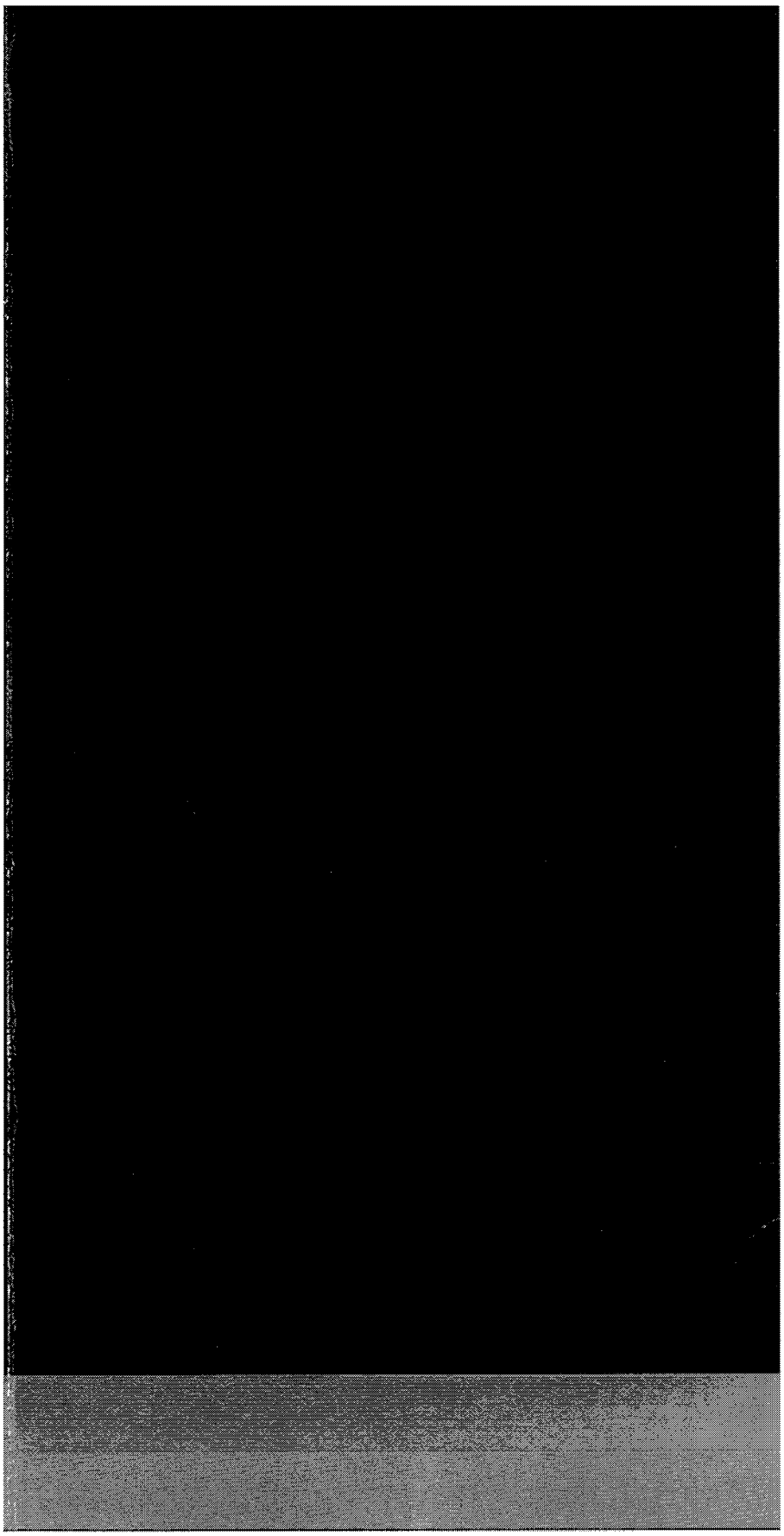
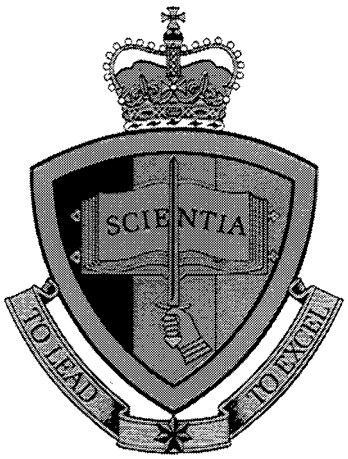




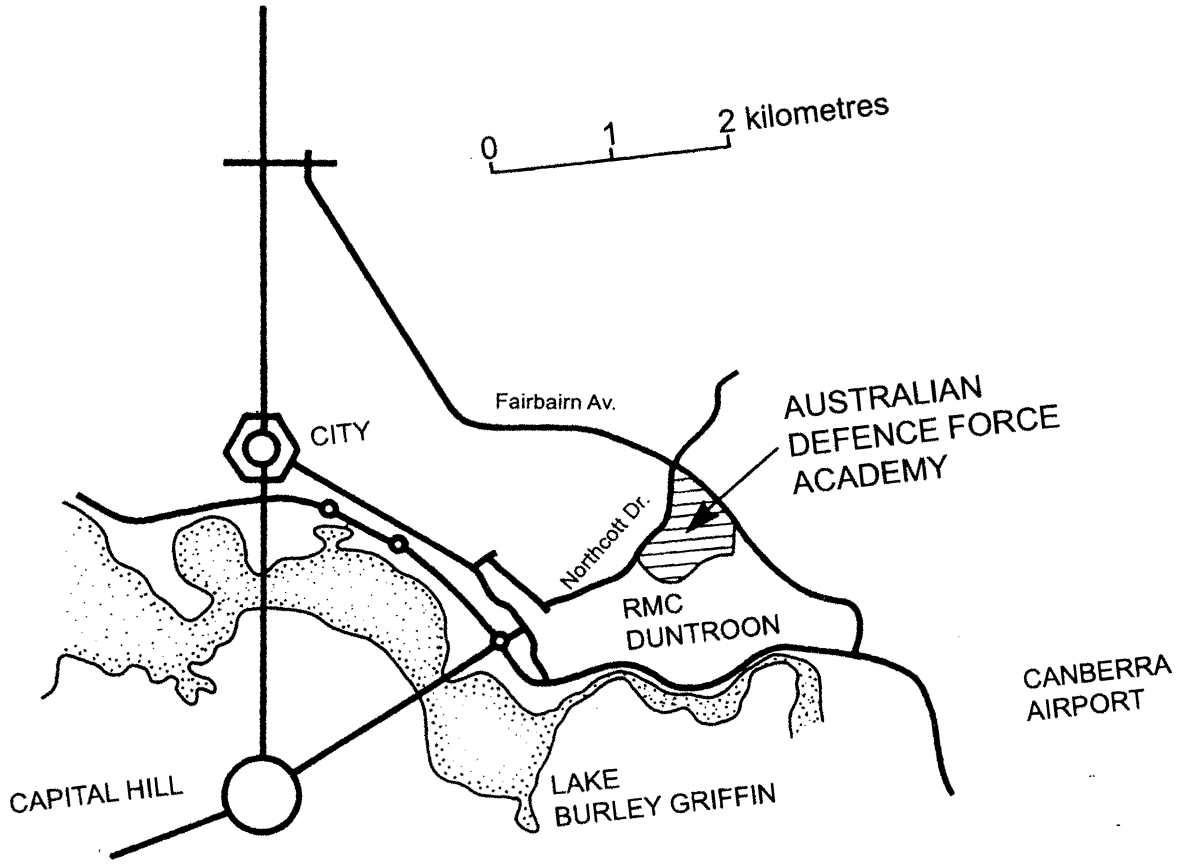
Australian Defence Force Academy

HANDBOOK

THE UNIVERSITY OF NEW SOUTH WALES

DEPARTMENT OF DEFENCE

2001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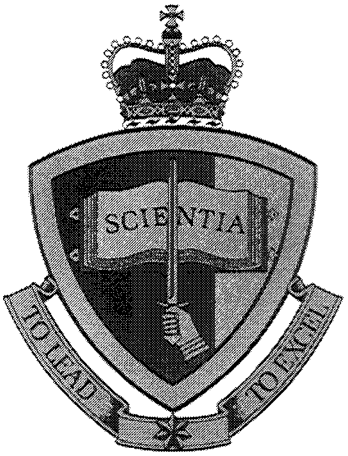

Australian Defence Force Academy

HANDBOOK

THE UNIVERSITY OF NEW SOUTH WALES

DEPARTMENT OF DEFENCE

2001

The address of the Australian Defence Force Academy is:

Northcott Drive,
Canberra, 2600
Telephone: (02) 6268 8111
Home page: http://www.adfa.edu.au

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

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

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A message to all new officer cadets and midshipmen

We offer our congratulations on your selection to undertake education and training at the Australian Defence Force Academy. Your program at ADFA will provide you with an excellent basis for your leadership role and career in your chosen Service.

While you are at ADFA, the emphasis of your perparations will be on academic studies to develop your intellectual capabilities and vocational utility. The other very important emphasis will be on military education and training to develop your professional abilities and the qualities of character and leadership that are appropriate to officers in the Australian Defence Force.

Our intention is to provide you with an exciting, challenging and rewarding experience at ADFA, in a supportive environment where you will have the opportunity, and be encouraged, to excel.

Brigadier Gordon Jones, AM
Commandant
Australian Defence Force Academy

Professor Robert King
Rector, University College
University of New South Wales
Australian Defence Force Academy

Preface

The Australian Defence Force Academy

The Australian Defence Force Academy is an Australian Defence Force unit established to provide military and academic training to midshipmen and officer cadets. It is a unique institution which develops some of the future leaders of the Australian armed forces.

The Australian Defence Force Academy educates and trains cadets through two study programs. Firstly, a program of common and single- Service military studies is provided to all Academy cadets and a small number of cadets from regional military forces. This is carried out in association with the Royal Australian Navy College, HMAS CRESWELL at Jervis Bay, the Royal Military College at Duntroon and the Royal Australian Air Force College at Point Cook.

Secondly, an undergraduate academic studies program which meets Navy, Army and Air Force tertiary education requirements is provided through arrangements with the University of New South Wales. Academic programs are delivered through the University College, a faculty of the University of New South Wales, in a range of degree discipline areas covering the sciences, engineering, humanities and the social sciences. The University College also provides undergraduate and postgraduate academic studies programs to other Defence Force officers and senior non-commissioned officers, members of the Australian Public Service and selected foreign civilian and military students.

The Australian Defence Force Academy is unusual amongst Western military officer training institutions in that it provides its military and academic programs simultaneously to the young officers of all three armed Services. Therefore, while the Academy is not a university, it seeks and encourages academic excellence from its students. However, the focus on academic excellence occurs in the context of a strong focus on the development of those attributes which cadets will need in order to perform effectively as junior leaders when they leave the Academy.

Entry to the Australian Defence Force Academy as a midshipman or 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 2000 was 1523. 694 were undergraduate midshipmen and officer cadets and 639 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 midshipmen 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.

Location and Site

The Australian Defence Force Academy is located on 52 hectares of land in the area bounded by Northcott Drive, General Bridges Drive and Fairbairn Avenue in the Canberra suburb of Campbell. Access to the Academy is possible from all three roads with the main entrance to the Academy being Northcott Drive. Playing fields occupy a further 23 hectares, separated from the main site by Fairbairn Avenue.

As may be seen from the site plan on the inside back cover, the Academy is divided into four main zones. To the north is the Support Zone; which also contains the Leadership Reaction Course; in a large square area south of this is the Academic Zone; further south and to the west of the grassed main parade ground is the Administration Zone; and to the far west and south-west is the Accommodation Zone comprising the Officers, Senior Non-Commissioned Officers' and Junior Ranks messes, the cadet accommodation blocks and the Academy Cadets Mess. The Indoor Sports Centre is adjacent to the Cadets Mess. Across Northcott Drive in the corner of Northcott Drive and Fairbairn Avenue are the married quarters for the Academy's military staff.

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 is a sub-campus at 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 30,000 and a full-time staff of some 5200, of whom more than 2000 are teaching and research staff.

The University consists of ten faculties: Arts and Social Sciences, the Built Environment, Commerce and Economics, Engineering, Law, Life Sciences, Medicine, Science and Technology, the Australian Graduate School of Management; and the Faculty of the College of Fine Arts. A wide range of first degrees, higher degrees, graduate diplomas and other courses is offered, and there are substantial research facilities within these units.

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.

The Badge

The symbology of the Australian Defence Force Academy Badge is as follows:

The Crown surmounting the Shield	Allegiance to Crown and Country
The Commonwealth Star	Australia
Three-sided Shield enclosing the single-Service Colours	Joint Service nature of the Australian Defence Force Academy
Navy blue colouring	Royal Australian Navy
Red colouring	Australian Army
Light blue colouring	Royal Australian Air Force
Gauntlet and Sword covering the UNSW Book of Knowledge	The Military/Academic bond
The motto	'To Lead, To Excel'

Calendar for 2001

Week beginning	*Week No.*	
1 January	1	Leave
8	2	
15	3	Military Training
22	4	
29	5	
5 February	6	
12	7	
19	8	
26	9	
5 March	10	
12	11	Session 1
19	12	(14 weeks: 5 March to 22 June)
26	13	
2 April	14	
9	15	
16	16	
23	17	
30	18	
7 May	19	May recess: career development and field trips
14	20	
21	21	
28	22	
4 June	23	
11	24	
18	25	
25	26	Mid-year examinations
2 July	27	
9	28	Mid-year leave

Dates to Note in 2001

		Meetings of College Committees (Tentative dates)	
January			
8	Academy Year begins		
26	Australia Day		
30	Market Day		
31-2 Feb	Academic enrolment for 1st year undergraduate students		
February			
13	Navy 2000 enrolments	9	Academic Board Executive and Research Committees
14-15	Enrolment of postgraduate students	23	Postgraduate Coursework Education Committee
March			
5	**Session 1 begins**		
		9	Academic Board and Research Committees
		16	Science Board of Studies
		21	Engineering Board of Studies
12	Canberra Day—Public Holiday	23	Humanities and Social Sciences Board of Studies
31	Last day for enrolled students to add Session 1 courses or to discontinue without failure Session 1 courses	30	Postgraduate Coursework Education Committee
31	HECS census date		
April			
		6	Academic Board Executive and Research Committees
13	Good Friday—Public Holiday		
16	Easter Monday—Public Holiday		
25	Anzac Day		
27	Publication of provisional timetable for mid-year examinations		
May			
4	Last day for students to advise of examination clashes	4	Academic Board Executive and Research Committees
5	May recess begins		
11	Applications close for postgraduate enrolment in Session 2		
20	May recess ends		
21	Publication of final timetable for mid-year examinations	25	Humanities and Social Sciences Board of Studies
June			
		1	Science Board of Studies
		6	Engineering Board of Studies
11	Queen's Birthday—Public Holiday	8	Academic Board and Research Committees
18-22	Exam revision week		
22	**Session 1 ends**		
25	Mid-year examination period begins	29	Postgraduate Coursework Education Committee
July			
7	Examination period ends	7	Academic Board Executive and Research Committees
8-22	Mid-year leave	19	Assessment Committees
20	Assessment results published	20	Humanities and Social Sciences Board of Studies
23	**Session 2 begins**		

		Meetings of College Committees (Tentative dates)	
August			
		1	Engineering Board of Studies
11	Last day for enrolled students to add Session 2 courses	3	Academic Board Executive and Research Committees
31	Last day for students to discontinue without failure session 2 courses	10	Science Board of Studies
31	HECS census date		
September			
		5	Engineering Board of Studies
7	Publication of provisional examination timetable	7	Academic Board and Research Committees
14	Last day for students to advise of examination Timetable clashes	14	Postgraduate Coursework Education Committee
		14	Science Board of Studies
		21	Humanities and Social Sciences Board of Studies
21	Publication of final timetable for the annual examinations		
22	Session 2 study recess begins		
October			
1	Labour Day—Public Holiday		
1	Session 2 study recess ends	5	Academic Board Executive and Research Committees
26	**Session 2 ends**		
29	Study period begins		
November			
4	Examinations begin	9	Academic Board and Research Committees
11	Remembrance Day		
16	Examination period ends		
30	Postgraduate coursework applications close	29-30	Assessment Committees
30	Assessment results published		
December			
12	Degree conferring ceremonies		
13	Graduation Parade		
19	Academy Year Ends		
31	Postgraduate research applications close		

PUBLIC HOLIDAY COMPENSATION:

Monday 12 March (Canberra Day)	Monday lost
Friday 13 April (Good Friday)	Friday lost
Monday 16 April (Easter Monday)	Monday timetable on Tuesday 17 April
Wednesday 25 April (Anzac Day)	Wednesday lost
Monday 11 June (Queen's Birthday)	Monday timetable on Thursday 15 June

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 to 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

The Academy Council

Membership of the Academy Council

Chair

The Hon Justice I.D.F. Callinan
Appointed by the Minister for Defence

Members

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

Admiral C. Barrie, AO, RAN
Chief of the Defence Force

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

Professor B. Bennett AO
Member elected by the academic staff of the University College

Air Commodore K. Birrer
Director General Defence Education & training Policy

Lieutenant General P. Cosgrove AC MC
Chief of Army

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

Dr Allan Hawke,
Secretary,
Department of Defence

Brigadier G. Jones AM
Commandant
Australian Defence Force Academy

Professor R.J. King
Rector
Australian Defence Force Academy

Professor K.M. McConkey
President of the Academic Board
The University of New South Wales

Air Marshal E. McCormack, AO
Chief of Air Force

Professor C. Newton
Deputy Rector (Education)
Member elected by the academic staff of the University College

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

Mr Andrew Northover
Member elected by the graduates of the University College

Mr A.T. Papinneimi
Member elected by the postgraduate students of the University College

Group Captain I.M. Pearson,
Member of the military staff nominated by the Commandant

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

Major General P. Phillips AO, MC
Member appointed by the Minister for Defence

Vice Admiral D. Shackleton, RAN
Chief of Navy

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

TBA
Member elected by the undergraduate students of the University College

Mrs T. Mitchell
Secretary

Military Education and Training

'TO LEAD, TO EXCEL'

The Australian Defence Force Academy's Charter, Vision, Mission and Values

The Australian Defence Force Academy Charter

The charter of the Australian Defence Force Academy includes the requirement to provide midshipmen and officer cadets with:

a. military education and training 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. a balanced and liberal university education within a military environment.

The Australian Defence Force Academy Purpose

To serve Australia by providing the Australian Defence Force (ADF) with tertiary graduates who have the foundational attributes, intellect and skills required by an officer.

The Australian Defence Force Academy Mission

Best leaders for the ADF.

Our Learning Environment

We will create and foster a contemporary military education and training environment which engenders in the individual an ethos of service and builds:

Integrity

Professionalsim

Adaptability

Initiative

Determination

through being honest, giving everyone a fair go, respecting others and doing our best.

Standards of Behaviour

All people working and living at the Academy are expected to be honest and treat each other with respect.

As potential future leaders of Australian Servicemen and women, midshipmen and officer cadets are expected to demonstrate very high standards of behaviour in all facets of their work and life at the Academy. The Academy values provide the framework in which they can demonstrate achievement of those standards.

In addition to demonstrating a strong commitment to their chosen military career, midshipmen and officer cadets must coexist and cooperate with others regardless of gender, race, or other differences. They will also be expected to show that they possess the attributes that will permit them to function effectively as leaders when they graduate from the Defence Force Academy. Physical and moral courage, loyalty, self discipline, honesty, fairness, confidence, a sense of responsibility and duty, and a sense of humour are foremost amongst these attributes.

In short, midshipmen and officer cadets are expected to demonstrate their suitability for leadership everywhere and at all times.

The Military Environment

A military environment is maintained at the Defence Force Academy. Midshipmen and officer cadets are required to live, work and be led and managed in a military command and administrative structure which reflects the structures in which they will live and work after graduation. The purpose of the military environment is to provide the cadets with the appropriate atmosphere to develop the behaviours and attitudes required of members of the ADF. The military environment will also help to build their motivation for a long term career in the ADF.

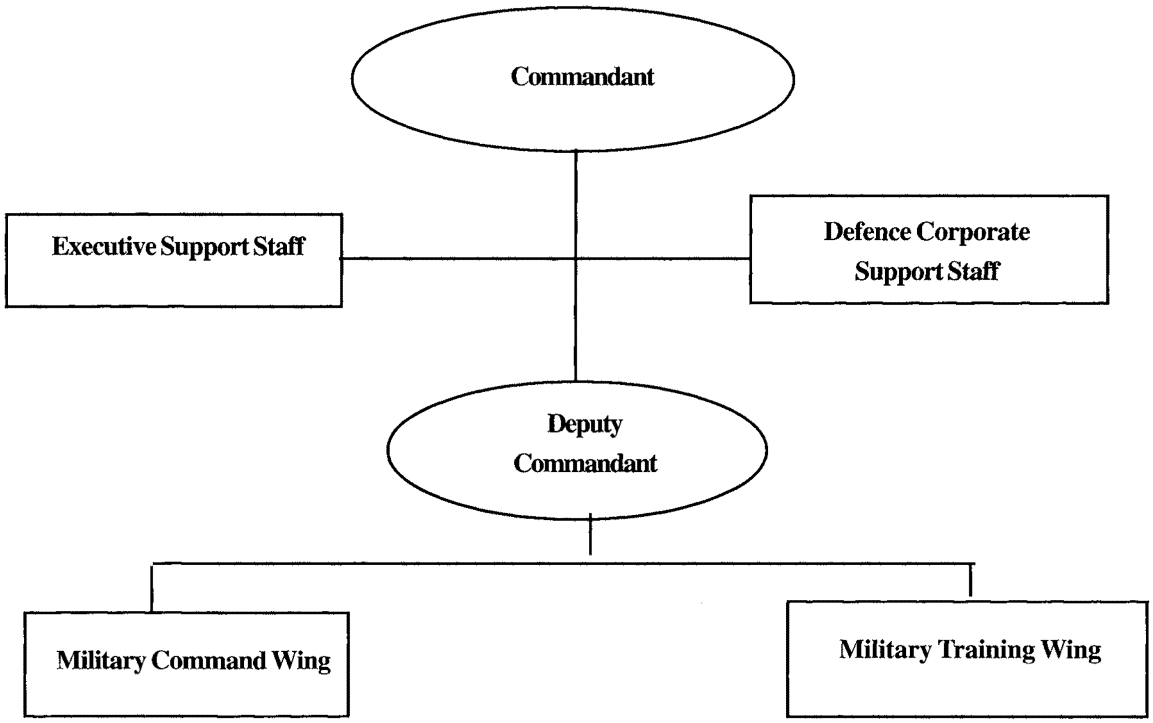
In this environment midshipmen and officer cadets are subject to the Defence Force Discipline Act 1982. They are expected to abide by all Defence regulations and instructions relevant to the Australian Defence Force and the Academy. This includes attending all scheduled academic studies program classes, obeying the lawful orders and directions of the Academy military staff, treating other people at the Academy fairly and with respect, and conducting themselves in an appropriate manner at all times.

All midshipmen and officer cadets wear the uniform of the Service to which they belong, with minor Academy embellishments and the issue of items specific to the Academy's training needs. Parade drill, the observance of military customs and traditions including the paying of compliments to superiors by saluting, and membership of the Academy Cadets Mess are other features of the military environment. In the Mess, cadets have the opportunity to participate in a range of formal social activities, such as dining-in nights, in which military traditions are observed.

At all times, midshipmen and officer cadets are expected to conduct themselves in a manner that will bring credit on themselves, the Academy and the Australian Defence Force. They will also represent the Academy and the Defence Force in a number of public ceremonies, notably those conducted at the Australian War Memorial commemoration services held on ANZAC Day and Remembrance Day. A small number of parades are also held during the year at the Academy, with the Chief of the Defence Force Parade in February and the Graduation Parade in December being the most significant.

THE ORGANISATION

Organisational Chart



Office of the Commandant

The Commandant has overall military responsibility for the Defence Force Academy and is either a Navy Commodore, Army Brigadier or Air Force Air Commodore. The Commandant is directly responsible to the Chief of the Defence Force for the control and management of the Academy. All military staff, midshipmen and officer cadets are under his command.

The Commandant exercises command through the Deputy Commandant and the Commanding Officers of the Military Command and Military Training Wings. Also directly responsible to the Commandant are the Business Manager and Director of Finance who deal with corporate issues affecting the Academy.

Office of the Deputy Commandant

The Deputy Commandant is responsible for the military education and training of the midshipmen and officer cadets. The Commanding Officers of the Military Command Wing and the Military Training Wing report directly to the Deputy Commandant. The Deputy Commandant is responsible for administering command of the Academy during the Commandant's absence.

Military Command Wing

The Military Command Wing is responsible for the day-to-day development, administration, discipline and command of the midshipmen and officer cadets and other military personnel undertaking full-time tertiary study at the Academy. The organisation is shown below:

There is no formal rank structure within the cadet body. However, five administrative positions have been established for selected Year 3 cadets. The positions are as follows:

a. President of the Mess Committee;

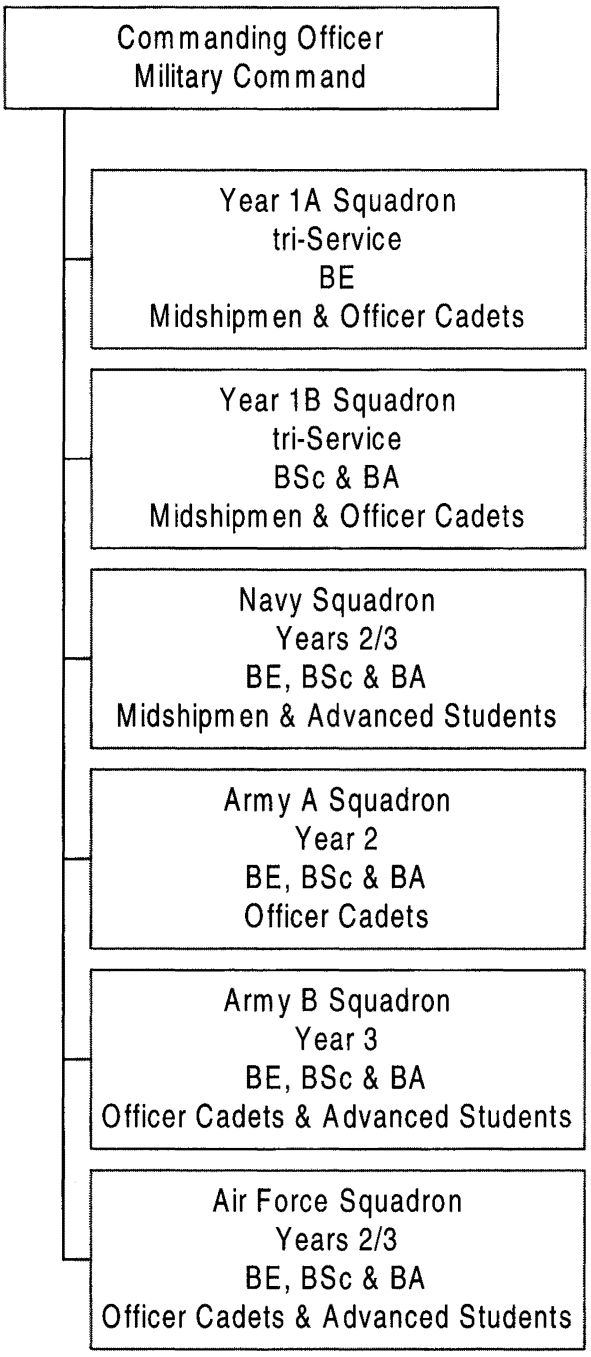
b. Deputy President of the Mess Committee;

c. Administrative Coordinator;

d. Sports Coordinator; and

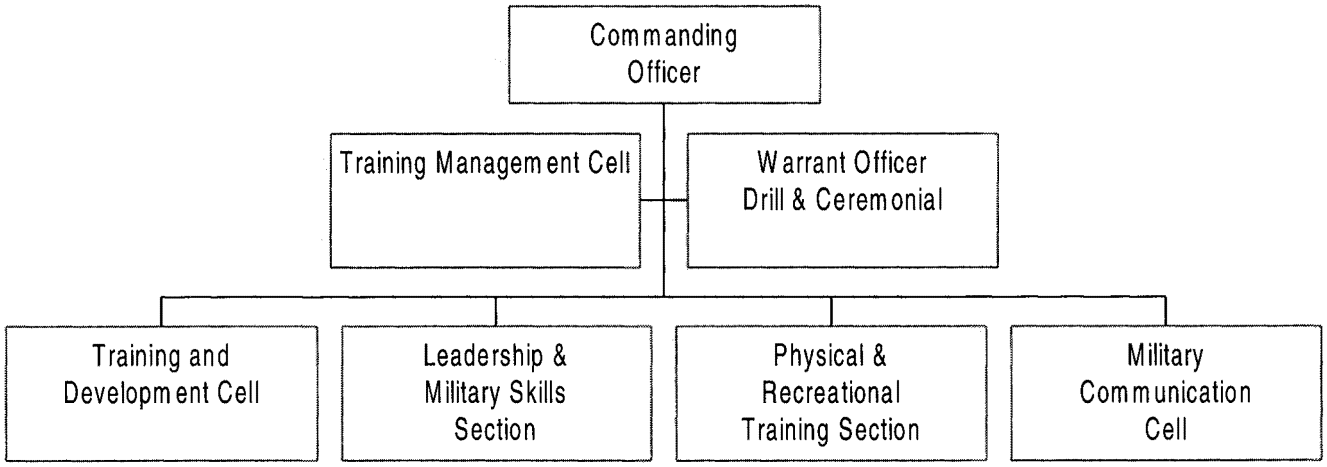
e. Band Coordinator.

The selected cadets are responsible for the coordination of various activities, and liaise with the Commanding Officer of the Military Command Wing on matters concerning the welfare and administration of the cadet body



Military Training Wing

The Military Training Wing conducts Common Military Training and coordinates the Single-Service Training for midshipmen and officer cadets. It is responsible for delivering and coordinating military training that gives cadets the knowledge and skills, and promotes the values and attitudes, required by the three Services. All military staff at ADFA assist in the delivery of military training. The organisation of the Military Training Wing is shown below.



Defence Corporate Support

The Defence Corporate Support Office provides a number of support services to the Academy, including transport, catering, clothing store, cash office, administration services and garrison support such as gardening.

OFFICER DEVELOPMENT

Military Training

The three-year military training program is designed to provide midshipmen and officer cadets with the fundamental knowledge, skills and attitudes that junior officers in the Australian Defence Force require. This provides the basis for the individual Services to conduct further training and development when cadets leave the Academy. The military training program consists of two key components – Common Military Training and Single-Service Training.

Common Military Training

The Common Military Training program is carried out in 'blocks' at the beginning and end of the year and for six hours per week during the academic sessions. There is significant emphasis on creating experience-based leadership opportunities in the training activities.

The Common Military Training program includes a range of subjects:

Leadership Studies form a large part of the Common Military Training curriculum and are conducted both formally and informally. The studies aim to develop leadership skills and to prepare midshipmen and officer cadets to take their places as junior officers in the Australian Defence Force. ADFA has its own Leadership Reaction Course for practical development of leadership skills.

Drill and Ceremonial promotes reaction to command, self-discipline and teamwork through knowledge and practice of the customs and traditions of military ceremonies.

Military Communication is designed to develop confidence and effectiveness in midshipmen and officer cadets' oral and written communication skills, which are necessary for their military careers. It also introduces cadets to the style and forms of written communication used in the Defence environment.

Equity and Diversity training provides midshipmen and officer cadets with the skills to live, study and develop in a healthy academic and social environment by teaching them how treat people fairly and with respect in accordance with Australian Defence Force policies.

First Aid and Health examines the impact on society of drug and alcohol abuse and teaches first aid and preventative health techniques. Field Craft introduces midshipmen and officer cadets to living in the field as a member of a group and survival in adverse circumstances.

Military Law introduces midshipmen and officer cadets to the Defence Force Discipline Act and the Geneva Conventions. The subject is designed to enable cadets to more detailed training being conducted nearer the time of their commissioning.

Physical and Recreational Training teaches fitness strength and agility. As sport and a high standard of physical fitness are important parts of Service life, midshipmen and officer cadets are encouraged to obtain a coaching or refereeing qualification for at least one sport. Competitions in a wide range of sports are conducted at the Academy and teams are entered in many civilian competitions in Canberra.

Weapon Training gives midshipmen and officer cadets training in the operation and maintenance of small arms Service weapons.

Single-Service Training

Single-Service Training is generally conducted at the beginning and end of the year for varying periods of time and gives midshipmen and officer cadets the opportunity to experience and learn about their parent Service. The individual Services are responsible for designing and implementing the syllabi for the conduct of single-Service training which are outlined below:

Naval Single-Service Training

In first year, midshipmen are introduced to life in the Royal Australian Navy through periods at sea and visits to shore establishments. In their second and third years midshipmen will go to sea in a variety of ships where they work alongside sailors to gain an appreciation of shipboard life and work. Midshipmen reading engineering also undertake periods of work experience during their naval training.

Army Single-Service Training

The single-Service Training for Army officer cadets is conducted at the Royal Military College at Duntroon and takes them to the level of a trained soldier. The training includes weapon handling, fieldcraft, navigation and tactics at platoon level.

Air Force Single- Service Training

Air Force single-Service Training is designed to allow officer cadets to complete the RAAF Junior Officers Initial Course during their time at the Academy. The training includes general Service knowledge, ground defence training and air power knowledge. It also includes elements to motivate each officer cadet towards their chosen branch in the Air Force.

Progress of Academy Programs

Midshipmen and officer cadets undertaking Arts, Science or Technology programs are awarded their degrees after satisfactory completion of three years' academic and military studies. Cadets undertaking an Engineering degree follow a prescribed four-year program. Students of merit may be offered transfer to an honours program, providing their Service authorises a further twelve months of training.

After successfully completing three years at the Academy, all Army officer cadets undertake a year of military training at the Royal Military College at Duntroon, after which they are commissioned as Lieutenants. Most then take up their first appointment in an Army unit while others return to the Defence Force Academy for an honours year or the fourth year of an Engineering degree.

Midshipmen and Air Force officer cadets who undertake a fourth year of study do so as Advanced Students, without a break in their academic studies. Their rank for the fourth year is midshipman or officer cadet.

Prizes and Awards

At the end of the third year at the Academy, all midshipmen and officer cadets who have met the military and academic requirements are awarded ADFA graduate status and a University of New South Wales degree.

The third year midshipman or officer cadet who achieves the highest overall result in military subjects and academic studies and who exerts the most positive and effective influence on his/her peer group, will receive the Commander-in-Chief Medal for excellence in training. The most outstanding third year midshipman, Army officer cadet and Air Force officer cadet each will be presented with a Chief of Defence Force Prize from their parent Service.

Outstanding individual performances in the various academic streams and individual subjects in all years are rewarded with other prizes which are paid for by public funds, University of New South Wales funds and donations. Prizes and awards are also presented for individual excellence in military subjects and are funded by private donations from individuals and organisations.

Return of Service Obligation

On reaching the end of their second year at the Academy, seen as the 'employable point' of their careers, midshipmen and officer cadets attract a requirement to fulfil a 'Return of Service Obligation' equivalent to one year of service for every year spent under training, plus one additional year. At this 'employable point' midshipmen and officer cadets may not resign from the Service until they have discharged their Return of Service Obligation.

There is a financial penalty for midshipmen and officer cadets who seek discharge at their own request after their second year of study. They may in exceptional circumstances be permitted to resign, but will be required to reimburse the Commonwealth for the cost of their training and education The amount to be reimbursed will be determined by the Minister for Defence.

ACADEMY LIFE

The First Weeks

The first weeks at the Academy are a busy time for midshipmen and officer cadets as they are issued with clothing, have medical examinations, undertake military orientation and commence three weeks of Common Military Training. This period is known as the Cadet Familiarisation Period and is intended to give cadets the basic military and interpersonal skills essential for their Service careers and to living and working at the Defence Force Academy.

Military discipline, care of uniforms, self-discipline and strict routines are new experiences for most cadets. The development of high standards of dress, bearing, behaviour and attitude is the aim of the Cadet Familiarisation Period. In order to achieve and maintain these standards, cadets must quickly acquire skills in organising and managing their time, washing and ironing, polishing boots and shoes, making beds and cleaning rooms and facilities. Midshipmen and officer cadets can prepare for the first six weeks by being proficient in those tasks and by having a high level of physical fitness before arriving at the Academy.

Fitness and Health

Sport and physical training play an important part in Service life. The primary aim of physical training at the Academy is to educate midshipmen and officer cadets in the values of maintaining a healthy lifestyle. During their stay at the Academy midshipmen and officer cadets are required to annually pass the relevant single Service Fitness Test. The minimum standards for midshipmen and officer cadets are as follows:

Navy

	Male			Female		
Level	1	2	3	1	2	3
Hang	25	40	55	25	40	55
or						
Push-ups	25	40	55	10	25	40
Sit-up	25	40	55	25	40	55
2.4 Km Run	13mins	11mins	10mins	15mins	13mins	12mins
or		30secs		30secs		
5 Km Walk	42mins	39mins	37mins	43mins	40mins	38mins
or		30secs			30secs	
500 m Swim	12 mins	11mins	9mins	13mins	12mins	10mins
	30secs		30secs	30secs		30secs

Army < 21

	Male			Female		
Level	1	2	3	1	2	3
Push-up	50	60	70	25	35	45
Sit-up	75	90	100	75	90	100
2.4 Km Run	10 mins	8mins	7mins	12mins	10mins	9mins
	48secs	30secs	45secs	27sexs	40secs	40secs

Army 21 - 25

Push-up	40	55	60	21	35	41
Sit-up	70	85	98	70	85	98
2.4 Km Run	11mins 18secs	10mins	8mins 40secs	13mins 30secs	11mins 25secs	10mins

RAAF

	Male			Female		
Level	1	2	3	1	2	3
Hang	30	45	60	30	45	60
Sit-up	30	45	60	30	45	60
2.4 Km Run	12mins	10mins	9mins	13mins	11mins	10mins
or		30secs			30secs	
5 Km Walk	40mins	37mins	35mins	41mins	38mins	36mins
		30secs			30secs	

Daily Routine

The daily routine during the week consists of wake up at 0600 and roll call at 0605. Academic and military lessons begin at 0800. Before 0800 cadets are required to attend breakfast and to take part in scheduled Divisional activities such as parades, cleaning duties, flag raising duties and Divisional Officer hours. Academic and military lessons are divided into nine 50-minute periods from 0800 to 1700. (Please note, the timetable process may change.)

At weekends cadets pursue their own activities unless they are involved in sporting commitments or the occasional military activity. Cadets are free to go on local leave within a 100-kilometre radius of the Academy. Approval must be obtained to travel outside this radius.

Military Protocol

Military staff at the Defence Force Academy are drawn from the three Services of the Australian Defence Force. Although midshipmen and officer cadets join a single Service, the tri-Service nature of the Academy means that they must quickly learn the rank insignia of the three Services. Cadets learn the insignia early in the Common Military Training program.

Saluting

The military salute has its origins in the middle ages when knights, upon meeting, raised their visors as a sign of friendship and trust. The hand salute was also a means of showing an open palm with no concealed weapons – again, a sign of trust. Today, the hand salute is an expression of mutual respect such that when a senior is saluted he or she is obliged to return the salute. The salute is a visible act of courtesy, not an act of servility. Midshipmen and officer cadets are required to salute all service officers, whether in uniform or in civilian clothing.

Ceremonial

The drill and ceremonial procedures taught at the Defence Force Academy have been developed from those used in the single Services. During periods of single-Service Training and on leaving the Academy, midshipmen and officer cadets will be taught the drill and ceremonial requirements of their parent Service.

Discipline

As members of the Australian Defence Force, midshipmen and officer cadets are subject to the Defence Force Discipline Act 1982. This Act, whilst closely aligned with civil law, is unique to the Australian Defence Force. Midshipmen and officer cadets attend lessons on the Defence Force Discipline Act and how it applies to them as members of the Academy.

Dress and Grooming

During their first week at the Academy, new midshipmen and officer cadets will be issued with the uniforms of their Service, plus common items such as sports clothing.

During a working day cadets wear their single-Service uniforms. During free time they are permitted to wear civilian dress. The civilian dress standard is slightly higher than the community norm for students of that age group.

There is a variety of forms of Service uniforms and cadets may be expected to wear more than one type of uniform during the day. As such, they need to be well organised and accustomed to planning ahead.

SUPPORT SERVICES

Chaplains

There are three Chaplains at the Academy, one from each Service, representing the Anglican and Protestant denominations. The Catholic chaplain at Royal Military College is available for specifically Catholic issues.

The chaplains conduct workshops in Character Development (as part of the Military Training Program) and Character Guidance for all midshipmen and cadets. They also conduct a two-day exercise for midshipmen and officer cadets at the end of their second year at the Academy.

Spiritual and personal development is encouraged through worship services at the Australian Defence Force Academy, and on Sunday by worship at the ANZAC Memorial Chapel of St Paul in nearby Duntroon. Voluntary bible study, prayer and fellowship groups meet at the Academy on a daily basis.

The Chaplains seek to engage with cadets and staff in a proactive manner both at the Academy, and in a variety of single-Service and field training and leisure environments. They provide a confidential pastoral and counselling ministry both during the working day, and out of hours through an 'on-call' Chaplain.

Medical and Dental

The Canberra Medical Unit at the Royal Military College at Duntroon (CAMU-D) provides full medical services, and a small medical centre is located within the Academy. Cadets incur no cost for consultations, treatment and prescription costs arising from from illness or injury.

Psychology and Counselling Service

This service operates through three qualified psychologists and two support staff. The psychologists offer a confidential counselling service for midshipmen and officer cadets who wish to refer themselves for counselling or advice. Referrals are made for a wide variety of reasons, ranging from issues relating specifically to studies or Service career through to more personal concerns or difficulties.

In addition to individual counselling, the psychologists conduct workshops on study techniques and methods for reducing stress and anxiety. Courses are also taught on leadership dynamics, interviewing and counselling skills and alcohol and drug awareness.

The psychologists also have an important role in assisting first-year midshipmen and officer cadets make the transition from civilian to military life, and from secondary to tertiary education. This includes advice on approaching academic work and study techniques, and on course and subject choices in relation to students' abilities and vocational goals.

Equity and Diversity

The Defence Force Academy is committed to promoting and fostering a culture of equity and diversity, and emphasises the importance of valuing fairness and difference as good leadership practice. Equity means a fair go for everyone and seeks to treat people on their merit. Diversity focuses on making the most of differences in people to ensure a more harmonious, productive and efficient work environment.

Commanders and managers at the Academy are required to provide a work environment free from discrimination, harassment, sexual offences and other unacceptable behaviour. To achieve this, the Academy operates under the Australian Defence Force policy of zero tolerance for unacceptable behaviour, and the guidelines for dealing with and eliminating discrimination, harassment, sexual offences and unacceptable behaviour.

The Academy Equity Adviser network supports commanders and managers in implementing equity and diversity at the Academy, and provides all personnel with information and options for the resolution of workplace equity and diversity issues.

Living Arrangements

Accommodation

Midshipmen and officer cadets are accommodated in comfortable, functional living quarters. Each person has a private room with facilities for studying. Four such rooms are grouped into a corridor with shared bathroom and laundry facilities. In addition to individual accommodation, each Division has a common recreation area with pay telephone, refrigerator, microwave oven, television, stereo and a computer terminal room. Cadet accommodation is inspected regularly by Divisional staff in order to ensure that cleanliness and neatness is maintained.

Midshipmen and officer cadets in their first year at the Academy are accommodated in mixed Service, single gender Divisions comprising approximately 47 cadets. During their second and

third years, midshipmen and officer cadets live in a mixed gender, single-Service environment. The single Service nature of second- and third-year Squadrons assists cadets in developing greater familiarity with their parent Service.

One room in each accommodation block is allocated as an office to the Divisional Officer.

Visitors

Visitors to the Academy are welcome provided they do not disrupt the study program of the host cadet or any other person. Only in exceptional circumstances will cadets be permitted to receive visitors during programmed working hours or sports periods. For reasons of welfare and security, visitors are not permitted to enter the accommodation blocks without appropriate authorisation from the Divisional Officer.

Pay

Midshipmen and officer cadets are paid each Thursday fortnight directly into a nominated bank or credit union account. The Defence Credit Union (DEFCREDIT) and the Australian Defence Credit Union have a branch located at the Academy. There is also a DEFCREDIT Multi-Card ATM facility which operates 24 hours a day.

All members of the Australian Defence Force pay tax, contributions to the Military Superannuation Benefits Scheme and charges for the rations and quarters provided. Ration and quarters charges are not made during periods of leave in excess of 72 hours or when cadets are in the field or at sea.

At June 2000 midshipmen and officer cadet pay scales were as follows:

a. 1st Year $15 532 Per Annum,

b. 2nd Year $18 519 Per Annum, and

a. 3rd Year $23 298 Per Annum.

In June 2000 a first year cadet could expect to be paid $610.86 each fortnight less deductions. In June 2000 a first year cadet could expect deductions for accommodation, and utilities (compulsory) and for meals (optional). The tax and superannuation deductions increase each year with the cadets' salary.

The Department of Defence pays the Higher Education Contribution Scheme (HECS) levy for cadets' university studies at the Defence Force Academy. Cadets who leave the Defence Force prior to completing their Return of Service Obligation are liable for payment of any unpaid portion of HECS.

Leave

Midshipmen and officer cadets generally receive two periods of recreation leave each year. This may be subject to changes in accordance with training requirements. The two leave periods include: four to five weeks during the Christmas/New Year break and two weeks during the Semester break in July.

Midshipmen and officer cadets receive one free trip to their nominated next of kin address within Australia each year. This may be taken during either leave period. Cadets are required to vacate their accommodation during the Christmas/New Year break to enable professional cleaning and refurbishment of the building.

During the first six weeks of the Cadet Familiarisation Program, new cadets may be granted one-day of leave. After the first six weeks, leave is generally restricted to weekends until July. After July first-year cadets may take local leave until midnight during the week. Additional leave may be requested through the chain of command where special circumstances exist.

The first opportunity for extended leave occurs at Easter and is usually of four days' duration. For this period cadets may apply for leave and travel at their own expense beyond the local area.

In addition to recreation leave, the two-week May Training Period provides an opportunity to undertake adventurous training, field study trips, Single-Service Training, Common Military Training, remedial academic courses or Engineering workshops. Midshipmen and officer cadets may go on leave during the May Training Period if they are not required for duty. Duty is defined as any activity at which a cadet's attendance has been programmed or ordered by the Commanding Officer. It includes sport, sports training and all academic and military activities.

The Academy Cadets Mess

Adjacent to the cadet's accommodation is the Academy Cadets Mess, which is the largest Officers Mess in Australia and is designed to seat 1000 people and cater for up to 1200 cadets. The Mess comprises food preparation areas, kitchen, storage and freezer rooms, dining areas, bars, recreation rooms, a shop and a branch of the Australian Defence Credit Union (ADCU) and Smart Cover Insurance.

Facilities and Services

Indoor Sports Centre

The Indoor Sports Centre contains a 25-metre heated swimming pool, three squash courts, a basketball court, a weight training room, an aerobic exercise room, a boxer-cise room, a circuit room and gymnasium. There are also showers and change rooms. The Indoor Sports Centre is located adjacent to the Cadets Mess and is only a short walk from the accommodation blocks.

Sports Grounds

Within the grounds of the Academy are playing fields for cricket, football, hockey and other sports. Tennis courts are located to the east of the Geography Building and cadets may use the golf course at the Royal Military College, Duntroon.

Boatshed and Boating

The Academy Boatshed is located on the shore of Lake Burley Griffin at Yarralumla. The facility houses rowing boats, sailing and racing dinghies, canoes and a number of sailboards. The Boatshed has a ramp to the waters of Yarralumla Bay and is perfectly sited for all water sports. The Academy also operates two Endeavour 24 Yachts, which are moored permanently on the Lake, and seven support craft for a variety of waterborne activities.

