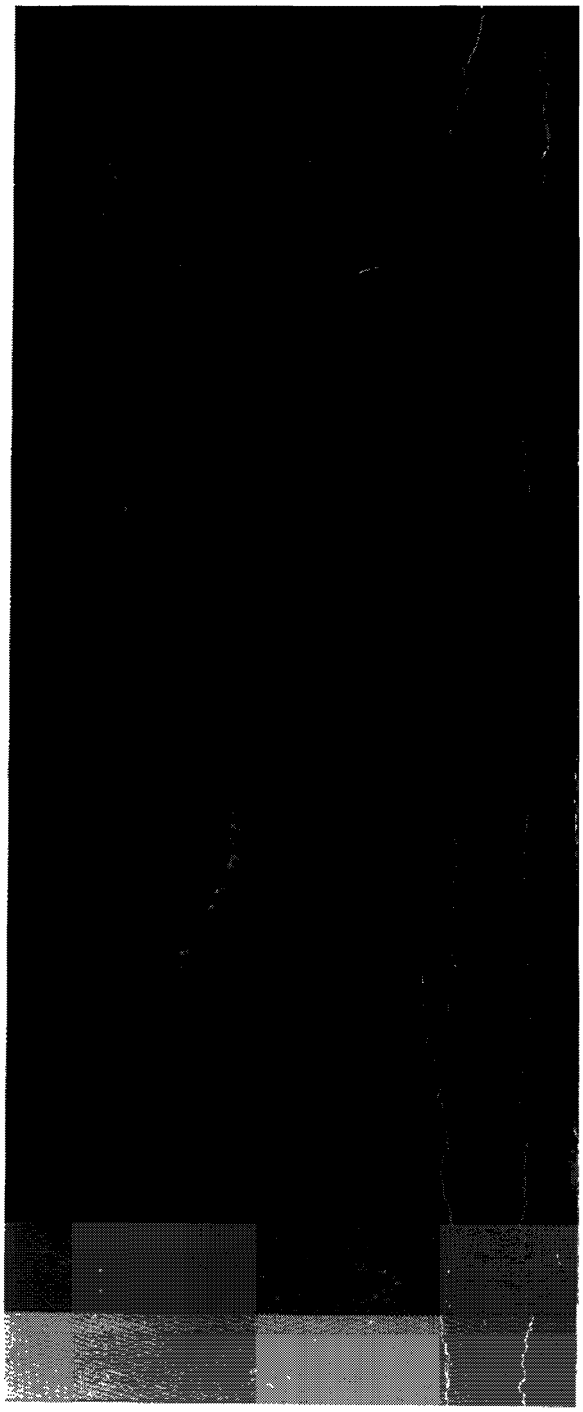
PERSONAL TIMETABLE

PERIOD	1	2	3	4	5	6	7	8	9
MONDAY									
TUESDAY									
WEDNESDAY									
THURSDAY									
FRIDAY									



* Humanities and Social Sciences schools

Economics and Management
English
History
Politics



UNSW

This Handbook has been specifically designed as a source of detailed reference information for first year re-enrolling undergraduate and postgraduate students.

Separate handbooks are published for:

Applied Science
Arts and Social Sciences
Built Environment
Commerce and Economics
Engineering
Law
Medicine
Professional Studies
Science
Australian Graduate School of Management (AGSM)
Australian Taxation Studies Program (ATAX)
College of Fine Arts (COFA)
University College, Australian Defence Force Academy (ADFA)
General Studies.

For fuller details about the University – its organization; staff members; description of disciplines; scholarships; prizes and so on, consult the University Calendar (Summary Volume). For further information on student matters consult the UNSW Student Guide.