Academy House

A building known as Academy House is located in the area bound by the Library, the Information Technology Service Centre and the Computer Science Department. On the ground floor are the following establishments, which provide services to all Academy staff, midshipmen and officer cadets:

Banking: A branch of DEFCREDIT which offers a wide range of banking needs and a 24 hour ATM facility. (A branch of the Australian Defence Credit Union (ADCU) is located in the Cadets Mess.)

Bookshop: The University Cooperative Bookshop is open Monday to Friday from 0900–1700 hours and stocks all academic textbooks, general books and stationery. A wide range of computer software is also available. Membership of the Co-op permits attractive discounts on most purchases, excluding magazines, cards and postage stamps.

Coffee shop: The Coffee Lounge offers hot meals to eat in or take away, snacks, hot and cold drinks and confectionery. Newspapers are sold and a dry cleaning agency operates from the venue. The Coffee Lounge is an area where cadets can relax either inside or on the patio outside the building.

Hairdressers: A hairdressing salon operates between 0830–1700 hours on weekdays and on Thursday nights by appointment. A florist agency operates from the salon.

Motor Vehicles

Midshipmen and officer cadets may own and operate motor vehicles, including motor cycles. All vehicles must be registered with the Academy on arrival. Vehicles must be registered with the ACT Motor Registry as soon as possible and the vehicle's interstate registration cancelled at the same time. An ACT driver or rider's licence must also be obtained.

Each cadet who has a vehicle registered at the Academy is allowed to park in the car parks available. Motor vehicles must be roadworthy, mechanically sound, registered and insured to at least third-party property level or they cannot be driven, ridden or parked in the Academy grounds. In exceptional circumstances and depending upon the availability of spaces, cadets may be

allowed to use a second car parking space for parking a second vehicle, e.g. a trailer.

The operation and parking of motor vehicles at the Academy are privileges, not rights. Such privileges may be revoked if a driver or owner breaches any of the traffic rules applicable to the Academy or contravenes any accepted practice of safe operation of a motor vehicle.

COMMUNITY & OTHER ACTIVITIES

General Sport

Participation in sporting activities at the Academy is intended to promote competitiveness, teamwork, leadership, strength, agility and endurance. Sport also provides midshipmen and officer cadets with opportunities to meet and socialise with members of other teams. However, Academy sports are not limited to team events: individual excellence in such sports as athletics, swimming, fencing, sailing and shooting is also encouraged.

Participation in sport is not compulsory, although involvement in at least one major sport each season is strongly encouraged. Major sports are those team sports in which the Academy is represented in local competitions and they also form the basis of internal competitions between squadrons. Subsidies of uniforms or equipment and assistance with compulsory costs and travel may be available for many sports.

The ADFA Sports Championships are held annually for athletics, swimming, cross country running, tug o war and obstacle course. Other sports within this competition are:

Military Drill	Hockey
Rifle Shooting	Water Polo
Sailing	Orienteering
Volleyball	Tennis
Softball	Soccer
Basketball	Squash
Touch Football	Rugby Union
Netball	Australian Rules Football

Sports Clubs

Sporting clubs at the Academy are formed under the control of the Commanding Officer of the Military Training Wing and guidance from the Officer Commanding the Physical and Recreation Training Squadron. Members of staff are appointed as supervisors of each club. Sporting clubs include:

Australian Rules Football	Inline Hockey
Rugby Union	Netball
Hockey	Triathlon
Touch Football	Soccer
Basketball	Orienteering
Rowing	Water Polo
Sailing	Volleyball

The Academy sends teams each week to participate in the various community sports competitions. Most participation occurs in Winter due to the long absence of cadets from the Academy during the Summer months. Cricket is played on a social basis during the Summer season.

Voluntary Extra-Curricular Activities

A number of Voluntary Extra-Curricular Activities that provide cadets with interests outside normal activities and sports are established, depending on the amount of interest shown in them. They include:

Band and Choir	Cricket
Debating	Military Shooting
Performing Arts	Yearbook
Scuba Diving	Sky Diving

The Band, Pipes and Drums of the Academy

The Band, Pipes and Drums of the Australian Defence Force Academy is a military concert band under the administration and conduct of a member of the Australian Army Band Corps. The Band rehearses regularly and has occasional practice weekends. Membership of the Band is voluntary with a commitment of 12 months. Midshipmen and officer cadets who wish to join are encouraged to supply their own instruments, although some are provided by the Academy.

There are bagpipe, percussion and woodwind sections of the Band. The bagpipe is the only instrument that is taught from beginner level, with tuition provided by a civilian teacher.

The Band performs for all Academy parades and provides musical support for the Academy Production, concert evenings, presentation nights and Church services. The Band also performs outside the Academy occasionally, with a commitment during the academic year to providing a piper or bugler for the weekly closing of the Australian War Memorial.

The Foster Family Scheme

During the first few weeks, midshipmen and officer cadets from outside the Australian Capital Territory are invited to join the Foster Family Scheme. This scheme introduces cadets to serving and retired military officers and warrant officers living locally who will provide a home-away-from-home environment to assist in the settling-in process. These families, who are all volunteers, also provide mentoring and an opportunity for one-on-one discussion about career options and other concerns. Cadets are encouraged to join the scheme.

Charities

The Academy is involved in supporting a number of charities each year. These include Legacy, Red Cross, Anzac Day badge selling and the Salvation Army Door Knock appeal. Individual cadets may be asked to provide support during these appeals.

Community Participation

Cadets are encouraged to pursue personal interests outside the Academy and take an active role in the local community. Some are involved in local organisations such as scouting groups, local sporting teams, the Canberra Symphony Orchestra, bible study groups and the local animal shelter, to name a few.

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.

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 courses 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 5 (The Faculties and Deans) of the By-laws of the University and Section 3 of the Rules, in respect of all matters.

Committees

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

Research Committee

Composition

- The Presiding Member of the University College Academic Board
- The Rector
- The Deputy Rector (Research)
- The Heads of Schools (or nominees) of the University College
- The Registrar, or nominee
- One person elected by each of the three Boards of Studies
- One person nominated by the Presiding Member (to address gender balance)
- One person nominated by the Presiding Member (to represent newer researchers)
- Two graduate students enrolled in research degrees
- Chief of Defence Scientist (or nominee)
- Representative of the external Humanities and Social Sciences research community

Function

The Research Committee is responsible for:

- the oversight of research matters (including the allocation of grant funds and recommendations relating to grant applications where necessary);
- matters relating to the candidature of higher degree research students;
- respective standing committees under authority delegated by the University Council; and
- performing such duties as may be assigned to it by Council on the recommendation of the Academic Board.

Postgraduate Coursework Education Committee

Composition

- The Presiding Member of the University College Academic Board
- The Rector
- The Deputy Rector (Education)
- The Heads of Schools (or nominees) of the University College
- The Registrar, or nominee
- One person elected by each Board of Studies
- Two graduate coursework student representatives

Functions

The Postgraduate Coursework Education Committee shall be responsible for:

- the consideration of all matters relating to the Doctor of Information Technology, masters by coursework, graduate diplomas and graduate certificates of the University College and shall act in accordance with the broad policy indicated by the University College Academic Board;
- the oversight of continuing and professional education by the University College;
- action on all matters relating to the enrolment of postgraduate coursework students, other than those matters for which approval has been delegated by Council to the Registrar (or nominee) on the recommendation of the Rector or a Head of School (or their nominees), provided that the action taken shall at all times be in accordance with the policy laid down by the University College Academic Board

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

Composition

- The Presiding Member (elected)
- The Registrar, or nominee
- The Heads of Schools with "major involvement"
- Two persons elected from each of the Schools with "major involvement"
- The Heads (or nominee) of Schools contributing "relevant" courses
- Two (for Science and Humanities and Social Sciences) and three (for Engineering) undergraduate student representatives
- The Deputy Commandant, or nominee
- A military member nominated by the Commandant.

Schools with "major involvement":

Science: Chemistry, Computer Science, Geography and Oceanography, Mathematics and Statistics, Physics.

Humanities and Social Sciences: Computer Science, Economics and Management, Geography and Oceanography, History, Language Literature and Communication, Politics.

Engineering: Aeronautical and Mechanical Engineering, Civil Engineering,Electrical Engineering.

Schools contributing "relevant" courses:

Science: Economics and Management, Language Literature and Communication, History, Politics.

Humanities and Social Sciences: Chemistry, Mathematics and Statistics, Physics.

Engineering: Chemistry, Computer Science, Mathematics and Statistics, Physics.

Presiding Member

The Presiding Member is elected from among the constituency of the Board by the constituency for a period of office of two years.

Functions

The Boards of Studies shall be responsible for:

- the consideration of all matters relating to undergraduate degrees and shall act in accordance with the broad policy indicated by the University College Academic Board;
- the implementation of the objectives of the General Education Program within the University College;
- action on all matters relating to the enrolment of undergraduate students, other than those matters for which approval has been delegated by Council to the Registrar (or nominee) on the recommendation of the Rector or a Head of School (or their nominees), provided that the action taken shall at all times be in accordance with the policy laid down by the University College 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 programs for which the relevant Board of Studies is responsible and, where appropriate, determines each student's standing in a program.

Admissions 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 programs in the University College.

Staff of the University College

Rector
Professor Robert John King, BSc DipEd PhD *Melb.*

Deputy Rector (Education)
Professor Charles Sinclair Newton, Cand Scient *Copenhagen,* PhD *A.N.U.*

Deputy Rector (Research)
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Rodney Oscar Weber, BSc *Melb.*, PhD *Tas.*

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Mark Francis Collins, BSc *Syd.*, MSc *Kent*, PhD *UNSW*
Wen Dai, BSc *Yunnan*, MSc, *Beijing Normal U.*, PhD *A.N.U.*
Zlatko Jovanoski, BSc *Monash,* PhD *UNSW*
Geoffrey Norman Mercer, BSc PhD *Adel.*
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Belinda Barnes, BSc *Cape Town*, GradDipAppComp *Tas.*, PhD *Monash*

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Victoria Steblina, BSc MSc *Moscow,* PhD *A.N.U.*

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Professor

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Ravinder Kumar Sood, BSc PhD *Lond.*, DIC, MIAU, FASA, FAIP

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Warrick Andrew Lawson, BSc MSc PhD *Cant.*
Peter Lynam, BSc *Birm.*, PhD *S'ton.*, CPhys, FAIP, MInstP
Garry Robinson, BSc PhD *Melb.*, ARMIT
Robert Gordon Smith, BSc PhD *Melb.*, MASA
Glen Alan Stewart, BSc PhD DipEd *Monash.*, FAIP

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

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LTCOL Gary Barkley, BA qtc ATO(AS)
LTCOL Andrew Crosby Sheogog, GDipTS *Swin.I.T,* psc, MMgt Stud *UNSW.*

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 programs
- Course descriptions: *this section includes HSC requirements, prerequisites, corequisites, exclusions and other notes*

4. Graduate Study

This contains:

- Courses and Programs: *followed by course outlines*
- Course 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:

UC	Units of credit
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 Courses by Numbers

A course 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 program offered by the University'.

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

- Each course has a unique Course Identifier comprising an alphabetic prefix and a numeric suffix.
- The authority offering a course is indicated by an alphabetic prefix.
- The particular undergraduate course is identified by four digits.
- An undergraduate course has a number in the range 1 to 4 as the second digit of the suffix to the course identifier.
- The level of a particular course is indicated by the first digit of the numeric suffix of the course identifier.
- Each identifying number is allocated to one course only.

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

AMEC	Aerospace and Mechanical Engineering
ACIV	Civil Engineering
AELE	Electrical Engineering
AECM	Economics and Management
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 course

The School of Language, Literature and Communication identifies its courses

as AENG	English
and AIND	Indonesian

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 programs. 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.

All applicants who are required to appear before a Defence Force Selection Board must lodge an application form with the University Admission Centre (UAC) (Locked Bag 500, Lidcombe, NSW, 1825) by the end of September (late applications are accepted until mid December on payment of a late fee). Applicants may use the same form to apply for civilian NSW and ACT universities.

Scholarships

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

Educational Qualifications for Admission to the University College in 2001

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

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

(2) 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 programs at the University College.

2. Assumed Knowledge

There are no compulsory courses in the BA and BSc programs. However, certain first year courses specify Assumed Knowledge requirements that indicate specific knowledge or background expected of students prior to their enrolment in the course concerned.

Assumed Knowledge for BA, BSc, BE and BTech programs is set out in Schedules I and II.

SCHEDULE I
ASSUMED KNOWLEDGE FOR LEVEL I COURSES
BA AND BSc PROGRAMS

Level I Courses		*Assumed Knowledge from Years 11 & 12*
Chemistry and Physics		ACT: Major in Advanced Mathematics NSW: 2 Unit Mathematics Qld: Mathematics B SA/NT: Mathematics 1 Tas: Mathematics Stage 2 Vic: 4 units of VCE Mathematics including Mathematical Methods 3 & 4 WA: 3 units of Mathematics including Calculus
	and or or	Year 11 and 12 Chemistry Physics Senior Science
Mathematics		ACT: Major-minor in Advanced Mathematics extended NSW: 2 Unit Mathematics (90%) 3 or 4 unit Mathematics preferred Qld: Mathematics B (HA) Mathematics B & C preferred SA/NT: Mathematics 1 (18/20) Mathematics 1 & 2 preferred Tas: Mathematics Stage 2 (HA) Stage 3 preferred Vic: 6 units of VCE Mathematics including Mathematical Methods 3 & 4 and Specialist Mathematics 3 & 4 8 units preferred WA: 3 units of Mathematics including Calculus 4 units preferred
Economics) English) History) Politics)		Year 11 and 12 English* or English as a Second Language

* In States where Year 12 English may be replaced by a humanities subject for the purposes of meeting Year 12 certificate requirements, the assumed knowledge is Year 11 English plus a Year 12 humanities subject.

SCHEDULE II
ASSUMED KNOWLEDGE FOR LEVEL I
BE AND BTECH DEGREE COURSES

Level I Courses	*Assumed Knowledge from Years 11 & 12*
Mathematics	As for Mathematics in BA and BSc programs
Aeronautical) Civil) Electrical) Mechanical)	As for Chemistry and Physics in BA and BSc programs

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 programs 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 (02) 6268 8111

Facilities and Services

The Academy 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 programs 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 430,000 volumes. There are current subscriptions to over 5,000 current periodicals, about half of which are available electronically.

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 large 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 at http://www.lib.adfa.edu.au.

The Library is the lead institution in the Australian Literature Electronic Gateway, a major national research infrastructure initiative providing unique access to Australia's cultural heritage.

The Library's Information Desk provides assistance to library users together with on-line and printed guides concerning many aspects of using the library effectively. In addition, the Library conducts orientation classes and tutorials on library use for specific courses 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, the Australian Catholic University (Signadou Campus), and Charles Sturt University (St Mark's Campus). Special arrangements existfor personnel of the Department of Defence.

Information Technology Services Centre

The IT Services Centre is the central Information Technology Service Provider for the Academy. In broad terms, its role encompasses, although is not limited to, providing various levels of support to the schools, centres, the University College administratve areas, Defence staff, and students.

The Centre also supports, as a large part of its role, the campus network. This now has over two thousand five hundred nodes and includes full network and Internet access in all undergraduate accommodation. In addition, the network interconnects the Academy with the Australian National University, University of Canberra, Signadou Campus of the Australian Catholic University, and the CSIRO. Access to the Internet is also provided via high speed links through the Australian Academic Research Network, making the network an increasingly important part of the education process at the Academy.

The Centre operates numerous systems for teaching, research, and administration purposes, and directly supports a number PC laboratories which are available to all students. All staff and students are provided with access to electronic mail, access to the Internet and a wide variety of other Internet based services such as news, file transfer, and directory services.

The Centre maintains a number of application packages available on various hosts and servers for teaching purposes. These include scientific and graphic libraries, statistical and econometric analysis programs, symbolic mathematics, text analysis and processing, simulation and engineering design, and database work.

More information on both the IT Services Centre is available via the ADFA web site.

Flexible Education Centre

The Flexible Education Centre was established in July 1998 to oversee the College's transition to flexible delivery of appropriate elements of the teaching program, and for working with staff to establish support and staff development needs. In addition, the Centre provides specific support to the College's distance education students.

Centre for Media Resources

The Centre for Media Resources' core business is to support the teaching, research, publication and important public relations activities of the Academy.

This is achieved through the provision of services in Graphic Design, Video Services, Photography and Educational Technology support of the formal Teaching Venues, Military Theatrette, and Assembly Hall. In addition, a centralised pool of mobile AV equipment is available for campus wide loan for official Academy business only.

Products and services available to staff broadly include:

a) The design and production of a range of instructional media, both traditional and electronically based, in support of teaching and training, both on campus and using flexible delivery modes.

b) Videoconference facilities.

c) Design and layout to finished artwork for teaching, publication and printing, WWW and multimedia applications.

d) Media support of research activities.

e) Recording of important Academy public relations events.

f) Educational Technology support of the formal teaching venues.

g) Limited support service for conferences and seminars held at the Academy.

h) A catalogue of library images for general use by Academy staff in support of their work at the Academy.

i) Bureau services in the preparation of digital imaging for use in teaching, publications, CDROM, WWW etc.

j) Networked four colour photocopier for self-preparation of teaching material and for low volume 'print on demand' applications.

k) Separation negative service for 'four colour' high volume mechanical printing.

Further information on the full range of services is available via a web site linked to the Academy home page, or by direct contact with the Centre.

Business Development Office

The Business Development Office coordinates professional development courses, conferences and seminars using the expertise of academic staff at University College. The Office also acts as an agency for Unisearch consulting activities, providing access to the skills and knowledge of staff on a commercial basis.

Enquiries should be addressed to the Manager, Business Development Office, University College, ADFA, Canberra ACT 2600, telephone (02) 6268 8288, fax (02) 6268 8690 or email: Business.Office@adfa.edu.au

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, Janice Rafferty, University College, ADFA, Canberra ACT 2600, telephone (02) 62688497, fax (02) 6268 8690 or email unisearch@adfa.edu.au.

Degree Rules

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 course 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 course, the requirement shall be construed as meaning that the candidate shall:

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

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

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

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

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

(a) Courses in the following subject areas are designated as Arts courses,

Asia-Pacific Studies

Economics

English

History

Indonesian

Information Systems

Management

Politics

and in the following subject areas as Science courses,

Chemistry

Computer Science

Mathematics

Oceanography

Operations Research and Statistics

Physics

and in the following subject area as Arts courses in an Arts degree, and as Science courses in a Science degree,

Geography

(b) A course is defined as an area of study in a single discipline or in cognate disciplines, at one level, taken in one session which is recognised by the University for the purposes of accreditation.

Courses are allotted units of credit as defined in the schedules.

(c) A major is a sequence of courses from one subject, or from two approved subjects. It consists of Level I courses to the value of 12 units, Level II courses to the value of 12 units, and Level III courses to the value of 24 units. Similarly a minor is a sequence of Level I courses to the value of 12 units and Level II courses to the value of 12 units.

(d) A minor may also be any combination of Level I, Level II and Level III courses in the same subject, or in cognate subjects, to the value of at least 24 units, 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 courses totalling in value 144 units of credit which shall include:

(a) Level I courses, totalling 48 units of credit, with at least 36 units chosen from three Arts subjects,

(b) at least one major and one minor in Arts courses,

(c) a second major or minor in Arts or in Science courses,

(d) specified general education courses for the Arts program, of total value 12 units of credit.

7. To qualify for the degree of Bachelor of Science, a candidate shall, in accordance with the provisions of Rule 8, complete courses totalling in value at least 144 units of credit which shall include:

(a) Level I courses, totalling 48 units of credit, with at least 36 units chosen from three Science subjects,

(b) at least one major and one minor in Science courses,

(c) a second major or minor in Arts or in Science courses,

(d) specified general education courses for the Science program, of total value 12 units of credit.

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 144 units of credit (normally 24 units in each full-time session), of which:

(a) no more than 12 units may be gained from general education courses, with a maximum of 6 units to be taken in any one School,

(b) no more than 48 units may be gained from Level I courses,

(c) at least 84 units must be from Level II or Level III courses,

(d) no more than 12 units at Level I may be taken in any one School in the first year,

(e) no more than 84 units may be gained from courses in any one School,

(f) no general education course may be taken concurrently with, or subsequent to, a Level I course in 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 courses for the degrees of Bachelor of Arts and Bachelor of Science

SCHEDULE A—ARTS COURSES

Course No.	*Course Name*	*Level*
Economics and Management		
AECM1101	Economics 1A	I
AECM1102	Economics 1B	I
AECM2001	Quantitative Methods in Economics and Management	II
AECM2101	Growth and Fluctuations in Open Economies	II
AECM2102	Production, Prices and Trade	II
AECM2191	Economics 2A (Honours)	II
AECM2192	Economics 2B (Honours)	II
AECM2302	Introduction to Corporate and Government Accounting	II
AECM2304	Logistics Management	III
AECM2303	Organisational Behaviour	II
AECM2391	Management 2A (Honours)	II
AECM2392	Management 2B (Honours)	II
AECM3001	Finance	III
AECM3002	Methods and Techniques of Quantitative Research	III
AECM3102	Asia-Pacific Economic Development	III
AECM3101	Applied Economics	III
AECM3103	The Making of Economic Policy	III
AECM3191	Economics 3A (Honours)	III
AECM3192	Economics 3B (Honours)	III
AECM3193	Economics 3A (Combined Honours)	III
AECM3194	Economics 3B (Combined Honours)	III
AECM3301	Leadership	III
AECM3302	Human Resource Management	III
AECM3304	Management Accounting	III
AECM3305	Project Management	III
AECM3306	Public Sector Management	III
AECM3391	Management 3A (Honours)	III
AECM3392	Management 3B (Honours)	III
AECM3393	Management 3A (Combined Honours)	III
AECM3394	Management 3B (Combined Honours)	III
AECM4191	Economics 4 (Honours) F/T	IV
AECM4192	Economics 4 (Honours) P/T	IV
AECM4391	Management 4 (Honours) F/T	IV
AECM4392	Management 4 (Honours) P/T	IV
AECM4193	Economics 4 (Combined Honours) F/T	IV
AECM4194	Economics 4 (Combined Honours) P/T	IV
AECM4393	Management 4 (Combined Honours) F/T	IV
AECM4394	Management 4 (Combined Honours) P/T	IV

Course No.	*Course Name*	*Level*
English		
AENG1101	English 1A	I
AENG1102	English 1B	I
AENG2101	C16/17 Literature	II
AENG2113	Late C19 Literature	II
AENG2015	The Australian Literary Heritage	II
AENG2116	C19 American Literature	II
AENG2039	Romanticism and Revolution	II
AENG2109	Modernism and After	II
AENG2107	Communications(1)	II
AENG2120	Creative Writing and Reading	II
AENG2020	Modern Drama	II
AENG2016	Australian War Literature	II
AENG2122	Women's Writing	II
AENG2121	Australia and the Asia Pacific	II
AENG2193	2 Honours: Foundation Works of Western Culture	II
AENG3015	The Australian Literary Heritage	III
AENG3039	Romanticism and Revolution	III
AENG3107	Communications(1)	III
AENG3020	Modern Drama	III
AENG3016	Australian War Literature	III
AENG3191	3 Honours: Issues in Contemporary Criticism and Theory	III
AENG4191	English 4 (Honours) F/T	IV
AENG4192	English 4 (Honours) P/T	IV
AENG4193	English 4 (Combined Honours) F/T	IV
AENG4194	English 4 (Combined Honours) P/T	IV
History		
AHIS1103	History 1A	I
AHIS1104	History 1B	I
AHIS2101	Colonial Australia	II
AHIS2102	East Asia: Between Tradition and Modernity	II
AHIS2103	European Powers in Peace and War 1870–1914	II
AHIS2104	Fall & Rise of Europe: 1945-Present	II
AHIS2105	Modern Australia: Politics and Culture	II
AHIS2106	Naval History and Sea Power in the C20	II
AHIS2107	Revolts and Counter-Insurgency in Southeast Asia	II
AHIS2108	Rise of Modern Navies and Sea Power 1500-1900	II
AHIS2109	Russian History	II
AHIS2110	Science and Technology in Australia	II
AHIS2111	Social Change in East Asia	II
AHIS2112	Soviet History	II
AHIS2113	Studies in Diplomatic History	II
AHIS2114	The American Civil War	II
AHIS2115	The Great War 1914-1918	II
AHIS2117	The Origins of Modern War	II
AHIS2116	The Making of Contemporary Society	II
AHIS2118	The Pacific Basin 1945–1990	II
AHIS2119	The Second World War	II
AHIS2120	War and Society in Australia 1788-1988	II
AHIS2121	The War in the Air	II
AHIS3191	History 3A (Preliminary Honours)	III
AHIS3192	History 3B (Preliminary Honours)	III
AHIS3193	History 3A (Combined Preliminary Honours)	III
AHIS3194	History 3B (Combined Preliminary Honours)	III
AHIS4191	History 4 (Honours) F/T	IV
AHIS4192	History 4 (Honours) P/T	IV
AHIS4193	History 4 (Combined Honours) F/T	IV
AHIS4194	History 4 (Combined Honours) P/T	IV
Indonesian		
AIND1101	Indonesian 1A	I
AIND1102	Indonesian 1B	I
AIND2101	Indonesian 2A	II

AIND2102	Indonesian 2B	II
AIND3101	Indonesian 3A	III
AIND3102	Indonesian 3B	III

Information Systems

ACSC1001	Information Technology Fundamentals	I
ACSC1301	Information Systems Principles	I
ACSC2304	Application Development	II
ACSC2003	C3I Systems	II
ACSC2011	Current Issues	II
ACSC2005	Data Communications	II
ACSC2012	Databases and Database Design	II
ACSC2006	Decision Analysis	II
ACSC2014	Human Factors	II
ACSC2016	Knowledge Based Systems	II
ACSC2017	Knowledge Management	II
ACSC2018	Linear Programming	II
ACSC2020	Security, Privacy & Ethical Issues in Computing	II
ACSC2303	Systems Analysis	II
ACSC2021	Systems Development Methodologies	II
ACSC3008	Application Integration	III
ACSC3003	Computer Project	III
ACSC3010	Decision and Collaborative Systems	III
ACSC3011	Distributed Systems and Databases	III
ACSC3012	Electronic Commerce	III
ACSC3013	Managing Information Strategically	III
ACSC3014	Object Oriented Modelling and Systems	III
ACSC3015	Operations Research	III
ACSC3016	Operations Research Project	III
ACSC3017	Optimisation Techniques	III
ACSC3006	Simulation	III
ACSC3018	Software Project Management	III
ACSC3019	Structured Information in Organisations	III
ACSC3007	Systems Administration	III
ACSC3305	Systems in Organisations	III
ACSC4391	Information Systems 4 (Honours) F/T	IV
ACSC4392	Information Systems 4 (Honours) P/T	IV
ACSC4393	Information Systems 4 (Combined Honours) F/T	IV
ACSC4394	Information Systems 4 (Combined Honours) P/T	IV

Course No.	*Course Name*	*Level*

Politics

APOL1101	Politics 1A	I
APOL1102	Politics 1B	I
APOL2101	Approaches to Politics	II
APOL2102	Conflict in the Twenty First Century	II
APOL2103	Culture, Conquest and International Society	II
APOL2104	Democracy and Development in Asia	II
APOL2105	Electoral Systems	II
APOL2106	From International to Global Politics	II
APOL2107	Issues and Problems in Australian Foreign Policy	II
APOL2108	Japan in the Asia-Pacific	II
APOL2109	Political Cultures in Asia and the Pacific	II
APOL2110	Politics in Japan	II
APOL2111	Politics of Australian Defence Policy	II
APOL2112	Politics of China	II
APOL2113	Politics of Indonesia	II
APOL2115	Politics of Korea	II
APOL2116	Politics of Russia	II
APOL2118	Politics of the USA	II
APOL2120	Special Studies in Politics	II
APOL2121	Strategic Issues in the Asia-Pacific	II
APOL2122	The Collapse of Communism	II
APOL2124	War in International Politics	II
APOL4191	Politics 4 (Honours) F/T	IV
APOL4192	Politics 4 (Honours) P/T	IV
APOL4193	Politics 4 (Combined Honours) F/T	IV
APOL4194	Politics 4 (Combined Honours) P/T	IV

Asia–Pacific Studies

AINT2101	Asia-Pacific Culture: China	II
AINT2102	Asia-Pacific Occasional Option	II
AINT2103	War and Society in the Asia-Pacific	II
AINT3101	Asia-Pacific Culture: China	III
AINT3102	Asia-Pacific Occasional Option	III
AINT3103	War and Society in the Asia-Pacific	III
AINT3104	Asia-Pacific Issues—Economics, Politics and Society	III

SCHEDULE S—SCIENCE COURSES

Course No.	*Course Name*	*Level*

Chemistry

ACHM1101	Chemistry 1A	I
ACHM1102	Chemistry 1B	I
ACHM2101	Inorganic Chemistry 2	II
ACHM2102	Organic Chemistry 2	II
ACHM2103	Physical Chemistry 2	II
ACHM2104	Special Topic 2A	II
ACHM2105	Special Topic 2B	II
ACHM2114	Marine Chemistry 2	II
ACHM2112	Environmental Chemistry	II
ACHM2113	Chemical Instrumentation and Devices	II
ACHM2108	Dealing with Dangerous Substances	II
ACHM2109	Energy in Chemical Contexts	II
ACHM2111	Modern Materials	II
ACHM3101	Inorganic Chemistry 3	III
ACHM3102	Organic Chemistry 3	III
ACHM3103	Physical Chemistry 3	III
ACHM3111	Chemical Modelling and Computation	III
ACHM3112	Inorganic Reaction Mechanism	III
ACHM3104	Special Topic 3A	III
ACHM3105	Special Topic 3B	III
ACHM3107	Biological Chemistry	III
ACHM3108	Explosives	III
ACHM3109	Polymeric Materials	III
ACHM3110	Project	III
ACHM4191	Chemistry 4 (Honours) F/T	IV
ACHM4192	Chemistry 4 (Honours) P/T	IV
ACHM4193	Chemistry 4 (Combined Honours) F/T	IV
ACHM4194	Chemistry 4 (Combined Honours) P/T	IV

Computer Science

ACSC1001	Information Technology Fundamentals	I
ACSC1101	Programming Fundamentals	I
ACSC2003	C3I Systems	II
ACSC2106	Computer Languages A	II
ACSC2107	Computer Languages B	II
ACSC2009	Computer Speech Processing	II
ACSC2010	Cryptography and Computer Security	II
ACSC2011	Current Issues	II
ACSC2005	Data Communications	II
ACSC2012	Databases and Database Design	II
ACSC2006	Decision Analysis	II
ACSC2013	Human Computer Interaction	II
ACSC2014	Human Factors	II
ACSC2015	Interactive Computer Graphics	II
ACSC2016	Knowledge Based Systems	II
ACSC2017	Knowledge Management	II
ACSC2018	Linear Programming	II
ACSC2019	Multimedia and Virtual Environments	II
ACSC2108	Operating Systems	II
ACSC2020	Security, Privacy & Ethical Issues in Computing	II
ACSC2008	Special Topic	II
ACSC3001	Artificial Intelligence	III
ACSC3003	Computer Project	III
ACSC3009	Data Networks	III
ACSC3011	Distributed Systems and Databases	III
ACSC3012	Electronic Commerce	III
ACSC3015	Operations Research	III
ACSC3016	Operations Research Project	III

ACSC3017	Optimisation Techniques	III
ACSC3006	Simulation	III
ACSC3104	Software Development	III
ACSC3018	Software Project Management	III
ACSC3019	Structured Information in Organisations	III
ACSC3007	Systems Administration	III
ACSC4191	Computer Science 4 (Honours) F/T	IV
ACSC4192	Computer Science 4 (Honours) P/T	IV
ACSC4193	Computer Science 4 (Combined Honours) F/T	IV
ACSC4194	Computer Science 4 (Combined Honours) P/T	IV

Course No.	*Course Name*	*Level*
Mathematics and Statistics		
AMAT1101	Mathematics 1A	I
AMAT1102	Mathematics 1B	I
AMAT2103	Linear Systems	II
AMAT2106	Data Analysis	II
AMAT2107	Modelling Continuous Systems	II
AMAT2110	Discrete Dynamics	II
AMAT2111	Networks and Patterns	II
AMAT2112	Regression Modelling	II
AMAT2113	Special Topic 2A	II
AMAT2114	Special Topic 2B	II
AMAT3104	Applied Mathematical Techniques	III
AMAT3107	Complex Variables	III
AMAT3110	Industrial Mathematics	III
AMAT3113	Projectiles	III
AMAT3114	Projects	III
AMAT3116	Fluid Mechanics	III
AMAT3118	Waves	III
AMAT3119	Biological Mathematics	III
AMAT3120	Elements of Optimisation	III
AMAT3121	Financial Mathematics	III
AMAT3122	Mathematical Methods for Differential Equations	III
AMAT3123	Nonlinear Systems	III
AMAT3305	Multivariate Data Analysis	III
AMAT3306	Statistical Forecasting	III
AMAT3307	Statistics Project	III
AMAT3309	Bayesian Statistics	III
AMAT3310	Reliability Modelling	III
AMAT3311	Statistical Modelling	III
AMAT3312	Stochastic Modelling	III
AMAT3313	Special Topic 3A	III
AMAT3314	Special Topic 3B	III
AMAT4191	Mathematics 4 (Honours) F/T	IV
AMAT4192	Mathematics 4 (Honours) P/T	IV
AMAT4193	Mathematics 4 (Combined Honours) F/T	IV
AMAT4194	Mathematics 4 (Combined Honours) P/T	IV
AMAT4391	Statistics 4 (Honours) F/T	IV
AMAT4392	Statistics 4 (Honours) P/T	IV
AMAT4393	Statistics 4 (Combined Honours) F/T	IV
AMAT4394	Statistics 4 (Combined Honours) P/T	IV
Oceanography		
AGOC1301	Marine Science 1A	I
AGOC1302	Marine Science 1B	I
AGOC2301	Oceanography 2A	II
AGOC2302	Oceanography 2B	II
AGOC2306	Remote Sensing Applications	II
AGOC2310	Coastal Dynamics	II
AGOC3301	Ocean Circulation and Mixing	III
AGOC3302	Continental Shelf Oceanography	III
AGOC3303	Oceanographic Data Acquisition and Analysis	III
AGOC3304	Oceanography Research Report	III
AGOC3305	Regional Oceanography	III
AGOC3306	Oceanography Research Project	III
AGOC4391	Oceanography 4 (Honours) F/T	IV
AGOC4392	Oceanography 4 (Honours) P/T	IV
AGOC4393	Oceanography 4 (Combined Honours) F/T	IV
AGOC4394	Oceanography 4 (Combined Honours) P/T	IV
Physics		
APHY1101	Physics 1A	I
APHY1102	Physics 1B	I
APHY1501	Engineering Physics 1A	I
APHY1502	Engineering Physics 1B	I
APHY1503	Electrical Engineering Physics 1A	I
APHY1504	Electrical Engineering Physics 1B	I
APHY2104	Electronic Properties of Materials	II
APHY2107	Waves and Remote Sensing	II
APHY2108	Astronomy and Astrophysics	II
APHY2109	Environmental Physics	II
APHY2110	Health and Radiation Physics	II
APHY2111	Meteorology and Atmospheric Physics	II
APHY2112	Sonar and Underwater Optics	II
APHY2113	Thermodynamics and Propulsion	II
APHY2501	Electromagnetic Waves E	II
APHY2502	Physics of Electronic Device Materials E	II
APHY3101	Atmospheric Dynamics	III
APHY3102	Cosmology and Relativistic Astrophysics	III
APHY3103	Electromagnetic Waves and Remote Sensing	III
APHY3104	Physics of Advanced Materials	III
APHY3105	Case Studies in Military Physics	III
APHY3106	Infrared Technology	III
APHY3107	Laser Physics and Applications	III
APHY3108	Physics Laboratory Program 3A	III
APHY3109	Physics Laboratory Program 3B	III
APHY3111	Applied Electronics	III
APHY3112	Aviation Meteorology	III
APHY3113	Computational Physics	III
APHY3114	Cosmic Radiation	III
APHY3115	Nuclear and Particle Physics	III
APHY3116	Plasma and Ionospheric Physics	III
APHY3701	Atmospheric Physics and Meteorology BT	III
APHY3117	Quantum Technology	III
APHY3118	Sonar Physics	III
APHY3103	Electromagnetic Remote Sensing*	III
APHY3114	Space Physics*	III
APHY3119	Aviation and Boundary Layer Meteorology*	III
APHY3120	Computers and Electronics in Physics*	III
APHY3121	Experimental Physics - Laboratory*	III
APHY3122	Experimental Physics - Project*	III
APHY3123	Infrared and Laser Technology*	III
APHY3124	Navigation and Guidance Physics*	III
APHY3125	Special Topics in Military Physics*	III
APHY4191	Physics 4 (Honours) F/T	IV
APHY4192	Physics 4 (Honours) P/T	IV
APHY4193	Physics 4 (Combined Honours) F/T	IV
APHY4194	Physics 4 (Combined Honours) P/T	IV

* Not offered in 2001

SCHEDULE AS—ARTS OR SCIENCE COURSES

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

Course No.	*Course Name*	*Level*
Geography		
AGOC1101	Geography 1A	I
AGOC1102	Geography 1B	I
AGOC2101	The Geography of Development 2	II
AGOC2102	Biogeography	II
AGOC2103	Cartographic Methods	II
AGOC2104	Economic Geography: Globalisation and Change	II
AGOC2105	Geomorphology	II
AGOC2106	Remote Sensing Applications	II
AGOC2107	Social Geography	II
AGOC2108	Geographical Techniques	II
AGOC2109	Geographical Issues in the Asia-Pacific Region	II
AGOC3101	The Geography of Development 3	III
AGOC3102	Cultural Geography	III
AGOC3103	Ecological Systems	III

AGOC3104	Environmental Hazards	III
AGOC3105	Geographic Information Analysis	III
AGOC3106	Geographic Research Methods	III
AGOC3107	Geomorphological Systems	III
AGOC3108	Global Change	III
AGOC3109	Political Geography	III
AGOC3110	Population and Development	III
AGOC3111	Resource Management	III
AGOC3112	Selected Special Topics	III
AGOC3113	Transport Geography	III
AGOC4191	Geography 4 (Honours) F/T	IV
AGOC4192	Geography 4 (Honours) P/T	IV
AGOC4193	Geography 4 (Combined Honours) F/T	IV
AGOC4194	Geography 4 (Combined Honours) P/T	IV

SCHEDULE GE—GENERAL EDUCATION COURSES

Course No.	*Course Name*
For the Arts Course	
GENZ0501	The World of Chemistry
GENZ0502	Chemistry and Life
GENZ0503	Chemistry in Defence and Peace
GENZ1501	Engineering the Environment
GENZ8502	Information Technology in Organisations
GENZ2001	Telecommunications: Principles, Systems and Policy
GENZ3501	Marine Environment
GENZ3502	Marine Resources
GENZ5501	Presenting and Analysing Data in the Social Sciences
GENZ5502	Statistical Modelling in the Social Sciences
GENZ5503	The World of Mathematics
GENZ2501	Mechanics of Flight 1
GENZ2502	Mechanics of Flight 2
GENZ6001	Physics for Society
GENZ6002	Astronomy
GENZ6003	Introductory Meteorology
GENZ6004	Environmental Physics
For the Science Course	
GENZ1501	Engineering the Environment
GENZ8501	Computers in Society
GENZ1001	Competition and Innovation
GENZ1002	Macroeconomic Growth and Stability
GENZ1003	Leadership Studies
GENZ5001	Writing and the Media
GENZ5002	Issues in Modern Australian Literature and Film
GENZ5003	Literature and Modern War
GENZ5004	Science and the Literary Imagination
GENZ5005	Australian Literature and Film
GENZ5006	American Literature
GENZ5007	Exciting Writing
GENZ5008	Re-presenting Gender
GENZ5009	The Journey of Legend
GENZ4501	The First World War: Image and Reality
GENZ4502	Rats, Lice and History
GENZ4503	An Introduction to Australian Military History
GENZ4504	Black-White Relations in Australia
GENZ4505	Japan in the Modern World
GENZ4506	The American Civil War
GENZ4507	Australia in the Twentieth Century
GENZ4508	Woman Warrior: Women, War and Peace
GENZ2501	Mechanics of Flight 1
GENZ2502	Mechanics of Flight 2
GENZ4001	Why Politics Matters
GENZ4002	Issues in Contemporary Australian Politics
GENZ4003	Introduction to Strategic and Security Studies

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 subjects 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 courses 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 course.

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 courses 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 subjects 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 courses 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 course.

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 courses 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 course 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 course, the requirements shall be construed as meaning that the candidate shall:

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

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

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

5. Academic Requirements:

(a) *Standard Program.* The candidate shall complete in the years prescribed the qualifying courses 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 courses 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 two sessional general education courses (6 units of credit) one approved full-year Language course.

(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 courses 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 courses in Schedule E1 must be completed in the first two years of the program.

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.

Schedule of Courses for the BE Degree

Schedule E1—The First Year Program

All Engineering Students

AMAT1501	Engineering Mathematics 1A
AMAT1502	Engineering Mathematics 1B
ACSC1501	Computer Tools for Engineers

Aeronautical Engineering

ACHM1701	Engineering Materials for Aeronautical Engineers
AINT1502	Engineering Mechanics 1A
AINT1503	Engineering Mechanics 1B
AINT1501	Engineering Graphical Communications
AMEC1701	Fundamentals of Flight 1
AMEC1702	Fundamentals of Flight 2 & Workshop Practice
APHY1501	Engineering Physics 1A
APHY1502	Engineering Physics 1B

Civil Engineering

ACHM1501	Engineering Chemistry A
ACHM1502	Engineering Chemistry B
AINT1502	Engineering Mechanics A
AINT1503	Engineering Mechanics B
AINT1501	Engineering Graphical Communications
ACIV1501	Civil Engineering Practice
APHY1501	Engineering Physics 1A
APHY1502	Engineering Physics 1B

Electrical Engineering

ACHM1504	Introduction to Engineering Materials for Electrical Engineers
ACSC1101	Programming Fundamentals
AELE1503	Circuits & Systems
AELE1504	Digital Systems 1
AELE1505	Digital Systems 2
AELE1506	Electronics 1
APHY1503	Electrical Engineering Physics 1A
APHY1504	Electrical Engineering Physics 1B

Mechanical Engineering

ACHM1503	Introduction to Engineering Materials
AINT1501	Engineering Graphical Communications
AINT1502	Engineering Mechanics 1A
AINT1503	Engineering Mechanics 1B
AMEC1501	Introduction to Profession of Mechanical Engineering & Workshop Practice
APHY1501	Engineering Physics 1A
APHY1502	Engineering Physics 1B
AINT2504	Introduction to Electrical & Mechanical Engineering Plant

Schedule E2—The Second Year Program

All Engineering Students

AMAT2501	Engineering Mathematics 2A
AMAT2502	Engineering Mathematics 2B

Aeronautical Engineering

ACSC2501	Numerical Analysis E
AELE2004	Electrical & Electronic Technology
AINT2501	Fluid Engineering
AINT2502	Strength of Materials A
AINT2503	Strength of Materials B
AMEC2001	Design 1
AMEC2006	System Dynamics 1A
AMEC2007	System Dynamics 1B
AMEC2008	Thermofluids
AMEC2705	Aerospace Design 1
AMEC2011	Thermodynamic Cycles

Civil Engineering

2 General Education courses

AMAT2501	Eng Mathematics 2A
AMAT2502	Eng Mathematics 2B
ACIV2518	Eng Computational Meth 1
ACIV2514	Basic Fluid Mechanics
AINT2501	Fluid Engineering
AINT2502	Strength of Materials A
AINT2503	Strength of Materials B
ACIV2515	Engineering Surveying 1
ACIV2516	Geotechnical Engineering 1
AINT2504	Intro to Elec & Mech Eng Plant
ACIV2510	Eng Construction & Design
ACIV2517	Environ Eng Fundamentals

Electrical Engineering

2 General Education courses

ACSC2501	Numerical Analysis E
ACSC2502	Data Structures E
APHY2502	Physics of Electronic Device Materials E
APHY2501	Electromagnetic Waves E
AELE2502	Electronics 2
AELE2501	Digital Systems 3
AELE2503	Electronics Design Laboratory 1
AELE2507	Circuits, Signals & Systems
AELE2508	Microcomputer Interfacing
AECM0503	Economics and Management for Engineers

Mechanical Engineering

AELE2004	Electrical & Electronic Technology
ACSC2501	Numerical Analysis E
AINT2502	Strength of Materials A
AINT2503	Strength of Materials B
AMEC2001	Design 1
AMEC2006	System Dynamics 1A
AMEC2007	System Dynamics 1B
AMEC2011	Thermodynamic Cycles
AMEC2008	Thermofluids
AMEC2501	Introduction to Mechanical Design
AINT2501	Fluid Engineering

Schedule E3—The Third Year Program

Aeronautical Engineering

4 General Education courses

ACIV3521	Engineering Management 1
AMAT3504	Engineering Mathematics 3
AMEC3001	Maintenance Management and Logistics Engineering
AMEC3003	Viscous Flows & Gas Turbine Theory
AMEC3703	Aerodynamics
AMEC3705	Aircraft Structures 1A
AMEC3706	Aircraft Structures 1B
AMEC3707	Flight Mechanics 1
AMEC3708	Aircraft Design 2
AMEC4010	Rotary Wing 1
AMEC4710	Aircraft Systems

Civil Engineering

2 General Education courses

ACIV3516	Eng Computational Meth 2
ACIV3512	Hydraulics
ACIV3508	Structural Analysis 1A
ACIV3509	Structural Analysis 1B
ACIV3501	Civil Eng Materials A
ACIV3502	Civil Eng Materials B
ACIV3517	Engineering Surveying 2
ACIV3518	Geotechnical Engineering 2A
ACIV3519	Geotechnical Engineering 2B
ACIV3513	Structural Design 1A
ACIV3514	Structural Design 1B
ACIV3520	Environ Eng Applications
ACIV3521	Engineering Management 1

1 Elective course

Electrical Engineering

2 General Education courses

AMAT3504	Engineering Mathematics 3
AELE3504	Control Theory 1
AELE3505	Control Theory 2
AELE3502	Electronics 3
AELE3503	Electronics Design Laboratory 2
AELE3510	Optoelectronic Techniques
AELE3511	Analogue Communications
AELE3512	Engineering Electromagnetics 1
AELE3513	Engineering Electromagnetics 2
AELE3514	Power and Machines
AELE2508	Microcomputer Interfacing
ACSC3501	Management Science E
ACIV3521	Engineering Management 1

Mechanical Engineering

4 General Education courses

ACIV3521	Engineering Management 1
AMAT3504	Engineering Mathematics 3
AMEC3001	Maintenance Management and Logistics Engineering
AMEC3003	Viscous Flows & Gas Turbine Theory
AMEC3507	Mechanics of Solids 2A
AMEC3508	Mechanics of Solids 2B
AMEC3510	Thermodynamics
AMEC3511	Instrumentation
AMEC3512	Pumps, Turbines & Compressors
AMEC3513	Design 2
AMEC3509	System Dynamics 2

Schedule E4—The Final Year Program

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

Aeronautical Engineering

AMEC4702	Aeronautical Engineering Project and Thesis A
AMEC4703	Aeronautical Engineering Project and Thesis B & Practical Experience
AECM0503	Economics and Management for Engineers
AMEC4001	Avionics and Navigational Aids
AMEC4702	Aeronautical Engineering Project and Thesis A
AMEC4703	Aeronautical Engineering Project and Thesis B & Practical Experience
AMEC4709	Aircraft Structures 2
AMEC4723	Aircraft Design 3A
AMEC4707	Aircraft Design 3B

AMEC4724 Applied Aerodynamics
AMEC4725 Flight Mechanics 2
4 Elective courses

Civil Engineering

ACIV4502 Thesis and Seminar A & Practical Experience
ACIV4503 Thesis and Seminar B
OR
ACIV4504 Integrated Design A & Practical Experience
ACIV4505 Integrated Design B
ACIV4526 Water Resources
ACIV4508 Structural Analysis 2
ACIV4527 Geotechnical Engineering 3
ACIV4513 Structural Design 2A
ACIV4528 Structural Design 2B
ACIV4529 Environmental Eng Practice
ACIV4534 Engineering Management 2A
ACIV4535 Engineering Management 2B
ACIV4532 Transport Engineering A
ACIV4523 Transport Engineering B
2 Elective courses

Electrical Engineering

AELE4502 Electrical Engineering: Project, Thesis, Laboratory Work, Practical Experience and Specialist Lectures A
AELE4503 Electrical Engineering: Project, Thesis, Laboratory Work, Practical Experience and Specialist Lectures B

Compulsory courses

AELE4509 Systems Engineering
7 Elective courses

Mechanical Engineering

AECM0503 Economics and Management for Engineers
AMEC4502 Mechanical Engineering: Project and Thesis A
AMEC4503 Mechanical Engineering: Project and Thesis B & Practical Experience
AMEC4509 Mechanics of Solids 3
AMEC4510 Applied Thermodynamics
AMEC4521 Design 3 A
AMEC4506 Design 3 B
AMEC4508 Fluid Applications
AMEC4507 System Dynamics 3
4 Elective courses

Schedule E5—General Education Courses

(See pp 132 for availability in 2001)

GENZ1001 Competition and Innovation
GENZ1002 Macroeconomic Growth and Stability
GENZ1003 Leadership Studies
GENZ5001 Writing and the Media
GENZ5002 Issues in Modern Australian Literature and Film
GENZ5003 Literature and Modern War
GENZ5004 Science and the Literary Imagination
GENZ5005 Australian Literature and Film
GENZ5006 American Literature
GENZ5007 Exciting Writing
GENZ5008 Re-presenting Gender
GENZ4501 The First World War: Image and Reality
GENZ4502 Rats, Lice and History
GENZ4503 Suakin to Saigon: A Survey of Australian Military History
GENZ4504 Black-White Relations in Australia
GENZ4505 Japan in the Modern World
GENZ4506 The American Civil War
GENZ4507 Australia in the C20
GENZ4508 Woman Warrior: Women, War and Peace
GENZ3501 Marine Environment
GENZ3502 Marine Resources
GENZ4001 Why Politics Matters
GENZ4002 Issues in Contemporary Australian Politics: foreign policy dimensions
GENZ4003 Introduction to Strategic and Security issues

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 course 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 course, the requirements shall be construed as meaning that the candidate shall:

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

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

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

5. Academic Requirements:

(a) Standard Program. The candidate shall complete in the years prescribed the qualifying courses as set out in the Schedules BT1, BT2 and BT3. General Education courses 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 two sessional general education courses (6 units of credit) one Level I language course 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 courses 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 courses in Schedule BT1 must be completed in the first two years of the program.

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 Courses for the Bachelor of Technology Degree

Schedule BT1—The First Year Program

Aeronautical Engineering

ACHM1701	Engineering Materials for Aeronautical Engineers
AINT1501	Engineering Graphical Communications
AINT1502	Engineering Mechanics 1A
AINT1503	Engineering Mechanics 1B
AMEC1701	Fundamentals of Flight 1
AMEC1702	Fundamentals of Flight 2 & Workshop Practice
APHY1501	Engineering Physics 1A
APHY1502	Engineering Physics 1B

Aviation

ACHM1701	Engineering Materials for Aeronautical Engineers
ACSC1501	Computer Tools for Engineers
AINT1502	Engineering Mechanics 1A
AINT1503	Engineering Mechanics 1B
AMAT1501	Engineering Mathematics 1A
AMAT1502	Engineering Mathematics 1B
AMEC1703	Fundamentals of Flight 2
AMEC1704	Introduction to Aviation - A Systems Approach
AMEC1701	Fundamentals of Flight 1
APHY1501	Engineering Physics 1A
APHY1502	Engineering Physics 1B

Schedule BT2—The Second Year Program

Aeronautical Engineering

ACSC2501	Numerical Analysis E
AELE2004	Electrical & Electronic Technology
AINT2501	Fluid Engineering
AINT2502	Strength of Materials A
AINT2503	Strength of Materials B
AMAT2501	Mathematics 2EA
AMAT2502	Mathematics 2EB
AMEC2001	Design 1
AMEC2006	System Dynamics 1A
AMEC2007	System Dynamics 1B
AMEC2008	Thermofluids
AMEC2705	Aerospace Design 1
AMEC2011	Thermodynamic Cycles

Aviation

4 General Education courses

AELE4001	Avionics and Navigation Aids
AMEC2711	Aircraft Systems for Aviators
AMEC2707	Aviation Aerodynamics
AMEC2708	Aviation Flight Mechanics
AMEC2709	Aviation Safety
AMEC2710	Introduction to Aircraft Structures
APHY2701	Meteorology

Schedule BT3—The Third Year Program

All third year technology students must complete the appropriate Practical Experience course.

Aeronautical Engineering

4 General Education courses

ACIV3521	Engineering Management 1
AMAT3504	Engineering Mathematics 3
AMEC3001	Maintenance Management and Logistics Engineering
AMEC3003	Viscous Flows & Gas Turbine Theory
AMEC3703	Aerodynamics
AMEC3707	Flight Mechanics 1
AMEC3711	Aero Project and Practical Experience
AMEC3708	Aircraft Design 2
AMEC4010	Rotary Wing 1
AMEC4710	Aircraft Systems
APHY3701	Atmospheric Physics and Meteorology BT
AMEC3001	Maintenance Management and Logistics Engineering

Aviation

AMEC3715	Advanced Aviation Safety
AMEC3716	Advanced Flying Training
AMEC3717	Aviation Project and Practical Experience
AMEC3718	Basic Flying Training and Theory

Undergraduate Degree Programs

The Undergraduate Programs

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

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

The BTech(Aeronautical Engineering) program is a three year degree 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.

The BTech(Communications and Information Systems) program is a three year degree at pass level for serving officers in the Corps of Signals of the Australian Army, and is not available for officer cadets.

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 programs in the University College and complete their degrees 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 programs in arts and science and all engineering students return to the Academy to complete their degrees in the final academic year at the University College.

Uniform Units of Credit System

In 2000 The University of New South Wales introduced a uniform units of credit system for all of its programs. Under this system each standard full-time year of a degree program will accrue 48 units of credit, i.e. 24 units of credit per session.

Students who commenced their programs in 1999 or earlier will continue to follow the degree rules applying prior to 2000, although the credit points previously used will be translated into the new units of credit system, i.e. 120 CP will become 48 UC.

Undergraduate Program Codes

Programs			*Program Codes*
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
		Communications and Information Systems	4436
		Aviation	4437
Articulation Program		BTech(Aero) to BE(Aero)	4425

Arts and Science

The programs shown below are samples of those available under the new 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 degree structures, typical programs and the sorts of options available. For simplicity, course numbers have been omitted. Nothing in this chapter replaces or modifies any part of the degree rules.

Some courses have prerequisites and/or corequisites. A student must have completed a prerequisite for a course before being permitted to enrol in that course. A corequisite must be taken concurrently with the course, unless the student has completed it already. In general, a level I course is assumed knowledge for a level II course and a level II for a level III. Other assumed knowledge may be included in course syllabuses.

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

BA Program examples

Double major in English and Geography

Year I	S1	History IA (6)	English IA (6)	IT Fundamentals (6)	Geography IA (6)	24
	S2	History 1B (6)	English 1B (6)	IS Principles (6)	Geography IB (6)	24
						48
Year 2	S1	Level II History (6)	Level II English (6)	2 General Ed. (6)	Level II Geography (6)	24
	S2	Level II History (6)	Level II English (6)	2 General Ed. (6)	Level II Geography (6)	24
						48
Year 3	S1		Level III English (12)		Level III Geography (12)	24
	S2		Level III English (12)		Level III Geography (12)	24
						48

Major in Management, minors in Politics, Indonesian, and History

Year I	S1	Economics IA (6)	Politics IA (6)	Indonesian IA (6)	History IA (6)	24
	S2	Economics 1B (6)	Politics 1B (6)	Indonesian IB (6)	History IB (6)	24
						48
Year 2	S1	Level II Management (6)	Level II Politics (6)	Level II Indonesian (6)	2 General Education (6)	24
	S2	Level II Management (6)	Level II Politics (6)	Level II Indonesian (6)	Level II History (6)	24
						48
Year 3	S1	Level III Management (12)	Level III Politics (6)		2 General Education (6)	24
	S2	Level III Management (12)	Level III Politics (6)		Level II History (6)	24
						48

BSc Program examples

Double major in Physics and Mathematics

Year I	S1	Physics IA (6)	Mathematics IA (6)	IT Fundamentals (6)	Geography IA (6)	24
	S2	Physics 1B (6)	Mathematics 1B (6)	Programming Fund. (6)	Geography IB (6)	24
						48
Year 2	S1	Level II Physics (6)	Level II Mathematics (6)	Level II Comp.Sci. (6)	2 General Education (6)	24
	S2	Level II Physics (6)	Level II Mathematics (6)	Level II Comp.Sci. (6)	2 General Education (6)	24
						48
Year 3	S1	Level III Physics (12)	Level III Mathematics (12)			24
	S2	Level III Physics (12)	Level III Mathematics (12)			24
						48

Major in Geography, minors in Computer Science, Chemistry and Politics

Year I	S1	Geography IA (6)	IT Fundamentals (6)	Chemistry IA (6)	Politics IA (6)	24
	S2	Geography IB (6)	Programming Fund. (6)	Chemistry IB (6)	Politics IB (6)	24
						48
Year 2	S1	Level II Geography (6)	Level II Comp.Sci. (6)	Level II Chemistry (6)	Level II Politics (6)	24
	S2	Level II Geography (6)	Level II Comp.Sci. (6)	Level II Chemistry (6)	2 General Education (6)	24
						48
Year 3	S1	Level III Geography (12)	Level III Comp.Sci. (6)	Level III Chemistry (6)		24
	S2	Level III Geography (12)		Level II Politics (6)	2 General Education (6)	24
						48

Engineering and Technology

Standard Programs for the BE and BTech degrees are as shown in Schedules on pp. 54-57

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 minor in Asia-Pacific Studies it will be necessary for students to have gained at least 24 units of credit from courses with a substantial Asia-Pacific emphasis. These should include at least one of the interdisciplinary core courses. In addition, students could take other Asia-Pacific interdisciplinary courses and/or two discipline-based Asia-Pacific courses to make up their 24 units of credit. The Asia-Pacific Studies minor can be built on the following Schedule A or Schedule AS courses at Level I: English, Indonesian, History, Politics, Economics, Geography.

In 2001, two interdisciplinary 'core' courses may be offered, each a single session course: 'Asia-Pacific Studies Occasional Option: North-East Asian Studies', and 'War and Society in the Asia-Pacific' [6 units of credit each). Outlines of these two interdisciplinary core courses are given below. A third interdisciplinary 'core' course, 'Asia-Pacific Issues: Economics, Politics and Society' may be offered in second semester 2001. Information and a course outline will be available early in 2001.

Students should note that they may, with the permission of the appropriate Head of School, count core courses in the Asia-Pacific Studies program towards the completion of a major or minor in a field taught in a particular school.

Core Courses (Inter-Disciplinary)

AINT2101
Asia-Pacific Culture: China

Note/s: Not offered in 2001

AINT2103
War and Society in the Asia-Pacific
Staff Contact: Mr J. Doyle (Language, Literature and Communication)
S2 UC6 HPW 4 (2L 2T)
Prerequisite: 48 units of credit in Level I courses.

This course is a study of the inter-relationship between War and Society within a selection of nations, their opponents 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 will also be given to their cultural products, for example, their literary and cinematic handling of warfare and their social effects on both the military and wider communities. In 2001 the course will focus on the East Timor Peace Keeping Operations.

AINT2102
Asia-Pacific Occasional Option: North-East Asia
Staff Contact: Dr S. Lone (History) Mr J. Doyle (Language, Literature and Communication)
S1 UC6 HPW 4 (2L 2T)
Prerequisite: 48 units of credit in Level I courses.

This is a course on Twentieth Century China and Japan focussing on the politics of culture; that is, the use for political purposes of images and ideas both by the state and its critics. Topics covered might include: the role of 'decadenti' culture in 1920s Japan; the use of mass media and folk culture to mobilise the Chinese during the anti-Japanese war; the links between American culture and 'democracy' in post-1945 Japan; and, the role of sports and physical culture in 1990s Chinese nationalism.

AINT3104
Asia-Pacific Issues: Economics, Politics and Society
Staff Contact: Professor P. Hall (Economics and Management) Mr J. Doyle (Language, Literature and Communication)
S2 UC6 HPW 4
Prerequisite: 48 units of credit in Level I courses.

A course outline will be available early 2001

Discipline-Based Courses

In addition to the core courses listed above, a number of single-discipline courses may be offered in the Asia-Pacific Studies Program.

The following courses for second or third year undergraduates are indicative of the range of courses in particular schools which may form part of an Asia-Pacific Studies minor. Not all courses are necessarily available in a particular year. Prospective students should check the availability of particular courses under the School entry.

Geography and Oceanography

The Geography of Development

Geographical Issues in the Asia-Pacific Region

History

East Asia Between Tradition and Modernity

Social Change in East Asia

Language, Literature and Communication

Communications and Film Studies

Australia and the Asia-Pacific

Indonesian I, II, III

Politics

Democracy and Development in Asia

Politics of China

Politics in Japan

Strategic Issues in the Asia-Pacific

Economics and Management

Asia-Pacific Economic Development

Asian Languages

Undergraduate students who are studying Asian languages as at university level may wish to have these courses counted towards the minor in Asia-Pacific Studies.

In 2001 students will be able to take Indonesian 1, 2, or 3 on campus at ADFA. The opportunity also exists for 2nd and 3rd year students enrolled in the BA or BSc programs to study Chinese or Japanese off-campus, subject to permission from the Commandant and the Rector.

School of Chemistry

The Chemistry School offers a variety of courses and structures to facilitate the incorporation of varying extents of Chemistry into a student's BSc, BA, BEng or BTech program.

The General Education courses, World of Chemistry, Chemistry of Life and Chemistry in Defence and Peace are each 3 units-of-credit electives in which chemistry is discussed in a social context. The General Education courses are essentially cultural in nature. They do not aim to produce professional Chemists but rather informed persons. Only two of the three courses will be offered in 2001.

Level I chemistry courses, Chemistry 1A and Chemistry 1B, can be taken as isolated first year courses, or ones which lead on to further studies in chemistry or other scientific courses. Chemistry 1A and 1B combined are similar in content and academic outlook to full first year chemistry courses elsewhere, but are presented as self-paced programs. Students who enrol in level I Chemistry are advised to take both Chemistry 1A and Chemistry 1B

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

The major comprises Chemistry 1A and 1B, four courses of level II and four of level III Chemistry. This is a program which provides the skills and knowledge of chemistry needed by graduates for research training (such as a Chemistry honours year and subsequent postgraduate courses), for employment in chemistry-based industry or in other technology-based careers including management and, of course, military officer careers. It is accredited by the Royal Australian Chemical Institute. In level II Chemistry, students study chemistry in four specific core courses, 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 inorganic chemistry and organic chemistry, each with illustrations from a variety of industrial and biological processes, physical chemistry as applied to both isolated molecules and assemblies of molecules, and environmental chemistry. Level III Chemistry provides a choice - four of eightcourses; not all will be offered in any one year. These courses cover all the traditional areas of chemistry and more, but allow some degree of specialisation commensurate with what other Australian universities now offer. The level III chemistry courses include two aspects of inorganic chemistry, explosives, polymeric materials, physical chemistry, organic chemistry, biological chemistry, and chemical modelling and computational chemistry which is becoming increasingly more important. It also includes the option of a project, which is more likely to be made available for talented students in the major/submajor of chemistry who wish to better prepare for an honours program.

A major/minor stream is available to students entering second year. In addition to the major students must complete four other courses in level II Chemistry and two additional courses in level III Chemistry. At level II, the additional topics of study build on the principles already established at level I, and cover the areas of handling dangerous substances, energy, modern materials, and chemical instrumentation and devices. At level III, major/minor students are given the opportunity to systematically learn more of the fundamental principles by choosing two extra courses from the eight offered, covering the three following subdisciplines: inorganic chemistry, organic chemistry and physical chemistry.

Chemistry majors who have completed only four level II courses may still elect to take all six level III courses, to gain an extra 12 units-of-credit in preparation for an honours program or to round out their program of study.

For students majoring in courses other than chemistry, there is a minor consisting of Chemistry 1A and 1B, and four courses of level II Chemistry. Science students are advised that level I Mathematics is a useful background for level II Chemistry. Students may be allowed to substitute one of the level II supplementary courses for Physical Chemistry if their background in mathematics is considered insufficient.

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 (credit average or better) during the study of the major or major/minor. Although desirable, six courses of level III Chemistry are not mandatory for entry to Chemistry 4.

Certain other chemistry courses are available only to students enrolled in level II and level III Oceanography or in the Engineering degree streams.

Outline Course Structures

	HPW [1]	UC [2]
(a) Major		
Chemistry 1A	7	6
Chemistry 1B	7	6
Chemistry level II (4 core courses)	7-8	12
Inorganic Chemistry 2		
Organic Chemistry 2		
Physical Chemistry 2		
Environmental Chemistry		
Chemistry level III (4 of 9 courses)	10	24
Inorganic Chemistry 3		
Inorganic Reaction Mechanisms		
Biological Chemistry		
Explosives		
Polymeric Materials		
Chemical Modelling and Computation		
Organic Chemistry 3		
Physical Chemistry 3		
Project		
(b) Major/minor		
Chemistry level II (4 core courses)	7-8	12
Inorganic Chemistry 2		
Organic Chemistry 2		
Physical Chemistry 2		
Environmental Chemistry		
Chemistry level II (4 supplementary courses)	7-8	12
Chemical Instrumentation and Devices		
Dealing with Dangerous Substances		
Energy in Chemical Contexts		
Modern Materials		
Chemistry level III (6 of 9 courses)	15	36
Inorganic Chemistry 3		
Inorganic Reaction Mechanisms		
Biological Chemistry		
Explosives		
Polymeric Materials		
Chemical Modelling and Computation		
Organic Chemistry 3		
Physical Chemistry 3		
Project		
(c) Minor		
Chemistry 1A	7	6
Chemistry 1B	7	6
Chemistry level II (4 core courses)	7-8	12
Inorganic Chemistry 2		
Organic Chemistry 2		
Physical Chemistry 2		
Environmental Chemistry		
(d) General Education Courses		
World of Chemistry	2	3
Chemistry and Life	2	3
Chemistry in Defence and Peace	2	3
(e) Honours program		
Chemistry 4 (Honours)	* *	* *
Chemistry 4 (Combined Honours)		

1 Hours per week.
2 Units of credit.
* * Fourth year students are committed full time to their Honours work.

Level I

Staff Contact: Dr J.G. Collins, Dr M. Rahman

Chemistry 1A and 1B comprise a first year study designed to prepare students for advanced studies in chemistry or other sciences, or as an introduction to chemical science.

There are no formal chemistry co- or prerequisites for entry into level I Chemistry. Students who have not studied chemistry in years 11 and 12 are advised to examine the prescribed Chemistry level I textbook and consult with chemistry staff to determine their suitability for enrolment.

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.

ACHM1101
Chemistry 1A
UC6 S1 S2 HPW7

The course commences with chemical reactions, the concepts involved in chemical equations, how to balance them, 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.

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.

ACHM1102
Chemistry 1B
UC6 S1 S2 HPW7

The direction in which chemical reactions proceed (thermodynamics), and the speed with which they occur (kinetics), are phenomena commonly confused. Examples are chosen to clarify the connection, and thereafter the two phenomena are treated separately. There is an introduction to the 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. Electron transfer (redox reactions) is introduced as an important area of chemistry, together with the principles of electrochemical cells.

Some descriptive chemistry of the elements and their compounds, including those of the transition elements, is also included in this course.

Level II

Staff Contact: Dr H. Riesen, Dr R.J. Blanch

Chemistry level II comprises eight courses, four covering the main branches of the discipline and normally included in the major in Australian universities and four extending that study to include applications of chemistry likely to have value in defence careers. Both sets of courses require a total of four lecture hours per week with one tutorial and a three or four hour laboratory session. The courses of the second set are usually taken by students who have enrolled for the first set and are usually taken together but enrolment in individual supplementarycourses is also possible if it benefits the student. Students who choose the Chemistry major and minor will need to take all eight courses.

The laboratory work associated with each of the four core courses is designed to further develop experimental skills, and to introduce more advanced chemical techniques and their applications.

ACHM2101
Inorganic Chemistry 2
UC3 S2 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, e.g. nitrogen fixation in living systems, and in the use of metal ions and ligands in medicinal chemistry.

ACHM2102
Organic Chemistry 2
UC3 S1 HPS26
Assumed Knowledge: Basic structural drawing skills and an understanding of lewis structures, basic organic nomenclature and 'electron pushing' as a tool to explain reaction mechanisms.

Organic chemistry is about the reactions, structures and synthesis of molecules that have a carbon-based backbone. These materials form the basis of all known life, most of our pharmaceuticals and a wide range of materials. In this course, we look at the skills that chemists need to determine the structure of the compounds that they have isolated or prepared; how to determine the way they will react and introduce strategies used in synthesis. We introduce and use NMR and IR methods for structure determination. The reaction mechanisms are investigated using the traditional functional groups and the concepts of nucleophiles (Lewis bases) and electrophiles (Lewis acids). The products from a wide range of reactions can be predicted and explained using these theories. However, organic chemistry is so broad that it is impossible to cover all possible reactions. The in-depth examination of select examples provides the essential tools and knowledge required for dealing with this ever-expanding field.

ACHM2103
Physical Chemistry 2
UC3 S2 HPS26

In chemistry we often need to understand the behaviour of large collections of particles. Intuitively we know that thermodynamic properties must be related to underlying intermolecular forces. In the first part of this unit the relationship between microscopic interactions and bulk thermodynamic properties will be addressed by application of Statistical Mechanics. The fundamental principles of Statistical Mechanics will be developed and applied to areas such as solvation and chemical reactions, including simple electrochemical reactions. The second part of this unit will concern modern spectroscopic methods. A simple introduction to quantum chemistry will be presented and the interaction of matter with electromagnetic radiation will be introduced. This knowledge will then be applied to spectroscopic phenomena and methods, ranging from radio frequency transitions to the highly relevant nuclear magnetic resonance (NMR) spectroscopy. As well, we will consider vibrational-rotational patterns of simple molecules in the infra-red region and X-ray excited atomic fluorescence spectra. The understanding of rotational, vibrational and electronic transitions will facilitate a better understanding of atoms, ions and molecules.

ACHM2112
Environmental Chemistry
UC3 S1 HPS26

In this unit we study the effects of the distribution and migration of the chemical elements brought about by both natural and human (anthropogenic) activities. The first part of the course considers water quality and treatment for consumption; also release of waste water into the environment. The practical work involves collection of samples from the Canberra region and subsequent chemical and microbiological analysis in the laboratory.

Pollutants are viewed as something imposed on a natural background and to originate from both natural and/or anthropogenic sources. For example, CH_4 arises naturally from wetlands, oceans etc. and from rice paddies, petroleum-gas, cattle waste; again dioxins arise naturally from bushfires as well as from industrial incinerators. Many pollutants are entirely anthropogenic and vary in their toxicity. The hazards listed in the Defence Instructions General and Navy (DIG and DIN) are discussed in terms of their common chemical properties and physiological effects (e.g. H_2S and HMAS Stalwart, asbestos, beryllium)

Air quality, particulates and potentially dangerous gases are studied as well as pollution from organic pesticides halons etc. Chemical reactions of ozone in the troposphere and stratosphere are discussed. Chemical solutions to environmental problems are presented including the evaluation of analytical data and difficulties in risk assessment of contaminated land.

The final part of the course considers the abundance of the elements in the Earth's crust and its major, minor and trace constituents. The geochemical and biogeochemical cycles of the non-metallic C, N, P, S etc. elements and the natural mobility of metallic elements as seen in the weathering of ore bodies are studied.

Supplementary Level II Chemistry Courses

Staff Contact: Dr H. Riesen, Dr R.J. Blanch

The laboratory work associated with the four supplementary courses will be based on projects each of five to six weeks' duration. Students will be offered some flexibility in the selection of topics.

ACHM2113
Chemical Instrumentation and Devices
UC3 S1 HPS22

Spectroscopic, electrochemical and thermochemical techniques used for chemical analysis and for investigating the structure and properties of substances in the laboratory and in the field are studied to bring out the physical and chemical principles which they use and assess the ranges of their application and the levels of accuracy they achieve. The issue of increased sensitivity and the concurrent increased risk of interference from contaminating substances is raised in connection with modern approaches to quality assessment. Analytical kits developed for use by novices in the field are surveyed and their accuracy compared with that of specialised devices and laboratory instruments.

ACHM2108
Dealing with Dangerous Substances
UC3 S2 HPS22

Modern society must be able to control chemical substances and reactions in the environment, including the home and the workplace. This course aims to provide the basis for making rational decisions concerning hazardous chemical substances, especially with respect to issues of handling, protection and disposal. It also covers the chemistry of energy production by nuclear reactions—radioactivity, fusion and fission, the latter including fuel production, reprocessing and waste disposal Chemical principles learned in other level II Chemistry courses, eg. thermodynamics, kinetics, redox reactions, and molecular interactions, are developed in this context. Applications such as toxicity of pesticides and chemical carcinogens and modern chemical warfare agents, together with their biological modes of action, are examined.

ACHM2109
Energy in Chemical Contexts
UC3 S2 HPS22

Containing three topics, this course 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 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.

ACHM2111
Modern Materials
UC3 S1 HPS22

Chemistry plays a central role in the discovery of materials with specific and desirable properties. The first part of the course covers basic aspects of x-ray crystallography including the 14 Bravais lattices and relevant crystal growing techniques (the Bridgman-Stockbarger, Verneuil and Czochralski methods). Sol-gel processes and the chemical vapour deposition technique are discussed, the latter technique being highly relevant in the semiconductor industry. Physical properties of metals and alloys are visualised using simple models. A brief introduction to laser materials makes it possible to explore their military applications. In the second part of the course the chemical and physical properties of ceramics are studied with special attention given to methods used to enhance the strength or toughness of ceramics like silicon nitride and zirconia.

ACHM2104
Special Topic 2A
UC6 S1 L/T/LAB 42

ACHM2105
Special Topic 2B
Staff Contact: Head of School
UC6 S1 L/T/LAB 42

Specially arranged lectures and supervised project work presented by visitors, external lecturers or staff.

ACHM2114
Marine Chemistry 2
UC3 S2 HPS24

Open only to students enrolled in level II Oceanography.

This course 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.

Level III

Staff Contact: Dr C.E. Woodward, Prof W.G. Jackson

Level III Chemistry treats areas of chemistry that are of special importance to prospective officers in the services, but presented from the viewpoint of the chemical fundamentals of analytical, inorganic, organic and physical chemistry. Four of the following courses must be chosen to complete the major in chemistry. For the major-submajor six courses are required. Not all of the following courses will be offered every year. Upon invitation by the Head of School, a student may substitute a project for one of the options.

ACHM3107
Biological Chemistry
UC6 S 2 L/T 36 LAB 24

The composition, structure and reactivity of biomolecules, particularly 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.

The second part of the course covers general aspects of the inorganic chemistry of biological systems, in particular the roles of metal ions in biological processes. For example, the function of iron in haemoglobin and myoglobin is elaborated. Certain properties of the metal centres are rationalised in terms of the ligand field theory. Important physical methods used to investigate the metal centres are summarised. Techniques discussed include

X-ray structure analysis, EXAFS, Electron paramagnetic resonance (EPR), absorption and luminescence spectroscopy and Raman scattering.

ACHM3108
Explosives
UC6 S2 L/T 36 LAB 24

Assumed Knowledge: Chemical thermodynamics and chemical kinetics at the level of ACHM2103 Physical Chemistry or ACHM2109 Energy in Chemical Contexts. Understanding and ability to carry out algebraic manipulations of equations and simple differential and integral calculus.

Chemistry is central to the technology of energetic materials. The burning of fuels and the oxidation or decomposition of an explosive are very rapid reactions with many common features (e.g. free radical mechanisms). 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 explosive reactions are described. Also discussed are the detailed decomposition mechanisms for materials like HDX and RDX, as revealed by recent advances in spectroscopic techniques. Thermodynamics is used to estimate maximum temperatures and pressures produced by explosives. The requirements for insensitive munitions are also examined.

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. Physical and chemical methods of detecting explosives are examined in detail. Different chemical and spectroscopic techniques are introduced in the context of their application to various problem situations, such as post-blast forensic analysis and the detection of hidden explosives.

ACHM3109
Polymeric Materials
UC6 S 1 L/T 36 LAB 24

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 organic conductors, and for their optical properties.

ACHM3102
Organic Chemistry 3
UC6 S1 L/T 36 LAB 24

Assumed Knowledge: Familiarity with standard organic nomenclature, structural drawing and electron arrow pushing. An understandding of the mechanisms of simple elimination, substitution and addition reactions examined in Organic Chemistry and competence in basic spectroscopic problem solving.

Organic chemistry has always pondered these questions: What is this compound? How and why does it react? How can I make it? However, the way in which we answer these questions is continually changing with our increasing technological skills and understanding. We will build on the skills and knowledge from organic chemistry 2 in a course based on solving practical and theoretical problems. Spectroscopic interpretation skills will be enhanced, and involve a more detailed examination of the NMR phenomena and spectral properties. Our ability to answer the second question will be extended with the introduction of molecular orbital theory, which will be assisted with modern computer based packages. The final question to be answered is perhaps the one with the greatest economic and societal impact, "How can this compound be made?" We will examine the logical method of retro-synthetic analysis to show that this question may indeed have many answers.

ACHM3103
Physical Chemistry 3
UC6 S1 L/T 36 LAB 24

Assumed Knowledge: Quantum chemistry and spectroscopy at the level of ACHM2103 Physical Chemistry. Understanding and ability to carry out algebraic manipulations of equations and simple differential and integral calculus.

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.

ACHM3112
Inorganic Reaction Mechanisms
UC6 S 1 L/T 36 LAB 24
The course begins with a consideration of the water exchange rates for aqua transition metal ions $[M(OH_2)_6]^{n+}$ which range from very slow to very fast. This leads to a consideration of more general substitution reactions of octahedral and square planar transition metal ion complexes. The geometries of the complexes are reviewed, following on to isomerisation and racemisation reactions. Other relevant chemistry to be treated are electron transfer processes, acid, base and metal ion catalysis, and the activation of coordinated ligands through metal ion coordination.

ACHM3110
Project
UC6 S 1/S2 L/T/LAB 60

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

ACHM3104
Special Topic 3A

ACHM3105
Special Topic 3B
Staff Contact: Head of School

Specially arranged lectures and supervised project work presented by visitors, external lecturers or staff.

ACHM3101
Inorganic Chemistry 3
UC6 S1 L/T 36 LAB 24

Note/s: Not offered in 2001.

ACHM3111
Chemical Modelling and Computation
UC6 L/T 36 LAB 24

Note/s: Not offered in 2001.

Level IV

ACHM4191
Chemistry 4 (Honours) F/T
Staff Contact: Head of School
UC48 S1 S2

ACHM4192
Chemistry 4 (Honours) P/T
Staff Contact: Head of School
UC24 S1 S2

The course 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.

ACHM4193
Chemistry 4 (Combined Honours) F/T
Staff Contact: Relevant Heads of Schools
UC24 S1 S2

ACHM4194
Chemistry 4 (Combined Honours) P/T
Staff Contact: Relevant Heads of Schools
UC12 S1 S2

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.

Courses offered in Engineering Programs

ACHM1501
Engineering Chemistry 1A
Staff Contact: A/Prof. K. R. Harris
UC3 S1 HPW4

Electronic structure of atoms, periodic table, electronic structure of molecules and chemical bonding. Engineering materials - structure of metals and other solid materials, phase diagrams and properties of alloys and ceramics. Chemistry of cement and concrete.

ACHM1502
Engineering Chemistry 1B
Staff Contact: A/Prof K.R. Harris
UC3 S2 HPW4

Handling dangerous materials. Organic materials - plastics, fuels and explosives. Chemistry of explosive reactions and energetic materials. Solutions and chemical equilibria. Degradation of materials in the environment. Environmental chemistry as applied to civil engineering.

ACHM1503
Introduction to Engineering Materials
Staff Contact: Dr C. E. Woodward
UC3 TH39

The electronic structure explanation of th electrical, mechanical and chemical properties of liquids, solids and gases. Phases of matter. Metals, polymers, ceramics. The corrosiion and degreadation of materials.

ACHM1701
Engineering Materials for Aeronautical Engineers
Staff Contact: Dr C. E. Woodward
UC3 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.

ACHM1504
Introduction to Engineering Materials for Electrical Engineers
UC3 S1 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.

School of Computer Science

Outline of course structures for the Arts and Science degrees.

		UC
(a) Level I courses		
Computer Science		
S1	Information Technology Fundamentals	6
S2	Programming Fundamentals	6
Information Systems		
S1	Information Technology Fundamentals	6
S2	Information Systems Principles	6
(b) The minor program:		
Computer Science		
S1	Information Technology Fundamentals	6
S2	Programming Fundamentals	6
4 specified Level II courses in Computer Science:		
S1	Computer Languages A	6
S2	Computer Languages B	3
S2	Operating Systems or Data Communications	3
Information Systems		
S1	Information Technology Fundamentals	6
S2	Information Systems Principles	6
4 specified Level II courses in Information Systems:		
S1	Systems Analysis	3
S1	Databases and Database Design	3
S2	Application Development	3
S2	Data Communications	3
Operations Research and Statistics		
(Taught jointly with the School of Mathematics and Statistics)		
S1	Information Technology Fundamentals	6
S2	Programming Fundamentals *or*	6
	Information Systems Principles	6
Students are also encouraged to take the following courses:		
S1	Mathematics 1A6	
S2	Mathematics 1B	6
Level II Computer Science courses:		
S1	Decision Analysis	3
S2	Linear Programming	3
Level II Statistics courses:		
S1	Data Analysis	3
S2	Regression Modelling	3
(c) The major program:		
Computer Science		
Minor program in Computer Science plus		
S1	Software Development	3
S1	Software Project Management	3

S1	Databases and Database Design	3
S1	1 x Computer Science Elective	3
S2	Project	6
S2	Operating Systems or Data Communications	3
S2	1 x Computer Science Elective	3

Information Systems

Minor program in Information Systems plus

S1	Systems in Organisations	3
S1	Software Project Management	3
S1	Application Integration	3
S1	Distributed Systems and Databases	3
S2	Project	6
S2	Managing Information Strategically	3
S2	1 x Information Systems Elective	3

Operations Research and Statistics

(Taught jointly with the School of Mathematics and Statistics)

Minor program in Operations Research and Statistics plus

S1	Operations Research	3
S1	Simulation	3
S1	2 x Level III Statistics Elective	6
S2	Optimisation Techniques	3
S2	1 x Level III Statistics Elective	3
S2	Operations Research Project *or*	6
	Statistics Project	6

(d)The major/minor program:

Computer Science

Major program in Computer Science plus

8 x other level 2/3 courses offered by the School 24

Information Systems

Major program in Information Systems plus

8 x other level 2/3 courses offered by the School 24

Prerequisites for Level II Courses

Courses	Prerequisites
Session 1	
Computer Languages A	Programming Fundamentals
Database and Database Design	Information Technology Fundamentals
Data Structures E	Computer Tools for Engineers, *and* Programming Fundamentals
Decision Analysis	Programming Fundamentals *or* Information Systems Principles
Numerical Analysis E	Computer Tools for Engineers *or* Programming Fundamentals, *and* Engineering Mathematics 1A, *and* Engineering Mathematics 1B
Systems Analysis	Programming Fundamentals *or* Information Systems Principles
Session 2	
Application Development	Databases and Database Design, *and* Systems Analysis
Computer Languages B	Computer Languages A
Data Communications	Programming Fundamentals *or* Information Systems Principles
Linear Programming	Programming Fundamentals *or* Information Systems Principles
Operating Systems	Computer Languages A
Session 1 or 2	
C^3I Systems	Information Technology Fundamentals
Computer Speech Processing	Computer Languages A
Current Issues	Information Technology Fundamentals
Cryptography and Computer Security	Computer Languages A
Human Computer Interaction	Computer Languages A
Human Factors	Information Technology Fundamentals
Interactive Computer Graphics	Computer Languages A
Knowledge Based Systems	Programming Fundamentals *or* Information Systems Principles
Knowledge Management	Information Technology Fundamentals
Multimedia and Virtual Environments	Computer Languages A
Security, Privacy and Ethical Issues in Computing	Information Technology Fundamentals
Special Topic	Programming Fundamentals *or* Information Systems Principles
Systems Development Methodologies	Systems Analysis

Prerequisites for Level III Courses

Courses	Prerequisites
Session 1	
Application Integration	Systems Analysis
Distributed Systems and Databases	Databases and Database Design
Operations Research	Linear Programming
Software Development	Computer Languages A
Software Project Management	Information Technology Fundamentals
Systems in Organisations	Information Systems Principles
Session 2	
Computer Project	Software Project Management, and Software Development *or* Systems Analysis
Managing Information Strategically	Software Project Management
Management Science E	Programming Fundamentals, *and* Engineering Mathematics 1A, *and* Engineering Mathematics 1B

Session 1 or 2

Artificial Intelligence
Data Networks
Decision and Collaborative Systems
Electronic Commerce
Object Oriented Modelling and Systems
Structured Information in Organisations

Systems Administration

Computer Languages B
Data Communications
Systems in Organisations
Data Communications
Systems Analysis
Programming Fundamentals *or*
Information Systems Principles
Programming Fundamentals *or*
Information Systems Principles

Level I Courses

ACSC1001
Information Technology Fundamentals
Staff Contact: Mr C. Freeman
UC6 S1 L3 T1 LAB2

Introduction to computing: distinction between information systems and computer science, computing history, overview of computer architecture, operating system, network tools and components, data representation, file and data organisation, databases. Overview of management science, information in organisations, decision support systems, human factors, ethics, computer security, artificial intelligence, graphics.

ACSC1101
Programming Fundamentals
Staff Contact: Mr D. Essam
UC6 S2 L3 T1 LAB2
Prerequisite: Information Technology Fundamentals

Software development: software engineering, introduction to multiple programming languages. Elementary problem solving, algorithms and data structures. Algorithm development and problem solving in Java.

ACSC1301
Information Systems Principles
Staff Contact: Mr C. Freeman
UC6 S2 L3 T1 LAB2
Prerequisite: Information Technology Fundamentals

Systems concepts, methodologies, project management, organisational foundations, strategic role of information systems, decision support systems, telecommunications, information systems construction, information systems tools. Programming: classes and methods, data structures, object oriented design, graphical user interface design.

Level II Courses

ACSC2304
Application Development
Staff Contact: Dr D. Hart
S2 UC3 TH39
Prerequisite: Databases and Database Design, Systems Analysis

This course aims to extend and build upon the student's basic knowledge of standard office automation products, notably spreadsheets and personal database systems, to the production of complete (albeit small) systems with a user interface incorporating forms, menus and reports. It covers structure, prototyping the application, macros and basic programming concepts using an application generation tool, simple error handling, and linking different applications together.

ACSC2003
C^3I Systems
Staff Contact: Mr M. Ford
SS UC3 TH39
Prerequisite: Information Technology Fundamentals

C^3I 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 C^3I systems.

ACSC2106
Computer Languages A
Staff Contact: Mr D. Essam
UC6 S1 TH78
Prerequisite: Programming Fundamentals
Note/s: this is a double course

This course introduces students to the main programming paradigms, basic algorithms and data structures, illustrating each paradigm with one or more example languages that use each paradigm. Assembler and hardware structure. Introduction to paradigms: object orientation, imperative, functional, logic. Introduction to scripting languages. Iterative control structures and arrays.

ACSC2107
Computer Languages B
Staff Contact: Mr D. Essam
S2 UC3 TH39
Prerequisite: Computer Languages A

A second course in computer programming to develop competence with the use of advanced data structures and algorithms, across a range of programming paradigms; emphasis on the principles of information hiding. Tables and hashing; tree structures; sorting and searching; knowledge representation.

ACSC2009
Computer Speech Processing
Staff Contact: Dr F. Clermont
SS UC3 TH39
Prerequisite: Computer Languages A

This course introduces theoretical and computational aspects of speech science and technology. Its main objectives are to provide basic knowledge of modern techniques for analysing, synthesising and recognising spoken language. Owing to the multi-disciplinary nature of the subject matter, the topics of interest will be drawn from the following, relevant areas: signal processing; phonetics; speech production and audition; techniques for speech recognition and visualisation.

ACSC2011
Current Issues
Staff Contact: Dr W. Toomey
SS UC3 TH39
Prerequisite: Information Technology Fundamentals

Students will study three to five current topics in Information systems. These will be new topics not covered elsewhere in the course and will canvass new and cutting edge technology, techniques/applications and paradigms.

ACSC2010
Cryptography and Computer Security
Staff Contact: Dr L. Brown
SS UC3 TH39
Prerequisite: Computer Languages A

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

ACSC2005
Data Communications
Staff Contact: Dr L. Brown
S2 UC3 TH39
Prerequisite: Programming Fundamentals or Information Systems Principles

Overview and history of data communications; common applications; OSI reference model, physical media and wiring, data link layer and LANS, network, transport, presentation and application layers; client-server applications; ASN.1; network management, configuration and design.

ACSC2012
Databases and Database Design
Staff Contact: Mr D. Munro
S1 UC3 TH39
Prerequisite: Information Technology Fundamentals

This course introduces data modelling as a tool within the Systems Analysis Life Cycle. It uses the entity-relationship (E-R) diagram as the expression of the model, and explains the purpose and method of data normalisation. The essential relationship between the E-R diagram and the database schema is explored. The SQL language is introduced and used to illustrate flexible access to data repositories. Database transactions and the problems of concurrency and its control are introduced. The role of the Database Administrator is explained. Common database software is used in lab sessions to reinforce the theoretical concepts.

ACSC2006
Decision Analysis
Staff Contact: Dr R. Sarker
S1 UC3 TH39
Prerequisite: Programming Fundamentals or Information Systems Principles

Decision making: decision tables, decision trees, influence diagrams, descriptive theories. Utility theory. Multifactor decision making: SMART, AHP, SelectGain. Group decision making: aggregating methods, GDSSs, negotiation and conflict resolution methods.

ACSC2013
Human Computer Interaction
Staff Contact: Dr G. Freeman
SS UC3 TH39
Prerequisite: Computer Languages A

Designing and implementing user-interfaces. Interfaces in web documents and in a client-server architecture. Criteria for judging interfaces. Information presentation techniques. Programming to respond to and control interfaces.

ACSC2014
Human Factors
Staff Contact: Dr E. Lewis
SS UC3 TH39
Prerequisite: Information Technology Fundamentals

Impact of information systems upon people: effects of information ecology (information overload, stress, and other factors) that determine ability of people to use IS properly. Impact of people upon IS: motivation individual differences (cognitive style, personality), group effects, and politics of projects that determine ability of people to influence the success of IS.

ACSC2015
Interactive Computer Graphics
Staff Contact: Dr G. Freeman
SS UC3 TH39
Prerequisite: Computer Languages A

Interactive graphics of 2D and 3D scenes, rubber shape drawing, graphical input event handling, perspective and orthographic views, transformation of coordinate spaces, colour perception and specification, animation, double buffering, ray tracing, surface properties, scene rendering. Programming to produce graphics.

ACSC2016
Knowledge Based Systems
Staff Contact: Dr R. McKay
SS UC3 TH39
Prerequisite: Information Systems Principles or Programming Fundamentals

Knowledge representation: rule-based representation; object-based representation. Reasoning: inference systems; reasoning under uncertainty; default reasoning; commonsense reasoning; explanation. Application: technology assessment; methodologies and life cycles; design and implementation; evaluation. Knowledge acquisition: human-based; automated; knowledge based.

ACSC2017
Knowledge Management
Staff Contact: Dr R. McKay
SS UC3 TH39
Prerequisite: Information Technology Fundamentals

Modelling organisational knowledge. Knowledge-centred approaches: organisational knowledge tools; automated knowledge (KBS); automated knowledge extraction (data mining); Group knowledge tools. Human-centred approaches: knowledge ownership and politics in organisations; organisational approaches to knowledge sharing (sharing incentives, organisational cultures); tools for knowledge sharing; implications of knowledge management for decision-making in organisations.

ACSC2018
Linear Programming
Staff Contact: Dr R. Sarker
S2 UC3 TH39
Prerequisite: Programming Fundamentals or Information Systems Principles

Introduction: History of OR/MS, nature of OR problems, overview of OR modelling approach. Linear programming: problem definition, model formulation, solution approach, sensitivity analysis. Allocation models: transportation, assignment, transhipment. Game theory. Integer programming: formulation, solution approach. Network models: network, project networks, shortest path, maximal flow, minimal spanning tree. Goal programming: formulation, solution approach. Modelling using computer packages.

ACSC2019
Multimedia and Virtual Environments
Staff Contact: Dr M. Barlow
SS UC3 TH39
Prerequisite: Computer Languages A

Theory and practice of multimedia and virtual environment construction. Types and formats of different digital media (images, sounds, movies, 3D models, animation). Issues in construction. Practical work in Java and VRML.

ACSC2108
Operating Systems
Staff Contact: Dr M. Barlow
S2 UC3 TH39
Prerequisite: Computer Languages A

This course 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.

ACSC2020
Security, Privacy and Ethical Issues in Computing
Staff Contact: Dr C. Lokan
SS UC3 TH39
Prerequisite: Information Technology Fundamentals

Significance of privacy considerations for information systems. Security threats to information systems and the range of security control measures available. Ethical considerations in development and use of information systems.

ACSC2008
Special Topic
SS UC3 TH39
Prerequisite: Programming Fundamentals or Information Systems Principles

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

ACSC2303
Systems Analysis
Staff Contact: Mr G. Millar
S1 UC3 TH39
Prerequisite: Information Systems Principles or Programming Fundamentals

This course introduces students to the analysis and design of information systems. Emphasis is given to the methods, tools, and techniques that are used to analyse, design, and document information systems.

ACSC2021
Systems Development Methodologies
Staff Contact: Dr D. Hart
SS UC3 TH39
Prerequisite: Systems Analysis

Review and criticism of traditional approaches to system development. System development problems. Assumptions underlying system development: philosophical, human, organisational. New, non-traditional and emerging tools and techniques. Description and analysis of representative and contrasting methodologies. Applicability and comparison of methodologies.

Level III Courses

ACSC3008
Application Integration
Staff Contact: Mrs J. Backhouse
S1 UC3 TH39
Prerequisite: Systems Analysis

Implications for organisations of convergent technologies. Web-based applications. Evolving standards for integration (HTML, XML, etc). Use and limitations of Java based interaction, scripting languages (Javascript, Vbscript, Perl, CGI scripting). Other interaction mechanisms (ODBC, CORBA, DCOM).

ACSC3001
Artificial Intelligence
Staff Contact: Dr R. McKay
SS UC3 TH39
Prerequisite: Computer Languages B

The quest for artificial intelligence. Survey of AI: Reasoning; Learning; Planning; Understanding other intelligences: natural language; Understanding the World: perception. AI as problem representation plus search. Knowledge Representation: logic based, frame and object oriented representations; intelligent agents. AI without representation: neural nets. Functional and logic programming for artificial intelligence.

ACSC3003
Computer Project
Staff Contact: Mr M. Ford
UC6 S2
Prerequisite: Software Project Management, and either Software Development or Systems Analysis
Note/s: this is a double course

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.

ACSC3009
Data Networks
Staff Contact: Dr L. Brown
SS UC3 TH39
Prerequisite: Data Communications

This course investigates the design, implementation, operation and management of data networks. The OSI Reference Model. Data Transmission concepts. Transmission media. Data encoding: modulation; clocking; error detection. Local area networks. 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. Network management: structure of management information; SNMP. Network security: cryptography; authentication; social issues. Network design. High-speed networks: broadband ISDN, ATM, frame relay; design issues; implementation issues.

ACSC3010
Decision and Collaborative Systems
Staff Contact: Dr E. Lewis
SS UC3 TH39
Prerequisite: Systems in Organisations

Characteristics of human thinking. Models of decision-making, from optimisation to naturalistic. Group process losses and gains. Types of decision support systems. Factors influencing the choice of types. Principles for the design of DSS. Principles for the introduction of DSS into organisations. Applications of DSS in Defence, from personal decisions to C4ISR.

ACSC3011
Distributed Systems and Databases
Staff Contact: Dr D. Hart
S1 UC3 TH39
Prerequisite: Databases and Database Design

This course builds on the material covered in a basic database course dealing with centralized systems, by extending it to the case of distributed environments. Client/server and distributed database systems are covered along with a brief introduction to World Wide Web and distributed object-oriented systems.

ACSC3012
Electronic Commerce
Staff Contact: Mr G. Millar
SS UC3 TH39
Prerequisite: Data Communications

Students will study basic concepts of electronic commerce, its applications, and its impact on business organisations.

ACSC3013
Managing Information Strategically
Staff Contact: Mr G. Millar
S2 UC3 TH39
Prerequisite: Software Project Management

This course examines how information technology can be used to support and enable business objectives. Emerging information technology programs. Managing information strategically. Business-IT alignment. Using IT for Business process re-engineering. Strategic performance measures for IM. Enterprise IT architectures. Virtual organisations. Learning organisations. Change management.

ACSC3014
Object Oriented Modelling and Systems
Staff Contact: Dr D. Hart
SS UC3 TH39
Prerequisite: Systems Analysis

Review of principles of object-orientation. A representative OO Modelling Technique and Notation (UML/OMT). Overview of the OO Modelling Notations. OO CASE tools. OO Databases. OO Application development. Hybrid Systems.

ACSC3015
Operations Research
Staff Contact: Dr R. Sarker
S1 UC3 TH39
Prerequisite: Linear Programming

Project planning and controlling tools: CPM, cost analysis, resource constraints, PERT. Dynamic programming. Queueing models: queueing systems, the birth-and-death process, decision making using queueing models. Decision making with Markov models. Reliability and replacement: structural function, system reliability, breakdown and preventive maintenance, cost analysis. Inventory models: EOQ, EPQ, shortages and price discounting, variable deterministic demand, stochastic models, constrained and multistage problems.

ACSC3016
Operations Research Project
Staff Contact: Dr R. Sarker
UC6 S2
Note/s: This is a double course

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.

ACSC3017
Optimisation Techniques
Staff Contact: Mr H. Abbass
S2 UC3 TH39

Mathematical methods: interpolation, Newton-Raphson. Numerical methods: univariate and multivariate, direct and gradient, preplanned and sequential. Heuristic techniques: genetic algorithms, evolutionary computing, Tabu search, simulated annealing.

ACSC3006
Simulation
Staff Contact: Prof C. Newton
S1 UC3 TH39

Concepts of modelling, continuous and discrete systems. Random number generation. Time-stepped and event-stepped simulation. Simulation languages, object oriented simulation techniques. Statistical analysis of output, verification, and validation. Modelling using ARENA.

ACSC3104
Software Development
Staff Contact: Dr C. Lokan
S1 UC3 TH39
Prerequisite: Computer Languages A

Programming in the small vs programming in the large. Software life cycle. Requirements gathering, requireents specification. System modelling: process, data, control, object models. Design methods, software architecture, design specification. Program architecture, data structure selection, version control. Quality assurance, reviews, testing.

ACSC3018
Software Project Management
Staff Contact: Mr G. Millar
S1 UC3 TH39
Prerequisite: Information Technology Fundamentals

Software development standards, software evelopment life cycles, software estimation, project planning and tracking, risk management, software measurement, quality assurance, configuration management, requirements management, verification and validation, process improvement.

ACSC3019
Structured Information in Organisations
Staff Contact: Dr R. McKay
SS UC3 TH39
Prerequisite: Information Systems Principles or Programming Fundamentals

Information requirements analysis. Information tructuring, presentation and maintenance. Information structuring standards and technologies (SGML/XML/RDF and related). Information presentation standards and technologies (CCS/XSL, PS and related).

ACSC3007
Systems Administration
Staff Contact: Dr W. Toomey
SS UC3 TH39
Prerequisite: Information Systems Principles or Programming Fundamentals

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. Admninistration support tools. Software installation, maintenance. Network administration. Network security, firewalls. LAN and PC administration. Server administration.

ACSC3305
Systems in Organisations
Staff Contact: Dr E. Lewis
S1 UC3 TH39
Prerequisite: Information Systems Principles

Principles of information ecology; especially information behaviour; effect of people upon success of systems and the effect of systems upon people. Preparation of a business case. Systems concepts, (control, feedback, coupling). Tools and techniques for determining values, creating options, and evaluating options, taking account of the political and behavioural factors. Building simple cost models. Use of risk management, including the risk-remedy approach for evaluation. Implications for performance measurement, within evaluation and contract management.

Level IV Courses

ACSC4191
Computer Science 4 (Honours) F/T

ACSC4192
Computer Science 4 (Honours) P/T

ACSC4391
Information Systems 4 (Honours) F/T

ACSC4392
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 coursework as approved by the Head of School.

Courses offered in Engineering Programs

ACSC1501
Computer Tools for Engineers
Staff Contact: Dr M. Barlow
UC3 S1 TH40

Introduction to computing: functional hardware components, operating systems, networks, email, news, Internet, data and number representation, spreadsheets, word processing, software applications, programming languages. The UNIX operating system. Problem solving methods and algorithm developments: programs, pseudocode, stepwise refinement, top down design, modularity. MATLAB programming language: identifiers, input/output, assignment statements, standard and user defined functions. Elementary structures: decision, iteration, array handling.

ACSC1101
Programming Fundamentals
Staff Contact: Mr D. Essam
UC6 S2 L3 T1 LAB2
Prerequisite: Computer Tools for Engineers

Software development: software engineering, introduction to multiple programming languages. Elementary problem solving, algorithms and data structures. Algorithm development and problem solving in Java.

ACSC2501
Numerical Analysis E
Staff Contact: Dr F. Clermont
UC3 S1 TH40
Prerequisite: Computer Tools for Engineers or Programming Fundamentals, Engineering Mathematics 1A, Engineering Mathematics 1B
Corequisite: Mathematics 2EA

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, Newtonís method, method of false position, secant method, convergence criteria. Interpolation and approximation: finite differences, interpolation formulae, 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 MATLAB programming.

ACSC2502
Data Structures E
Staff Contact: Dr M. Barlow
UC3 S1 TH40
Prerequisite: Computer Tools for Engineers and Programming Fundamentals

This is a second course in computer programming, using Java as the primary programming language to develop skills applying data structuring techniques to problems involving control of dynamic memory. Control and Data Structures. Fundamental notions of Object-Oriented programming: design, abstraction, encapsulation, measurement; their application using features in Java. Software Engineering: Problem Analysis, Design using a top-down approach, implementation using step-wise refinement, documenting & program structure to ease maintenance.

ACSC3002
Management Science E
Staff Contact: Mr H. Abbass
UC3 S2 TH33

Prerequisites: Programming Fundamentals, Engineering Mathematics 1A, Engineering Mathematics 1B

Introduction: the decision making process, types of decisions, problem solving techniques, mathematical formulation. Mathematical programming: linear, integer, and goal programming. Network optimisation: graph theory, shortest path problem, minimum spanning trees, maximum flow problem. Inventory and queueing systems

School of Economics and Management

The School of Economics and Management offers courses 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 economics and management courses in the Engineering programs.

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 has the advantage of offering the complementary study of economic behaviour and the study of organisational behaviour, management and leadership.

Students seeking a self-contained, general introduction to the area may take Level I Economics.

Pass students may take a major or minor in either Economics or Management and may also take a major in one of these course areas with a minor in either. To achieve a major in Economics or in Management, students must complete the level I courses Economics 1A and 1B and, in the course area in which their major falls, must gain at least 12 units of credit at level II and 24 units of credit at level III. To take a major in Management, students must complete at least one of Introduction to Corporate and Government Accounting and Quantitative Methods in Economics and Management. To obtain a minor in Economics or in Management, students must gain at least 24 units of credit in relevant courses over two or more levels (levels I and II, or levels II and III, or levels I, II, and III) or at level III. In all cases prerequisite and corequisite conditions must be met. The courses which may be taken at level III to complete a major or minor are listed at p. 75.

Honours students wishing to concentrate on Economics will normally take Economics 1A and 1B, at Level II, Production, Prices and Trade, Growth and Fluctuations in Open Economies, Quantitative Methods, and Economics 2 (Honours); at Level III, The Making of Economic Policy, Asia-Pacific Economic Development, and Methods and Techniques of Quantitative Research, at least one further Level III Economics or Management course, and Economics 3 (Honours). Economics 4H completes the Honours program.

Honours students wishing to concentrate on Management will normally take Level I Economics; at Level II, Organisational Behaviour, Quantitative Methods, Introduction to Corporate and Government Accounting, and Management 2 (Honours); and at Level III, Methods and Techniques of Quantitative Research, Project Management, another Management course, and a fourth Level III course from either Management or Economics, and Management 3 (Honours). Management 4H completes the Honours program.

Other options may be exercised, but require the prior approval of 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 minor in Asia–Pacific studies from the courses listed for this inter-School program at p.61.

Level I

AECM1101
Economics 1A
Principles of Microeconomics
Staff Contact: Mr. M. Kowalik
S1 UC6 L3 T1
Prerequisite: See p.45.

The mechanisms established by societies to allocate and discover scarce resources are the focus of this course. The basic concepts of economics are introduced including property rights, trade, specialisation and transaction costs. Attention is given to the analysis of competitive markets in the Australian economy including commodity, capital and currency markets. The rationale for and impacts of government policies on the operation of these markets are considered.

AECM1102
Economics 1B
Principles of Macroeconomics
Staff Contact: Mrs. S. Jackson
S2 UC6 L3 T1
Prerequisite: Economics 1A

This course covers introductory macroeconomics, which is concerned with economy-wide issues such as growth, inflation and unemployment. These issues are explored over the long run, providing an understanding of why variations in living standards and growth rates occur. The links between money growth and inflation, savings rates and growth, and unemployment policies and the natural rate of unemployment are examined. Balance of payments issues and the role of international trade and long run growth are also considered. Aggregate demand and supply and used to explore short-run fluctuations in output. The effect of the business cycle on unemployment and inflation and the role of stabilisation policy are studied.

Level II

AECM2001
Quantitative Methods in Economics and Management
Staff Contact: Mrs. S. Jackson
S1 HPW4
Prerequisites: Economics 1A and 1B

This course introduces students 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 pre-requisite is required. The emphasis is on applications in management and economic analysis and decision-making. Students will be expected to gain basic competencies in 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.

AECM2102
Production, Prices and Trade
Staff Contact: Mr. Twan Huybers
S1 UC6 L3 T1
Prerequisite: Economics 1A and 1B

This course covers the foundations of modern microeconomic theory at an intermediate level and applies the principles and analytical framework of modern microeconomics to international trade. Topics covered include property rights, transaction costs and public goods; division of labour and specialisation; concepts of efficiency; the firm; production and costs; consumer demand; price determination; competition; valuation; international trade flow analysis; gains from trade; barriers to trade. Lessons for analysis of defence-related issues are drawn.

AECM2101
Growth and Fluctuations in Open Economies
Staff Contact: Mr. T. Huybers
S2 UC6 L3 T1
Prerequisites: Economics 1A and 1B and AECM2102

This course covers the foundations of modern, open-economy macroeconomic theory and policy at an intermediate level. Topics covered include aggregate supply in open economies; economic growth and its determinants; aggregate demand and stabilisation policy in open economies; money; international capital markets; price, output and employment fluctuations; exchange rate determination and the balance of payments. Implications for security and defence are addressed.

AECM2302
Introduction to Corporate and Government Accounting
Staff Contact: Head of School
S2 UC6 HPW4
Prerequisite: Economics 1A and 1B

The course 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.

AECM2303
Organisational Behaviour
Staff Contact: Dr. J.R. Warn
S1 UC6 HPW4
Prerequisite: Economics 1A and 1B

This course 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.

AECM2304
Logistics Management
Staff Contact: Mrs E. Barber
S2 UC6 HPW4

Prerequisite: Economics 1A and 1B

This course examines and applies management tools and principles to supply and distribution problems associated with the flow of materials and products through organisations and the supply chain to the end customer.. A broad overview of the logistics field is presented first, followed by more advanced concepts including JIT, Kanban, MRP and DRP processes. Transportation and warehousing are studied, providing a basis for examining issues in logistics system design including stock location, sourcing, flow allocation, and the number and location of facilities. Global logistics and control methodologies for performance are addressed. Case studies in Australian industry supply chains and military logistics are presented in the latter part of the course.

AECM2191
Economics 2A (Honours)
S1 HPW1

AECM2192
Economics 2B (Honours)

Staff Contact: Prof P.H. Hall
S2 HPW1
Corequisites: AECM2101, AECM2102 and AECM2001

Honours involves an extra hour of tuition each week designed to broaden and deepen students' knowledge of material covered in Production, Prices and Trade and Growth and Fluctuations in Open Economies at the Pass level.

AECM2391
Management 2A (Honours)
S1 HPW1

AECM2392
Management 2B (Honours)
Staff Contact: Prof P.H. Hall
S2 HPW1
Corequisites: AECM2001, AECM2302 and AECM2303

Honours involves an extra hour of tuition each week designed to broaden and deepen students' knowledge of material covered in the Level II Management courses.

Level III

For the purposes of completing a major or minor in Economics, the following level III courses may be taken when offered: The Making of Economic Policy, Asia-Pacific Economic Development, Applied Economics, Methods and Techniques of Quantitative Research, Finance.

For the purposes of completing a major or minor in Management, the following level III courses may be taken when offered: Leadership, Project Management, Human Resource Management, Finance, Methods and Techniques of Quantitative Research, Management Accounting, Public Sector Management.

With the permission of the Head of School, students may complete a major or minor by drawing on courses a cognate course.

AECM3102
Asia-Pacific Economic Development
Staff Contact: Dr. J.S. Seo
S2 HPW4
Prerequisites: AECM2607 U and AECM2608 U

This course offers analysis of the process of economic development illustrated by case studies from the experience of selected East Asian and Pacific countries. Topics include capital formation and skill building; financial linkages and liberalisation; international trade and investment; institution building and transformation; industrialisation and trade; the role of economic policy.

AECM3103
The Making of Economic Policy
Staff Contact: Dr. P. Oslington
S1 HPW4
Prerequisites: AECM2607 U and AECM2608 U

The course deals with the process of economic policy making and analyses the rationales for and implications of micro- and macro-economic policies in open economies. Topics covered include rationales for government activity and intervention; critiques of the size and economic role of government; public versus private ownership, production and provision; regulation and deregulation; competition and industry policy; implications of economic policy for economic welfare, and for security, defence and defence industry.

AECM3101
Applied Economics
Staff Contact: Head of School
S1 S2 HPW4

Note/s: Not offered in 2001

AECM3002
Methods and Techniques of Quantitative Research
Staff Contact: Mrs. S. Jackson

S2 HPW4
Prerequisite: AECM2001

Building on a foundation of statistical knowledge, this course introduces students to the methods and tools of quantitative research in economics and management. The emphasis of the course is on recognising the problems involved in the empirical measurement of relationships in economics and management, and the techniques that can solve these problems. Students will develop practical skills in building and testing models with the use of statistical software.

AECM3301
Leadership
Staff Contact: Dr I. Densten
S1 HPW4
Prerequisites: AECM2303

This course considers leadership as a management activity and provides a critical analysis of the assumptions underlying the concept of leadership. The course provides a conceptual integration of students' previous leadership experiences with leadership theory and research. Both simple and complex organisations are examined. The role of command and control is discussed. Topics include: approaches to leadership; leadership skills (interpersonal skills, self-management, negotiation, networking); power and authority; rules, sanctions and incentives; inner values; ethics; gender differences (women in organisations); leadership development and training.

Note: Students who completed AECM2301 Leadership 2 in 1999 or 2000 may not enrol for this course.

AECM3302
Human Resource Management
Staff Contact: Dr H.B. Cheah
S1 HPW4
Prerequisite: AECM2303

This course 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.

AECM3305
Project Management
Staff Contact: Mrs. E. Barber
S2 HPW4
Prerequisite: AECM2303

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 courses, students investigate the planning, execution, monitoring and control, and termination of important work assignments within the context of large organisations. The course introduces students to the use of management decison tools and computer packages.

AECM3304
Management Accounting
Note/s: Not offered in 2001

AECM3306
Public Sector Management
Note/s: Not offered in 2001

AECM3001
Finance
Staff Contact: Dr G. Manger
S2 HPW4

This course deals with investment evaluation and finance. Investment appraisal techniques covered include evaluation under conditions of risk and uncertainty for public and private enterprises. Financial topics covered include standard techniques such as discounted cash flow, financial statement analysis, capital asset pricing, security evaluation, optimal capital structure, and sources of capital from financial institutions in Australia.

AECM3191
Economics 3A (Honours)
S1

AECM3192
Economics 3B (Honours)
Staff Contact: Head of School
S2

Prerequisite: AECM2191/AECM2192

AECM3391
Management 3A (Honours)

S1

AECM3392
Management 3B (Honours)
Staff Contact: Head of School
S2
Prerequisite: AECM2391, AECM2392

Honours students in Economics or Management must enrol in the relevant pass courses as stated in the introduction to studies in the School. Enrolment in an Honours course involves an additional one-hour tutorial per week.

AECM3193
Economics 3A (Combined Honours)
S1

AECM3194
Economics 3B (Combined Honours)
Staff Contact: Head of School
S2

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.

AECM3393
Management 3A (Combined Honours)
S1

AECM3394
Management 3B (Combined Honours)
Staff Contact: Head of School
S2
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.

AECM4191
Economics 4 (Honours) F/T
Staff Contact: Head of School
UC48 S1 S2

AECM4192
Economics 4 (Honours) P/T
UC24 S1 S2
Staff Contact: Head of School

Applied Economics
Staff Contact: Head of School
HPY110

Candidates will be expected to attend lectures, seminars and tutorials on topics determined by the Head of School, including in particular all School research seminars, and to submit regular written work and to write a supervised thesis normally between 10,000 and 15,000 words long. Coursework and the thesis will each account for 50% of the total marks. With modification, the program may be taken as a qualifying year towards a Masters (Honours) degree.

AECM4391
Management 4 (Honours) F/T
Staff Contact: Head of School
UC48 S1 S2

AECM4392
Management 4 (Honours) P/T
Staff Contact: Head of School
UC24 S1 S2

Applied Management
Staff Contact: Head of School
HPY110

Candidates will be expected to attend lectures, seminars and tutorials on topics determined by the Head of School, including in particular all School research seminars, and to submit regular written work and to write a supervised thesis normally between 10,000 and 15,000 words long. Coursework and the thesis will each account for 50% of the total marks. With modification, the above program may be taken as a qualifying year towards a Masters (Honours) degree.

AECM4193
Economics 4 (Combined Honours) F/T
UC24 S1 S2

AECM4194
Economics 4 (Combined Honours) P/T
UC12 S1 S2

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.

AECM4393
Management 4 (Combined Honours) F/T
UC24 S1 S2

AECM4394
Management 4 (Combined Honours) P/T
UC12 S1 S2
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 Unit

The following unit is offered in the Engineering Program.

AECM0503
Economics and Management for Engineers

Staff contact: Mr M. Kowalik
S1 UC3

This course examines the economic and management issues faced by a practising engineer. The economics component covers topics including consumer sovereignty and demand, production and cost, profit, comparative advantage and specialisation, investment appraisal and market structures. The management component covers a range of central topics in the field which may include corporate strategy, organisational behaviour, human resource management, marketing, project management, finance and law.

School of Geography and Oceanography

All Geography courses are available to both Arts and Science students and the school makes no distinction in curricula between students who are enrolled in the degrees of Bachelor of Arts, Bachelor of Arts with Honours, Bachelor of Science and Bachelor of Science with Honours. With respect to course structure all major and minor sequences in Geography begin with Level I Geography.

Geography

Level I

Two courses are offered in Level 1 Geography and both are required for a major in the course. In both courses an integrative approach to the understanding of environmental processes and human activities that take place on the surface of the earth is developed, at the global scale in Geography 1A and with particular reference to Australia in Geography 1B. In each course students are required to complete tutorial, test, essay and practical assignments and field classes. An examination is held at the end of each course. To obtain a pass in Geography 1A and/or Geography 1B all assessable components of the course must be completed to a satisfactory level.

AGOC1101
Geography 1A
Global Environmental Change
Staff Contact: Mr J. Doyle
S1 UC 6 HPW 6 (3L, 3P)

Geographical perspectives on the nature and magnitude of global environmental change. Natural and anthropogenic processes and their global scale impacts. Geographical implications of one or more of the following: global climate change, land degradation and land surface change, biodiversity and geodiversity, human dimensions of global change, population dynamics and urbanisation, sustainability and development, and the globalisation of economic activity.

AGOC1102
Geography 1B
Geographies of Contemporary Australia
Staff Contact: Mr J. Doyle
S2 UC 6 HPW 6 (3L, 3P)

Geographical perspectives on Australian society and environment. A range of geographies of relevance to understanding livelihood and land in contemporary Australia. Themes may include landscape processes and problems; biogeographical perspectives; resource availability, allocation and management; population, economic and social trends; urban, rural and regional issues; and heritage and cultural studies.

Level II

Six Level II courses in Geography are offered three in each session. Each course has 6 units of credit and 6 contact hours per week. A major in Geography includes two Level II courses and must include at least one of the first session courses which have a five day field school held during the May break. In 2001 these courses are AGOC2102 (Biogeography) and AGOC2104 (Economic Geography). A minor in Geography includes any two other courses not previously selected for the major sequence.

Students who intend to take more than 24 UC of Level III Geography, including potential honours students should take four Level II Geography courses. It is important that students enrolling in Level II Geography indicate their choice of courses at the time of enrolment.

Syllabus Details for Level II Geography Courses

AGOC2102
Biogeography
Staff Contact: Mr. D. Paull
S1 UC 6 HPW 6 (2L, 4P/T)

Introduction to the principles of biogeography. Biotic and abiotic factors in plant and animal distributions. Energy flow and nutrient cycling in terrestrial and aquatic ecosystems. Plant and/or animal community dynamics and recent ecological change. Contemporary biogeographical and environmental issues may be highlighted.

In 2001 a compulsory five-day residential field school will be held during the May break.

AGOC2104
Economic Geography: Globalisation and Change
Staff Contact: Dr R. Ball
S1 UC 6 HPW 6 (2L, 4P/T)

This course examines how people's lives in both rural and urban locations are affected by changing economic and social circumstances including globalisation. 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.

In 2001 a compulsory five-day residential field school will be held during the May break.

AGOC2105
Geomorphology: Catchment Processes and Landscapes
Staff Contact: Dr J. Shen
S2 UC 6 HPW 6 (2L, 4P/T)

Introduction to the principles of geomorphology. Rivers, drainage basins and denudation systems. Weathering, hillslope hydrology, mass movement. Fluvial processes and landforms. Other geomorphic processes and landforms may be emphasised in any one year.

AGOC2107
Social Geography
Staff Contact: Dr P. Tranter
S2 UC 6 HPW 6 (2L, 4P/T)

An examination of how settlements are structured by society and are shaped by people. The course focuses on urban environments as they shape and are shaped by culture, society and politics. Policies of social change are addressed. Other themes in social geography may be emphasised in any one course.

AGOC2108
Geographical Techniques
Staff Contact: Dr. K. White
S1 UC 6 HPW 6 (2L, 4P/T)

An introduction to cartographic methods, spatial analysis, remote sensing and geographic information systems and their applications. In any course one or more of these topics may be emphasised. Other technologies used in geography may be discussed.

AGOC2109
Geographical Issues in the Asia-Pacific Region
Staff Contact: Dr. G. Banks
S2 UC 6 HPW 6 (2L, 4P/T)

This course is concerned with a range of contemporary geographical issues in the Asia-Pacific region. These may include landscape processes and problems; biogeography and biodiversity; population and urbanisation; trade, tourism and transport; poverty and rural development; resource exploitation and environmental management; and environmental hazards and human response. Case studies from particular areas and countries in the region may be emphasised in any one course.

Additional Level II courses may be offered

AGOC2103
Cartographic Methods

AGOC2106
Remote Sensing Applications

Asia–Pacific Studies Program

The following are Level II courses in the Asia–Pacific Studies Program.

AGOC2101
The Geography of Development 2
See AGOC3101 for details

AGOC2109
Geographical Issues in the Asia-Pacific Region

See AGOC2109 entry above for details

Level III

Eight Level III Geography courses will be offered in Year 2001, four in each session. Each course comprises six units of credit and up to six contact hours per week. To obtain a major in geography, students must have completed Geography 1A and 1B, two Level II geography courses including one that involved a residential field school (either AGOC2105 or AGOC2107 in 2000), and four Level III geography courses including AGOC3106 Geographic Research Methods. Note that Geographic Research Methods will involve a residential field school of several days duration. A major – minor in geography comprises a major as outlined above plus any two other courses not previously selected for the major sequence.

Field work may be required as part of each course. It is important that students enrolling in Level III Geography indicate their choice of courses for both sessions at the time of enrolment.

Syllabus Details for Level III Geography Courses

AGOC3101
The Geography of Development
Staff Contact: Dr. Rochelle Ball
S2 UC 6

Theories and explanations of development and underdevelopment. An examination of 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 primarily drawn from the Asia-Pacific Region and may cover a range of geographical scales from international to the household.

AGOC3103
Ecological Systems
Staff Contact: Mr. D. Paull
S2 UC 6

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, landscape ecology, island ecology or animal ecology.

AGOC3104
Environmental Hazards
Staff Contact: Dr J. Burgess
S2 UC 6

The principles of hazard research; the nature of environmental hazards; hazard perception, adjustment, planning and management.

AGOC3105
Geographic Information Analysis
Staff Contact: Dr K. White
S1 UC 6

An introduction to the various methodologies involved with the collection, analysis and display of geographic information. Applications of geographic information systems are highlighted.

AGOC3106
Geographic Research Methods
Staff Contact: Dr G. Banks
S2 UC 6

Research frameworks in geography. Topic definition, theory and methodology. Practicalities of data collection and field work. Data analysis and interpretation. Reporting research findings. Applications of geographic research. Research ethics. The course provides students with experience in designing and undertaking a field-based geographic research project. Students should note that this course involves a residential fieldschool of several days duration. The course must be completed to a satisfactory level to satisfy the requirements for a major in geography.

AGOC3107
Geomorphological Systems
Staff Contact: Dr J. Croke
S1 UC 6

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 reference to one or more of the following: fluvial, karst, arid, cold climate, slope and coastal systems. The management of geomorphic systems may be emphasised in any one year.

AGOC3111
Resource Management
Staff Contact: Dr G. Banks
S1 UC 6

The course is concerned with the analysis, allocation and management of natural resources. It involves understanding the characteristics of resources; what is involved in their allocation; and, how they are managed. Case studies are examined in parts of the course.

AGOC3113
Transport Geography
Staff Contact: Dr P. Tranter
S1 UC 6

This course evaluates alternative approaches to the geographical study of transport, using a range of case studies from Australia and overseas. Specific transport issues are investigated.

Additional Level III options that may be offered

AGOC3102
Cultural Geography

AGOC3108
Global Change

AGOC3109
Political Geography

AGOC3110
Population and Development

AGOC3112
Selected Special Topics

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.

AGOC4191
Geography 4 (Honours) F/T
Staff Contact: Dr. C. Robinson
UC48 S1 S2

AGOC4192
Geography 4 (Honours) P/T

UC24 S1 S2

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.

AGOC4193
Geography 4 (Combined Honours) F/T
UC24 S1 S2

AGOC4194
Geography 4 (Combined Honours) P/T
UC12 S1 S2

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

The study of Oceanography begins with Level I Marine Science and continues in second and third year with Level II and III Oceanography to develop a major or a minor. Level I Marine Science provides students with a broad introduction to the study of the oceans, including topics in ocean and atmosphere circulation, marine physics, chemistry, biology, ecology and geology. Level II and III Oceanography uses physical and applied mathematical arguments to develop an understanding of physical phenomena that take place within the world's oceans. For students wishing to study Oceanography 2A and/or 2B, Mathematics 1A or 1B is assumed knowledge as the courses require a basic understanding of algebraic manipulations and calculus. The emphasis in Level II and III Oceanography is placed on physical oceanography but the courses include components covering marine acoustics and optics and marine chemistry. Additional Marine Science courses are offered as part of the General Education Program.

Level I Marine Science

Two courses are offered in Level 1 Marine Science and both are required for a major or minor in Oceanography. The courses introduce students to many aspects of the oceans, their biology, ecology, chemistry, geology, physics and impact on climate. Also, the importance of the oceans to Army, Navy and Air Force operations are considered. Marine Science 1A concentrates on the physical processes of the oceans while Marine Science 1B treats aspects of the geology, biology, ecology and chemistry of the oceans. Both courses involve lectures, tutorials and laboratory work with a field school normally held in the May recess as part of Marine Science 1A.

AGOC1301
Marine Science IA
Ocean Process and Circulation
Staff Contact: A/Prof. P. Holloway
UC6 S1 L3 LAB3

An historical introduction to Marine Science, general properties of sea water, an introduction to waves and tides, oceanic and atmospheric circulation and their impacts on climate, El Nino.

AGOC1302
Marine Science 1B
The Global Ocean
Staff Contact: Dr G. Symonds
UC6 S2 L3 LAB3

Marine and submarine topography, marine geology and seismology, structure of the sea floors, marine sediments, chemical oceanography, environmental and biological oceanography, marine ecology, marine resources and management, and defence oceanography.

LEVEL II Oceanography

The 12 units of credit for Level II Oceanography are made up from AGOC2301 Oceanography 2A, AGOC2302 Oceanography 2B and 6 units of credit from the other listed courses. Mathematics 1A or Mathematics 1B is assumed knowledge for Oceanography 2A and Oceanography 2B.

AGOC2301
Oceanography 2A
Introductory Ocean Dynamics
Staff Contact: A/Prof. P.Holloway
S1 UC3 (26L + 4 x 3 hour labs + 4 day field school)

Physical properties of the oceans and sea water including topics on salinity, temperature, density, water column stability, and double diffusion. An introduction to the flow of fluids and a description of the forces that control the currents of the world's oceans. Ideas of space-time scales in the ocean. The dynamics of wind-driven flow, the Ekman and geostrophic balances, and inertial oscillations. A field school is normally held during the May recess where students collect, process and analyse oceanographic data.

AGOC2302
Oceanography 2B
Ocean Waves and Processes
Staff Contact: Dr H. Wang
S2 UC3 (26L + 6 x 3 hour labs)

Topics on surface gravity waves including wave dispersion, short and long surface waves, wave groups, wind generation of waves, surf and rip currents, wave refraction and diffraction. Tides in the oceans and the dynamics that govern tidal processes. Topics include equilibrium tidal theory, semi-diurnal and diurnal tides, Spring-Neap cycles, tides in gulfs. Selected topics in applied oceanography.

APHY2112

Sonar and Underwater Optics (School of Physics)

Staff Contact: Dr. G.A. Stewart
S1 UC3 L21 T4 P12

Plane wave approximation, acoustic refraction, ray tracing and sound channels; acoustic wave theory, the decibel unit, transmission across a media interface and propagation loss; acoustic beam formation and electronic steering; sonar applications: active sonar versus passive sonar, echo sounders, sidescan sonar, sonobuoys, towed arrays, multiple beam and switching sonar; sonar equations and sonar system effectiveness. Mechanisms for attenuation of light by sea-water, the extra-low frequency and blue transmission windows; airborne mapping of coastal waters: the Nd:YAG infra-red laser, frequency doubling, Q-switching, and the Australian ("LADS") and US ("ABS") systems.

ACHEM 2114

Marine Chemistry 2 (School of Chemistry)

Staff Contact: Dr. A. P. Arnold
S2 UC3 HPS24

Open only to students enrolled in Level II Oceanography.

This course 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.

Additional Level II courses may be offered

AGOC2306
Remote Sensing Applications
AGOC2310
Coastal Dynamics

LEVEL III Oceanography

The 24 units of credit for Level III Oceanography are made up from the following courses. Oceanography 2A and Oceanography 2B are assumed knowledge for Level III Oceanography courses.

AGOC3301
Ocean Circulation and Mixing
Staff Contact: Dr. C. Hearn
S1 UC6 (3LPW + 6 x 4 hour labs)

This course examines the dynamics of large-scale wind driven ocean currents. The course aims to explain why there is a broad equatorward flow in all the major ocean basins, except the Southern Ocean, and why there are strong, poleward flowing boundary currents such as the Gulf Stream and the East Australia Current on the western boundaries. The production of turbulence in the oceans and its role in mixing is also examined. The discussion of mixing in the ocean includes Kolmogoroff and Batchelor lengths, molecular mixing and diffusive boundary layers; the logarithmic boundary layer and mixing lengths; vertical mixing by wind and tidal stirring; dispersion in the ocean, its measurement, and the Taylor mechanism.

AGOC3302
Continental Shelf Oceanography
Staff Contact: Dr. G. Symonds
S2 6UC (3LPW + 6 x 4 hour labs)

The course examines wind driven currents on continental shelves where the presence of a land boundary places significant constraints on the circulation. Topics covered include the steady response to cross-shore winds, coastal trapped waves and storm surges. An introduction to the nature and properties of internal waves in the ocean. Topics include the application of the internal wave equation to interfacial waves and waves in a continuously stratified ocean; internal wave generation by ships and submarines; internal wave instabilities; internal seiches; and solitary internal waves.

AGOC3303
Oceanographic Data Acquisition and Analysis
Staff Contact: Dr.G.Symonds
S1 UC3 (2LPW + 6 x 3 hour labs)

Instrumentation and measuring techniques used in obtaining oceanographic observations. Both traditional and modern technologies and methods are examined including satellite remote sensing. Introduction to commonly used time series analysis tools used in analysing oceanographic data. This includes lagged-correlation, digital filtering and spectral analysis. Both theory and applications are considered.

AGOC3304
Oceanography Research Report
Staff Contact: A/Prof. P. Holloway
S1 UC3 (2TPW)

The course of study aims to develop students understanding of a particular facet of Oceanography through the preparation of a presentation and report. Students are introduced to basic research methodologies and techniques and are required to consider effective ways of communicating the knowledge they acquire in a specialised area.

AGOC3305
Regional Oceanography
Staff Contact: Dr. C. Hearn
S2 UC3 (2LPW + 6 x 3 hour labs)

The oceanography of the Australian region including the major current systems, such as the East Australia Current and the Leeuwin Current, and their influence on coastal communities, fisheries, climate and marine ecology. Regions outside of Australian waters may also be considered. The dynamics of estuaries, embayments and lagoons and the modelling of their flushing times, and mixing regimes, in relation to the environmental quality of the land-sea margins.

AGOC3306
Oceanography Research Project
Staff Contact: Dr. H. Wang
S2 UC3 (2TPW)

The project aims to broaden students understanding of a particular aspect of oceanography through consideration and analysis of a small body of data. Students research skills, methodologies and planning abilities are extended as they examine a topic of particular interest and prepare their interpretation/comment for presentation.

AGOC4191
Oceanography 4 (Honours) F/T
Staff Contact: Dr G. Symonds
UC48 S1 S2

AGOC4192
Oceanography 4 (Honours) P/T
UC24 S1 S2

Candidates for Honours in Oceanography must undertake an approved research project and prepare a thesis. Additional requirements will normally include the completion of prescribed coursework and assignments and attendance at oceanography research seminars.

AGOC4193
Oceanography 4 (Combined Honours) F/T
UC24 S1 S2

AGOC4194
Oceanography 4 (Combined Honours) P/T
UC12 S1 S2

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 minor sequences in History begin with Level I History.

Students have maximum flexibility in completing major or minor sequences. They are able to select their own combinations of single-session courses at Upper Level. For a Major they must complete 36 units of Credit at the upper level. A Minor consists of any combination of Level I and upper level courses to the value of 24 units of Credit.

The Honours Program

The normal honours program in History will begin in third year. For details see Course Descriptions (below).

Course Descriptions

Level I

AHIS1103
History 1A
Conflicts in Context: aspects of world history 1900-1941
Staff Contact: Dr David Blaazer
UC6 S1 HPW3

Prerequisite: As for English 1

The course will study the major military and civil conflicts of the first half of the twentieth century. As well as studying the course of the conflicts, we will also examine their causes and

consequences, in order to gain an understanding of the major forces which have shaped the twentieth century world. The course will begin with the imperial conflicts which marked the beginning of the century, and will include a study of the First World War and the social and political turmoil which preceded and followed it, before concluding with a study of the early 'European' phase of the Second World War. Using a range of media, the course will introduce students to skills, problems and intellectual approaches specific to the discipline of history.

AHIS1104
History 1B
Conflicts in Context: aspects of world history 1941 to the present
Staff Contact: Dr David Blaazer
UC6 S2 HPW3

Prerequisite: As for English I

The course will study the major military and civil conflicts of the second half of the twentieth century. As well as studying the course of the conflicts, we will also examine their causes and consequences, in order to gain an understanding of the major forces which have shaped the twentieth century world. The course will begin with the entry of the USSR and the USA into the Second World War, which established the framework of a post-war world characterized by 'cold war' between two superpowers. After study of post-colonial and 'proxy' wars, including Vietnam, we will conclude with an examination of critical post cold-war conflicts including the Gulf War, former Yugoslavia, and East Timor. Using a range of media, the course will introduce students to skills, problems and intellectual approaches specific to the discipline of history.

Upper Level

AHIS2101
Colonial Australia
Staff Contact: Mr Gerry Walsh
UC6 S1 HPW3

Prerequisite: History 1A or 1B

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.

AHIS2106
Naval History and Sea Power in the C20
Staff Contact: Dr John Reeve
UC6 S2 HPW3
Prerequisite: History 1A or 1B

The course will deal with issues surrounding navies and sea power, on the international stage, from the 1890s to the 1990s and beyond. The emphasis will be on naval power as a vital part of the wider context of twentieth century history. In terms of naval warfare, the emphasis will be on strategic and grand strategic, rather than tactical themes, although these will feature in case studies (e.g. the Battle of the Atlantic). Major topics will include Mahan and the classical maritime strategists, the world wars at sea, sea power and the British empire, the Cold War, contemporary issues and the future of sea power, naval command, the experience of naval warfare, and naval historical writing and the current state of naval history.

AHIS2107
Revolts and Counter-Insurgency in Southeast Asia
Staff Contact: Mr Gerry Walsh
UC6 S2 HPW3

Prerequisite: History 1A or 1B

The course 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 course deals with case studies in Burma, Malaya, the Philippines, Indonesia and Vietnam.

AHIS2109
Russian History
Staff Contact: Dr Linda Bowman
UC6 S1 HPW3
Prerequisite: History 1A or 1B

This course explores state-building in Russia from the era of the Kievan Rus in the tenth century to the revolutions of 1917. It focuses on the politics and personalities of the tsars, including Ivan the Terrible, Peter the Great, Catherine the Great and Nicholas the 'Bloody'. We will also interrogate the causes and results of Russia's particular path of modernization. Several case studies highlight the way Russia waged war and how this influenced the development of Russian society and culture. Russian music, art, film, memoirs and literature will serve as windows into the lives, culture and society of the Russian people.

AHIS2111
Social Change in East Asia
Staff Contact: Dr Stewart Lone
UC6 S1 HPW3
Prerequisite: History 1A or 1B

This course charts the social and political changes in Japan and China throughout the twentieth century. The first half of the course concentrates on Japan's military and political expansion in Asia up to 1945, plus the development of communism in China and its role in ending the period of rule by warlords. The latter part of the course examines the rise of demilitarised Japan as an economic power and its socio-economic problems in the 1990s; also the unification of China along socialist lines, followed by the devastation of 'continuous revolution' in the 1960s, and the economic changes of the 1980s-90s.

AHIS2117
The Origins of Modern War
Staff Contact: Prof Peter Dennis
UC6 S2 HPW3

Prerequisite: History 1A or 1B

A study of warfare from the early 16th century to the eve of the First World War, with some preliminary attention to ancient and medieval warfare. The course emphasises the changing nature of warfare and the forces employed in it, discussing such topics as the emergence of professional standing armies, the growth of centralised bureaucratic power, the development of staff systems and of professionalism, problems of reform, and the influence of wider political, social and economic factors.

AHIS2119
The Second World War
Staff Contact: Ms Debbie Lackerstein
UC6 S1 HPW3

Prerequisite: History 1A or 1B

This course seeks to give the student an understanding of the greatest conflict in history through a broad coverage of its military, social, political, economic and moral aspects. The course traces the major campaigns and key turning points of the military war and deals with the impact of the war on life on the home fronts and under German occupation. Students will also be introduced to the moral issues raised by this world conflict and the differing historical interpretations of them: the barbarisation of warfare, the Final Solution, the dropping of the first atomic bomb and the trials which ended the war.

AHIS2120
War and Society in Australia 1788-1988
Staff Contact: A/Prof Jeffrey Grey
UC6 S2 HPW3

Prerequisite: History 1A or 1B

This course is designed to provide students with an understanding of the impact of war, the military, and defence issues generally on the development of Australian society over the two hundred years of European settlement, with an emphasis upon the period since 1899. While not neglecting the pre-Federation period, the focus of the course is on substantive issues arising from involvement in Australia's wars in the twentieth century and the periods of peace between them.

AHIS2121
The War in the Air
Staff Contact: Dr Alan Stephens
UC6 S2 HPW3

The course will analyse the impact of air power on warfare, from its influential but supporting role in World War 1 through to its extraordinary dominance in the Gulf War and Kosovo. Attention will focus on operations (in both major and minor conflicts), theory, strategy, technology, the moral dimension, and so-called 'virtual war'.

Additional upper level options that may be offered in other years:

AHIS2112
Soviet History

AHIS2116
The Making of Contemporary Society

AHIS2103
European Powers in Peace and War 1870-1914

AHIS2105
Modern Australia: Politics & Culture

AHIS2104
Fall & Rise of Europe: 1945-Present

AHIS2108
Rise of Modern Navies and Sea Power, 1500-1900

AHIS2115
The Great War 1914-1918

The BA (Honours) in History

The honours program has been designed on the assumption that honours work will commence in the third year of degree studies. The pattern envisaged is as follows:

AHIS3191
History 3A (Preliminary Honours)

AHIS3192
History 3B(Preliminary Honours)
Staff Contact: Dr Stewart Lone
S1 S2 UC6 HPW2

Prerequisites: 2 upper level History courses

Corequisites: 3 upper levelHistory courses

A course (to be determined) to be taken in addition to the pass courses chosen from the Upper Level History Program.

AHIS3193
History 3A (Combined Preliminary Honours)
S1 UC3

AHIS3194
History 3B (Combined Preliminary Honours)
Staff Contact: Dr Stewart. Lone
S2 UC3 HPW3

In this program, coursework is divided between the School of History and another School as approved by the Heads of the two Schools concerned.

AHIS4191
History 4 (Honours) F/T
UC48 S1 S2

AHIS4192
History 4 (Honours) P/T
Staff Contact Dr Stewart Lone
UC24 S1 S2

Prerequisite: Preliminary Honours

Students will complete an historical thesis of approximately 15,000 words, together with a course of study in historiography and a special course (to be determined).

AHIS4193
History 4 (Combined Final Honours) F/T
UC24 S1 S2

AHIS4194
History 4 (Combined Final Honours) P/T
UC12 S1 S2

Staff Contact: Dr Stewart Lone

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 jointly by the two Schools. In addition, candidates are required to complete coursework as approved by the Head of School.

School of Language, Literature and Communication

The School of Language, Literature and Communication offers courses 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 courses are offered at first, second, and third year level in English, and at first, second and third year level in Indonesian.

English

A major sequence in English will normally consist of English 1A, 1B (12 units of credit), followed by 36 units of credit in Upper Level courses (normally 12UC at Level II, and 24UC at Level III). A minor sequence in English requires 12UC at Level I and 12UC of Upper Level courses. A major/minor sequence requires 12UC at Level I and at least 60UC in Upper level courses.

Science and Engineering students may satisfy their General Education requirements, in part, by passing any two English General Education courses (3 units of credit).

Details of undergraduate courses offered in 2001 are set out below.

Asia-Pacific Studies

Students with the necessary pre-requisites may construct a minor in Asia-Pacific Studies. The course available in 2001 from the School of Language, Literature and Communication is Australia and the Asia Pacific in second session. Details are provided on p.61.

Level I

AENG1101
English 1A
Staff Contact: A/Prof. A Caesar
UC6 S1 HPW4 (L3 T1)
Prerequisite: See p.45.

This course provides an introduction to reading and writing practices in contemporary society. Through readings of various texts, both 'classic' and 'popular', from the Renaissance to the present day, students encounter the major literary genres, poetry, drama, and the novel, as well as other modes, such as biography and autobiography. There is considerable emphasis on improving students' own writing skills. Part of the course will be devoted to a series of writing lectures and workshops which will help students with formal grammar and essay writing, and give them the opportunity to experiment with writing in various genres.

AENG1102
English 1B
Staff Contact: Dr C. Pratt
UC6 S2 HPW4 (L3 T1)

Prerequisite: See p. 45.

This course introduces students to recent Australian writing and media, including poetry, fiction, journalism and film. The course looks at the literary and historical heritage of present-day Australia and its influence in shaping contemporary understanding of what

it means to be Australian. Texts include writing which experiments with or develops traditional forms, often crossing conventional genre boundaries. As in English 1A, there is emphasis on improving students writing and reading skills, especially when approaching new texts and films.

Upper Level

Courses offered at upper level consist of (a) a series of option courses devoted to chronological and introductory surveys of major periods of English, American and Australian writing, and(b) a range of thematic options.

Schedule of Upper Level English Courses offered in 2001

Session 1

AENG2101	C16/17 Literature
AENG2115	The Australian Literary Heritage
AENG2116	C19 American Literature
AENG2117	Romanticism and Revolution
AENG2113	Late C19 Literature
AENG2109	Modernism and After

Session 2

AENG2118	Modern Drama
AENG2107/AENG3107	Communications (1)
AENG2120	Creative Writing and Reading
AENG2119	Australian War Literature
AENG2121	Australia and the Asia Pacific
AENG2122	Women's Writing

AENG2101
C16/17 Literature
Staff Contact: Dr P. Looker and MrJ. Doyle
S1 UC6 HPW3

This course focuses on the evolution of literary, dramatic and some cultural works from about 1520 to the 1680s: the literature of the period of Henry VIII; the 'Golden Age' of Elizabeth I; the early Stuarts, James I and Charles I; the Civil War and Commonwealth periods of the mid-seventeenth century; and the Restoration from 1660-1688. The course covers a period of enormous social change and incorporates some fundamental questions about what the past means to us, how we understand the past, and how we read works from the past. It explores works from various social, cultural and theoretical perspectives. (NB. Students who studied AENG2101 'Language Revitalised' in 2000 are not eligible for this course in 2001.)

AENG2115
The Australian Literary Heritage
Staff Contact: Dr C. Pratt
S1 UC6 HPW3

This course examines writing in Australia from the beginnings of white settlement to the early part of the twentieth century, including literary works which have contributed to the development of an Australian cultural identity as well as a range of materials such as explorers' accounts, diaries and journalism which respond to the Australian experience. The course maps some of the influences of European and American literature on Australian writing and considers the ways in which Australians responded to the great intellectual debates of the 19th and the early 20th centuries.

AENG2116
C19 American Literature
Staff Contact: Dr D Headon and Dr H. Neilson
S1 UC6 HPW3

This course is designed to familiarize students with some of the most significant and influential authors and works of American literature of the nineteenth century. The course will enhance students' knowledge of the history, culture and politics of the United States in the nineteenth century.

AENG2039
Romanticism and Revolution
Staff Contact: Prof B. Bennett and A/Prof A Caesar
S1 UC6 HPW 3

This course is a study of Romanticism which includes the works of such poets as Blake, Wordsworth, Coleridge, Byron and Keats and selected prose works that might include the Gothic novel, the writings of Mary Shelley, Dorothy Wordsworth and the Brontë sisters. The course will consider the development of Romantic ideas and aesthetics in relation to the social and political upheavals of the period.

AENG2113
Late C19 Literature
Staff Contact: Dr C. Pratt and Dr P. Looker
S1 UC6 HPW3

This course explores a number of themes through a study of novels and non-fiction prose from the last two decades of the nineteenth century: horror as a response to modern city life, the advent of Freudian psychology, the 'woman question' (late nineteenth-century feminism), and the emergence of detective fiction. (NB. Students who studied AENG2113/AENG3113 'The Century's Corpse' in 2000 are not eligible for this course in 2001.)

AENG2109
Modernism and After
Staff Contact: A/Prof. A Caesar
S1 UC6 HPW3

This course covers some of the major works of the Modernist period, 1900-1920, and of the further development and reaction that followed it in the 1920s and 1930s. The literary works on the course are read against a background of preceding and contemporary literary, political and artistic movements..

(NB. Students who studied AENG2109/AENG3109 'Literature and Society 1900-1920' in 2000 are not eligible for this course in 2001.)

AENG2118

Modern Drama
Staff Contact: Dr P. Looker and A/Prof S.Lever
S2 UC6 HPW3

Beginning with the modern revival of drama in the late nineteenth century, this course investigates some of the most significant approaches to stage drama up to the present time. Examples of naturalism, realism, anti-realism, absurdist drama and political drama will be included. Students will be encouraged to think about performance aspects of the works studied.

AENG2119
Australian War Literature
Staff Contact: A/Prof A .Caesar
S2 UC6 HPW 3

This course comprises a study of various works, including novels, poetry, personal memoirs and films which focus on the depiction of warfare in Australian society. Themes explored include the mythology of ANZAC, representations of the soldier, of the enemy and of violence, together with the place of love and mateship in war.

AENG2107/AENG3107
Communications (1)
Staff Contact: Mr J. Doyle
S2 UC6 HPW

This course studies some of the theories and practices of communications and media, with an emphasis on the connections between visual and written works and criticism. The course will consist of selected theoretical readings integrated with two or three broad modules of practical analysis chosen from such generic or thematic topics as: 'classic' Hollywood; writing for TV; journalism; news photographs; science fiction; documentaries; the sitcom; sports writing; Asian film; and special studies.

AENG2120
Creative Writing and Reading
Staff Contact: A/Prof S. Lever and A/Prof A. Caesar
S2 UC6 HPW3

This course begins with a detailed examination of the formal aspects of poetry, using the set anthologies. Students will examine the constraints and freedoms of poetic form and undertake the task of writing poetry in a range of forms. The course will consider the distinctions between poetry and prose before moving to study the problems inherent in storymaking. Examples of narrative style will be examined and the final part of the course will focus on the work of contemporary short fiction writers. Students will write several stories of their own in order to develop their understanding of narrative technique.

AENG2121
Australia and the Asia Pacific
Staff Contact: Prof B. Bennett and Mr J. Doyle
S2 UC6 HPW3

This course explores literary, visual and cultural links between Australia and countries of the Asia-Pacific region. The course maps changing Australian attitudes, outlooks, values and expectations, as expressed in literary and cinematic works in relation to 'Asia' and to individual countries such as China, India, Japan, Sri Lanka, Indonesia, Malaysia and Singapore.

AENG2122
Women's Writing
Staff Contact: Dr C. Pratt
S2 UC6 HPW3

This course will raise issues of gender, race and politics which reveal the complexity of women's identity and women's writing. Works may be selected from various periods, nations and genres: for example, Australian women's writing, American women's writing, nineteenth and twentieth century women's writing, and works written by women in the early modern period.

ENGLISH HONOURS

The English Honours program is designed for students showing a special interest in and aptitude for advanced work in the discipline.

Entry to English Honours is at the discretion of the Head of School. Students normally enter the program at the beginning of the second full year of academic study, and will be expected to have completed UC24 by the end of their first year of enrolment, with passes in English 1A and 1B at credit level or better. Rules governing the award of the degree of Bachelor of Arts with Honours are set out on p. 53 of this Handbook.

Level II English Honours

Staff Contact: Dr H. Neilson

Prerequisite: AENG1101 and AENG1102 passed at credit level or better.

At Level II English Honours students enrol in: S1 two options of their choice taken from Upper Level English courses and S2 another option of their choice plus AENG 2193 'Foundation Works of Western Culture'.

AENG2193
Foundation Works of Western Culture (2H)
Staff Contact: Dr H. Neilson
S2 UC6 HPW3

This course is designed to offer students some familiarity with a range of key works, myths and ideas in Western culture. The course will begin with material from the Old and New Testaments, and an introduction to the Hellenic pantheon, focused upon Homer's 'Odyssey'. The course will continue with works from the medieval period through to the nineteenth century. Principal works by such authors as Chaucer, Shakespeare, Milton, Pope and Wordsworth will be included.

Level III English Honours

Staff Contact: A/Prof A. Caesar

Prerequisite: Entry to English III Honours is at the discretion of the Head of School. Students will normally have passed four upper level English courses including AENG2193 (2H), at credit level or better.

Level III English Honours students enrol in : S1 three options of their choice taken from the English upper level courses plus AENG3191 'Issues in Contemporary Criticism and Theory' and S2 four options taken from the English upper level courses.

AENG3191
Issues in Contemporary Criticism and Theory (3H)
Staff Contact: Dr C. Pratt and Dr H. Neilson
S1 UC6 HPW3

In this course, students will consider works outside traditional canons. Feminist, Aboriginal, postcolonial and genre writing will be discussed in relation to the critical theories of the last twenty years.

AENG4191
English 4 (Honours) F/T
UC48 S1 S2

AENG4192
English 4 (Honours) P/T
Staff Contact: A/Prof P. Eggert
UC24 S1 S2

Prerequisite: Entry to English IV Honours is at the discretion of the Head of School. Students will normally have passed at least ten upper level English courses, including AENG3191 (3H), 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.
- Australia and the Asia-Pacific (first session); C20th Literary Theory (first session).
- American Fiction and Film (second session); British Fiction and Film (second session).

AENG4193
English 4 (Combined Honours) F/T
UC24 S1 S2

AENG4194
English 4 (Combined Honours) P/T
UC12 S1 S2

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.

Indonesian

From 2001 Indonesian language and culture classes will be available on campus from 1st to 3rd year levels. Students who have completed Year 12 Indonesian or equivalent studies, may apply for exemption from Indonesian 1A and 1B and enrol in Level II Indonesian course to approval from the course authority.

AIND1101
Indonesian 1A
Staff Contacts: Dr M. Sakai and Mr J. Doyle
UC6 S1 2L 4T HPW 6

This is the first session of a study of elementary Indonesian language and culture. It may be followed by Indonesian 1B and Indonesian 2A and 2B to form a minor, or with Indonesian 1B, 2A, 2B, 3A and 3B to form a major. It requires 6 contact hours per week including 2 lectures and 4 language tutorials. Students are expected to attend at least one contact hour every day for Level I Indonesian courses.

AIND1102
Indonesian 1B
Staff Contacts: Dr M. Sakai and Mr J. Doyle
UC6 S2 2L 4T HPW 6

Prerequisite: Students must have passed Indonesian 1A.

This is the second session of elementary Indonesian language and culture. It builds on the entry level course Indonesian 1A. It may be followed by Indonesian 2A and 2B to form a minor or with Indonesian 2A, 2B, 3A and 3B to form a major.

Level II

AIND2101
Indonesian 2A
Staff Contacts: Dr M. Sakai and Ms I. Nurhayati
UC6 S1 2L 4T HPW 6

Prerequisite: Students must have passed Indonesian 1B or equivalent.

This is the first session of an intermediate level of a study of Indonesian language and culture which focuses on oral competence in Indonesian as well as comprehensive understanding of Indonesian cultures and society. It is followed by Indonesian 3 to form either a minor or a major or with Indonesian 3 and 4 to form a major. Level II Indonesian courses require 5-6 contact hours per week. Students are expected to attend at least one contact hour each day.

AIND2102
Indonesian 2B
Staff Contacts: Dr M. Sakai and Ms I. Nurhayati
UC6 S2 2L 4T HPW 6

Prerequisite: Students must have passed Indonesian 2A or equivalent

This is the second session of an intermediate level of a study of Indonesian language and culture which focuses on oral competence in Indonesian as well as comprehensive understanding of Indonesian cultures and society. It is followed by Indonesian 3 to form either a minor or a major or with Indonesian 3 and 4 to form a major. Level II Indonesian courses require 5-6 contact hours per week. Students are expected to attend at least one contact hour each day.

Level III

AIND3101
Indonesian 3A
Staff Contacts: Dr M. Sakai and Ms I. Nurhayati
UC12 S1 L1 T5 HPW 6

Prerequisite: Students must have passed Indonesian 2B or equivalent.

This is the first session of an advanced Indonesian course, which focuses on oral competence in Indonesian as well as comprehensive understanding of Indonesian cultures and society. Students are expected to read and respond to authentic Indonesian materials. They should develop advanced language skills as well as a good understanding of the topics covered in class. Level III Indonesian courses require 5-6 contact hours per week. Students are expected to attend at least one contact hour each day.

AIND3102
Indonesian 3B
Staff Contacts: Dr M. Sakai and Ms I. Nurhayati
UC12 S2 L1 T5 HPW 6

Prerequisite: Students must have passed Indonesian 3A or equivalent.

This is the second session of an advanced Indonesian course, which focuses on oral competence in Indonesian as well as comprehensive understanding of Indonesian cultures and society. Students are expected to read and respond to authentic Indonesian materials. They should develop advanced language skills as well as a good understanding of the topics covered in class. Level III Indonesian courses require 5-6 contact hours per week. Students are expected to attend at least one contact hour each day.

School of Mathematics and Statistics

Mathematics teaches us how to define a problem with precision, how to break it up into a series of clearly defined steps and analyse it logically, and how to assess the answer and its implications.

The skills developed when problems are defined and analysed in mathematics are universal and of value to anyone who has to face complex problems and make decisions.

Science and Technology are based on mathematical thinking and use the language of mathematics. The humanities as well as the natural sciences draw on the power of mathematics, particularly probability and statistics, to predict, plan and understand natural and human affairs. As society becomes increasingly dependent on technology, mathematics is becoming more of an essential tool in our lives.

The School of Mathematics and Statistics offer courses in the Bachelor of Science, Bachelor of Arts, Bachelor of Technology and Bachelor of Engineering programs.

The Level I courses build on high-school mathematics to give a broad introduction to mathematics and statistics. Here the basic language and techniques of mathematics and statistics are taught.

At Level II students have a choice of courses to take. Linear Systems builds on the basic concepts of linear algebra introduced in Mathematics 1A and looks at a variety of applications. Discrete Dynamics is the study of quantities that change at discrete points in time such as the size or genetic make-up of populations, while Modelling Continuous Systems shows how differential equations are used describe aspects of the natural and artificial world. The Networks and Patterns course provides an introduction to the mathematics of graphs and networks, looking at some of the key problems and applications. Two courses in Data Analysis and Regression Modelling give the material necessary for an introduction to Statistics and Operations Research.

Level III courses go into a variety of applications of mathematics, probability and statistics, and also delve into mathematical techniques in greater depth.

A fourth (Honours) year is offered to students with talent and enthusiasm for mathematics. In an honours year, students use the mathematics they have learnt to pursue a research project, as well as undertaking further coursework.

The School also offers courses in the General Education program for Arts students. These may be taken in either second or third year. Two courses introduce statistical data analysis and statistical modelling techniques that are important in the social sciences, while a third introduces the history, ideas and uses of mathematics.

Outline of options in the Science and Arts degrees

(a) A student may obtain a **major** in Mathematics or Statistics by completing 12 units at Level I, at least 12 units at Level II and at least 24 units at Level III.

(b) A **minor** consists of 12 units at Level I and at least 12 units at Level II.

(c) The **major/minor** combination consists of 12 units at Level I, at least 24 units at Level II and at least 36 units at Level III.

(d) A fourth year **honours** program is offered for students who have completed a major at a sufficiently high standard.

(e) Students who wish to major in other areas of Science are encouraged to take at least the Level **1 Mathematics** courses.

(f) The **General Education** courses (listed on p.53) are provided for students in the Arts degree.

(g) Level II and Level III statistics courses are also available for students wishing to complete a major or minor in **Operations Research and Statistics**.

The following courses are offered in the Arts and Science programs:

LEVEL I

AMAT1101
Mathematics 1A
Staff Contact: Dr Z.Jovanoski
UC6 S1 L4 T1 LAB2*

Prerequisite: See p 45

An introduction to aspects of mathematics: its logical structure and development; mathematics as a language and tool; the importance of applications as motivators of mathematical developments; the unity of the various branches of mathematics; the role of computers.

Linear algebra: vectors from 2- to n-dimensions; geometrical description of vectors and their uses; systems of linear equations; matrix theory; matrix inverses and determinants; eigenvalue problems. Applications from manpower planning and population dynamics as drivers for the development of the theory. The concept of linearity and its significance.

Calculus: functions of one and two variables - graphical, numerical and algebraic representations; solution of first-order differential equations - separation of variables, the derivative, integration by substitution and using tables, numerical integration, slope fields, Euler's method for graphical and numerical solution, Taylor series and approximate solutions; modelling with first-order differential equations.

* Lab hours are used flexibly for small-group projects, revision and exam preparation.

AMAT1102
Mathematics 1B
Staff Contact: Dr Z.Jovanoski
UC6 S2 L4 T1 LAB2*

Prerequisite: See p.45

Extensions and applications of Mathematics 1A: complex numbers; further calculus; nonlinear systems; probability theory.

Complex numbers: polynomial equations as examples of nonlinear equations and the need for complex numbers; different representations of complex numbers; development of their algebra and applications.

Calculus: optimisation - critical points, points of inflection, local and global extrema, applications; second-order differential equations - algebraic, numerical and approximate algebraic solutions of homogeneous equations with constant coefficients, modelling with second-order differential equations; the definite integral - Riemann sums, the Fundamental Theorem of Calculus, integration problems such as volumes of solids, centres of mass; introduction to partial differential equations - partial derivatives, applications.

Nonlinear systems: the change from linear to nonlinear; simple nonlinear equations and their origins; the nature of the solutions and the revolutionary aspects introduced by nonlinear terms; bifurcation and chaos in nonlinear mathematical modelling.

Probability theory: elementary probability theory, sample space, methods of counting, conditional probability, Bayes' theorem, independence, discrete probability distributions and cumulative distribution functions, expected values and variances, transforming random variables, special discrete distributions, quality control.

* Lab hours are used flexibly for small-group projects, revision and exam preparation.

LEVEL II

All courses are worth 3 units of credit, so students wishing to obtain a minor or major in Mathematics or Statistics must complete at least four Level 2 courses. With the approval of the Head of School, students wishing to take a major/minor combination in Mathematics and Statistics may also take Level 3 courses that do not rely on specific assumed knowledge beyond Level 1.

Students planning to major in Mathematics are stronglyencouraged to take the two courses Linear Systems and Modelling Continuous Systems.

Students wishing to obtain a minor or major in Statistics or Operations Research & Statistics must take the two courses Data Analysis and Regression Modelling.

Mathematics 1A and Mathematics 1B are assumed knowledge for the Level 2 Mathematics and Statistics courses.

In 2001 the following six courses will be offered.

Semester 1	Semester 2
Linear Systems	Modelling Continuous Systems
Discrete Dynamics	Networks and Patterns
Data Analysis	Regression Modelling

AMAT2103
Linear Systems
Staff Contact: Dr S. Barry
UC 3 S1 HPW 2.5

This course builds on the basic concepts of linear algebra introduced in Mathematics 1A and looks at a variety of applications - from fitting curves to data, to modelling systems of differential equations with applications to the evolution of population growth, problems in mechanics, chemical reactions and other areas of science. Key topics include the central concepts of linearity and linear superposition, generalisation of the dot product to an inner product, general vector spaces, and approximation of functions by orthogonal sets such as Fourier Series. Finally these techniques will be applied to partial differential equations , which will be introduced and solved.

AMAT2110
Discrete Dynamics
Staff Contact: Dr H. Sidhu
UC 3 S1 HPW 2.5

Discrete dynamics is the study of quantities that change at discrete points in time such as the size or genetic make-up of populations. Topics covered will include linear difference equations, the role of probability in discrete dynamical modelling, nonlinear difference equations, self-similarity and fractal geometry, systems of discrete equations. Examples will be drawn from diverse areas including biology and finance.

AMAT2106
Data Analysis
Staff Contact: A/Prof E. Catchpole
UC 3 S1 HPW 3

This course gives an introduction to data analysis, with emphasis on the analysis of experiments. It teaches the principles of good experimental design, and focuses on a project where you design and analyse your own experiment. The course introduces a simple statistical package that is used for data presentation and analysis. Topics covered in the course include graphical presentation of data, sampling distributions, confidence intervals, one and two sample hypothesis tests, the analysis of variance and tables of counts.

AMAT2107
Modelling Continuous Systems
Staff Contact: Dr B. Barnes
UC 3 S2 HPW 2.5

Drawing on a basic knowledge of calculus and the fundamental principles of differential equations introduced in Level 1 Mathematics, we develop models from a variety of disciplines (such as biology, geography, archaeology and physics). The properties and methods of solution of first and second order ordinary differential equations arising in these contexts are studied. The emphasis is on applications and, to this end, a range of case studies is included.

AMAT2111
Networks and Patterns
Staff Contact: Prof C. Pask
UC 3 S2 HPW 2.5

Networks are everywhere: roads, telephone lines, airline routes, nerve cells and, of course, computer systems. This course will provide an introduction to the mathematics of graphs and networks, looking at some of the key problems and applications. Topics will include introductory graph theory, the Travelling Salesperson Problem, symmetry and packing, flow in networks.

AMAT2112
Regression Modelling
Staff Contact: Dr M. Collins
UC 3 S2 HPW 3

Regression is one of the most widely used statistical tools. Its purpose is to uncover patterns in data, and to explore relationships between variables. The course emphasises informal techniques rather than mathematical analysis, and model building rather than formal statistical analysis. The importance of graphical methods is stressed. Topics covered include simple linear regression, including diagnostic tools and transformations; multiple linear regression, including model selection and collinearity; and smoothing techniques.

AMAT2113
Special Topic 2A
UC 3 S1

This course 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.

AMAT2114
Special Topic 2B
UC 3 S2

This course 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.

LEVEL III

Students wishing to obtain a major in Mathematics or Statistics must complete at least 24 units of credit at Level 3 (although, with the approval of the Head of School, Level 2 courses which have not previously been taken may be substituted for up to two Level 3 courses). Students wishing to obtain a major in Operations Research & Statistics must take three Level 3 Statistics courses as well as specified courses from the School of Computer Science. They must also complete either a Statistics or a Computing project. Students wishing to complete a major/minor combination must complete at least 36 units of credit at Level 3 and should discuss their program with the third-year course coordinator.

The following courses are grouped loosely into Applied Mathematics and Statistics, although the Financial Mathematics and Stochastic Modelling courses may be considered as part of either a Mathematics or a Statistics major. These courses are planned for 2001, but final selection will depend on student demand and preferences. In particular, it is likely that not all Statistics courses will be offered. (Students wishing to obtain a major in Statistics should contact the Head of School as soon as possible to discuss their program.) In all cases, the choice of courses is subject to the approval of the Head of School.

Applied Mathematics Courses

Semester 1	Semester 2
Biological Mathematics	Projectiles
Financial Mathematics	Industrial Mathematics
Mathematical Methods for Differential Equations	Waves
	Nonlinear Systems
	Complex Variables
	Applied Mathematical Techniques

Statistics Courses

Semester 1	Semester 2
Bayesian Statistics	Statistical Forecasting
Multivariate Data Analysis	Stochastic Modelling
Reliability Modelling	Statistics Project
Statistical Modelling	

Details of courses are given below. All courses are worth 3 units of credit except for *Mathematical Methods for Differential Equations* and the *Statistics Project* which are both worth 6 units.

AMAT3122
Mathematical Methods for Differential Equations
Staff Contact: Dr G. Mercer
UC 6 S1 TH60

This course looks at a variety of methods for solving ordinary and partial differential equations. Examples and applications used to motivate the course will be drawn from areas such as solid and fluid mechanics, electrical circuits, chemical balance systems, pattern formation, heat, ozone creation in the atmosphere and river pollution. The types of problems and methods of solution considered will include: series solutions, systems of differential equations (including phase plane analysis), boundary value problems, partial differential equations and elementary perturbation analysis. Computational methods for solution of ordinary and partial differential equations will be introduced and software packages such as Matlab and Maple will be used to implement the algorithms and visualise the results.

AMAT3119
Biological Mathematics
Staff Contact: Dr G. Aldis
UC 3 S1 TH30

The current scientific literature shows how extensively different types of mathematics can be applied to biology and medicine. This course considers recent developments in a selection of these areas. Possible topics include: how size matters in insect flight or in how animals jump; scale effects in animal physiology and body design; fractal structures in nature; emerging infectious diseases and strategies to reduce their spread; metabolic processes including poisons, drugs in sport, blood glucose and insulin, and the nonlinear kinetics of enzymes.

AMAT3121
Financial Mathematics
Staff Contact: Dr S.J. Garth
UC 3 S1 TH30

Financial engineering is one of the fastest growing areas in the modern banking and corporate world. This, together with the sophistication of modern financial products, provides a rapidly growing impetus for new mathematical models and methods. The course covers an introduction to the pricing of options, futures, and other financial derivatives. Topics include: present and future values, valuation of bonds and stock, arbitrage, lognormal model of stock price movement, analytical solutions for European options, binomial model for pricing options, exotic options. We also discuss options and the stock market in practice, and closely follow the fortune of some exchange-traded options and their underlying stock over the course of the semester.

AMAT3113
Projectiles
Staff Contact: Dr R. Weber
UC 3 S2 TH30

This course will consider the motion of projectiles from a mathematical point of view. The major forces; namely, gravity, drag and lift, will be included in progressively more sophisticated models of projectile motion, with an emphasis on being able to determine numerical values for all relevant parameters and on

calculating complete trajectories. Advanced topics, such as the effect of the Coriolis force and the fluid mechanical origin of drag and lift will also be included. Analytical and numerical techniques will be used and there will be considerable discussion of the application to projectiles in sport.

AMAT3110
Industrial Mathematics
Staff Contact: Dr S. Barry
UC 3 S2 TH30

This course is concerned with applying mathematical techniques to the many diverse problems that arise in industrial situations. The course will be based upon a number of case studies and will use methods from many areas of mathematics, including difference and differential equations, numerical simulation and probability. The case studies will be drawn from industrial processes as diverse as chocolate-coating of biscuits, laser drilling, water filtration and human resource planning. Throughout the course, emphasis is given to formulating simple models that may be analysed to gain insight into the real-world process.

AMAT3118
Waves
Staff Contact: Dr P. McIntyre
UC 3 S2 TH30

An introduction to the mathematical description of waves. Theory and physical intuition are developed using simple examples such as waves on strings. More complex systems are then examined, including sound waves, light waves and water waves in a variety of applications.

AMAT3123
Nonlinear Systems
Staff Contact: Dr H. Sidhu
UC 3 S2 TH30

Nonlinear phenomena and complex behaviour are encountered in many real-world systems (such as oscillations in chemical reactions, fibrillation of the heart, spread of disease, spontaneous ignition and market volatility). This course examines the questions of whether we can we still predict the behaviour of such systems and how this behaviour changes as the parameters of the system are varied. Specific topics covered will include nonlinear algebraic equations, first-order ordinary differential equations (equilibrium points, stability and bifurcation), systems of ordinary differential equations (phase plane analysis), the origins of oscillatory behaviour and an introduction to chaotic systems.

AMAT3107
Complex Variables
Staff Contact: Prof R. Sammut
UC 3 S2 TH30

The extension of basic calculus into the complex plane leads to some of the most beautiful (and sometimes surprising) results in Mathematics. After revising the basic properties of complex numbers, this course looks at how familiar concepts such as functions, derivatives and integrals are defined and evaluated in the complex plane. Specific topics include: analytic functions, the Cauchy-Riemann equations, complex line integrals, Cauchy's theorem and integral formulae, Laurent series, the Residue theorem, evaluation of real integrals by contour integration, and elementary functions as mappings.

AMAT3104
Applied Mathematical Techniques
Staff Contact: Dr S. Barry
UC 3 S2 TH30

This course introduces a variety of techniques, mainly dealing with mathematical problems that do not have exact analytical solutions. Topics will be selected from the following: perturbation theory; bifurcation; dynamical systems; asymptotics; calculus of variations; integral transforms; integral equations; comparison theorems.

AMAT3114
Projects
Note/s: Not offered in 2001.

AMAT3116
Fluid Mechanics
Note/s: Not offered in 2001.

AMAT3120
Elements of Optimisation
Note/s: Not offered in 2001.

AMAT3309
Bayesian Statistics
Staff Contact: A/Prof E. Catchpole
UC 3 S1 HPW 3

In this course we develop the modern Bayesian perspective on statistics. The course introduces computational techniques and free software that make it possible to analyse a vast range of data, from the very simple to the very complex, in a consistent and straightforward way. The Bayesian approach is universal, but in this course the examples, which involve real data, come mainly from biology, sports, and medicine. Topics covered include: The Bayesian approach to statistics; likelihood; elementary statistics from a Bayesian perspective; Markov chain Monte Carlo methods; the BUGS package.

AMAT3305
Multivariate Data Analysis
Staff Contact: Dr M. Collins
UC 3 S1 HPW 3

This course covers techniques used for the exploration and analysis of multivariate data sets. Multivariate data sets contain measurements on more than one variable - often many variables. The object of MDA is to simplify this information. For example analysis of 45 different measurements (time, location, forced entry, etc) taken at 100 different crime scenes may reveal say four distinct patterns of offence. Some techniques are visual, some analytical, and all rely on computer software. Topics include: 3D plots. Brushing and spinning. Classification and prediction with tree methods. Multidimensional scaling. Cluster analysis. Discriminant analysis. Principal Component analysis, factor analysis and latent variables.

AMAT3310
Reliability Modelling
Staff Contact: A/Prof E. Catchpole
UC 3 S1 HPW 3

This course studies the performance of equipment and systems. Achieving high reliability is of crucial importance for safety reasons (e.g. in fighter aircraft), and for financial reasons (in commercial products). This course covers both the basic models used in reliability engineering and the statistical analysis of reliability data. Topics covered include common lifetime models, model selection and fitting, repairable items, maintenance strategies, and system reliability.

AMAT3311
Statistical Modelling
Staff Contact: Dr W. Catchpole
UC 3 S1 HPW 3

This course is an introduction to the techniques used by professional statisticians to model non-normal data. The failure of a mortar round to detonate is an example of such data, where we may wish to relate its failure to detonate to another variable such as damage to the fuse. Similarly in a drug trial we may wish to relate patient survival time to whether the patient was on the treatment drug or a placebo. Topics include: Maximum likelihood. Generalised linear models. Loglinear models. Logistic regression. Survival models. Case studies.

AMAT3306
Statistical Forecasting
Staff Contact: Dr W. Catchpole
UC 3 S2 HPW 3

Companies make forecasts of economic growth when they plan expansion and diversification. The Defence Force makes forecasts when it decides how many weapons to stockpile, and how many new recruits to accept. This course teaches techniques for forecasting in the short and long term, calculation of uncertainty limits on the forecasts, and tests of how good a forecasting technique has been on past data. Techniques studied include time series decomposition, exponential smoothing methods and Box-Jenkins methodology. Students will have an opportunity to practise the techniques on their own chosen set of data.

AMAT3312
Stochastic Modelling
Staff Contact: Dr M. Collins
UC 3 S2 HPW 3

Stochastic modelling builds up models of common phenomena using tools from probability. Such models can be used to explain why buses arrive in threes and why the casino's 'edge' means that a gambler will ultimately lose his capital with probability one. Topics include: Poisson process. Interarrival time distributions. Discrete Markov chains including the Chapman-Kolmogorov equation and the random walk. Gambler's ruin problem. Continuous Markov chains including birth and death processes. Queueing systems.

AMAT3307
Statistics Project
Staff Contact: A/Prof E. Catchpole
UC 6 S2 HPW 6

Practical experience in setting up and using statistical 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 to the School and submit a written report.

LEVEL IV

AMAT4191
Mathematics 4 (Honours) F/T
Staff Contact: Prof R. Sammut
UC48 S1 S2

AMAT4192
Mathematics 4 (Honours) P/T
UC24 S1 S2

Specialised study in selected topics, together with an approved project in the area in which the honours program is concentrated.

AMAT4193
Mathematics 4 (Combined Honours) F/T
UC24 S1 S2

AMAT4194
Mathematics 4 (Combined Honours) P/T
UC12 S1 S2

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.

AMAT4391
Statistics 4 (Honours) F/T
Staff Contact: Prof R. Sammut
UC48 S1 S2

AMAT4392
Statistics 4 (Honours) P/T
UC24 S1 S2

Specialised study in selected topics, together with an approved project in the area in which the honours program is concentrated.

AMAT4393
Statistics 4 (Combined Honours) F/T
UC24 S1 S2

AMAT4394
Statistics 4 (Combined Honours) P/T
UC12 S1 S2

In the Combined Honours program candidates are required to present a thesis or research project on a topic that is concerned with Statistics 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 COURSES

The following courses are offered in the Bachelor of Technology and Bachelor of Engineering programs:

AMAT1501
Engineering Mathematics 1A
Staff Contact: Dr Z. Jovanoski
UC 6 S1 L4 T1

Course description appears under 1st year Engineering (p.103).

AMAT1502
Engineering Mathematics 1B
Staff Contact: Dr Z. Jovanoski
UC 6 S2 L4 T1

Course description appears under 1st year Engineering (p. 103).

AMAT2501
Engineering Mathematics 2A
Staff Contact: Dr S. Garth
UC 4 S1 HPW 4

Ordinary Differential Equations: First, second and higher order ordinary differential equations. Emphasis is on applications of second order constant coefficient equations using techniques of reduction of order, variation of parameters and undetermined coefficients. Resonance. Laplace transforms with applications to electrical and mechanical systems with impulses.

Multivariable Calculus: Curves, surfaces, volumes and their parameterisation. Partial derivatives, the gradient, directional derivatives. Cylindrical and spherical coordinates. Double and triple integration with applications. Vector fields and their application to fluid flow and electromagnetism. Line integration, flux and surface integration. Green's theorem, divergence theorem, the curl, Stokes' theorem and applications.

AMAT2502
Engineering Mathematics 2B
Staff Contact: Dr S. Garth
UC 4 S2 HPW 4

Linear and Nonlinear Systems: Vectors, systems of linear equations, matrices, eigenvalues and eigenvectors, linear independence, diagonalisation. Approximating functions in 2 dimensions, optimisation, projection and orthogonal functions. Markov models, linear and nonlinear regression. Systems of differential equations and phase plane analysis. Partial Differential Equations: Separation of variables. Laplace's equation, the heat equation, the wave equation in rectangular coordinates and detailed application examples. Eigenfunction expansions, including Fourier series. Solving partial differential equations in polar coordinates.

AMAT3504
Engineering Mathematics 3
Staff Contact: Prof R. Sammut
UC 4 S1 HPW 4

Differential Equations: 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.

Probability and Statistics: The Normal Distribution; pdf, mean, variance, tables, common contexts including white noise, Central

Limit Theorem. Independent sequences of random variables. Component reliability; hazard rate, survivor function, common distributions - exponential, Weibull, Gamma, Log normal, extreme value. System reliability; series and parallel systems, fault tree method, event tree method. Acceptance and rejection testing; Type I and Type II error, attributes vs variables, OC curves. Tolerance and control charts; specification and tolerance limits, tolerance intervals, sequential sampling, stability, warning and action limits, mean chart, range chart, cusum chart, charts using attributes.

Operations Research and Statistics Program

This program offers BA and BSc students the opportunity to develop studies in this area by combining courses from two Schools to give a coherent structure.

Students must take ACSC1001 Information Technology Fundamentals and either ACSC1101 Programming Fundamentals or ACSC1301 Information Systems Principles. Students are also encouraged to take AMAT1101 Mathematics 1A and AMAT1102 Mathematics 1B.

To complete a minor, students must take the following Operations Research and Statistics courses:

ACSC2006	Decision Analysis
ACSC2018	Linear Programming
AMAT2106	Data Analysis
AMAT2112	Regression Modelling

To complete a major, students must then take the following Operations Research courses:

ACSC3006	Simulation
ACSC3017	Optimisation Techniques
ACSC3015	Operations Research

as well as three Level 3 Statistics courses, and either

ACSC3016	Operations Research Project
or	
AMAT3307	Statistics Project

School of Physics

The School of Physics offers courses that contribute towards the degrees of Bachelor of Science, Bachelor of Science with Honours, Bachelor of Engineering and Bachelor of Technology. Courses for the Bachelor of Science degree are also available in the Bachelor of Arts degree.

Level I Physics is structured primarily to lead into Level II Physics. However Physics 1A and Physics 1B are self-contained courses suitable for those Science and Arts candidates who wish to major in other fields of study. In addition, some of the Level II and Level III courses may be taken by students majoring in other fields of study providing that the School of Physics is satisfied that their background knowledge is appropriate. The Honours program at Level IV is for those students performing well at Level III, and is based on parallel course work and a research project spread over both Sessions. A combined Honours program of two disciplines is possible and such proposals are dealt with on a case by case basis.

The School of Physics revised its courses in line with the introduction of a new units of credit system in 2000. In the following syllabus descriptions PART A is for students commencing their degrees in 2000 or 2001. Students who commenced prior to 2000 will continue with the courses shown in PART B (p.94).

The School of Physics offers up to four electives for the **General Education Program**. In 2001, two only will be offered. One or both may be selected by Arts students, see p.132 for course descriptions. Course descriptions for **Physics in the Engineering Degree** may be read on p. 103 for Level I Engineering and on p. 97 for Level II Electrical Engineering. The School of Physics also provides some **Special Courses for Other Subjects** and these course descriptions may be read on p. 97.

PART A (for students starting their degrees in 2001 or 2000)

Outline program structures

1. Pass Program—Arts and Science Degrees

Contact hours vary depending on the courses chosen. Details regarding formal contact hours are given alongside the course descriptions. The Laboratory program is an integral part of Level I and Level II Physics courses. It is a stand-alone course at Level III. Students who wish to obtain a major in Physics will need to study a balanced range of courses, including specified core courses, a laboratory component at all three Levels, and a minimum specified Mathematics component.

	Units of Credit
(a) Single courses in Physics	
Physics IA and / or	6
Physics IB	6
(b) Minor in Physics	
Physics IA & Physics IB	12
Four Level II Physics courses	12
TOTAL	24
(c) Single Major in Physics	
Physics IA & Physics IB	12
Four Level II Physics courses, including specified core courses	12
Eight Level III Physics courses, including specified core courses	24
TOTAL	48
(d) Major/Minor in Physics	
Physics IA & Physics IB	12
Eight Level II Physics courses	24
Twelve Level III Physics courses	36
TOTAL	72

(e) Individual courses

Individual courses may be chosen from any level by students majoring in other fields of study, providing they satisfy the School that their background knowledge is appropriate.

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.

Introduction to the Pass Program

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 program 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 Program 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.

The lectures are supplemented by laboratory exercises in each year of study. The experiments are tailored to enhance the conceptualization 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 develop basic computer skills of the scientific and technical kind.

Level I

Course coordinator: Dr J. R. Taylor; Laboratory convenor: Dr. D. J. Low

APHY1101
Physics 1A
S1 UC6 L39 T13 P27

Motion and Ballistics

Staff Contact: A/Prof D. J. Isbister

Physics has its origins in the clarification of the ideas of force and motion by Galileo, Newton and other great scientists. These concepts, along with those of energy and linear momentum and their conservation laws, underlie much of physics. Particular applications include gun recoil and the impulsion and trajectories of projectiles (artillery shells and rockets). For rotational motion, torque and angular momentum are the counterparts of force and linear momentum; they have applications to rifling and gyroscopic stabilisation while rocket and artillery aiming is affected by the rotation of the Earth.

Thermodynamics of the Terrestrial Environment

Staff Contact: Dr P. Lynam

The state of a gas is described by a law relating its temperature, pressure and volume and the amount of gas. The relationship between internal energy, heat flow and work done by a gas is formalised by the first law of thermodynamics. Specific and latent heats link the first law to changes in the state of a gas. These ideas are applied to the study of the Earth's atmosphere which is close to a state of hydrostatic balance with pressure and density steadily decreasing with altitude. This decrease is the basis of an aircraft pressure altimeter. Small changes in pressure over the planet's surface due to variations in radiation produce the gradients which drive our weather systems.

Space Physics and Astrodynamics

Staff Contact: A/Prof R.K. Sood

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 successful application of the physics of Newton to the description of planetary motion that 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, and ends with the role of fundamental forces and of thermodynamics in the creation of the Universe.

Laboratory Program

Staff Contact: Dr D. J. Low

The program comprises up to 9 laboratory experiments, each of three hours duration, relating to and supplementing the lecture course. Students acquire an appreciation of the place and utility of computers in modern scientific endeavour by using them for graphing, data gathering, control functions and simulation. In addition, the School provides mathematical methods classes during the laboratory program. These are aimed at reinforcing mathematical skills essential to the Level I Physics lecture program.

APHY1102
Physics 1B
S2 UC6 L39 T13 P27

Electromagnetism and Applications

Staff Contact: Dr G. Robinson

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.

Waves in Optical and Remote Sensing Systems

Staff Contact: Dr D. J. Low

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. A. Lawson

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 and Heisenberg's Uncertainty Principle as expressed in the photon or particle-like qualities of light and the wave-like behaviour of particles. The pioneering Bohr model for the hydrogen atom introduced the concept of discrete energies which are responsible for the optical and X-ray spectra of all atoms. Nuclear physics encompasses a regime of considerably decreased size and greatly increased characteristic energy. Unstable nuclei are radioactive; applications include medical radiotherapy, radiocarbon dating, and both peaceful and military uses of nuclear energy.

Laboratory Program

Staff Contact: Dr D. J. Low

The program comprises up to 9 laboratory experiments, each of three hours duration, relating to and supplementing the lecture course. Students acquire an appreciation of the place and utility of computers in modern scientific endeavour by using them for graphing, data gathering, control functions and simulation. In addition, the School provides mathematical methods classes during the laboratory program. These are aimed at reinforcing mathematical skills essential to the Level I Physics lecture program.

Level II (from 2001)

Course coordinator: Dr V. A. Drake; Laboratory Convenor: Dr. G. A. Stewart

Each Level II course is worth 3 units of credit.

A 12 hour laboratory program (which could include practical experiments, field trips, workshops) is an integral part of each Level II course. These activities are designed to illustrate and extend the scope of the lectures, and introduce methods of physical measurement, scientific recording and data analysis.

Prerequisites: APHY1101 Physics 1A, APHY1102 Physics 1B; AMAT1101 Mathematics 1A; and AMAT1102 Mathematics 1B are prerequisites for students intending to study Level II Physics as part of their Major. However, students may be able to study certain courses in Level II Physics without the above prerequisites, conditional upon approval from the Head of School.

Students intending to major in Physics must include the *two* core courses and *two* of the six electives listed below.

Core courses:	**Electronic Properties of Materials**
	Waves and Remote Sensing
Elective courses:	**Astronomy and Astrophysics**
	Environmental Physics
	Health and Radiation Physics
	Meteorology and Atmospheric Physics
	Sonar and Underwater Optics
	Thermodynamics and Propulsion

CORE COURSES

APHY2104
Electronic Properties of Materials
Staff Contacts: Dr G. A. Stewart
S2 UC3 L21 T4 P12

The structures of important electronic device materials, structural determination by x-ray diffraction and electron microscopy as an introduction to the concept of wave-particle duality; the time-independent Schrödinger equation and the quantum mechanical description of electrons; the Pauli Exclusion Principle and simple models for electrons in solids, introduction to the concepts of bands and band gaps; factors influencing the speed of electronic switching and the absorption and emission of photons; a selection of applications from the topics: high speed amplifiers via modulation doping, band-gap engineering, semiconductor lasers and light-emitting diodes, solar cells, thermoelectric devices, piezoelectric transducers.

APHY2107
Waves and Remote Sensing
Staff Contacts: Dr D. L. Low
S1 UC3 L21 T4 P12

General wave physics: diffraction and resolution limits; refractive index and wave velocity; ray tracing; dispersion and Fourier composition; wave energy transport.

Wave propagation: sound in air; sound in water; light and other electromagnetic waves in the atmosphere; mirages; sonar and radar shadow zones; optical fibre imaging; radar, including time-of-flight ranging; pulse-Doppler systems; radio-acoustic sounding systems (RASS).

Electromagnetic Radiation: dipoles; polarisation; dielectrics; electrets and magnets; eddy currents, metal detectors and magnetic anomaly detectors; the magnetron; displacement current; Maxwell's equations and the electromagnetic wave Threading through the Program, 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.

equation in free space and in ideal materials; generation and reception of electromagnetic waves; the Poynting vector.

ELECTIVE COURSES

APHY2108
Astronomy and Astrophysics
Staff Contacts: Dr R.G. Smith
S1 UC3 L21 T4 P12

Tools of astronomy: telescopes, spectrometers, detectors; astronomy fundamentals: distances, magnitudes; the Sun; fundamental physics: ionisation, excitation, blackbody radiation, Doppler effect; stellar spectra and the HR diagram; star formation; evolution of stars; stellar models; thermodynamics of stars; star deaths; the Milky Way galaxy; galaxies and clusters of galaxies; introduction to cosmology.

APHY2109
Environmental Physics
Staff Contact: Prof S. J. Campbell
S1 UC3 L21 T4 P12

Radiation: the Stefan-Boltzmann, Wien and Lambert-Beer laws; interaction of light with matter; solar ultraviolet radiation and life; ozone physics; global climate: energy balance; greenhouse modelling; climate variation modelling. Spectroscopic analysis of the environment: atoms and molecules; spectra, spectroscopic techniques; satellite and ground-based instrumentation and techniques. Energy for Human Use: Renewable and non-renewable energy sources; energy storage and transport; Noise: human perception; sound transmission and propagation; control of sound.

APHY2110
Health and Radiation Physics
Staff Contact: Dr P. Lynam
S2 UC3 L21 T4 P12

Nuclear Structure and radiation: nuclear force and stability, nuclear models, energy levels and excited states, decay processes, decay laws, radiation characteristics, nuclide charts, nuclear reactions. Interaction of charged particles, photons and neutrons with matter: absorption and scattering coefficients, shielding, detection. Effects of radiation on the human body: biological effects, radiation dosimetry, relative biological effectiveness, radiation quantities and units, sources of radiation, permissible levels and doses, radiation protection, quantitative detection and measurement. Application of radiation and radioisotopes: includes medical diagnostic and therapeutic techniques, medical research.

APHY2111
Meteorology and Atmospheric Physics
Staff Contact: Dr D. L. Low
S2 UC3 L21 T4 P12

Hydrostatic balance and the vertical structure of the atmosphere; altimetry. Pressure systems and winds; geostrophic, gradient and ageostrophic balance. The global circulation, synoptic-scale weather systems, airmasses and fronts, local winds. Thermodynamics of dry and moist air; the aerological diagram; stability and conditional stability; cloud base and tops

APHY2112
Sonar and Underwater Optics
Staff Contact: Dr G. A. Stewart
S1 UC3 L21 T4 P12

Plane wave approximation, acoustic refraction, ray tracing and sound channels; acoustic wave theory, the decibel unit, transmission across a media interface and propagation loss; acoustic beam formation and electronic steering; sonar applications: active sonar versus passive sonar, echo sounders, sidescan sonar, sonobuoys, towed arrays, multiple beam and switching sonar; sonar equations and sonar system effectiveness. Mechanisms for attenuation of light by sea-water, the extra-low frequency and blue transmission windows; airborne mapping of coastal waters: the Nd:YAG infra-red laser, frequency doubling, Q-switching, and the Australian ("LADS") and US ("ABS") systems.

APHY2113
Thermodynamics and Propulsion
Staff Contact: Dr G. Robinson
S2 UC3 L21 T4 P12

The laws of thermodynamics and entropy; heat transfer and engine cycles as employed in vehicle propulsion; Carnot, Otto, Diesel, Stirling, Rankine and gas turbine cycles. Specific topics to be treated will be selected from the following: rockets and related aspects of aerospace propulsion; fundamentals of fuel cells; chemical, liquid and solid fuels; and explosive propulsion.

Level III (from 2002)

Students enrolling in 2001 for Level III courses, please see Part B for your course details.

Course coordinator: Dr R.G. Smith;
Laboratory Convenor: Dr. G. Robinson

Each Level 3 course is worth 3 units of credit.

Prerequisites: Four courses in Level II Physics, including the specified core courses, are prerequisite for students intending to study Level III Physics as part of their Major. In addition, these students are advised to include Level II Mathematics as part of their program. However, students not intending to major in Physics, may be able to study certain courses in Level III Physics without the above prerequisites, conditional upon approval from the Head of School.

Students intending to major in Physics must do the three core courses and five of the nine electives listed below.

Core courses:	**Physics of Advanced Materials**
	Electromagnetic Remote Sensing
	Experimental Physics – Laboratory
Elective courses:	**Infrared and Laser Technology**
	Atmospheric Dynamics
	Computers and Electronics in Physics
	Special Topics in Military Physics
	Aviation and Boundary Layer Meteorology
	Cosmology and Relativistic Astrophysics
	Navigation and Guidance Physics
	Space Physics
	Experimental Physics - Project

CORE COURSES

APHY3103
Electromagnetic Remote Sensing
S2 UC3 L/W 30

Maxwell's equations and their origin; electromagnetic radiation; propagation, reflection and refraction; interaction of radiation with surfaces; interaction of radiation with the atmosphere; Scattering; Passive microwave systems; Ranging systems; Antennas; Techniques; side-looking airborne radar; synthetic aperture radar; applications of radar imaging; Stealth Technology.

APHY3104
Physics of Advanced Materials
S1 UC3 L/W 30

Mechanical and physical properties of materials: Chemical bonding, structural symmetry and microstructure; materials subjected to extreme conditions (e.g. Military transport, hardware and aerospace); large scale influences, structural defects, deformations, dislocations and hardness, grain size, surface (corrosion effects), phase diagrams, steel, advanced polymers, super alloys, crystalline and glassy ceramics, composites and thin films.

Magnetism: quantum origins of atomic magnetism, multi-electron atoms and Hund's rules; diamagnetism, paramagnetism, ferromagnetism; soft and hard magnetic materials, permanent magnets; a selection from the following: motors, transformers, magnetic disks and tapes, magneto-optical data storage and magnetostrictive sonar transducers.

APHY3121
Experimental Physics – Laboratory experiments
S1 UC3 P48 W8

Students will carry out a selection of laboratory experiments which range from basic physics through to applications of direct relevance to the Australian Defence Force. At least some of the experiments available for selection will be designed to complement the lecture courses on offer in Level III Physics.

ELECTIVE COURSES

APHY3101
Atmospheric Dynamics
S1 UC3 L/W 30

The meteorological equations of motion and the vorticity equation; using atmospheric vorticity to understand and diagnose vertical motion in the atmosphere; evolution of synoptic scale weather systems and cloud formation in the Australian region; the microphysics of water droplet and ice crystal formation and growth in clouds; the initiation of water and ice precipitation from clouds and the physics of precipitation; mesoscale weather: thunderstorms, storm complexes and tropical cyclones; the global atmospheric observing system and the dissemination and assimilation of meteorological data.

APHY3102
Cosmology and Relativistic Astrophysics
S2 UC3 L/W 30

Structure of the Universe; relativistic cosmology; the Big Bang and the beginning of the Universe; the inflationary Universe; the early Universe; matter distribution in the Universe, dark matter; the cosmic microwave background; dense states of cosmic matter: white dwarfs, neutron stars and black holes; thermodynamics of black holes.

APHY3126
Space Physics
S1 UC3 L/W 30

The origin of cosmic rays; cosmic rays in the galactic and intergalactic medium; the cosmic ray flux in the near-Earth environment; nuclear fusion in stars, thermonuclear explosions and controlled fusion reactors, treated as thermonuclear reactions in a plasma; magnetic field 'freezing' in a plasma; the ionosphere as a plasma: structure and variability, auroral activity, interaction between the solar wind plasma and the Earth's ionosphere and magnetosphere; interaction between high energy particles and photons with matter: the effect of cosmic rays and the solar wind plasma on high-altitude aircraft and satellites; planetary astronomy.

APHY3119
Aviation and Boundary Layer Meteorology
S2 UC3 L/W 30

The significance of weather and climate factors for aviation; visibility; icing; windshear (including microbursts) and turbulence (including CAT). The planetary boundary layer; surface wind profiles; turbulence, convection, and transport of heat, momentum, and pollution; fog.

APHY3120
Computers and Electronics in Physics
S1 UC3 L/W 30

Electronics: components and devices for applied physics: elementary components, operational amplifiers, digital logic gates and microprocessors. Specific topics will be selected from: circuit construction for power supplies, filters, feedback, amplifiers, oscillators, digital circuits, combinational and sequential logic and control systems. Applications of relevance to the military environment include radio, radar, signal analysis, rangefinders, GPS navigation and sensor systems.

Data Analysis Tools: realistic modelling of collected data using current algebra processing packages; curve fitting, numerical differentiation and integration, Fourier analysis, correlation functions, convolution and deconvolution of experimental signals and theory based formulae. Applications will be selected from a number of areas of applied physics.

APHY3122
Experimental Physics - Project Work
S2 UC3 P62

This will be in the form of a research project which each student will conduct in collaboration with a member of the academic staff. Many of the topics offered are designed to be of relevance to the Australian Defence Force. However, project topics related to other areas of interest to staff and/or students may be chosen.

APHY3123
Infrared and Laser Technology
S1 UC3 L/W 30

Thermal radiation laws; properties of thermal radiators; emission spectra; absorption spectra; atmospheric transmission; target and background signatures; infrared detectors. Applications include: image processing; general purpose cameras and night vision systems; smart weapon seekers; forward looking infrared sensors (FLIR) and infrared search and track systems (IRST).

Laser components and properties of laser light; spontaneous and stimulated emission; population inversion, pumping schemes; pulsed and continuous wave operation; laser resonators: laser output and output modification; laser types. A selection of applications from: low-power-communications, data storage and retrieval; remote sensing-laser ranging, laser radar (LIDAR), laser velocimetry; holography; laser material processing and surgery; laser safety.

APHY3124
Navigation and Guidance Physics
S2 UC3 L/W 30

Spherical geometry and celestial co-ordinate systems, dead reckoning and celestial navigation; attitude determination, principles of gyroscopes and their operation; mechanical and laser gyroscopes and their use in instruments; inertial navigation, accuracy requirements, problems and limitations; gravity models and the determination of the local vertical; strap-down versus stable platform systems; initialisation of an inertial navigation system; radar systems: ground mapping and terrain profiling, beam formation and synthetic aperture radars; satellite navigation: first generation systems, doppler navigation; orbit determination and requirements for navigational precision; GPS, principles, requirements for clock accuracy, relativistic effects, constellation design; high precision GPS modes, carrier phase and differential GPS; atmospheric propagation and modelling.

APHY3125
Special Topics in Military Physics
S2 UC3 L/W 30

This course demonstrates the importance of Physics to military/ defence operations. It will involve some guest lectures by outside experts. Topics selected from the following: military ballistics, nuclear weapons, guided missiles, landmine detection, mobility study, search and rescue, rotor aerodynamics; sonar physics, including acoustic signatures, the deployment of sonar buoys, and advanced towed array systems; military use of space; military applications of quantum technology; infrared signatures in military operations.

Honours Year

Coordinator: Prof S.J. Campbell

Students with a special interest and aptitude in physics are encouraged to apply for the Honours program. The standard for entry is typically a CREDIT average or better in Level III Physics courses.

APHY4191
Physics 4 (Honours) F/T
UC48 S1 S2

APHY4192
Physics 4 (Honours) P/T
UC24 S1 S2

APHY4193
Physics 4 (Combined Honours) F/T
UC24 S1 S2

APHY4194
Physics 4 (Combined Honours) P/T
UC12 S1 S2

For APHY4191 and APHY4192, candidates are required to present a thesis or research project. In addition, there is a lecture component consisting typically of four units drawn from the following:

Available courses: **Astrophysics**
Experimental Magnetism
Group Theory in Quantum Mechanics
Meteorological Remote Sensing
Microcomputer Applications in Advanced Materials, Astronomy, and/or Meteorology
Nuclear Physics and Hyperfine Interactions
Small Scale Atmospheric Motions
Solid State Physics
Statistical Mechanics
Stellar Physics

In the Combined Honours programs, APHY4193 and APHY4194, candidates are required to present a thesis or research project on a topic that is concerned with physics and the interests of the other involved School. The thesis or project is supervised and examined jointly by the two Schools. In addition, candidates are required to complete course work as approved by the Head of School.

PART B (for students who started their degrees before 2000)

Level I

Coordinator: Dr J. R. Taylor
(Not offered in 2001 - see 1999 Handbook for details)

Level II

Coordinator: Dr V. A. Drake
(Not offered in 2001 - see 2000 Handbook for details)

Level III

Coordinator: Dr R.G. Smith

Students completing the minimal requirement for a major in Physics must enrol in the following core Level III courses.

Core courses: **Physics of Advanced Materials**
Electromagnetic Waves and Remote Sensing
Atmospheric Dynamics
Cosmology and Relativistic Astrophysics
Physics Laboratory Program 3A and 3B
Laser Physics and Applications
Infrared Technology
Case Studies in Military Physics
Plasma and Ionospheric Physics

Additional credit can be obtained by adding either elective or core courses to a minor program (Physics Level I and Level II) or elective courses to a single major program (Physics Level I, Level II and Level III). The elective courses are listed below.

Elective courses: **Applied Electronics**
Aviation Meteorology
Computational Physics
Cosmic Radiation
Nuclear and Particle Physics
Quantum Technology
Sonar Physics

The Level III units and laboratory programs available in 2001 are as follows:

CORE COURSES

APHY3101
Atmospheric Dynamics
Staff Contact: Dr J.R. Taylor
S1 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 organised weather systems such as thunderstorms, mesoscale storm complexes, tropical cyclones and temperate depressions.

APHY3102
Cosmology and Relativistic Astrophysics
Staff Contact: A/Prof R.K. Sood
S2 L/T26

This course builds on 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 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 gravitational waves is closely linked with the formation and existence of dense objects in the Universe and the observation of such waves would 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 such as the isotropy of the present Universe, the large amount of helium in it, and the absence of significant amounts of anti-matter. The existence of the microwave background radiation and the possible existence of cosmic strings are closely linked to the early evolution of the Universe.

APHY3103
Electromagnetic Waves and Remote Sensing
Staff Contact: Dr R.G. Smith
S2 L/T26

Electromagnetic waves form the basis of most remote sensing systems and the performance of those systems depends on the influence of the media through which the waves propagate. Topics covered in this unit 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.

APHY3104
Physics of Advanced Materials
Staff Contact: Prof S.J. Campbell
S1 L/T26

This unit builds on the level II 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 are selected from 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.

APHY3105
Case Studies in Military Physics
Staff Contact: A/Prof D.H. Chaplin
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.

APHY3106
Infrared Technology
Staff Contact: Dr P. Lynam

S1 L/T13

The radiation laws and the properties of blackbody radiation studied in the Level II 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 underlie 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.

APHY3107
Laser Physics and Applications
Staff Contact: Dr J. R. Taylor
S1 L/T13

Light from lasers has unequalled wavelength precision and directionality, and extremely high spatial and spectral output power density. These unique properties result from the organised nature of the emissions from the individual atoms and are exploited in a wide range of applications such as optical discs, fibre-optic communications, holography, spectroscopy, target location and weapon guidance, battle simulation, materials

working, precision surgery, and nuclear fusion. This unit deals first with the underlying principles of laser operation (key laser types, continuous and pulsed modes, Q-switching and mode-locking) and then considers some of the applications.

APHY3108
Physics Laboratory Program 3A

and

APHY3109
Physics Laboratory Program 3B
Convenor: Dr G. Robinson
S1 & S2 130 P

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.

APHY3116
Plasma and Ionospheric Physics
Staff Contact: Dr W. A. Lawson
S2 L/T13

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.

ELECTIVE COURSES

APHY3111
Applied Electronics
Staff Contact: Dr G. Robinson
S1 L/T13

This unit comprises topics selected from the following list. *Components and devices:* resistors, capacitors and inductors, diodes and transistors, crystals, operational amplifiers, digital logic gates, microprocessors. *Circuits:* filters, feedback, power supplies, 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.

APHY3112
Aviation Meteorology
Staff Contact: Dr V. A. Drake
S2 L/T13

The significance of weather and climate factors for civil and military aviation. Visibility. Fog and fog formation. Airframe and engine icing. Winds, wind shear (including microbursts) and turbulence in the atmospheric boundary layer, in and near thunderstorms, and at high altitudes (including clear air turbulence).

APHY3113
Computational Physics
Staff Contact: A/Prof D.J. Isbister
S1 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, and convolution and deconvolution. Applications are selected from applied physics and areas of interest to the class.

APHY3114
Cosmic Radiation
Staff Contact: A/Prof R.K. Sood
S1 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.

APHY3115
Nuclear and Particle Physics
Staff Contact: A/Prof D H. Chaplin
S1 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 and collective model. Nuclear fission and nuclear power generation. Nuclear medicine, nuclear weapons, biological effects of radiation. Accelerators. Elementary particles: properties and interactions, quarks, the standard model, unification theory.

APHY3117
Quantum Technology
Staff Contact: Dr P. Lynam
S2 L/T13

Low- and high-temperature superconductivity. Superconducting junction devices for ultra-low magnetic field measurements, voltage standards and ultra-fast digital components. Device engineering on a nanometre scale: quantum wells, dots and lines, resistance standards, the atomic force microscope. Noise limits to measurement and instrumentation, quantum cryptography.

APHY3118
Sonar Physics
Staff Contact: Dr G. A. Stewart
S2 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.

Honours Year

Coordinator: Prof S.J. Campbell

Students with a special interest and aptitude in physics are encouraged to apply for the Honours program. The standard for entry is typically a CREDIT average or better in Level III Physics courses.

APHY4191
Physics 4 (Honours) F/T

APHY4192
Physics 4 (Honours) P/T

APHY4193
Physics 4 (Combined Honours) F/T

APHY4194
Physics 4 (Combined Honours) P/T

For APHY4191 and APHY4192, candidates are required to present a thesis or research project. In addition, there is a lecture component consisting typically of four units drawn from the following:

Available courses:

Astrophysics

Experimental Magnetism

Group Theory in Quantum Mechanics

Meteorological Remote Sensing

Microcomputer Applications in Advanced Materials, Astronomy, and/or Meteorology

Nuclear Physics and Hyperfine Interactions

Small Scale Atmospheric Motions

Solid State Physics

Statistical Mechanics

Stellar Physics

In the Combined Honours programs, APHY4193 and APHY4194, candidates are required to present a thesis or research project on a topic that is concerned with physics and the interests of the other involved School. The thesis or project is supervised and examined jointly by the two Schools. 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 following compulsory courses for Engineering students: Engineering Physics 1A (session 1) and 1B (session 2) for Level I Aeronautical, Civil and Mechanical Engineers; Electrical Engineering Physics 1A (session 1) and 1B (session 2) for Level I Electrical Engineers; Physics of Electronic Device Materials E, and Electromagnetic Waves E for Level II Electrical Engineers. Descriptions of the Level I courses may be found under Level 1 Engineering p. 103.

LEVEL I

Coordinator: *Dr J. R. Taylor; Laboratory convenor: Dr D. J. Low*

APHY1501
Engineering Physics 1A
Corequisite: AMAT1501 Engineering Mathematics 1A.
S1 UC6 L39 T13 P12

APHY1502
Engineering Physics 1B
Corequisite: AMAT1502 Engineering Mathematics 1B.
S2 UC6 L39 T13 P12

The laboratory program for 1A and 1B consists four three-hour classes in each session.

APHY1503
Electrical Engineering Physics 1A
Corequisite: AMAT1501 Engineering Mathematics 1A.
S1 UC6 L39 T13 P24

APHY1504
Electrical Engineering Physics 1B
Corequisite: AMAT1502 Engineering Mathematics 1B
S2 UC6 L39 T13 P24

The lecture/tutorial component is identical to Engineering Physics. The laboratory program for 1A and 1B consists of eight three-hour classes in each semester.

LEVEL II

Coordinator: *Dr V .A. Drake; Laboratory Convenor: Dr G. A. Stewart*

A 21 hour laboratory program of practical experiments and workshops is an integral part of each course. These activities are designed to illustrate and extend the scope of the lectures, and introduce methods of physical measurement, scientific recording and data analysis.

Corequisite: AMAT2501 Engineering Mathematics 2A, AMAT2502 Engineering Mathematics 2B

Prerequisites: AMAT1501 Engineering Mathematics and AMAT1502 Engineering Mathematics; APHY1503 Electrical Engineering Physics 1A and APHY1504 Electrical Engineering Physics 1B.

APHY2501
Electromagnetic Waves E
Staff Contact: A/Prof D. J. Isbister
S2 L/T34 P21

The nature of electromagnetic waves: electromagnetic spectrum and applications, polarisation, plane wave approximation and 1-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.

APHY2502
Physics of Electronic Device Materials E
Staff Contact: A/Prof. D. H. Chaplin
S1 L/T34 P21

Crystal structure of important device materials: conventions for the description of cubic crystal directions 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, 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.

Special Courses for Other Subjects

APHY3701
Atmospheric Physics and Meteorology BT
Staff Contact: Dr D. J. Low
L15 T3 P12

This course is a component of Level III Aeronautical Engineering (Bachelor of Technology)

The atmosphere: properties of dry and moist air, layers of the atmosphere defined by lapse rates, the hydrostatic equation, altimetry. 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. 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. Wind: meteorologically significant forces, equations of motion, wind types, surface winds, synoptic systems in Australia and their evolution. Mesoscale weather: thunderstorms and local winds.

School of Politics

The School of Politics offers courses which 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 courses 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 minor sequences in Politics begin with Level I Politics. In completing major or minor sequences students have maximum flexibility in selecting their own combination of single session courses at Upper Level,noting that a total of 36 units of credit at Upper level must be completed for a major in Politics, and at least 60 units of credit at Upper Level for a major/minor sequence.

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.

APOL1101
Politics 1A
Staff Contact: A/Prof D. W. Lovell
UC6 S1 HPW3
Prerequisite: See p.45

The Australian Political System

This course introduces students to the study of politics by focusing on Australian politics at the national level.

The course is in three sections. The first explores the nature of politics. The second introduces the major actors and institutions of the Australian political system, including the Constitution and the federal system, the Parliament and the executive, the electoral system, political parties and interest groups. The third section focuses on a number of key issues, both to understand the issues themselves in more depth and to see how they illuminate the operation of the political system.

APOL1102
Politics 1B
Staff Contact: A/Prof C. Kukathas
UC6 S2 HPW3
Prerequisite: See p.45

World Politics

This course introduces students to the study of world politics by focussing on some of the leading theories which have shaped our understanding of the nature of the state and of relations between states.

Three major themes run through the course. The first is the question of the nature of the state. Here the course will explore different understandings of the state and government, both in western and Asian traditions. The second theme is the problem of state breakdown. Here the focus will be on the explanation of war and revolution and the nature of political stability. The third theme is democracy and globalization. Here the course would examine the nature of modern movements of democratization, particularly in developing societies in Asia.

Upper Level

Upper level courses in Politics are sessional. A student must have completed APOL1101 and APOL1102 before enrolling in an upper level course.

Asia-Pacific Studies

Students with the necessary prerequisites may construct a minor in Asia-Pacific Studies. The courses available in 2001 in Politics and the Asia-Pacific are listed on p.61.

APOL2101
Approaches to Politics
Staff Contact: A/Prof C. Kukathas
S1 UC6 HPW3
Prerequisite: Two Level I Politics courses

The basic questions the course 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.

Note/s: This course is a prerequisite for entry into 4th year honours.

APOL2102
Conflict in the Twenty First Century
Staff Contact: To be advised
S2 UC6 HPW3
Prerequisite: Level 1 Politics courses

On the basis of recent and current events this course considers the changing nature of deadly conflict and the most likely sources of it in the first decade of the Twenty First Century. Central concerns in this inquiry are the inheritance, from the Twentieth Century, of weapons of mass destruction, ethnic nationalism and struggles for territory, and pressures arising from growing scarcities in vital natural resources. In relation to these the course discusses arms races and the proliferation of weapons, the implications of the revolution in military affairs for the use of force, the resurgence of nationalism and ethnic conflict, the (in)security dilemmas of weak states and intra-state violence, competition for scarce resources, the security implications of environmental degradation, drugs and drug trafficking, and the dilemmas of armed intervention. The course is intended to address the background to situations and issues to which armed forces might have to respond in the near future.

APOL2105
Electoral Systems
Staff Contact: A/Prof M. Mackerras
S2 UC6 HPW3
Prerequisite: Two Level I Politics courses

An examination of electoral systems used throughout the democratic world. The course 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 course also evaluates electoral systems long used in Western Europe, as well as those employed in the newly-emerging democracies in Eastern Europe.

APOL2107
Issues and Problems in Australian Foreign Policy
Staff Contact: A/Prof A. Bergin
S1 UC6 HPW3
Prerequisite: Two Level I Politics courses

This course 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.

APOL2109
Political Cultures in Asia and the Pacific
Staff Contact: Dr J. Walker
S1 UC6 HPW3
Prerequisite: Two Level I Politics courses

This course introduces students to the analysis of culture as a source of social and political action and understanding, exploring relationships between political forms and culture in Asia and the Pacific. The unit will draw examples from India, Indonesia, Malaysia, Japan and the Pacific.

APOL2110
Politics of Japan
Staff Contact: A/Prof A. George Mulgan
S1 UC6 HPW3
Prerequisite: Two Level I Politics courses

This course comprehensively evaluates the institutions, processes and practices of Japanese politics. It identifies the major actors in the political system, the nature of their interaction and the sources of their power. It seeks to answer some of the most vexed questions in the study of Japanese politics: Is Japan a democracy? Who rules in Japan, the politicians or the bureaucrats? What are the causes of political corruption and money politics? Why is Japan a one-party predominant system? Other themes include the impact of electoral reform, Japan's weak Opposition, the politics of patronage and the role of the government in the economy. Whilst highlighting the more distinctive aspects of Japanese politics, the broader comparative perspective is not ignored, with references to democratic theory, pluralist, elitist and corporatist models of interest groups, electoral theory and others. Contemporary policy problems are examined including environmental, administrative reform and deregulation issues.

APOL2111
Politics of Australian Defence Policy
Staff Contact: Dr G. Cheeseman
S1 UC6 HPW3
Prerequisite: Two Level I Politics courses

This course 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.

APOL2112
Politics of China
Staff Contact: Dr J. Zhang
S2 UC6 HPW3
Prerequisite: Two Level I Politics courses

The structure and working of the political system of China. The course examines the working through of China's revolution before and since the establishment of the People's Republic in 1949. The course 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.

APOL2116
Politics of Russia
Staff Contact: A/Prof W. Maley
S2 UC6 HPW3
Prerequisite: Two Level I Politics courses

This course provides a comprehensive introduction to the government and politics of contemporary Russia, with an emphasis on political mobilisation, ideological tension, and the interaction of domestic and international forces. It examines, in turn, the foundations of communist autocracy; post-Stalinist politics; the inheritance of 'Really-Existing Socialism'; the disintegration of the Soviet Union; and post-communist Russia, with emphasis on political structures and political crises.

APOL2118
Politics of the USA
Staff Contact: A/Prof M. Mackerras
S1 UC6 HPW3
Prerequisite: Two Level I Politics courses

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 course 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.

APOL2121
Strategic Issues in the Asia-Pacific
Staff Contact: Prof. J. Cotton
S2 UC6 HPW3
Prerequisite: Two Level I Politics courses

This course will analyse major strategic developments in the Asia-Pacific region 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, as well as the security policies of the major states, and attempts to develop regional security dialogue. 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, weapons proliferation and other possible challenges to regional security and stability.

APOL2124
War in International Politics
Staff Contact: A/Prof H. Smith
S1 UC6 HPW3
Prerequisite: Two Level I Politics courses

This course 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.

Additional Upper Level options that may be offered in other years:

APOL2103
Culture, Conquest and International Society

APOL2104
Democracy and Development in Asia

APOL2106
International to Global Politics

APOL2108
Japan in the Asia-Pacific

APOL2113
Politics of Indonesia

APOL2115
Politics of Korea

APOL2120
Special Studies in Politics

APOL2122
The Collapse of Communism

Honours Courses

All courses are full year.

Staff Contact: A/Prof D.W. Lovell

Prerequisite: APOL2101

Approaches to Politics

Major in Politics.

Credit Average in upper level Politics courses.

At least one Distinction for an upper level Politics course.

APOL4191
Politics 4 (Honours) F/T
UC48 S1 S2

APOL4192
Politics 4 (Honours) P/T
UC24 S1 S2 HPW4

Students will take four sessional topics or two full year topics in fields of study to be determined by the Head of School. Courses 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.

APOL4193
Politics 4 (Combined Honours) F/T
UC24 S1 S2

APOL4194
Politics 4 (Combined Honours) P/T
UC12 S1 S2

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 and BTech(Aero) and BTech(Av) Programs

First year engineering students enrol in separate programs in Aeronautical, Civil, Electrical or Mechanical Engineering. There is, however, considerable commonality within the engineering programs. More than half of the programs are devoted to mathematics, physics and computer science.

For first year prerequisite information see p. 45. Course descriptions for 1st year appear on p. 102. For 2nd year onwards, descriptions for service programs are included in the relevant School entry.

Tables of courses for each Engineering program is set out below:

Aeronautical Engineering (Program Code-4424)

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
ACSC1501	Computer Tools for Engineers	3		27	zero	13	40
AINT1501	Engineering Graphical Communications		3	zero	zero	36	36
ACHM1701	Engineering Materials for Aeronautical Engineers	3		39	zero	zero	39
AMAT1501	Engineering Mathematics 1A	6		54	13	zero	67
AMAT1502	Engineering Mathematics 1B		6	54	13	zero	67
AINT1502	Engineering Mechanics A	3		20	6	4	30
AINT1503	Engineering Mechanics B		6	40	14	6	60
APHY1501	Engineering Physics 1A	6		39	13	12	64
APHY1502	Engineering Physics 1B		6	39	13	12	64
AMEC1701	Fundamentals of Flight 1	3		20	7	zero	27
AMEC1702	Fundamentals of Flight 2 & Workshop Practice		3	20	7	zero	27
Total		24	24				*521*

Civil Engineering (Program Code-4421)

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
AMAT1501	Engineering Mathematics 1A	6		54	13	zero	67
AMAT1502	Engineering Mathematics 1B		6	54	13	zero	67
APHY1501	Engineering Physics 1A	6		39	13	12	64
APHY1502	Engineering Physics 1B		6	39	13	12	64
ACHM1501	Engineering Chemistry A	3		36		9	45
ACHM1502	Engineering Chemistry B		3	36		9	45
ACSC1501	Computer Tools for Engineers	3		27	zero	13	40
AINT 1502	Engineering Mechanics A	3		20	6	4	30
AINT1503	Engineering Mechanics B		6	40	14	6	60
AINT1501	Engineering Graphical Communications		3	zero	zero	36	36
ACIV1501	Civil Engineering Practice	3		13		54	67
Total		24	24				*585*

Electrical Engineering (Program Code-4422)

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
AMAT1501	Engineering Mathematics 1A	6		54	13	zero	67
AMAT1502	Engineering Mathematics 1B		6	54	13	zero	67
APHY1503	Electrical Engineering Physics 1A	6		39	13	24	76
APHY1504	Electrical Engineering Physics 1B		6	39	13	24	76
ACSC1501	Computer Tools for Engineers	3		21	zero	18	39
ACSC1101	Programming Fundamentals		6	40	13	27	80
ACHM1504	Introduction to Engineering Materials for Electrical Engineers	3		39	zero	zero	39
AELE1503	Circuits and Systems	3		34	zero	6	40
AELE1504	Digital Systems 1	3		34	zero	6	40
AELE1505	Digital Systems 2		3	34	zero	6	40
AELE1506	Electronics 1		3	34	zero	6	40
Total		*24*	*24*				*604*

Mechanical Engineering (Program Code-4423)

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
ACSC1501	Computer Tools for Engineers	3		27	zero	13	40
AINT1501	Engineering Graphical Communications		3	zero	zero	36	36
AMAT1501	Engineering Mathematics 1A	6		54	13	zero	67
AMAT1502	Engineering Mathematics 1B		6	54	13	zero	67
AINT1502	Engineering Mechanics A	3		20	6	4	30
AINT1503	Engineering Mechanics B		6	40	14	6	60
APHY1501	Engineering Physics 1A	6		39	13	12	64
APHY1502	Engineering Physics 1B		6	39	13	12	64
AINT2504	Introduction to Electrical & Mechanical Engineering Plant	3		40	zero	zero	40
ACHM1503	Introduction to Engineering Materials	3		39	zero	zero	39

AMEC1501	Introduction to Profession of Mechanical Engineering & Workshop Practice	3	27	zero	zero	27
Total		24	24			*534*

BTech(Aeronautical Engineering)(Program Code-4430)

		Units of Credit		*Lecture*	*Tutorial*	*Practical*	*Total*
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
ACSC1501	Computer Tools for Engineers	3		27	zero	13	40
AINT1501	Engineering Graphical Communications		3	zero	zero	36	36
ACHM1701	Engineering Materials for Aeronautical Engineers	3		39	zero	zero	39
AMAT1501	Engineering Mathematics 1A	6		54	13	zero	67
AMAT1502	Engineering Mathematics 1B		6	54	13	zero	67
AINT1502	Engineering Mechanics 1A	3		20	6	4	30
AINT1503	Engineering Mechanics 1B		6	40	14	6	60
APHY1501	Engineering Physics 1A	6		39	13	12	64
APHY1502	Engineering Physics 1B		6	39	13	12	64
AMEC1701	Fundamentals of Flight 1	3		20	7	zero	27
AMEC1702	Fundamentals of Flight 2 & Workshop Practice		3	20	7	zero	27
Total		24	24				*521*

BTech(Aviation)(Program Code-4437)

		Units of Credit		*Lecture*	*Tutorial*	*Practical*	*Total*
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
ACSC1501	Computer Tools for Engineers	3		26	zero	26	52
ACHM1701	Engineering Materials for Aeronautical Engineers	3		39	zero	zero	39
AMAT1501	Engineering Mathematics 1A	6		54	13	zero	67
AMAT1502	Engineering Mathematics 1B		6	54	13	zero	67
AINT1502	Engineering Mechanics 1A	3		20	6	4	30
AINT1503	Engineering Mechanics 1B		6	40	14	6	60
APHY1501	Engineering Physics 1A	6		39	13	12	64
APHY1502	Engineering Physics 1B		6	39	13	12	64
AMEC1701	Fundamentals of Flight 1	3		20	7	zero	27
AMEC1703	Fundamentals of Flight 2		3	20	7	zero	27
AMEC1704	Introduction to Aviation - a Systems Approach		3	20	7	zero	27
Total		24	24				*524*

Description of First Year Courses

ACHM1504
Introduction to Engineering Materials for Electrical Engineers
UC3 S1 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.

AELE1503
Circuits and Systems
UC3 S1 TH40

Resistance and Ohm's Law; Kirchoff's voltage and current laws; power; simple DC circuits; superposition; Thevenin's theorem; Norton's theorem; node and mesh analysis; dependent sources; electrical measurements; RMS voltages and currents; capacitance and inductance; impedance and admittance; phasors; simple AC circuits.

AELE1504
Digital Systems 1
UC3 S1 TH40

Differences between analog and digital signals; number systems and conversions; Binary arithmetic; Complement notation for negative numbers; Error detection and error correction codes; AND, OR and NOT operations; Formulation of Boolean expressions; Boolean theorems; Minimisation of Boolean expressions; Karnaugh maps for up to 6 variables; Analysis of sequential circuits; Stable and unstable states; Introduction to flip flops; algorithmic state machine approach to the description of digital circuits, analysis of synchronous sequential circuits, design of synchronous sequential circuits.

AELE1505
Digital Systems 2
UC3 S2 TH40

Interfacing with the analog world; Digital-to-Analog conversion; Analog-to-Digital conversion; Memory devices; Programmable logic devices; Storage devices; Data organization; Arithmetic/Logic Unit; ROM based controllers.

An introduction to the electrical engineering profession, 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.

AELE1506
Electronics 1
UC3 S2 TH40

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. Choosing electronic components.

AMAT1501
Engineering Mathematics 1A
Staff Contact: Dr Z. Jovanoski
UC6 S1 TH65

An introduction to aspects of mathematics: its logical structure and development; mathematics as a language and tool; the importance of applications as motivators of mathematical developments; the unity of the various branches of mathematics; the role of computers.

Linear algebra: vectors from 2- to n-dimensions; geometrical description of vectors and their uses; systems of linear equations; matrix theory; matrix inverses and determinants; eigenvalue problems. Applications from manpower planning and population dynamics as drivers for the development of the theory. The concept of linearity and its significance.

Calculus: functions of one and two variables - graphical, numerical and algebraic representations; solution of first-order differential equations - separation of variables, the derivative, integration by substitution and using tables, numerical integration, slope fields, Euler's method for graphical and numerical solution, Taylor series and approximate solutions; modelling with first-order differential equations.

AMAT1502
Engineering Mathematics 1B
Staff Contact: Dr Z. Jovanoski
UC6 S2 TH65

Extensions and applications of Engineering Mathematics 1A: complex numbers; further calculus; nonlinear systems; probability theory.

Complex numbers: polynomial equations as examples of nonlinear equations and the need for complex numbers; different representations of complex numbers; development of their algebra and applications.

Calculus: optimisation - critical points, points of inflection, local and global extrema, applications; second-order differential equations - algebraic, numerical and approximate algebraic solutions of homogeneous equations with constant coefficients, modelling with second-order differential equations; the definite integral - Riemann sums, the Fundamental Theorem of Calculus, integration problems such as volumes of solids, centres of mass; introduction to partial differential equations - partial derivatives, applications.

Nonlinear systems: the change from linear to nonlinear; simple nonlinear equations and their origins; the nature of the solutions and the revolutionary aspects introduced by nonlinear terms; bifurcation and chaos in nonlinear mathematical modelling.

Probability theory: elementary probability theory, sample space, methods of counting, conditional probability, Bayes' theorem, independence, discrete probability distributions and cumulative distribution functions, expected values and variances, transforming random variables, special discrete distributions, quality control.

ACHM1501
Engineering Chemistry A
Staff Contact: A/Prof K. Harris
UC3 S1 TH45

Electronic structure of atoms, periodic table, electronic structure of molecules and chemical bonding. Engineering materials - structure of metals and other solid materials, phase diagrams and properties of alloys and ceramics. Chemistry of cement and concrete.

ACHM1502
Engineering Chemistry B
Staff Contact: A/Prof K. Harris
UC3 S1 TH45

Handling dangerous materials. Organic materials - plastics, fuels and explosives. Chemistry of explosive reactions & energetic materials. Solutions and chemical equilibria. Degradation of materials in the environment. Environmental chemistry as applied to civil engineering.

APHY1503
Electrical Engineering Physics 1A
Coordinator: Dr. J. R. Taylor;
Laboratory convenor: Dr. D. J. Low
Corequisite: AMAT1501
UC6 S1 L39 T13 P24

and

APHY1501
Engineering Physics 1A
Coordinator: Dr. J. R. Taylor;
Laboratory convenor: Dr. D. J. Low
Corequisite: AMAT1501
UC6 S1 L39 T13 P12

The following lecture units are common to Electrical Engineering Physics 1A (APHY1503) and Engineering Physics 1A (APHY1501)

General Physics and Mechanics
Staff Contact: Dr W.A. Lawson

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
Staff Contact: Dr G. Robinson

Classification of waves, non-dispersive waves and the differential wave equation, harmonic waves, superposition, standing waves, beats, Doppler effect, Huygen's principle, reflection, refraction, lenses, interference, diffraction, resolving power of instruments.

Atomic and Nuclear Physics
Staff Contact: Dr W.A. Lawson

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.

APHY1504
Electrical Engineering Physics 1B
Coordinator: Dr. J. R. Taylor;
Laboratory convenor: Dr. D. J. Low
Corequisite: AMAT1502
UC6 S2 L39 T13 P24

and

APHY1502
Engineering Physics 1B
Coordinator: Dr. J. R. Taylor;
Laboratory convenor: Dr. D. J. Low
Corequisite: AMAT11502
UC6 S2 L39 T13 P12

The following lecture units are common to Electrical Engineering Physics 1B (APHY1504) and Engineering Physics 1B (APHY1502)

Electricity and Magnetism
Staff Contact: Prof S.J. Campbell

Coulomb's law, calculations of electric fields and potentials. Gauss' law, multipoles, capacitance. Conductors and electric currents. Origins of electrical resistance, Ohm's law, electrical measurements. Magnetic induction, motion of charges in electromagnetic fields. Ampère's law, Biot-Savart law. Electromagnetic induction, Faraday's law, inductance. Displacement current, Maxwell's equations in integral form.

Properties of Matter and Heat
Staff Contact: A/Prof D. H. Chaplin

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.

ACHM1701
Engineering Materials for Aeronautical Engineers
Staff Contact: Dr C.E. Woodward
UC3 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.

ACHM1503
Introduction to Engineering Materials
Staff Contact: Dr C.E. Woodward
UC3 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.

ACIV1501
Civil Engineering Practice
Staff Contact: A/Prof S.Yeomans
UC3 TH76

Aims to introduce new students with an overview of the civil engineering profession and a historical perspective of its impact on society. The course details the historical development of the branches of the profession and provides a background to contemporary issues such as occupational health and safety, environmental management, ethics, professional responsibilities and the impact of emerging technologies.

ACSC1501
Computer Tools for Engineers
Staff Contact: Dr M. Barlow
UC3 S1 TH52

Introduction to Computing: functional hardware components, operating systems, network technology and services, data representation, applications, history of computing. Problem Solving: programming languages, algorithms, top-down design, testing & debugging, efficiency & errors. MATLAB Programming: syntax, identifiers, data-types, I/O, arrays, relational operators, selection, iteration, functions, graphics.

AINT1502
Engineering Mechanics 1A
Staff Contact: A/Prof B.W. Golley
UC3 S1 TH30

Statics of particles and rigid bodies under two and three dimensional force systems. Application to trusses and frames. Dry friction and belt friction.

AINT1503
Engineering Mechanics 1B
Staff Contact: A/Prof B.W. Golley, A/Prof J.P. Baird
UC6 S2 TH60

Distributed forces, centres of gravity of solids, centroids of areas, lines and volumes. Internal forces in structural members, shear force and bending moment diagrams for beams. Cables under concentrated and distributed loads. Second moments of area and mass moments of inertia.

Kinematics and kinetics of the plane motion of particles and rigid bodies. Equations of motion, work, energy, impulse and momentum.

AINT1501
Engineering Graphical Communications
Staff Contact: Dr M.J. Harrap
UC3 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.

AMEC1701
Fundamentals of Flight 1
Staff Contact: A/Prof S.L. Gai
UC3 TH27

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.

AMEC1702
Fundamentals of Flight 2
Staff Contact: A/Prof S.L. Gai
UC3 TH27

Fundamentals: Application to aircraft design and performance. Basic flight theory. Steady level, climbing and gliding flight. Take-off and landing. Turning flight. Aircraft propulsion. Elements of stability and control.

Workshop practice: Instruction and practice in the use of hand and machine tools. The production of simple machine parts from drawings supplied.

AMEC1702
Fundamentals of Flight 2 & Workshop Practice
Staff Contact: A/Prof S.L. Gai
UC3 TH27

Fundamentals: Application to aircraft design and performance. Basic flight theory. Steady level, climbing and gliding flight. Take-off and landing. Turning flight. Aircraft propulsion. Elements of stability and control.

Workshop practice: Instruction and practice in the use of hand and machine tools. The production of simple machine parts from drawings supplied.

AMEC1704
Introduction to Aviation - a Systems Approach
Staff Contact: Dr M. Harrap
UC3 TH27

An introduction to Aviation as a system. The Aircraft, Flying Operations, Air Traffic Services and Aircrew as major components of the Aviation System. Aircraft Sub-systems: major aircraft components; structural integrity; aerodynamics; flight mechanics; stability and handling. Flying Operations Subsystems: ergonomics; planning; airport management; aircraft performance. Air Traffic Control Sub-systems: meteorology; flight separation; pilot response; communications. Sub-system interactions, failure modes and system safety will be analysed. The content of later courses will be placed in context. Organisational and regulatory structure of aviation, professional responsibilities and ethics within that structure.

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 recognised 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, with further specialisations (aeronautical, chemical, industrial, materials, electronic etc) having 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, airfields, buildings, water supply and waste treatment facilities, structures of all types, and the associated planning and management of projects.

The BE course in Civil Engineering at University College is firmly based on mathematics and the physical sciences in Year 1 and the engineering sciences in Year 2, leading into an engineering approach to analysis and design and engineering management in the later years. The major streams of the course are structural engineering, materials engineering, geotechnical engineering, water engineering, environmental engineering, surveying, the construction of civil engineering works, transport engineering, and the management of engineering projects. A number of elective courses are available in Year 3 and Year 4.

Students are encouraged to develop resourceful and innovative attitudes throughout the course, especially in their final year thesis or integrated design activities. Electives and Thesis/ Integrated Design in the final years will be selected in consultation with the Head of the School. The full range of electives available may not be offered in any one year.

The Practical Experience component of Thesis/Integrated Design should be completed before the start of Session 1 in the final year.

Outline of Second and Later Year Courses for Civil Engineering (Program Code 4421)

Second Year Program

	Course Name	*Hours*	*UOC*
2 General Education Courses			
AMAT2501	Eng Mathematics 2A	54	4
AMAT2502	Eng Mathematics 2B	54	4
ACIV2518	Eng Computational Meth 1	54	4
ACIV2514	Basic Fluid Mechanics	40	3
AINT2501	Fluid Engineering	40	3
AINT2502	Strength of Materials A	54	4
AINT2503	Strength of Materials B	54	4
ACIV2515	Engineering Surveying 1	40	3
ACIV2516	Geotechnical Engineering 1	54	4
AINT2504	Intro to Elec & Mech Eng Plant	40	3
ACIV2510	Eng Construction & Design	40	3
ACIV2517	Environ Eng Fundamentals	40	3
Average contact hours per week		23	

Third Year Program

	Course Name	*Hours*	
2 General Education Courses			
ACIV3516	Eng Computational Meth 2	40	3
ACIV3512	Hydraulics	40	3
ACIV3508	Structural Analysis 1A	40	3
ACIV3509	Structural Analysis 1B	40	3
ACIV3501	Civil Eng Materials A	40	3
ACIV3502	Civil Eng Materials B	40	3
ACIV3517	Engineering Surveying 2	40	3
ACIV3518	Geotechnical Engineering 2A	40	3
ACIV3519	Geotechnical Engineering 2B	40	3
ACIV3513	Structural Design 1A	40	3
ACIV3514	Structural Design 1B	40	3
ACIV3520	Environ Eng Applications	40	3
ACIV3521	Engineering Management 1	40	3
1 Elective course		27	3
Average contact hours per week		22	

Final Year Program

	Course Name	*Hours*	
ACIV4502	Thesis and Seminar A & Practical Experience}		3
ACIV4503	Thesis and Seminar B}	135	9
OR			
ACIV4504	Integrated Design A} & Practical Experience		3
ACIV4505	Integrated Design B}	135	9
ACIV4526	Water Resources	40	3
ACIV4508	Structural Analysis 2	40	3
ACIV4527	Geotechnical Engineering 3	40	3
ACIV4513	Structural Design 2A	40	3
ACIV4528	Structural Design 2B	40	3
ACIV4529	Environmental Eng Practice	40	3
ACIV4534	Engineering Management 2A	40	3
ACIV4535	Engineering Management 2B	40	3
ACIV4432	Transport Engineering A	40	3
ACIV4523	Transport Engineering B	40	3
1 Elective course		27	3
1 Elective course		27	3
Average contact hours per week		22	
Electives			
ACIV4514	Blast Design	27	3
ACIV4515	Blast and Dynamic Analysis	27	3
ACIV4517	Durability of Concrete and Concrete Structures	27	3
ACIV4519	Foundations for Light Structures	27	3
ACIV4520	Geosynthetics	27	3
ACIV4521	Prestressed Concrete	27	3
ACIV4522	Quantitative Risk Analysis	27	3
ACIV4524	Coastal Engineering	27	3
ACIV4525	Systems Eng	27	3
ACIV4533	Contaminated Site Investigations and Remediation	27	3

Course Descriptions

AMAT2501
Engineering Mathematics 2A
UC4 S1 TH54
See Course description under School of Mathematics and Statistics entry.

AMAT2502
Engineering Mathematics 2B
UC4 S2 TH54
See Course description under School of Mathematics and Statistics entry.

ACIV2518
Engineering Computational Methods 1
UC4 S1 TH54
The solution of practical engineering problems utilising: Solution sources, analytical tools, numerical tools, formal solution approaches, algebraic equations, vector and matrix operations, graphical techniques. Topics from a range of engineering disciplines will draw on the following mathematical techniques: differentiation, Integration, special functions, statistical description of data, random numbers, sorting, function optimisation, Taylor's series, ordinary differential equations.

ACIV2514
Basic Fluid Mechanics
UC3 S1 TH40

Physical properties of fluids. Compressible/incompressible fluids. Fluid statics. Control volumes. Continuity. Momentum. Energy.

AINT2501
Fluid Engineering
UC3 S2 TH40

Laminar and turbulent flow. Boundary layers. Lift and Drag. Dimensional analysis and modelling. Fluid resistance and the flow of real fluids. Friction and minor losses in single pipelines(CIV). Introduction to compressible flow.(A&M)

AINT2502
Strength of Materials A
UC4 S1 TH54

Materials Science: Structure of metals. Crystalline lattices. Phase transformations. Cast and wrought structures. Plastic deformation and annealing. Strengthening methods in metals and alloys. Ferrous metallurgy and processing of steels. Equilibrium and non-equilibrium transformations: annealing, normalising, quench and temper. Alloying of steels, hardenability. Tool and die steels. Stainless steels. Cast irons.

Mechanics of Solids: Revision of principles of statics. Concept of stress and strain. Axial Loading. Thermal stresses. Deformations in axially loaded members. Statically indeterminate structures. Shear stresses and strains. Bearing stress. Stress concentration. Torsion stresses and strains. Torsional deformations. Design of transmission shafts. Transformations of Stresses. Mohr's circle for plane stress.

AINT2503
Strength of Materials B
UC4 S2 TH54

Materials Science: Non-ferrous metallurgy. Aluminium Alloys: wrought and cast alloys, temper designations, heat-treatable and non-heat-treatable alloys. Copper-based alloys: brasses and bronzes. Welding metallurgy and weldability considerations for steels, stainless steels, aluminium alloys. Mechanical behaviour of metals. Ductile and brittle fracture. Fracture mechanics. Corrosion processes and corrosion protection systems.

Mechanics of Solids: Transformation of Strains. Mohr's circle for plane strain. Thin walled pressure vessels. Pure bending. Design of beams and shafts for strength. Deflections of beams. Transverse loading. Shearing stress formulae. Energy methods. Columns.

ACIV2515
Engineering Surveying 1
UC3 S2 TH40

Historical aspects. Elementary error theory. Surveying instrumentation and methods - levels, theodolites, electronic distance measurement, total stations, satellite position fixing, horizontal and vertical control and detail surveys. MGA 94 calculations. Introduction to GIS.

ACIV2516
Geotechnical Engineering 1
UC4 S2 TH54

Introduction to engineering geology. Effective stress principle. Drained and undrained conditions. Water and seepage in soils. Introduction to sheer strength of soils. Introduction to one-dimensional consolidation.

AINT2504
Introduction to Electrical and Mechanical Plant
UC3 S1 TH40

Electrical Plant: Introduction to power systems; generation, transmission and distribution. Apparent, real and imaginary power in AC circuits, power factor correction. Electrical installation practice; structural considerations, transformers, switchgear, circuit protection and cables. Electrical machines; single and three phase motor characteristics, installation requirements. Lighting and illumination requirements. Electrical safety.

Mechanical Plant: Introduction to heat, thermodynamics, gases. Introduction to refrigeration, air conditioning, waste disposal. Plant and equipment, refrigeration and air conditioning systems, boilers, chillers, diesel/petrol/other fuel engines, sewerage plant, garbage compactors, recycling, crushers (quarry), civil engineering plant. Mechanical considerations for civil engineers - foundation requirements, access needs, installation/replacement of plant, noise, air requirements, structural considerations, maintenance, engagement of mechanical engineers.

ACIV2510
Engineering Construction and Design
UC3 S1 TH40

Civil engineering industry. Introduction to civil engineering contracts. Interface between design and construction. Air and water in construction site. Movement of materials. Concrete, steel, timber and masonry construction. Foundation construction. Earthwork. Maritime construction. Site visit. Exercises in concept design and construction of civil engineering projects.

ACIV2517
Environmental Engineering Fundamentals
UC3 S2 TH40

An introduction to the science of environmental engineering. Pollution mechanisms, fundamentals of chemistry, microbiology, dispersion of pollutants, single species kinetics and interacting species.

ACIV3516
Engineering Computational Methods 2
UC3 S1 TH40

The solution of practical engineering problems utilising: stochastic tools, stochastic modelling, ordinary differential equations, partial differential equations, hypothesis testing, linear regression, analysis of variance, propagation of errors, Monte Carlo simulation, time series analysis, functionals and the calculus of variations, and neural networks.

ACIV3512
Hydraulics
UC3 S1 TH40

Pipe networks, combined turbo-machine and pipe systems. Open channels: friction losses, energy, momentum, gradually varied flow, rapidly varied flow. Flow measurement. Unsteady flow. Water wave theory. Wave transformation.

ACIV3508
Structural Analysis 1A
UC3 S1 TH40

Types of structures and loads. Analysis of statically determinate structures. Analysis of plane trusses. Internal loads in structural members. Shear force and bending moment diagrams for beams and frames. Statically determinate cable and arch structures. Influence lines. Deflections of beams, frames and trusses. The force method.

ACIV3509
Structural Analysis 1B
UC3 S2 TH40

Slope-deflection method. Moment distribution. Truss, beam and frame analysis using the stiffness method. Introduction to structural dynamics.

ACIV3501
Civil Engineering Materials A
UC3 S2 TH40

Metals as engineering materials; steels, aluminium alloys and other metals used in engineering construction. Fatigue and fracture in structures; fracture mechanics. Welding in structural engineering; quality assurance. Corrosion and corrosion protection systems, environmental effects. Timber engineering; types and availability, characteristics. Polymeric materials in engineering construction.

ACIV3502
Civil Engineering Materials B
UC3 S1 TH40

Concrete making materials and their influences on fresh and hardened concrete. Portland cement, aggregates, admixtures. Workability and consistency of concrete. Variability, durability and permeability. Properties and non-destructive testing. Role of concrete materials in the design and construction processes.

ACIV3517
Engineering Surveying 2
UC3 S1 TH27 (plus field school)

Photogrammetry. Least squares adjustments of horizontal and vertical control surveys. Computer aided techniques for processing and plotting detail surveys. One week field school covering various surveying techniques and applications.

ACIV3518
Geotechnical Engineering 2A
UC3 S1 TH40

Application of effective stress principle in geotechnical engineering. Sheer strength of soils. Principles of triaxial testing. Lateral earth pressure theory and the design of simple retaining structures. Influence of seepage on stability of retaining structures. Ground investigation.

ACIV3519
Geotechnical Engineering 2B
UC3 S2 TH40

Stress analysis in geotechnical engineering. One dimensional consolidation theory. Settlement of shallow foundation. Bearing capacity theory. Design of shallow footings. Introduction to slope stability.

ACIV3513
Structural Design 1A
UC3 S1 TH40

Design philosophy. Design processes. Main materials. Codes of practice. Types of loads and their combinations. Design of simple steel structures: design for tension, bending and compression. Design of connections. Steel design detailing. Timber design and construction: characteristics of structural timber, design procedures, design of timber beams and columns and design of tension members. Connections in timber. Examples.

ACIV3514
Structural Design 1B
UC3 S2 TH40

Materials and properties. Design methods and concepts. Limit states philosophy in design. Codes and standards. Loads and load combinations. Strength of rectangular sections in bending. Design of rectangular sections in bending. Analysis and design of flanged sections. Shear strength and shear and torsion reinforcement. Design for bond. Design of continuous beams. Design of one way slabs. Detailing of beams and one way slabs. Introduction to masonry design.

ACIV3520
Environmental Engineering Applications
UC3 S2 TH40

Applications of the science of environmental engineering. Jets, wakes and plumes, surface water pollution, soil and groundwater contamination, air pollution, noise pollution.

ACIV3521
Engineering Management 1
UC3 S2 TH40

An introduction to the project management body of knowledge. Resource planning. Work breakdown structures. Sequencing tasks and scheduling resources. Updating schedules. Cost planning, budgets and reporting. Quality (performance) management. The law of contract, operation and practice. The law of tort. The law of copyright. Legal liability. The design of contracts – allocation of risks and responsibility.

ACIV4502
Thesis and Seminar A and Practical Experience
UC3 S1

For description of practical experience requirements see 'Rules governing the award of the degree of Bachelor of Engineering'. For assessment, this course is combined with ACIV4503.

ACIV4503
Thesis and Seminar B
UC9 S2 TH135 (combined 4502/3)

The thesis project takes the form of a minor piece of research or investigation, a feasibility study, or a literature review. A staff member is nominated as supervisor to provide guidance and general supervision. Results will be presented both as a written thesis and as an oral seminar presented to staff and students of the School.

ACIV4504
Integrated Design A and Practical Experience
UC3 S1

For description of practical experience requirements see 'Rules governing the award of the degree of Bachelor of Engineering'. For assessment, this course is combined with ACIV4505.

ACIV4505
Integrated Design B
UC9 S2 TH135 (combined 4504/5)

Design of structures using a range of materials including steel, reinforced and/or prestressed concrete, and/or timber. Design of communication systems including roads, railways, ports and airfields, and associated works. Investigation and preparation of feasibility reports. Tasking of associated professions including geomatic, geotechnical and/or environmental investigations.

ACIV4526
Water Resources
UC3 S1 TH40

The hydrologic cycle, precipitation and runoff, interception, evaporation, infiltration. Hydrographs. Flood routing. Sediment transport. Water sources. Demand estimation. Storage design. Well design.

ACIV4508
Structural Analysis 2
UC3 S1 TH40

Plastic analysis of structures. Stability of bars and frames. Non-linear analysis of structures. Introduction to finite element methods.

ACIV4527
Geotechnical Engineering 3
UC3 S2 TH40

Introduction to unsaturated soil mechanics. Limit state design in geotechnics. Slope stability and retaining systems. Design of deep foundations. Ground improvement and soft soil engineering.

ACIV4513
Structural Design 2A
UC3 S1 TH40

Structural Steel Design
Design of steel members to resist individual and combined actions. Assessment of second order effects. Stability of building frames. Design of steel connections. Structural steel detailing. Torsion of structural members. Wind and earthquake loading on structures. Design of simple building frames. Fatigue effects. Use of Design Capacity Tables. Computer analysis and design of steel structures.

ACIV4528
Structural Design 2B
UC3 S1 TH40
Structural Concrete Design

Design of two-way slabs by the various Australian code recognised methods. Design of short columns. Design of slender columns. Design of footings. Detailing of reinforced concrete. Design for durability. Design for serviceability. Introduction to prestressed concrete analysis and design.

ACIV4529
Environmental Engineering Practice
UC3 S2 TH40

Engineering solutions to environmental problems. Wastewater and water treatment unit processes. Air pollution management. Contamination investigation. Monitoring. Environmental management, economics, legislation, environmental impact assessment.

ACIV4534
Engineering Management 2A
UC3 S2 TH40

Modelling project scope. Requirements engineering. Specification design. Tender documents. Tender evaluation. Contract types. Contract administration. Procurement management. Contract claims. Dispute resolution options. Parliament interest in projects. Government financial control.

ACIV4535
Engineering Management 2B
UC3 S1 TH40

Horizontal construction planning and control. Lightweight vertical construction. Design for climate. Construction details and specifications. Contract documentation. Design coordination. Design visualisation. Project coordination information management systems. Occupational health and safety. Expatriate construction projects. Standards, regulation, licensing.

ACIV4532
Transport Engineering A
UC3 S1 TH40

Pavement materials and testing. Structural design of unsealed and sealed pavements. Rigid and flexible roads and airfield pavements. Pavement construction and maintenance. Introduction to pavement management. Introduction to computer-aided techniques for processing and plotting of plans, and geometric design of roads.

ACIV4523
Transport Engineering B
UC3 S2 TH40

Systems interactions in the development of transport networks. Evaluation of economic and environmental impacts of transport proposals. Public participation in controversial transport planning proposals. Introduction to traffic engineering practice.

Electives

ACIV4514
Blast Design
UC3 S1 TH27

History of explosives use in engineering. Types and properties of explosives. Initiation systems. Quantity distance procedures. Quarry blasting. Explosive demolition. Blast waves and interactions, blast loads on structures, blast analysis and structural design. Survivability of structures.

ACIV4515
Blast and Dynamic Analysis
UC3 S2 TH27

Use of computer programs to assess external and internal blast loads. Assessment of structures against attack, ground shock. Earthquake analysis and design, wind induced vibrations.

ACIV4519
Foundations for Light Structures
UC3 TH27

Design considerations of foundations for light structures. Shrink-swell behaviour of reactive soils. Slab foundations on reactive soils. Foundations subject to uplift. Foundations on soft soil.

ACIV4518
Engineering in Low Resource Environments
UC3 TH27

Aid programs. Cultural and religious aspects. Stability of regions. Climatic conditions. Project management. Identification of requirement. Risk, availability of design information, suitability and availability of materials. Approval processes, balancing of cultural differences. Provision of ongoing maintenance. Local contractors and labour forces, costings, political involvement.

ACIV4517
Durability of Concrete and Concrete Structures
UC3 TH27

Factors essential to enhancement of durability of concrete and concrete structures, designing for durability according to macro and micro climatic conditions. Role of supplementary cementitious materials, superplasticisers, corrosion inhibitors, polymers, fibres and reinforcement treatments in the design of high performance concrete structures. Design and use of high strength lightweight concrete for offshore and gravity structures.

ACIV4521
Prestressed Concrete
UC3 TH27

Principles of prestressed concrete, material properties, methods of prestressing, flexural behaviour. Full and partial prestressing. Design of beams for serviceability. Deflections. Cable profiles.

ACIV4522
Quantitative Risk Analysis
UC3 S2 TH27

Risks and hazards. Probability and statistics. Modelling of uncertainties. Reliability index. Simulation. Applications in geotechnical engineering. Applications in decision making.

ACIV4520
Geosynthetics
UC3 S2 TH27

Use of geosynthetics in geotechnical and geo-environmental engineering practice. Topics may include: properties and test methods for geosynthetics (ie geotextiles, geogrids, geocomposites, and geomembranes); functions and mechanisms; designing for separation, filtration drainage and reinforcement. Design and construction of reinforced soil structures.

ACIV4525
Systems Engineering
UC3 S1 TH27

Systems approach to formulation and modelling of engineering problems in design and construction. System optimisation. Decision analysis.

ACIV4533
Contaminated Site Investigations and Remediation
UC3 S2 TH27

Contaminated site regulatory framework in Australia. Preliminary site investigations, landuse history, likely contaminants. Detailed site assessment, drilling, sampling, chemical compatibilities, sampling design and QA/QC. Health and safety management, action levels, personal protective equipment. Site remediation, landfill disposal, bioremediation, separate phase recovery. Advanced methods. Contaminated site excursion.

ACIV4524
Coastal Engineering
UC3 S2 TH27

Linear and nonlinear wave theories. Wave transformation. Wave force, energy and power. Wave prediction. Tides. Coastal currents. Sediment transport. Coastal protection methods. Structures in coastal zone.

Elective Courses from other Schools.

Subject to timetable considerations and with the approval of the Head of School, Civil Engineering and the relevant course authority, Courses from other Schools may be accepted as electives contributing to the Bachelor of Engineering (Civil) Degree.

School of Electrical Engineering

Electrical Engineering is one of the newer branches of engineering. 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 discipline, the last few 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 engineering courses.

Each year of the program comprises a number of School-based courses (identified by the prefix AELE) and courses taught by other Schools within University College. Completion of each year, thereby allowing progression to the next year, is normally achieved by satisfactory progress in each of the courses given in that year. At the discretion of the Head of School, students may be allowed to concurrently enrol in courses from more than one year of the program.

Outline of Second and Later Year Courses.

Second Year Program

	Courses	Units of Credit S1	S2	Total Hours
AMAT2501	Mathematics 2A	4		54
AMAT2502	Mathematics 2B		4	54
ACSC2501	Numerical Analysis E	3		40
ACSC2502	Data Structures E	3		40
APHY2502	Physics of Electronic Device Materials E	4		55
APHY2501	Electromagnetic Waves E		4	55
AELE2502	Electronics 2		3	33
AELE2501	Digital Systems 3	4		44
AELE2503	Electronics Design Laboratory 1		3	33
AELE2507	Circuits, Signals and Systems		4	44
AELE2508	Microcomputer Interfacing		3	33
AECM0503	Economics and Management for Engineers	3		33
General Education courses		3	3	54
		24	24	
Average contact hours per week				22.0

Third Year Program

	Courses	Units of Credit S1	S2	Total Hours
AMAT3504	Engineering Mathematics 3	4		54
AELE3504	Control Theory 1	3		33
AELE3505	Control Theory 2		3	33
AELE3502	Electronics 3	3		33
AELE3503	Electronics Design Laboratory 2		3	33
AELE3510	Optoelectronic Techniques		3	33
AELE3511	Analogue Communications	4		44
AELE3512	Engineering Electromagnetics 1	3		33
AELE3513	Engineering Electromagnetics 2		3	33
AELE3514	Power and Machines	4		44
AELE2508	Microcomputer Interfacing		3	33
ACSC3501	Management Science E		3	33
ACIV3521	Engineering Management 1		3	40
General Education courses		3	3	54
		24	24	
Average contact hours per week				20.5

Final Year Program

	Courses	Units of Credit	Total Hours
AELE4509	Systems Engineering	3	40
AELE4502	Electrical Engineering: Project, Thesis Laboratory Work, Practical Experience and Specialist Lectures A)	12	240
AELE4503	Electrical Engineering: Project, Thesis Laboratory Work, Practical Experience and Specialist Lectures B)	12	240

Students taking the final year Electrical Engineering program will select a further seven courses from the following list, subject to the approval of the Head of the School, to make a balanced program. Students will not normally be allowed to take courses from other Schools as part of their final year program.

	Courses	Units of Credit	Total Hours
AELE4506	Communications Systems	3	40
AELE4507	Digital Signal Processing	3	40
AELE4508	Electronics 4	3	40
AELE4511	Computer Control Theory	3	40
AELE4517	Guided Weapons Electronics	3	40
AELE4521	Occasional Option 1	3	40
AELE4522	Occasional Option 2	3	40
AELE4001	Avionics and Navigational Aids	3	40
AELE4523	Power Systems	3	40
AELE4535	Advanced Communication Techniques	3	40
AELE4536	Antennas and Propagation	3	40
AELE4531	Communications Networks	3	40

AELE4532	Digital Image Processing and Remote Sensing	3	40
AELE4529	Image and Video Transmission Systems	3	40
AELE4533	Introduction to Radar and Radar Imaging	3	40
AELE4518	Lasers and Laser Applications	3	40
AELE4534	Modelling and Simulation	3	40
AELE4535	Occasional Option 3	3	40
AELE4536	Occasional Option 4	3	40
AELE4526	Robotics and Mechanical Systems	3	40
		48	
Average contact hours per week			21.0

Course Descriptions

AMAT2501
Engineering Mathematics 2A
UC4 S1 TH54

AMAT2502
Engineering Mathematics 2B
UC4 S2 TH54
Prerequisite: AMAT1501 and AMAT 1502

See course description under School of Mathematics and Statistics entry.

ACSC2501
Numerical Analysis E
UC3 S1 TH40
Prerequisite: AMAT1501, AMAT1502, ACSC1501 and ACSC1101
Corequisite: AMAT2501 (Mathematics 2EA)

See course description under School of Computer Science entry.

ACSC2502
Data Structures E
UC3 S1 TH40
Prerequisite: ACSC1501 and either ACSC1101 or ACSC1502

See course description under School of Computer Science entry.

APHY2502
Physics of Electronic Device Materials E
UC4 S1 TH55

See course description under School of Physics entry.

APHY2501
Electromagnetic Waves E
UC4 S2 TH55

See course description under School of Physics entry.

AELE2502
Electronics 2
UC3 S2 TH33

Basic construction and characteristics of field-effect transistors (JFET and MOSFET); biasing circuits and Q-point selection. Introduction to FET and BJT (hybrid-pi) small signal models, low frequency analysis of small signal amplifiers. Regulated power supplies.

AELE2501
Digital Systems 3
UC4 S1 TH44

Manufacturing integrated circuits; Resistor-Transistor Logic (RTL); Diode-Transistor Logic (DTL); Transistor-Transistor Logic (TTL); Emitter-Coupled Logic (ECL); Metal-Oxide-Semiconductor Field-Effect Transistors (MOSFETs); MOSFET logic; Interfacing different logic families; Synchronous system design; Schmitt trigger devices; Tri-state outputs.

The design and development of digital computers and/or systems. Topics include: Computer organisation, comparative architecture of CPUs viewed from CISC and RISC design philosophies; the parallel computer data bus, handshaking, control, data flow; memories and memory organisation; peripherals; serial data buses (e.g., Ethernet and other LANs); machine level programming — machine code, assembly language; massively parallel computers.

AELE2503
Electronics Design Laboratory 1
UC3 S2 TH33

This course 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.

AELE2507
Circuits, Signals and Systems
UC4 S2 TH44

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; AC node and mesh analysis; mutual inductance; Laplace transforms; partial fraction expansions; simple and multiple poles and zeros; convolution; transfer functions; Bode diagrams; Fourier series and transforms; two-port networks; op-amps and active filters; computer aided circuit analysis and design.

AELE2508
Microcomputer Interfacing
UC3 S2 TH33

Introduction to programming in the C language. Program development, debugging and execution on the target system. Unconditional input/output interfacing. Interfacing of keyboards, displays, ADCs and DACs. I/O interfacing using interrupts.

AECM0503
Economics and Management for Engineers
UC3 S1 TH33

See course description under School of Economics and Management entry.

AMAT3504
Engineering Mathematics 3
UC4 S1 TH54

See course description under School of Mathematics and Statistics entry.

AELE3504
Control Theory 1
UC3 S1 TH33

Introduction to feedback control systems; deriving models from physical systems; dynamic modelling of AC and DC machines; transfer function models; state space models; discrete-time models; block diagram manipulation; conversion between state space and transfer function models; state space phase variable form; model uncertainty; linearization of nonlinear models; advantages of feedback control; limitations of feedback control; sensor noise and actuator saturation; pole placement controller design; transient response of control systems; inverse Laplace transform calculation of transient response; transient response of first and second order systems; dominant poles; time domain response of state space systems; the use of MATLAB and SIMULINK in control systems modelling, simulation and design.

AELE3505
Control Theory 2
UC3 S2 TH33

Control system accuracy and steady state error; integral action; frequency response; Bode plots; Nyquist plots; graphical construction of Bode and Nyquist plots; control system stability for discrete and continuous systems; Nyquist stability criterion; gain and phase margins; stability robustness; root locus diagrams; lead and lag compensators; PID compensators; loop shaping control system design; the use of MATLAB in frequency domain control analysis and design; MATLAB tools for modern control system design.

AELE3502
Electronics 3
UC3 S1 TH33

Frequency response of amplifiers; multistage amplifiers; power amplifiers; effects of feedback on amplifiers; oscillators. Differential and operational amplifiers; wave shaping circuits. Semiconductor power devices. DC/DC, AC/DC and DC/AC converters. Electronic circuit analysis and design using computer aids.

AELE3503
Electronics Design Laboratory 2
UC3 S2 TH33

This course continues the electronic circuit design exercises commenced in Electronics Design Laboratory 1 and will concentrate on topics involving; analogue filter design, analogue and digital communications circuits, and power electronics.

AELE3510
Optoelectronics Techniques
UC3 S2 TH33

The electromagnetic spectrum; wave and particle nature of light, Planck's blackbody radiation law. Detection processes in the visible and infrared. Principles of operation and characteristics of photon and thermal detection devices; PIN and avalanche photodiodes, phototransistors, photoconductive, photoemissive and pyroelectric devices. Noise in radiation detectors. Introduction to radiation detector applications; optical communications, optical processing and imaging devices.

AELE3511
Analogue Communications
UC4 S1 TH44

Fourier series and Fourier transform, Fourier spectrum and power spectrum. Parseval's theorem, properties of the Fourier transform. Energy spectral density, power spectral density. Linear system impulse response and transfer function. Amplitude modulation; doublesideband, single sideband, vestigial sideband, AM modulators and demodulators, coherent detection, envelope detection, superheterodyne receiver. Angle modulation; frequency modulation, phase modulation, narrowband FM, wideband FM, FM modulators and demodulators. White noise, narrowband noise and signal to noise ratio. Noise performance of modulation systems, pre-emphasis and de-emphasis and system comparisons

AELE3512
Engineering Electromagnetics 1
UC3 S1 TH33

Introduction to antennas, waveguide and propagation phenomena; Vector Tools: grad, div, curl and theorems; coordinate systems. Review of Electrostatics and Magnetostatics: static charges, electric fields, divergence; conductors and dielectrics; electrostatic potential; magnetic flux density, magnetic fields; magnetic materials; magnetic forces and torque. Time Varying Fields: induction, moving charges and currents, harmonic fields; Maxwell's equations and electromagnetic boundary conditions; wave equation and time harmonic fields. From Theory to Practice: solution of antenna radiation and wave propagation problems.

AELE3513
Engineering Electromagnetics 2
UC3 S2 TH33

Propagation: Plane wave propagation in lossless and lossy media, normal and oblique incidence to conducting and dielectric boundaries, reflection and transmission coefficients; propagation over the Earth (free space, ground wave, ionospheric and diffraction effects). Transmission Lines: structures, transmission line parameters, distributed circuits, characteristic impedance, propagation constant, reflection and transmission coefficients, Smith Chart, stub matching. Waveguides: TEM, TE and TM propagation; field theory for metal (rectangular and circular) and dielectric (optical) waveguides; losses, modes, cutoff, wavelength, dispersion and bandwidth. Antennas: elemental dipole, radiation pattern, polarisation, directivity, gain, impedance; wire and loop antennas, aperture antennas; antenna arrays.

AELE3514
Power and Machines
UC4 S1 TH44

Magnetic circuits and magnetic materials; single phase and three phase transformers; real and reactive power; electromagnetic energy conversion principles; principle of rotating electric machines. DC Machine, steady-state behaviour and speed control. Rotating mmf waves in AC machines; polyphase induction machines, principles of operation and equivalent circuit; synchronous machines, steady-state behaviour; single phase and fractional horse-power motors; variable reluctance machines, steady-state behaviour and speed control.

AELE3515
Digital Communications
UC3 S2 TH33
Note/s: Not offered in 2001

Revision of Fourier techniques; sampling theorem and aliasing; quantisation noise; pulse code modulation; bandwidth requirement of digital signals; entropy of signals; channel capacity, entropy encoding; differential PCM, DM and CVSDM techniques; synchronization; matched filters; decision theory; baseband systems; intersymbol interference; equalisation; M-ary baseband systems; binary modulation techniques, performance comparisons.

ACSC3501
Management Science E
UC3 S2 TH33

See course description under School of Computer Science entry.

ACIV3521
Engineering Management 1
UC3 S2 TH40

See course description under School of Civil Engineering entry.

AELE4507
Digital Signal Processing
UC3 TH40

Discrete time signals and systems, difference equations, state equations, discrete convolution, complex analysis, Z-transforms, inverse transforms, transfer functions, Fourier Transform, discrete-time Fourier transform, transform properties, sampling and aliasing, discrete-time approximation of analog filters. Discrete Fourier transform signal processing including the FFT, frequency response estimation, interpolation, downsampling, convolution, block convolution, correlation, cepstrum. Digital IIR Filter Design. Digital FIR Filter Design including windowing, the frequency sampling method, the McClellan-Parks Method. Linear phase filters, filter structures.

AELE4506
Communications Systems
UC3 TH40

Review of signal characteristics including bandwidth requirements of common data and message types in voice, picture and data transmission; discussion of transmission media and their signal handling capabilities, including a review of dispersion and attenuation characteristics, and the determination of signal

bandwidth; understanding of open wire, coaxial cable and optical fibre channels; design considerations for microwave radio, satellite links, UHF, ELF and VLF transmission, troposcatter systems and optical communications systems; review of mobile communication concepts; understanding of large scale and small scale fading and channel characteristics; descriptions of multiple access schemes, diversity techniques and wireless standards; study of cellular design fundamentals; and familiarisation with modulation techniques suitable for mobile communications; understanding of the importance and need for equalisers.

AELE4511
Computer Control Theory
UC3 TH40

Control system implementation; discrete time state space models; sampling of continuous time state space models; time domain response of discrete time systems; use of MATLAB and SIMULINK in the simulation of computer control systems; stability of discrete time systems; controllability and observability; disturbance models and random processes; MATLAB tools for computer control system design; pole placement state feedback controller design; state estimation and observers; output feedback controller design; linear quadratic optimal control; Kalman Filters and optimal filtering theory.

AELE4517
Guided Weapons Electronics
UC3 TH40

This course is an introduction to the multi disciplinary engineering found in guided weapons. It covers dispersion errors in unguided weapons, the modelling of a weapon trajectory and looks at guided weapons from a system perspective. The course focus is on guided weapons instrumentation, guided weapons autopilots (control), and the application of automatic control guidance methods including guidance homing & proportional navigation. An overview is presented on guidance homing heads, proximity fuses & arming, acoustic guidance and counter measures.

AELE4521
Occasional Option 1
UC3 TH40

The syllabus for this course 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.

AELE4522
Occasional Option 2
UC3 TH40

The syllabus for this course 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.

AELE4508
Electronics 4
UC3 TH40

Oscillators: configurations, design; Noise: thermal and non-thermal mechanisms, characterisation, Op-Amp noise parameters, BJT noise parameters (Y and S), communication system noise characterisation; noise figure, noise factor, noise temperature, noise measurement; Filters: passive filter analysis and design, active filter analysis and design, filter specifications and measurement; Mixers: unbalanced, single and double balanced mixers, non-linear behaviour and characterisation, applications; Introduction to Phase Lock Loop synthesisers: loop analysis, available components, noise.

AELE4001
Avionics and Navigational Aids
UC3 TH40

This course evaluates avionics systems by examining the systems architecture. The design of subsystems and interfaces are reviewed with particular emphasis on the integration of sensors and use of multiplex bus architecture. Active navigation aids such as ILS, TACAN, DME, VOR are introduced but greater emphasis is placed on the more modern integrated navigation systems using GPS, INS, DOPPLER and AIR DATA sensor components. This material will focus on applied real time computing implementing a discrete Kalman filter to achieve sensor integration.

AELE4523
Power Systems
UC3 TH40

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. Introduction to power systems dynamics and dynamic simulation.

AELE4509
Systems Engineering
UC3 TH40

A course that presents the principles of the software engineering discipline and practices students in the application of software engineering techniques. The theoretical component of the course covers current issues in software development and acquisition, process models, software management issues, computer-aided software engineering (CASE), software cost and schedule estimation, software development standards, software documentation, capability maturity models, metrics, quality assurance, configuration management, validation and verification, and test and evaluation. These principles are then reinforced through the conduct of a number of laboratory exercises to practise good software design and development.

AELE4535
Advanced Communications Techniques
UC3 TH40

M-ary ASK, FSK and PSK systems, performance comparisons; hardware implementation of ASK, FSK and PSK modulators and demodulators; channel coding, block codes (e.g. BCH and RS codes), convolutional codes, Viterbi decoding; modulation and coding trade-offs, QPSK, OQPSK, MSK and QAM systems; secure communications: encryption, spread spectrum modulation (direct sequence and frequency hopping).

AELE4536
Antennas and Propagation
UC3 TH40

Antenna fundamentals: wave equation and boundary conditions, scalar and vector potentials, far field radiation pattern, directivity, gain, efficiency, terminal impedance. Antenna types: survey of wire, aperture and array antennas; EMI and EMC. Analysis tools: estimation methods, moment method, NEC and ELNEC, visualisation tools. Receive antennas: effective height or area, Friis transmission formula, antenna noise, communication link design. Propagation: free space, ground wave, troposphere, ionosphere effects; flat and spherical Earth propagation; modelling and prediction over long and short distances.

AELE4531
Communications Networks
UC3 TH40

Introduction to communications networks, the ISO OSI and TCP/IP reference models, ISDN and ATM; concepts of transmission, switching, signalling and framing; overview of multiple access protocols, IEEE standards for LANS and MANS, bridges and high speed LANS; study of routing and congestion control schemes, internetworking and connection management; understanding of network design issues and network security; examples of networks including the Internet and ATM networks; applications of communications networks.

AELE4532
Digital Image Processing and Remote Sensing
UC3 TH40

Digital Image Processing: as 2D or higher dimensional signal processing; 2D discrete Fourier transform and concept of spatial frequency; 2D cosine transform; 2D wavelet transform; image domain and frequency domain filtering; digital image capture and display systems; perspective transform between 2D and 3D; image registration; image grey level and colour enhancement;

HSI and uniform colour space; image warping and interpolation - rotation, non-linear warping, morphing; image restoration and reconstruction. General applications - astronomical imaging, surveillance, forensic, medical imaging, preprocessing for machine vision.

Remote Sensing: Planck's black body radiation law and its application to wavelength selection in remote sensing imaging; atmospheric windows; passive and active microwave remote sensing; reflectance and scattering characteristics of the earth's surface and cultural features; overview of past, present and future imaging systems, high and low resolution optical sensors including multispectral line scanners and CCD push broom arrays, and SLAR and SAR radar techniques; sources of image distortion and correction; radiometric and geometric enhancement techniques, interpretation of optical and radar imagery and classification techniques.

AELE4529
Image and Video Transmission Systems
UC3 TH40

Physiological aspects of television, television standards, colour systems with particular reference to the PAL system. Television equipment; cameras, transmitters, receivers, video recorders. An introduction to digital video and image transmission, JPEG image compression standard, MPEG audio and video compression standards, digital television standards, digital video broadcasting.

AELE4533
Introduction to Radar and Radar Imaging
UC3 TH40

Radar Fundamentals: range determination, target backscatter, noise and clutter, radar range equation, radar cross section. Clutter: sea, land and rain backscatter characteristics; detection of targets in clutter. Radar Cross Section Reduction: backscatter characteristics; low reflection materials, mission design. CW and FM Radar: doppler effect; range and frequency resolution; system design. Pulse Radar: pulse width, PRF and resolution; signal spectrum; ambiguities in range and doppler frequency; pulse integration; MTI radar; non-coherent and coherent detection; matched filter; pulse compression; system design.

Imaging Radar: range and cross-range resolution limits; image formation and characteristics; distributed and point targets; inverse imaging; SAR and ISAR system design; airborne and space shuttle based SAR platforms, including AIRSAR, Seasat, ERS and Radarsat; applications of remote sensing imaging technology to target detection, assessment of Earth resources and atmospheric monitoring.

AELE4518
Lasers and Laser Applications
UC3 TH40

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. Non-linear optics, optical frequency harmonic and sub-harmonic generation, Q-switching and modulation techniques. Introduction to a selection of defence, industrial and medical laser applications such as laser range finding, laser-guided munitions, directed energy weapons, holographic non-destructive-testing, 3-D display, optical signal processing and lidar.

AELE4534
Modelling and Simulation
UC3 TH40

Models for nonlinear systems, phase portraits, linearization, limit cycles, nonlinear system stability, chaotic systems. Case studies involving switching control systems, Van der Pol oscillator, nonlinear systems with hysteresis, nonlinear resistor circuits (tunnel diode and Chua circuits). Computer simulation of nonlinear systems, use of MATLAB and SIMULINK in simulation. Modelling via system identification, MATLAB system identification toolbox.

AELE4535
Occasional Option 3
UC3 TH40

The syllabus for this course 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.

AELE4536
Occasional Option 4
UC3 TH40

The syllabus for this course 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.

AELE4526
Robotics and Mechanical Systems
UC3 TH40

Introduction to different robot configurations. Homogeneous transformations; Kinematics; inverse kinematics; Jacobians; robot dynamics; Newton Euler methods; Flexible robots; Flexible beam dynamics; Euler-Lagrange equation; Acoustical system dynamics; modal analysis; transfer functions; Finite-dimensional models; Modelling of piezoelectric actuators, DC motors, acoustic speakers. Classical and modern control methods for the control of robots, flexible structures and acoustical systems.

AELE4527
Software Engineering: Principles and Practice
UC3 TH40

A course that presents the principles of the software engineering discipline and practices students in the application of software engineering techniques. The theoretical component of the course covers current issues in software development and acquisition, process models, software management issues, computer-aided software engineering (CASE), software cost and schedule estimation, software development standards, software documentation, capability maturity models, metrics, quality assurance, configuration management, validation and verification, and test and evaluation. These principles are then reinforced through the conduct of a number of laboratory exercises to practice good software design and development.

AELE4502
Electrical Engineering: Project, Thesis, Laboratory Work, Practical Experience and Specialist Lectures A
UC12 S1

AELE4503
Electrical Engineering: Project, Thesis, Laboratory Work, Practical Experience and Specialist Lectures B
UC12 S2 HPY240

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 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.

The laboratory work component of the course is made up of a program of practical work spread uniformly throughout the year.

Before graduation a student 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.

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 late in second session each student will be required to lead a seminar on their project topic attended by other students taking this course and members of staff.

Courses offered to Aerospace and Mechanical Engineering

AELE2004
Principles of Electrical and Electronics Technology
UC3 S1 TH40

An application based course covering the following topics. DC circuit analysis, simple DC circuits, DC measurements, DC power sources. Operational amplifiers (Op-Amps); examples of Op-Amp circuits. Transducers and their application in measurement systems. Basic principles of digital electronics. 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 synchronous and induction motors. AC measurements.

AELE4001 E
Avionics and Navigational Aids
UC3 TH40

See course description under School of Electrical Engineering entry.

Bachelor of Technology in Communications and Information Systems

The Bachelor of Technology in Communications and Information Systems has been approved by the University and is designed to meet the needs of serving officers in the Australian Army. It is not being offered in 2001.

School of Aerospace and Mechanical Engineering

The School presents four degree programs and, for candidates with a BTech (Aero), an Articulation Program to a BE (Aero).

1	Bachelor of Engineering in Mechanical Engineering	Program Code 4423
2	Bachelor of Engineering in Aeronautical Engineering	Program Code 4424
3	Bachelor of Technology in Aeronautical Engineering	Program Code 4430
4	Bachelor of Technology in Aviation	Program Code 4437
5	Articulation Program	Program Code 4425

Bachelor of Engineering in Mechanical Engineering

Mechanical Engineering is the 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 program leads to the Bachelor of Engineering degree, and Pass and Honours classifications are determined at the conclusion of the course.

Descriptions of the courses which comprise the second and later years of the degree program are given below. Specialisation in Mechanical Engineering begins in second year and increases as the degree programe progresses. At the final year level, projects and a large number of elective courses 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 courses offered in other schools subject to the approval of the Heads of Schools concerned.

During the first and second years of the program, students may go on appropriate industrial visits.

The Mechanical Engineering program was redesigned to reduce the workload in all years and to remove any unnecessary differences between the three engineering degree streams presented by the school. The new first and second years of that program were introduced in 1999, and the new third year was introduced in 2000 together with minor changes to the fourth year program as well. The new fourth year program will be introduced in 2001.

The new units of credit system introduced throughout the University has necessitated other changes to the Mechanical Engineering program and in 2001 there has been a regrouping of subject matter within new courses for all years.

The first year program is described on p.101.

Outline of Second and Later Year Programs and List of Courses

Second Year Program

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
AMEC2001	Design 1		3	40			40
AELE2004	Electrical & Electronic Technology	3		40			40
AINT2501	Fluids Engineering		3	34		6	40
AMEC2501	Introduction to Mechanical Design		3	27			27
AMAT2501	Engineering Mathematics 2A	4		54	zero		54
AMAT2502	Engineering Mathematics 2B		4	54	zero		54
ACSC2501	Numerical Analysis E	3		27	13		40
AINT2502	Strength of Materials A	4		42	zero	12	54
AINT2503	Strength of Materials B		4	42	zero	12	54
AMEC2006	System Dynamics 1A	4		41		6	47
AMEC2007	System Dynamics 1B		4	40		6	46
AMEC2011	Thermodynamic Cycles		3	34		6	40
AMEC2008	Thermofluids	6		52		12	64
Total		24	24	527	13	60	600
Average contact hours per week							22.2

Third Year Program

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
Four General Education Courses		6	6	108			108
AMEC3513	Design 2		3	40			40
AMEC3511	Instrumentation		3	27			27
AMEC3001	Maintenance Management and Logistics Engineering		3	27			27
AMAT3504	Engineering Mathematics 3	4		54			54
AMEC3507	Mechanics of Solids 2A	3		27		2	29
AMEC3508	Mechanics of Solids 2B		3	27		2	29
ACIV3001	Project Management 1A	3		27			27
AMEC3512	Pumps, Turbines & Compressors		3	27		4	31
AMEC3509	System Dynamics 2		3	27			27
AMEC3510	Thermodynamics	4		39		4	43
AMEC3003	Viscous Flows & Gas Turbine Theory	4		54		4	58
Total		24	24	484		16	500
Average contact hours per week							18.5

Final Year Program

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
AMEC4510	Applied Thermodynamics		3	27			27
AMEC4521	Design 3A	3		27			27
AMEC4506	Design 3B		3	27			27
AECM0503	Economics and Management for Engineers	3		27			27
AMEC4508	Fluid Applications	3		27			27
ACHM4502	Mechanical Engineering Project and Thesis A	6		108			108
AMEC4503	Mechanical Engineering Project and Thesis B & Practical Experience*		9	108			108
AMEC4509	Mechanics of Solids 3	3		27			27
AMEC4507	Systems Dynamics 3	3		27			27
Electives	(4 at 3 units of credit each)	3	9	108			108
Total		24	24	513			513
Average contact hours per week							19.0

	Elective Courses	Units of Credit S1	S2	Total Hours
AMEC4002	Acoustic Noise		3	27
AMEC4511	Advanced Design		3	27
AMEC4013	Analysis of Structural Vibration			27
AMEC4512	Advanced Mechanisms			27
AMEC4513	Applied Elasticity and Plasticity			27
AMEC4514	Applied Optics		3	27
AMEC4515	Approximate Methods for Partial Differential Equations			27
AMEC4004	Chaos and Non-linear Dynamics			27
AMEC4014	Control Theory			27
AMEC4016	Impact Mechanics		3	27
AMEC4517	Marine Engineering	3		27
AMEC4518	Naval Architecture	3		27
AMEC4018	Non Destructive Inspection		3	27
AMEC4007	Occasional Elective		3	27
AMEC4009	Random Vibrations and Signal Analysis			27
AMEC4519	Thermal Performance and Energy Consumption in Buildings			27
AMEC4520	Tribology			27

Subject to pre-requisites, the following aeronautical engineering elective courses may also be available:

AMEC4005	Composite Mechanics		3	27
AMEC4017	Missile Design	3		27
AMEC4008	Orbital Mechanics		3	27
AMEC4010	Rotary Wing 1	3		27
AMEC4011	Rotary Wing 2			27
AMEC4012	Structural Joining Methods	3		27

* See Rule 6 of the BE Degree Rules.

Course Descriptions

Level II Mechanical Engineering

AMEC2001
Design 1
Staff Contact: Dr A. Fien, Dr W. F. Smith
UC 3 TH 40
*Prerequisites:*Engineering Mechanics 1A and 1B, Engineering Graphical Communications, Strength of Materials A
Corequisites:. Strength of Materials B

Principles of machinery and component design: example topics include springs, bearings, gears, linkages, brakes and clutches, standard hardware. Studies considering what components do, how they do it, how they were made, possible forms. Design philosophies: safe life, fail safe, damage tolerant.

AELE2004
Electrical & Electronic Technology
UC 3 TH 40

See course description under School of Electrical Engineering entry.

AINT2501
Fluids Engineering
UC3 TH40
Staff Contact: Dr N. R. Mudford

Laminar and turbulent flow. Boundary layers. Lift and Drag. Dimensional analysis and modelling. Fluid resistance and the flow of real fluids. Friction and minor losses in single pipelines(CIV)./ Introduction to compressible flow.(A&M)

AMEC2501
Introduction to Mechanical Design
Staff Contact: Dr W. F. Smith
UC 3 TH 27
Prerequisite: Statics and Dynamics, Engineering Graphical Communications, Mechanics of Solids 1A and Materials 1A
Corequisite: Mechanics of Solids 1B and Materials 1B

Introduction to design principles and processes. Original innovative design project (Warman Design and Build Competition). Adaptive design: assessment of merit and shortcomings of base design, failure analysis, redesign.

AMAT2501
Engineering Mathematics 2A
UC 4 TH 54

See course description under School of Mathematics and Statistics entry.

AMAT2502
Engineering Mathematics 2B
UC 4 TH 54

See course description under School of Mathematics and Statistics entry

ACSC2501
Numerical Analysis E
UC 3 TH 40

See course description under School of Computer Science entry.

AINT2502
Strength of Materials A
Staff Contact: Dr O. Kayali, A/Prof. S. R . Yeomans
UC 4 TH 54

Materials Science: Structure of metals. Crystalline lattices. Phase transformations. Cast and wrought structures. Plastic deformation and annealing. Strengthening methods in metals and alloys. Ferrous metallurgy and processing of steels. Equilibrium and non-equilibrium transformations: annealing, normalising, quench and temper. Alloying of steels, hardenability. Tool and die steels. Stainless steels. Cast irons.

Mechanics of Solids: Revision of principles of statics. Concept of stress and strain. Axial Loading. Thermal stresses. Deformations in axially loaded members. Statically indeterminate structures. Shear stresses and strains. Bearing stress. Stress concentration. Torsion stresses and strains. Torsional deformations. Design of transmission shafts. Transformations of Stresses. Mohr's circle for plane stress.

AINT2503
Strength of Materials B
Staff Contact: Dr O. Kayali, A/Prof. S. R . Yeomans
UC 4 TH 54

Materials Science: Non-ferrous metallurgy. Aluminium Alloys: wrought and cast alloys, temper designations, heat treatable and non-heat treatable alloys. Copper-based alloys: brasses and bronzes. Welding metallurgy and weldability considerations for steels, stainless steels, aluminium alloys. Mechanical behaviour of metals. Ductile and brittle fracture. Fracture mechanics. Corrosion processes and corrosion protection systems.

Mechanics of Solids: Transformation of Strains. Mohr's circle for plane strain. Thin walled pressure vessels. Pure bending. Design of beams and shafts for strength. Deflections of beams. Transverse loading. Shearing stress formulae. Energy methods. Columns.

AMEC2006
System Dynamics 1A
Staff Contact: Mr I.W. Linnett
UC 4 TH 47

Vibrations. Single degree of freedom systems. System modelling and linearization, the free vibration of undamped and damped systems, the forced response to harmonic, rotating unbalance and base excitations, vibration isolation, alternative models for damping, the response to generalised forcing functions, shock response spectra. Vibration measurement.

Control Theory. Mathematical modelling of system components, transfer functions, open and closed loop systems, transient response analysis of first and second order systems, basic control actions, stability, response of higher order systems.

AMEC2007
Systems Dynamics 1B
Staff Contact: Mr I.W. Linnett
UC 4 TH 46
Prerequisite: System Dynamics 1A

Vibrations.: Multiple degree of freedom systems. Matrix and state vector formulation of lumped parameter systems, the eigenvalue problem, modal analysis, forced response of undamped systems and of systems with viscous damping.

Control Theory.: Root locus and frequency techniques for analysis and design, compensation. The PID controller, introduction to robust control.

AMEC2011
Thermodynamic Cycles
Staff Contact: Dr. N. R. Mudford
UC 4 TH 46
Prerequisite: Thermofluids A

Reciprocating engines, compressors and expanders: cycle analysis, construction, performance. Vapour power cycles. Gas power cycles.

AMEC2008
Thermofluids
Staff Contact: A/Prof J.C.S.Lai / Dr N.R.Mudford
UC 6 TH 64
Prerequisites: Statics and Dynamics

The role of thermodynamics and fluid mechanics. Basic concepts. Fluid statics. Simple analysis of fluid motion. Laws of thermodynamics. Applications of thermodynamics and fluid mechanics to control volume.

Level III Mechanical Engineering

AMEC3513
Design 2
Staff Contact: Dr W. F. Smith
UC 3 TH 39
Prerequisites: Design 1, Mechanics of Solids 1A , Mechanics of Solids 1B, Materials 1A and Materials 1B.

Conceptual design of systems and subsystems, design as a constructive systematic integrative process. Introduction to design process models. Decision-based design: selection. Design process planning and management. Communication of design information.

Example domain topics include: fatigue, shaft design and gear design. Case studies. Major design project covering specification development to concept selection

ACIV3521
Engineering Management 1
UC 3 TH 40

See course description under School of Civil Engineering entry.

AMEC3511
Instrumentation
Staff Contact: Dr M.J. Harrap
UC 3 TH 27
Prerequisites: Principles of Electrical Technology, Principles of Electronics Technology and Mathematics 2E

The steady state performance of measuring systems; The dynamic performance of measurement systems; Error reduction techniques; Noise sources in measurement systems; Digital Data Acquisition systems; Distance, velocity and acceleration measurements; Mass, force, strain, torque and pressure measurements; Fluid quantity and flow measurements.

AMEC3001
Maintenance Management and Logistics Engineering
Staff Contact: Dr J. F. Milthorpe
UC 3 TH 27

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.

AMAT3504
Engineering Mathematics 3
UC 4 TH 54

See course description under School of Mathematics and Statistics entry.

AMEC3507
Mechanics of Solids 2A
Staff Contact: Dr A.R. Watson
UC 3 TH 27

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.

AMEC3508
Mechanics of Solids 2B
Staff Contact: Mr M Tahtali
UC 3 TH 27

Introduction to finite element stress analysis.

AMEC3512
Pumps, Turbines and Compressors
Staff Contact: Prof. R.K.Duggins / Mr I.W.Linnett / Dr M.J.Harrap
UC 3 TH 27

Prerequisites: Thermofluids

Axial flow machines. Two-dimensional cascades. Axial turbines, compressors, pumps and fans. Three-dimensional flows in axial machines. Centrifugal pumps, fans and compressors. Radial flow turbines.

AMEC3509
System Dynamics 2
Staff Contact: Mr I.W. Linnett
UC 3 TH 27

Kinematics and kinetics of mechanisms, velocities, accelerations, inertia and external loads. Balancing of rotating and reciprocating masses, whirling of shafts, rotor dynamics

AMEC3510
Thermodynamics
Staff Contact: Dr N. R. Mudford
UC 4 TH 39
Prerequisite: Thermofluids

Heat pump and refrigeration cycles. Combustion processes. Properties of mixtures. Air-conditioning.

AMEC3003
Viscous Flows & Gas Turbine Theory
Staff Contact: Prof R. K. Duggins, Dr N.R. Mudford
UC 4 TH 54
Prerequisite: Thermofluids

Laminar and turbulent motion. Flows in pipes and channels. Elementary treatment of boundary layers. Transition and turbulence. Separation. Skin friction and pressure drag. Jet and wake flows.

Types of power plant for civil, marine and aircraft applications with emphasis on gas turbines. Ideal and real operating cycles. Gas turbine combustion processes. Cycle calculations. Propulsive efficiency and thermodynamic performance of jet engines.

Level IV Mechanical Engineering

AMEC4510
Applied Thermodynamics
Staff Contact: Dr N.R. Mudford
UC 3 TH 27
Prerequisite: Thermodynamics

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.

AMEC4521
Design 3A
Staff Contact : Dr W. F. Smith
UC 3 TH 27
Prerequisites: Design 2A and Design 2B

Detail design of systems and subsystems, design as a constructive systematic integrative process. Decision-based design: compromise. Design process planning and management. Communication of design information.

Example domain topics include: mechanical power transmission, dimensioning and tolerancing. Major design project covering concept development to tender evaluation.

Further studies of materials science. Ferrous and non-ferrous materials. Other important non-metallic materials. Crack analysis. Creep.

AMEC4506
Design 3B
Staff Contact: Dr A. Fien, Dr W. F. Smith
UC 3 TH 27
Prerequisites: :Design 3A

Design as a forensic, repair activity. Trouble shooting at the machine level, failure analysis. Comparison of alternative designs and assemblies. Design for manufacture and maintenance. Adaptive and variant design. Code based design and non-code based design. Standards and their use. Example domain topics include: fracture, wear, vibration, joints, human factors. Further studies of materials science. Other important non-metallic materials. Crack analysis. Creep.

AECM0503
Economics and Management for Engineers
Staff Contact: Dr G. Manger
UC 3 TH 27

See course description under School of Economics and Management entry.

AMEC4508
Fluid Applications
Staff Contact: Prof R.K. Duggins
UC 3 TH 27
Prerequisite: Thermofluids

Advanced applications in Fluid Mechanics.

AMEC4502
Mechanical Engineering Project and Thesis A
UC 6 TH 108

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.

AMEC4503
Mechanical Engineering Project and Thesis B and Practical Experience
UC 9 TH 108

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.

Satisfactory completion of the Practical Engineering Experience Requirement, viz rule 6 of the Rules governing the award of the degree of Bachelor of Engineering.

AMEC4509
Mechanics of Solids 3
Staff Contact: Dr A.R. Watson
UC 3 TH 27

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.

AMEC4507
Systems Dynamics 3

Staff Contact: Dr. A.G.Sreenatha
UC 3 TH 27
Prerequisites: System Dynamics 2

Vibrations: isolation and control. Introduction to Modal Analysis and modal testing.

Control Systems: accuracy and stability, performance specification and design, process controllers and servomechanisms. Controller selection, settings and compensation.

Elective units

AMEC4002
Acoustic Noise
Staff Contact: A/Prof J.C.S. Lai
UC 3 TH 27

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.

AMEC4511
Advanced Design
Staff Contact: Dr W. F. Smith
UC 3 TH 27
Prerequisite: Design 2

Overview of current design science research. Concurrent engineering, systems engineering. Design as a multidisciplinary activity. Mathematical modelling in design. Design space exploration and representation. Optimisation theory and practice in design. Artificial intelligence / expert systems. Taguchi methods for robust design. Cost / benefit trade studies, design decision making.

AMEC4512
Advanced Mechanisms
Staff Contact: Dr A.R. Watson
UC 3 TH 27

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.

AMEC4013
Analysis of Structural Vibration
Staff Contact: A/Prof J.C.S. Lai
UC 3 TH 27
Prerequisite: Fluid Mechanics 3 or Flight Mechanics 3

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.

AMEC4513
Applied Elasticity and Plasticity
Staff Contact: Dr A.R. Watson
UC 3 TH 27

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.

AMEC4514
Applied Optics
Staff Contact: A/Prof J.P. Baird
UC 3 TH 27

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.

AMEC4515
Approximate Methods for Partial Differential Equations
Staff Contact: Dr J.F. Milthorpe
UC 3 TH 27

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.

AMEC4004
Chaos and Non-linear Dynamics
Staff Contact: A/Prof J.P. Baird and A/Prof J.C.S. Lai
UC 3 TH 27
Prerequisite: Mechanical Engineering 2 or Aeronautical Engineering 2

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.

AMEC4014
Control Theory
Staff Contact: Dr. A.G.Sreenatha
UC 3 TH 27

Analysis and design of control systems using Transfer Function Approach; State Space Analysis, controllability, observability, canonical forms, pole placement, optimal control, observers, Kalman Filters, Lyapunov stability analysis, introduction to digital control.

AMEC4016
Impact Mechanics
Staff Contact: Dr A.R. Watson
UC 3 TH 27

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.

AMEC4517
Marine Engineering
Staff Contact:
UC 3 TH 27

Ship resistance and propulsion. Propellers, their design and performance. Ship manoeuvrability. Alternative propulsion systems and associated equipment.

AMEC4518
Naval Architecture
Staff Contact: Dr W. F. Smith
UC 3 TH 27

Introduction to the principles of naval architecture. Ship design process. Types of vessels. Flotation and trim. Hull form generation. Transverse stability and subdivision. Ship structures. Resistance and powering. Propulsors. Ocean climate. Ship motions. Manoeuvrability and Control. Weight estimation.

AMEC4018
Non Destructive Inspection
Staff Contact: Dr K. Shankar
UC 3 TH 27
Prerequisite: Mechanics of Solids 2A and 2B or Aircraft Structures 1A and 1B.

Introduction to the theory and application of major non destructive techniques employed for inspection of structural components in the aircraft industry. Use of NDI in manufacturing and in maintenance. Familiarisation with practice of NDI techniques.

AMEC4007
Occasional Elective
UC 23TH 27

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.

AMEC4009
Random Vibrations and Signal Analysis
Staff Contact: Mr I.W. Linnett
UC 3 TH 27
Prerequisite: Probability and Statistics 3E

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.

AMEC4519
Thermal Performance and Energy Consumption in Buildings
Staff Contact: Dr M.J.Harrap
UC 3 TH 27
Prerequisite: Thermodynamics 3

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.

AMEC4520
Tribology
Staff Contact: Mr I.W. Linnett
UC 3 TH 27
Prerequisite: Dynamics of Mechanical Systems 3

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.

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 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 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 program, students may go on appropriate industrial visits.

The AeronauticalEngineering program was redesigned to reduce the workload in all years and to remove any unnecessary differences between the three engineering degree streams presented by the school. The new first and second years of that program were introduced in 1999, and the new third year was introduced in 2000 together with minor changes to the fourth year program as well. The new fourth year program will be introduced in 2001.

The new units of credit system introduced throughout the University has necessitated other changes to the Aeronautical Engineering program and in 2001 there has been a regrouping of subject matter within new courses for all years.

The first year program is described on p.101.

Outline of Second and Later Year Programs and List of Courses

Second Year Program

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
AMEC2705	Aerospace Design 1		3	27			27
AMEC2001	Design 1		3	40			40
AELE2004	Electrical & Electronics Technology	3		54			54
AINT2501	Fluid Engineering		3	34		6	40
AMAT2501	Engineering Mathematics 2A	4		54			54
AMAT2502	Engineering Mathematics 2B		4	54			54
ACSC2501	Numerical Analysis E	3		27	13		40
AINT2502	Strength of Materials A	4		42		12	54
AINT2503	Strength of Materials B		4	42		12	54
AMEC2006	System Dynamics 1A	4		41		6	47
AMEC2007	System Dynamics 1B		4	40		6	46
AMEC2011	Thermodynamic Cycles		3	34		6	40
AMEC2008	Thermofluids	6		52		12	64
Total		24	24	527	13	60	600
Average contact hours per week							22.2

Third Year Program

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
Four General Education Courses		6	6	108			108
AMEC3703	Aerodynamics		3	39			39
AMEC3708	Aircraft Design 2		3	39			39
AMEC3705	Aircraft Structures 1A	3		41		2	43
AMEC3706	Aircraft Structures 1B		3	27			27
AMEC4710	Aircraft Systems	4		54		4	58
ACIV3521	Engineering Management 1		3	40			40
AMEC3707	Flight Mechanics 1		3	39		2	41
AMEC3001	Maintenance Management and Logistics Engineering		3	27			27

AMAT3504	Engineering Mathematics 3	4		54		54
AMEC4010	Rotary Wing 1		3	39		39
AMEC3003	Viscous Flows & Gas Trubine Theory	4		54	4	58
Total		24	24	561	12	573

Average contact hours per week 21.2

Final Year Program

	Courses	*Units of Credit S1*	*S2*	*Lecture Hours*	*Tutorial Hours*	*Practical Hours*	*Total Hours*
AMEC4702	Aeronautical Engineering Project and Thesis A	6		108			108
AMEC4703	Aeronautical Engineering Project and Thesis B & Practical Experience*		9	108			108
AMEC4723	Aircraft Design 3A	3		27			27
AMEC4707	Aircraft Design 3B		3	27			27
AMEC4709	Aircraft Structures 2	3		39			39
AMEC4724	Applied Aerodynamics	3		39			39
AELE4001	Avionics and Navigational Aids		3	27			27
AMEC4508	Fluid Applications		3	27			27
AECM0503	Economics and Management for Engineers	3		27			27
AMEC4725	Flight Mechanics 2	3		39			39
Electives	(4 at 3 units of credit each)	3	9	108			108
Total		24	24	534			549

Average contact hours per week 20.3

	Elective Courses	*Units of Credit S1*	*S2*	*Total Hours*
AMEC4002	Acoustic Noise		3	27
AMEC4716	Aeroelasticity		3	27
AMEC4013	Analysis of Structural Vibration			27
AMEC4711	Applications of Fatigue and Fracture Mechanics			27
AMEC4004	Chaos and Non-linear Dynamics			27
AMEC4005	Composite Mechanics		3	27
AMEC4014	Control Theory			27
AMEC4016	Impact Mechanics		3	27
AMEC3511	Instrumentation		3	27
AMEC4713	Mechanics of Fracture	3		27
AMEC4017	Missile Design	3		27
AMEC4018	Non Destructive Inspection		3	27
AMEC4007	Occasional Elective		3	27
AMEC4008	Orbital Mechanics		3	27
AMEC4009	Random Vibrations and Signal Analysis			27
AMEC4717	Rapid Action Repair		3	27
AMEC4011	Rotary Wing 2			27
AMEC4714	Rotary Wing 3	3		27
AMEC4715	Rotary Wing 4	3		27
AMEC4012	Structural Joining Methods	3		27
APHY4701	Techniques for Studying Advanced Materials E			27

* See Rule 6 of the BE Degree Rules

Course Descriptions

Level II Aeronautical Engineering

AMEC2705
Aerospace Design 1
Staff Contact: Dr R. B. Heslehurst
UC 3 TH 27

Descriptive material on the following topics: The aircraft as a total system. The basic components of the aircraft and their functions. The application of mechanical principles in determining the behaviour of an aircraft. Commencement of the aerospace design project.

AMEC2001
Design 1
Staff Contact: Dr A. Fien, Dr W. F. Smith
UC 3 TH 40
*Prerequisites:*Engineering Mechanics 1A and 1B, Engineering Graphical Communications, Strength of Materials A
Corequisites:. Strength of Materials B

Principles of machinery and component design: example topics include springs, bearings, gears, linkages, brakes and clutches, standard hardware. Studies considering what components do, how they do it, how they were made, possible forms. Design philosophies: safe life, fail safe, damage tolerant.

AELE2004
Electrical & Electronic Technology
UC 3 TH 40

See course description under School of Electrical Engineering entry.

AINT2501
Fluid Engineering
UC3 TH40

Laminar and turbulent flow. Boundary layers. Lift and Drag. Dimensional analysis and modelling. Fluid resistance and the flow of real fluids. Friction and minor losses in single pipelines(CIV). Introduction to compressible flow.(A&M)

AMAT2501
Engineering Mathematics 2A
UC 4 TH 54

See course description under School of Mathematics and Statistics entry.

AMAT2502
Engineering Mathematics 2B
UC 4 TH 54

See course description under School of Mathematics and Statistics entry

ACSC2501
Numerical Analysis E
UC 3 TH 40

See course description under School of Computer Science entry.

AINT2502
Strength of Materials A
Staff Contact: Dr O. Kayali, A/Prof. S. R . Yeomans
UC 4 TH 54

Materials Science: Structure of metals. Crystalline lattices. Phase transformations. Cast and wrought structures. Plastic deformation and annealing. Strengthening methods in metals and alloys. Ferrous metallurgy and processing of steels. Equilibrium and non-equilibrium transformations: annealing, normalising, quench and temper. Alloying of steels, hardenability. Tool and die steels. Stainless steels. Cast irons.

Mechanics of Solids: Revision of principles of statics. Concept of stress and strain. Axial Loading. Thermal stresses. Deformations in axially loaded members. Statically indeterminate structures. Shear stresses and strains. Bearing stress. Stress concentration. Torsion stresses and strains. Torsional deformations. Design of transmission shafts. Transformations of Stresses. Mohr's circle for plane stress.

AINT2503
Strength of Materials B
Staff Contact: Dr O. Kayali, A/Prof. S. R . Yeomans
UC 4 TH 54

Materials Science: Non-ferrous metallurgy. Aluminium Alloys: wrought and cast alloys, temper designations, heat treatable and non-heat treatable alloys. Copper-based alloys: brasses and bronzes. Welding metallurgy and weldability considerations for steels, stainless steels, aluminium alloys. Mechanical behaviour of metals. Ductile and brittle fracture. Fracture mechanics. Corrosion processes and corrosion protection systems.

Mechanics of Solids: Transformation of Strains. Mohr's circle for plane strain. Thin walled pressure vessels. Pure bending. Design of beams and shafts for strength. Deflections of beams. Transverse loading. Shearing stress formulae. Energy methods. Columns.

AMEC2006
System Dynamics 1A
Staff Contact: Mr I.W. Linnett
UC 4 TH 47

Vibrations. Single degree of freedom systems. System modelling and linearization, the free vibration of undamped and damped systems, the forced response to harmonic, rotating unbalance and base excitations, vibration isolation, alternative models for damping, the response to generalised forcing functions, shock response spectra. Vibration measurement.

Control Theory. Mathematical modelling of system components, transfer functions, open and closed loop systems, transient response analysis of first and second order systems, basic control actions, stability, response of higher order systems.

AMEC2007
Systems Dynamics 1B
Staff Contact: Mr I.W. Linnett
UC 4 TH 46
Prerequisite: System Dynamics 1A

Vibrations: Multiple degree of freedom systems. Matrix and state vector formulation of lumped parameter systems, the eigenvalue problem, modal analysis, forced response of undamped systems and of systems with viscous damping.

Control Theory: Root locus and frequency techniques for analysis and design, compensation. The PID controller, introduction to robust control.

AMEC2011
Thermodynamic Cycles
Staff Contact: Dr. N. R. Mudford
UC 4 TH 46
Prerequisite: Thermofluids A

Reciprocating engines, compressors and expanders: cycle analysis, construction, performance. Vapour power cycles. Gas power cycles.

AMEC2008
Thermofluids
Staff Contact: A/Prof J.C.S.Lai / Dr N.R.Mudford
UC 6 TH 64
Prerequisites: Statics and Dynamics

The role of thermodynamics and fluid mechanics. Basic concepts. Fluid statics. Simple analysis of fluid motion. Laws of thermodynamics. Applications of thermodynamics and fluid mechanics to control volume.

Level III Aeronautical Engineering

AMEC3703
Aerodynamics
Staff Contact: A/Prof S.L.Gai
UC 3 TH 39
Prerequisite: Thermofluids

Fundamentals of two-dimensional incompressible aerodynamics. Stream function. Velocity potential. Flow singularities. Superposition of flows. Flow round a cylinder with circulation. Kutt-Joukowsky theorem of lift.

One and two-dimensional compressible flow. Normal and oblique shock waves. Prandtl-Meyer expansion. Shock expansion theory. Method of characteristics. Nozzles and diffusers.

AMEC3708
Aircraft Design 2
Staff Contact: Dr R.B. Heslehurst
UC 3 TH 39
Prerequisites: Aerospace Design 1 and Fundamentals of Flight.

Development of the initial sizing parameters for fixed wing aircraft. Estimates of maximum take-off weight, wing loading, power loading, aerodynamic coefficients and physical dimensions of the airplane. Discussion of special features of the aircraft and the introduction of performance, operational and manufacturing interaction and design compromise. Commencement of the aerospace design and build project. Continuation of the design project commenced in AMEC2705.

AMEC3705
Aircraft Structures 1A
Staff Contact: Dr. K. Shankar
UC 3 TH 40
Prerequisite: Mechanics of Solids 1

Application of statics and mechanics of solids theory to aircraft structures. Theory of symmetric and unsymmetric bending, torsion and transverse loading of thin-walled and semi-monocoque structures. Application of energy methods to structural analysis.

AMEC3706
Aircraft Structures 1B
Staff Contact: Mr M. Tahtali
UC 3 TH 27
Prerequisite: Mechanics of Solids 1

Fundamentals of finite element analysis theory and application.

AMEC4710
Aircraft Systems
Staff Contact: Dr R.B. Heslehurst
UC 4 TH 54
Prerequisite : Aerospace Design 1

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.

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.

ACIV3521
Engineering Management 1
UC 3 TH 40

See course description under School of Civil Engineering entry.

AMEC3707
Flight Mechanics 1
Staff Contact: Dr. A.G.Sreenatha

UC 3 TH 39

Longitudinal Static Stability of Aircraft, including stick-fixed and stick-free; Lateral and Directional Static Stability and Control; Different Axis system employed in Aircraft Dynamics, Equations of Motion in the Body-Axis system and Stability Axis system; Subsonic Aerodynamic Derivatives and their impact on the Aircraft Dynamics and Control; Analysis of Aircraft for Dynamic Stability Modes, namely: Short Period, Phugoid, Dutch Roll, Roll Subsidence and Spiral Subsidence; Stability Augmentation such as Pitch-Rate Damping and Yaw-Rate Damping; Autopilots for longitudinal dynamics; Adverse Yaw and Co-ordinated turn; Basic Aircraft Handling Criteria.

Flying Experience: 10 hours flying in a light aircraft with a qualified instructor

AMEC3001
Maintenance Management and Logistics Engineering
Staff Contact: Dr J. F. Milthorpe
UC 3 TH 27

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.

AMAT3504
Engineering Mathematics 3
UC 4 TH 54

See course description under School of Mathematics and Statistics entry.

AMEC4010
Rotary Wing 1
Staff Contact: A/Prof S.L. Gai
UC 3 TH 39
Prerequisite: Aerodynamics 1 or Fluid Mechanics 1

Basic helicopter configurations and rotor systems. Actuator disc and blade element theories. Rotor aerodynamics in vertical and forward flight. Rotor ground effect. Auto-rotation.

AMEC3003
Viscous Flows & Gas Turbine Theory
Staff Contact: Prof R. K. Duggins, Dr N.R. Mudford
UC 4 TH 54
Prerequisite: Thermofluids

Laminar and turbulent motion. Flows in pipes and channels. Elementary treatment of boundary layers. Transition and turbulence. Separation. Skin friction and pressure drag. Jet and wake flows.

Types of power plant for civil, marine and aircraft applications with emphasis on gas turbines. Ideal and real operating cycles. Gas turbine combustion processes. Cycle calculations. Propulsive efficiency and thermodynamic performance of jet engines.

Level IV Aeronautical Engineering

AMEC4702
Aeronautical Engineering Project and Thesis A
UC 6 TH 108

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.

AMEC4703
Aeronautical Engineering Project and Thesis B and Practical Experience
UC 9 TH 108

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.

Satisfactory completion of the Practical Engineering Experience Requirement, viz rule 6 of the Rules governing the award of the degree of Bachelor of Engineering.

The development of detailed aerodynamics aircraft parametrers. Determination of aircraft performance values and stability and control aspects. Final integration of the aircraft with on-board systems and structural arrangement. Completion of the design project.

AMEC4723
Aircraft Design 3A
Staff Contact: Dr R.B.Heslehurst
UC 3 TH 27
Prerequisite: Aircraft Design 2

The development of detailed aerodynamics aircraft parametrers. Determination of aircraft performance values and stability and control aspects. Final integration of the aircraft with on-board systems and structural arrangement. Completion of the design project.

AMEC4707
Aircraft Design 3B
Staff Contact: Dr R.B.Heslehurst
UC 3 TH 27
Prerequisite: Aircraft Design 3A

Details of military and civilian airworthiness and certification requirements and legal issues in aircraft design. Damage tolerant and fatigue design concepts. Aircraft design optimisation and trade studies. Aircraft costing and scheduling. Maintainability and reliability design. Introduction to helicopter and V/STOL design.

AMEC4709
Aircraft Structures 2
Staff Contact: Dr K. Shankar
UC 3 TH 39
Prerequisites: Aircraft Structures 1 A and 1B

Theory of bending of Plates. Application of finite difference and finite element analysis to plate bending problems, analysis of stiffened and orthotropic plates, membrane theory of shells, axisymmetric bending of shells, instability in plates and shells.

AMEC4724
Applied Aerodynamics
Staff Contact: A/Prof S.L. Gai
UC 3 TH 39
Prerequisite: Aerodynamics and Viscous Flows

Flow around aerofoils and wings in incompressible flow. Thin aerofoil theory. Symmetrical and cambered aerofoils. Finite wings - lifting line theory, down wash, and induced drag. Non-linear lift and low aspect ratio wings. Panel methods for aerofoils and wings.

Linearised subsonic compressible flow for aerofoils and wings. Prandtl-Glauert rule. Supersonic linear theory - Ackeret's rule. Lift and drag of aerofoils in supersonic flow. Supersonic wings. Transonic flow and area rule. Slender bodies in supersonic flow.

AELE 4001
Avionics and Navigational Aids
Staff Contact: Dr G. Cochrane - School of Electrical Engineering
UC 3 TH 27

See course description under Electrical Engineering entry.

AECM0503
Economics and Management for Engineers
UC 3 TH 27

See course description under School of Economics and Management entry .

AMEC4725
Flight Mechanics 2
UC 3 TH 39
Staff Contact: Dr. A.G.Sreenatha
Prerequisites: Flight Mechanics 1.

Case Study of a typical Aircraft: Establishing Equations of motion, Analysing Characteristic Roots, Comparison with approximations for the longitudinal and lateral dynamics, Examining Handling Qualities Uncompensated; Analysing Time Response Uncompensated; Designing Stability Augmentation system; Design of pitch hold, pitch orientation and acceleration autopilots for the longitudinal dynamics; Design of controller for achieving co-ordinated turn; Examining Augmented Stability Characteristics; Analysing Time Response to Flight Test Input; Analysing Time Response to a gust input;.

Students will work in both the real and Laplace domain, use the root locus method for designing controllers for both stability augmentation and performance, and will analyse the systems with the aid of MATLAB.

Electives

AMEC4002
Acoustic Noise
Staff Contact: A/Prof J.C.S. Lai
UC 3 TH 27

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.

AMEC4716
Aeroelasticity
Staff Contact: Dr A. G. Sreenatha
UC 3 TH 27
Prerequisites: Aerodynamics 1 , Aerodynamics 2, Flight Mechanics and Flight Mechanics 2
Corequisite: Flight Mechanics 3

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.

AMEC4013
Analysis of Structural Vibration
Staff Contact: A/Prof J.C.S. Lai
UC 3 TH 27
Prerequisite: Fluid Mechanics 3 or Flight Mechanics 3

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.

AMEC4711
Applications of Fatigue and Fracture Mechanics
Staff Contact: Dr A.R. Watson
UC 3 TH 27
Prerequisites: Mechanics of Solids 1 and Aircraft Design 1 or Design 1
Corequisite: Mechanics of Fracture

After reviewing the theory of fracture mechanics (Griffith cracks, plane strain, plane stress and intermediate cases) the course 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.

AMEC4004
Chaos and Non-linear Dynamics
Staff Contact: A/Prof J.P. Baird and A/Prof J.C.S. Lai
UC 3 TH 27
Prerequisite: :Mechanical Engineering 2 or Aeronautical Engineering 2

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.

AMEC4005
Composite Mechanics
Staff Contact: Dr K. Shankar
UC 3 TH 27
Prerequisite: Mechanics of Solids 1

Review of composite materials technology and properties. Mechanics of composite materials. Structural analysis and design of composite structures. Effect of damage, fatigue and the environment on mechanical properties of composites.

AMEC4014
Control Theory
Staff Contact: Dr. A.G.Sreenatha
UC 3 TH 27

Analysis and design of control systems using Transfer Function Approach; State Space Analysis, controllability, observability, canonical forms, pole placement, optimal control, observers, Kalman Filters, Lyapunov stability analysis, introduction to digital control.

AMEC4016
Impact Mechanics
Staff Contact: Dr A.R. Watson
UC 3 TH 27

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.

AMEC3511
Instrumentation
Staff Contact: Dr M.J. Harrap
UC 3 TH 27
Prerequisites: Principles of Electrical Technology, Principles of Electronics Technology and Mathematics 2E

The steady state performance of measuring systems; The dynamic performance of measurement systems; Error reduction techniques; Noise sources in measurement systems; Digital Data Acquisition systems; Distance, velocity and acceleration measurements; Mass, force, strain, torque and pressure measurements; Fluid quantity and flow measurements.

AMEC4713
Mechanics of Fracture
Staff Contact: Dr A.R. Watson
UC 3 TH 27
Prerequisite: Materials 1

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.

AMEC4017
Missile Design
Staff Contact: Dr J.F. Milthorpe
UC 3 TH 27

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.

AMEC4018
Non Destructive Inspection
Staff Contact: Dr K. Shankar
UC 3 TH 27
Prerequisite: Mechanics of Solids 2A and 2B or Aircraft Structures 1A and 1B.

Introduction to the theory and application of major non destructive techniques employed for inspection of structural components in the aircraft industry. Use of NDI in manufacturing and in maintenance. Familiarisation with practice of NDI techniques.

AMEC4007
Occasional Elective
UC 3 TH 27

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.

AMEC4008
Orbital Mechanics
Staff Contact: Dr J.F. Milthorpe
UC 3 TH 27

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.

AMEC4009
Random Vibrations and Signal Analysis
Staff Contact: Mr I.W. Linnett
UC 3 TH 27
Prerequisite: Probability and Statistics 3E

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.

AMEC4717
Rapid Action Repair
Staff Contact: Dr. R. B. Heslehurst
UC 3 TH 27
Prerequisite: Aircraft Structures 1
Corequisite: Aircraft Structures 2

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.

AMEC4011
Rotary Wing 2
Staff Contact: Dr J.F. Milthorpe
UC 3 TH 27
Prerequisite: Rotary Wing 1

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.

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.

AMEC4714
Rotary Wing 3
Staff Contact: Dr J.F. Milthorpe
UC 3 TH 27
Prerequisite: Rotary Wing 2

Stability and control of rotor blade motion. Control power and sensitivity. Response to control inputs. Gust response. Transition to autorotation in forward flight.

AMEC4012
Structural Joining Methods
Staff Contact: Dr R.B. Heslehurst
UC 3 TH 27
Corequisite: Composite Mechanics

Theory of load transferring structural joints. Detailed analysis of mechanically fastened, welded and adhesively bonded joints. Joint design fundamentals and practices. Joint structural analysis. Durability and environmental effects.

APHY4701
Techniques for Studying Advanced Materials E
UC 3 TH 27
Prerequisite: Materials 1

See course description under School of Physics entry.

Bachelor of Technology in Aeronautical Engineering

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 courses that comprise the second and third years of the degree course are given below. 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.

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.

During the first and second years of the program, students may go on appropriate industrial visits.

The Bachelor of Technology in Aeronautical Engineering program was redesigned to reduce the workload in all years and to remove any unnecessary differences between the three engineering degree streams presented by the school. The new first and second years of that program were introduced in 1999, and the new third year was introduced in 2000.

The new units of credit system introduced throughout the University has necessitated other changes to the Bachelor of Technology in Aeronautical Engineering program and in 2001 there has been a regrouping of subject matter within new courses for all years.

The first year program is described on p.101.

Outline of Second and Later Year Programs and List of Courses

Second Year Program

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
AMEC2705	Aerospace Design 1		3	27			27
AMEC2001	Design 1		3	40			40
AELE2004	Electrical & Electronics Technology	3		54			54
AINT2501	Fluid Engineering		3	34		6	40
AMAT2501	Engineering Mathematics 2A	4		54			54
AMAT2502	Engineering Mathematics 2B		4	54			54
ACSC2501	Numerical Analysis E	3		27	13		40
AINT2502	Strength of Materials A	4		42		12	54
AINT2503	Strength of Materials B		4	42		12	54
AMEC2006	System Dynamics 1A	4		41		6	47
AMEC2007	System Dynamics 1B		4	40		6	46
AMEC2011	Thermodynamic Cycles		3	34		6	40
AMEC2008	Thermofluids	6		52		12	64
Total		24	24	527	13	60	600
Average contact hours per week							22.2

Third Year Program

		Units of Credit		Lecture	Tutorial	Practical	Total
	Courses	*S1*	*S2*	*Hours*	*Hours*	*Hours*	*Hours*
Four General Education Courses		6	6	108			108
AMEC3703	Aerodynamics		3	39			39
AMEC3711	Aero Project and Practical Experience*	3		40			40
AMEC3708	Aircraft Design 2		3	39			39
AMEC4710	Aircraft Systems	4		54		4	58
AMEC3701	Atmospheric Physics & Meteorology BT		3	27		3	30
ACIV3001	Engineering Management 1		3	40			40
AMEC3707	Flight Mechanics 1		3	39		2	41
AMEC3001	Maintenance Management and Logistics Engineering		3	27			27
AMAT3504	Engineering Mathematics 3	4		54			54
AMEC4010	Rotary Wing 1		3	39			39
AMEC3003	Viscous Flows & Gas Trubine Theory	4		54		4	58
Total		24	24	560		13	573
Average contact hours per week							21.2

* See Rule 6 of the BTech Degree Rules.

Course Descriptions

Level II BTech in Aeronautical Engineering

AMEC2705
Aerospace Design 1
Staff Contact: Dr R. B. Heslehurst
UC 3 TH 27

Descriptive material on the following topics: The aircraft as a total system. The basic components of the aircraft and their functions. The application of mechanical principles in determining the behaviour of an aircraft. Commencement of the aerospace design project.

AMEC2001
Design 1
Staff Contact: Dr A. Fien, Dr W. F. Smith
UC 3 TH 40
Prerequisites: Engineering Mechanics 1A and 1B, Engineering Graphical Communications, Strength of Materials A
Corequisites: Strength of Materials B

Principles of machinery and component design: example topics include springs, bearings, gears, linkages, brakes and clutches, standard hardware. Studies considering what components do, how they do it, how they were made, possible forms. Design philosophies: safe life, fail safe, damage tolerant.

AELE2004
Electrical & Electronic Technology
UC 3 TH 40

See course description under School of Electrical Engineering entry.

AINT2501
Fluid Engineering
UC3 TH40

Laminar and turbulent flow. Boundary layers. Lift and Drag. Dimensional analysis and modelling. Fluid resistance and the flow of real fluids. Friction and minor losses in single pipelines(CIV). Introduction to compressible flow.(A&M)

AMAT2501
Mathematics 2EA
UC 4 TH 54

See course description under School of Mathematics and Statistics entry.

AMAT2502
Mathematics 2EB
UC 4 TH 54

See course description under School of Mathematics and Statistics entry

ACSC2501
Numerical Analysis E
UC 3 TH 40

See course description under School of Computer Science entry.

AINT2502
Strength of Materials A
Staff Contact: Dr O. Kayali, A/Prof. S. R . Yeomans
UC 4 TH 54

Materials Science: Structure of metals. Crystalline lattices. Phase transformations. Cast and wrought structures. Plastic deformation and annealing. Strengthening methods in metals and alloys. Ferrous metallurgy and processing of steels. Equilibrium and non-equilibrium transformations: annealing, normalising, quench and temper. Alloying of steels, hardenability. Tool and die steels. Stainless steels. Cast irons.

Mechanics of Solids: Revision of principles of statics. Concept of stress and strain. Axial Loading. Thermal stresses. Deformations in axially loaded members. Statically indeterminate structures. Shear stresses and strains. Bearing stress. Stress concentration. Torsion stresses and strains. Torsional deformations. Design of transmission shafts. Transformations of Stresses. Mohr's circle for plane stress.

AINT2503
Strength of Materials B
Staff Contact: Dr O. Kayali, A/Prof. S. R . Yeomans
UC 4 TH 54

Materials Science: Non-ferrous metallurgy. Aluminium Alloys: wrought and cast alloys, temper designations, heat treatable and non-heat treatable alloys. Copper- based alloys: brasses and bronzes. Welding metallurgy and weldability considerations for steels, stainless steels, aluminium alloys. Mechanical behaviour of metals. Ductile and brittle fracture. Fracture mechanics. Corrosion processes and corrosion protection systems.

Mechanics of Solids: Transformation of Strains. Mohr's circle for plane strain. Thin walled pressure vessels. Pure bending. Design of beams and shafts for strength. Deflections of beams. Transverse loading. Shearing stress formulae. Energy methods. Columns.

AMEC2006
System Dynamics 1A
Staff Contact: Mr I.W. Linnett
UC 4 TH 47

Vibrations. Single degree of freedom systems. System modelling and linearization, the free vibration of undamped and damped systems, the forced response to harmonic, rotating unbalance and base excitations, vibration isolation, alternative models for damping, the response to generalised forcing functions, shock response spectra. Vibration measurement.

Control Theory. Mathematical modelling of system components, transfer functions, open and closed loop systems, transient response analysis of first and second order systems, basic control actions, stability, response of higher order systems.

AMEC2007
System Dynamics 1B
Staff Contact: Mr I.W. Linnett
UC 4 TH 46
Prerequisite: System Dynamics 1A

Vibrations.: Multiple degree of freedom systems. Matrix and state vector formulation of lumped parameter systems, the eigenvalue problem, modal analysis, forced response of undamped systems and of systems with viscous damping.

Control Theory.: Root locus and frequency techniques for analysis and design, compensation. The PID controller, introduction to robust control.

AMEC2011
Thermodynamic Cycles
Staff Contact: Dr. N. R. Mudford
UC 4 TH 46
Prerequisite: Thermofluids A

Reciprocating engines, compressors and expanders: cycle analysis, construction, performance. Vapour power cycles. Gas power cycles.

AMEC2008
Thermofluids
Staff Contact: A/Prof J.C.S.Lai / Dr N.R.Mudford
UC 6 TH 64
Prerequisites: Statics and Dynamics

The role of thermodynamics and fluid mechanics. Basic concepts. Fluid statics. Simple analysis of fluid motion. Laws of thermodynamics. Applications of thermodynamics and fluid mechanics to control volume.

Level III BTech in Aeronautical Engineering

AMEC3703
Aerodynamics
Staff Contact: A/Prof S.L.Gai
UC 3 TH 39
Prerequisite: Thermofluids

Fundamentals of two-dimensional incompressible aerodynamics. Stream function. Velocity potential. Flow singularities. Superposition of flows. Flow round a cylinder with circulation. Kutt-Joukowsky theorem of lift.

One and two-dimensional compressible flow. Normal and oblique shock waves. Prandtl-Meyer expansion. Shock expansion theory. Method of characteristics. Nozzles and diffusers.

AMEC3711
Aero Project and Practical Experience
Staff Contact: Dr R. B. Heslehurst
UC 3 TH 40

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.

Satisfactory completion of the Practical Engineering Experience Requirement, viz rule 6 of the Rules governing the award of the degree of Bachelor of Technology.

AMEC3708
Aircraft Design 2
Staff Contact: Dr R.B. Heslehurst
UC 3 TH 39
Prerequisites: Aerospace Design 1 and Fundamentals of Flight.

Development of the initial sizing parameters for fixed wing aircraft. Estimates of maximum take-off weight, wing loading, power loading, aerodynamic coefficients and physical dimensions of the airplane. Discussion of special features of the aircraft and the introduction ofperformance, operational and manufacturing interaction and designcompromise. Commencement of the aerospace design and build project. Continuation of the design project commenced in AMEC2705.

AMEC4710
Aircraft Systems
Staff Contact: Dr R.B. Heslehurst
UC 4 TH 54
Prerequisite: Aerospace Design 1.

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.

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.

APHY3701
Atmospheric Physics & Meteorology BT
UC 3 TH 30

See course description under School of Physics entry .

ACIV3521
Engineering Management 1
UC 3 TH 40

See course description under School of Civil Engineering entry.

AMEC3707
Flight Mechanics 1
Staff Contact: Dr. A.G.Sreenatha

UC 3 TH 39

Longitudinal Static Stability of Aircraft, including stick-fixed and stick-free; Lateral and Directional Static Stability and Control; Different Axis system employed in Aircraft Dynamics, Equations of Motion in the Body-Axis system and Stability Axis system; Subsonic Aerodynamic Derivatives and their impact on the Aircraft Dynamics and Control; Analysis of Aircraft for Dynamic Stability Modes, namely: Short Period, Phugoid, Dutch Roll, Roll Subsidence and Spiral Subsidence; Stability Augmentation such as Pitch-Rate Damping and Yaw-Rate Damping; Autopilots for longitudinal dynamics; Adverse Yaw and Co-ordinated turn; Basic Aircraft Handling Criteria.

Flying Experience: 10 hours flying in a light aircraft with a qualified instructor

AMEC3001
Maintenance Management and Logistics Engineering
Staff Contact: Dr J. F. Milthorpe
UC 3 TH 27

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.

AMAT3504
Engineering Mathematics 3
UC 4 TH 54

See course description under School of Mathematics and Statistics entry.

ACIV3001
Project Management 1A
UC 3 TH 27

See course description under School of Civil Engineering entry.

AMEC4010
Rotary Wing 1
Staff Contact: A/Prof S.L. Gai
UC 3 TH 39
Prerequisite: Aerodynamics 1 or Fluid Mechanics 1

Basic helicopter configurations and rotor systems. Actuator disc and blade element theories. Rotor aerodynamics in vertical and forward flight. Rotor ground effect. Auto-rotation.

AMEC3003
Viscous Flows & Gas Turbine Theory
Staff Contact: Prof R. K. Duggins, Dr N.R. Mudford
UC 4 TH 54
Prerequisite: Thermofluids

Laminar and turbulent motion. Flows in pipes and channels. Elementary treatment of boundary layers. Transition and turbulence. Separation. Skin friction and pressure drag. Jet and wake flows.

Types of power plant for civil, marine and aircraft applications with emphasis on gas turbines. Ideal and real operating cycles. Gas turbine combustion processes. Cycle calculations. Propulsive efficiency and thermodynamic performance of jet engines.

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 a representative Articulation Program. The actual program will depend upon when the Bachelor of Technology degree in Aeronautical Engineering was completed and the current Bachelor of Engineering in Aeronautical Engineering 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.

	Courses	Units of Credit S1	S2	Lecture Hours	Tutorial Hours	Practical Hours	Total Hours
AMEC4702	Aeronautical Engineering Project and Thesis A	6		108			108
AMEC4703	Aeronautical Engineering Project and Thesis B & Practical Experience*		9	108			108
AMEC4723	Aircraft Design 3A	3		20			20
AMEC4707	Aircraft Design 3B		3	20			20
AMEC3705	Aircraft Structures 1A	3		41		2	43
AMEC3706	Aircraft Structures 1B		3	40		2	42
AMEC4709	Aircraft Structures 2	3		39			39
AMEC4724	Applied Aerodynamics	3		39			39
AMEC4001	Avionics and Navigational Aids	3		27			27
AECM0503	Economics and Management for Engineers	3		27			27
AMEC4725	Flight Mechanics 2	3		39			39
Electives	(4 at 3 units of credit each)	3	9	108			108
Total		30	24	616		4	620

Average contact hours per week 15.3

* See Rule 6 of the BE Degree Rules.

The courses in this Articulation Program, including the Electives, are the same as those in the third and fourth years of the Bachelor of Engineering degree program in Aeronautical Engineering, details of which are given earlier in this handbook.

Bachelor of Technology in Aviation

The BTech(Av) program is designed for potential pilots entering the Australian Defence Force. It covers both the technical and organisational aspects, with a concentration on the safety of aviation as a whole and highlights the safe practices of the components that make up aviation e.g. pilot, maintenance , air traffic control, etc.

The course comprises a first year at the University College which iis similar to the first year of the BE(Aero) degree, a second year at the University College which is designed to provide the student with a range of specialist courses in the field of Aviation and a third year which includes a project and the flying component of the degree presented at Tamworth (first semester) and Pearce (second semester).

The specialist components of the program use a systems approach to provide the student with a deep understanding of the various systems that contribute to the safe operation of aircraft, the interactions of those systems and likely failure modes. Aircraft accidents and/or incidents are considered as failures of the system.

The program shown below is a standard program, i.e. that which can be completed in a minimum time.

The first year program is described on p.101.

Outline of Second and Later Year Programs and List of Courses

Second Year Program

	Courses	Units of Credit S1	S2	Lecture Hours	Tutorial Hours	Practical Hours	Total Hours
Four General Education Courses		6	6	108			108
AMEC2711	Aircraft Systems for Aviators		6	36	14	14	64
AMEC2707	Aviation Aerodynamics	6		40	14	zero	54
AMEC2708	Aviation Flight Mechanics	6		20	7	27	54
AMEC2709	Aviation Safety	6		52	13	zero	65
AELE4001	Avionics and Navigation Aids		3	20	7	zero	27
AMEC2710	Introduction to Aircraft Structures		3	20	7	zero	27
APHY2701	Meteorology		6	39	20	12	71
Total		24	24	335	82	53	470

Average contact hours per week 17.0

Third Year Program

	Courses	Units of Credit S1	S2	Lecture Hours	Tutorial Hours	Practical Hours	Total Hours
AMEC3715	Advanced Aviation Safety	6		49			49
AMEC3716	Advanced Flying Training		24	100		130	230
AMEC3717	Aviation Project and Practical Experience	6		50			50
AMEC3718	Basic Flying Training and Theory	12		292		100	392
Total		24	24	491		230	721
Average contact hours per week							21.0

* See Rule 6 of the BTech Degree Rules.

Level II BTech (Av)

AMEC2711
Aircraft Systems for Aviators
Staff Contact: A/ Prof. J. Baird.
UC 6 TH 64 S2

General arrangement of aircraft systems. Purpose of aircraft systems. Design of mechanical type aircraft systems. Overview of non-mechanical type aircraft systems. Design of systems integration. Propulsion technologies including pistonprops, turbojets, turbofans and turboprops. Fundamentals of gas turbine technology. Advanced gas turbines. The characteristics and operation of power plants in terms of efficiency and performance and typical applications.

AMEC2707
Aviation Aerodynamics
Staff Contact: A/Prof S. Gai
UC 6 TH 54 S1
Prerequisite: Engineering Mathematics 1A and 1B

Physical properties of fluids, fluid statics, kinematics of a flow field. Air and the atmosphere, air flow, continuity, energy and momentum equations in one dimension. Aerofoils, lift and drag. Dimensional analysis: dynamic similitude and modelling. Introduction to laminar and turbulent flow. boundary layer, transition and flow separation, jets and wakes. Boundary layers, and transition to turbulence, jets and wakes. Boundary layers in pressure gradients, and separation. Introduction to compressible flow. Aerodynamic behaviour and forces on aerofoils. Control surfaces, lift and drag augmentation, propellers, aircraft performance.

AMEC2708
Aviation Flight Mechanics
Staff Contact: Dr Sreenatha.
UC 6 TH 54 S1
Prerequisites: Engineering Mechanics 1A and 1B, and Fundamentals of Flight1 and 2.

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.

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.

AMEC2709
Aviation Safety
Staff Contact: A/ Prof. J. Baird.
UC 6 TH 65 S1
Prerequisite: Introduction to Aviation - A Systems Approach

Using a systems approach this course will deal with the various elements which influence safety in aviation including aircraft and airspace design, maintenance, management and human performance.

History of Air Traffic Services and their relationship to the commercial and regulatory aspects of commercial aviation. Operational and administrative structures within the industry. Role of ATS from the perspective of a service provider. Air Traffic Control structure, legal aspects and implications. Communications, safety, noise abatement and the development of future systems. Professional responsibilities of airspace designers, air traffic controllers and pilots.

A number of aircraft accidents will be analysed to illustrate key concepts in flight safety and its philosophy. A pilot's professional responsibilities and ethical standards.

Aviation human factors: the study of the relationship between the safety and efficiency of an aviation system and the people, tasks, environments, and technologies making up that system. Human behaviour, information processing, ergonomics and error science. The relationship between human abilities and task performance in aviation, particularly within the environment of the cockpit. Ethics and professional responsibilities.

AELE4001
Avionics and Navigational Aids
Staff Contact: SQNLDR A. Doyle.
UC 3 TH 27 S2

See course description under Electrical Engineering entry.

AMEC2710
Introduction to Aircraft Structures
Staff Contact: Dr R. Heslehurst.
UC 3 TH 27 S1
Prerequisites: Engineering Mechanics 1A and 1B

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.

APHY2701
Meteorology
Staff Contact: Dr V.A. Drake
UC 6 TH 71 S2

See course description under Physics entry.

Level III BTech(Av)

AMEC3715
Advanced Aviation Safety
Staff Contact: A/ Prof. J. Baird.
UC 6 TH 49 S1
Prerequisite: Aviation Safety and Airworthiness.

Revision, risk management, Civil Air Law, International Aviation Regulation. System failure modes , multiple failures, accident analysis, the role of human factors in system failure modes, attitude, behaviour , professional ethics and responsibilities, case studies.

AMEC3716
Advanced Flying Training
Staff Contact: Dr M. Harrap.
UC 24 TH 230 S2

Advanced flying (approximately 130 hours of flying instruction) and ground instruction (approximately 100 hours): advanced general flying, maximum performance flight and manoeuvring, high altitude and low altitude operations, advanced aerobatics, advanced instrument flying, emergency instrument approach procedures, advanced navigational concepts, night instrument flying, formation flying.

AMEC3717
Aviation Project and Practical Experience
Staff Contact: A/Prof. J. Baird.
UC 6 TH 50 S1

This project will take the form of a minor piece of research or investigation, feasibility study, or a literature review.

Satisfactory completion of the Practical Experience Requirement, viz rule 6 of the Rules governing the award of the degree of Bachelor of Technology.

AMEC3718
Basic Flying Training and Theory
Staff Contact: Dr M. Harrap.
UC 12 TH 392 S1

Approximately 100 hours of flying instruction: General flying to a solo standard, instrument flying, navigation and night flying techniques. Ground School: aircraft systems, professional responsibilities,applied air traffic control, aviation medicine, cockpit systems, navigation, gas turbine engine operation.

Courses offered to Electrical Engineering

AMEC4001
Mechanical Technology
UC3 TH27

A selection of topics from:

Acoustics: effects of noise and vibration, sound pressure level and sound power level, acoustic instrumentation, principles of acoustic noise control, acoustic noise of electrical machines.

Power generation: power and heat pump cycles, thermal efficiency, steam, gas and water turbines.

Fluid power system: pumps, valves and actuators, their function and operating characteristics.

Machine elements: simple machine elements - links, cams, screws and gearing, energy fluctuations in machines, power transmissions.

Limitations of simple models of machine components, friction, flexibility, non-linearity, hysteresis and backlash.

General Education Program

Information for all Undergraduate Students

Objectives of the General Education Program

The following objectives were approved by the Council of the University in December 1994.

1. To provide a learning environment in which students acquire, develop, and deploy skills of rational thought and critical analysis
2. To enable students to evaluate arguments and information
3. To empower students to systematically challenge received traditions of knowledge, beliefs and values
4. To enable students to acquire skills and competencies, including written and spoken communication skills
5. To ensure that students examine the purposes and consequences of their education and experience at University, and to foster acceptance of professional and ethical action and the social responsibility of graduates
6. To foster among students the competence and the confidence to contribute creatively and responsibly to the development of their society
7. To provide structured opportunities for students from disparate disciplines to co-operatively interact within a learning situation
8. To provide opportunities for students to explore discipline and paradigm bases other than those of their professional or major disciplinary specialisation through non-specialist courses offered in those other areas
9. To provide an environment in which students are able to experience the benefits of moving beyond the knowledge boundaries of a single discipline and explore cross- and interdisciplinary connections
10. To provide a learning environment and teaching methodology in which students can bring the approaches of a number of disciplines to bear on a complex problem or issue.

General Education requirements

The basic General Education requirements are the same for students in all programs:-

* Four (4) session length courses or their equivalent in combinations of session length and year long courses
* An additional fifty-six (56) hours of study which foster acceptance of professional and ethical action and social responsibility.

The General Education Program for the University College

The General Education Program for the University College consists of a range of courses specifically designed as General Education courses, offered by the various Schools at the College. Courses offered by Science and Engineering schools are generally only available for Arts students, while courses offered by Humanities and Social Science schools are generally only available to Science and Engineering students. All students must complete four sessional courses, with no more than two from any one school. Mainstream courses in the University College may not be substituted for the general education requirements.

University College students are deemed to have fulfilled the UNSW requirement in the area of *professional and ethical action and social responsibility* by virtue of completing their Common Military Training. Common Military Training, which comprises more than 56 hours of study for each student, includes: Personal Qualities, Ethics and Morality, Leadership (including military ethics and professionalism) and Military Law.

General Education courses

Table of General Education courses

The following list shows the General Education courses offered and the degree programs in which they are available (A—Arts, S—Science, E—Engineering and Technology).

GENZ0501	The World of Chemistry*	A
GENZ0502	Chemistry and Life	A
GENZ0503	Chemistry in Defence and Peace	A
GENZ1501	Engineering the Environment	S,A
GENZ8501	Computers in Society	S
GENZ8502	Information Technology in Organisations	A
GENZ1001	Competition and Innovation	S,E
GENZ1002	Macroeconomic Growth and Stability	S,E
GENZ1003	Leadership Studies*	S,E
GENZ2001	Telecommunications: Principles, Systems and Policy	A
GENZ5001	Writing and the Media*	S,E
GENZ5002	Issues in Modern Australian Literature and Film*	S,E
GENZ5003	Literature and Modern War*	S,E
GENZ5004	Science and the Literary Imagination*	S,E
GENZ5005	Australian Literature and Film*	S,E
GENZ5006	American Literature*	S,E
GENZ5007	Exciting Writing*	S,E
GENZ5008	Re-presenting Gender*	S,E
GENZ4501	The First World War: Image and Reality	S,E
GENZ4502	Rats, Lice and History	S,E
GENZ4503	An Introduction to Australian Military History	S,E
GENZ4504	Black-White Relations in Australia	S,E
GENZ4505	Japan in the Modern World	S,E
GENZ4506	The American Civil War	S,E
GENZ4507	Australia in the Twentieth Century	S,E
GENZ4508	Woman Warrior: Women, War and Peace	S,E
GENZ3501	Marine Environment	A,E
GENZ3502	Marine Resources	A,E
GENZ5503	The World of Mathematics	A
GENZ5501	Presenting and Analysing Data in the Social Sciences	A
GENZ5502	Statistical Modelling in the Social Sciences	A
GENZ5503	The World of Mathematics	A
GENZ2501	Mechanics of Flight 1	S,A
GENZ2502	Mechanics of Flight 2	S,A
GENZ6001	Physics for Society*	A
GENZ6002	Astronomy	A
GENZ6003	Introductory Meteorology	A
GENZ6004	Environmental Physics*	A

GENZ4001	Why Politics Matters	S,E
GENZ4002	Issues in Contemporary Australian Politics: foreign policy dimensions*	S,E
GENZ4003	Introduction to Strategic and Security Studies	S,E
GENZ5009	The Journey of Legend	S,E

* Courses not offered in 2001

Restrictions on the selection of particular courses

Students who have completed a 6 units of credit first year course may not obtain credit for a general education course from the same school if taken concurrently or subsequently, e.g. Chemistry 1A and the World of Chemistry.

In all cases the general education courses taken prior to the 6 unit of credit level one course in the same discipline may count towards the degree.

Descriptions of courses

CHEMISTRY

GENZ0502
Chemistry and Life
Staff Contact: Dr H.A. McKenzie
UC3 S2 HPW2

This course 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 course 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
Chemistry in Defence and Peace
Staff Contact: Dr H.A. McKenzie
UC3S1 HPW2

This course 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 course 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 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.

GENZ0501
The World of Chemistry
Staff Contact: Dr H.A. McKenzie
UC3 HPW2
Note/s: Not offered in 2001

CIVIL ENGINEERING

GENZ1501
Engineering the Environment
Staff Contact: A/Prof S.R. Yeomans
UC3 S2 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
Computers in Society
Staff Contact: Mr D. Munro
UC3 S1 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
Information Technology in Organisations
Staff Contact: Mrs J. Backhouse
UC3 S2 HPW2

This course 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.

ECONOMICS AND MANAGEMENT

GENZ1001
Competition and Innovation
Staff Contact: Mr M. Kowalik
UC3 S1 HPW2

This course 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
Macroeconomic Growth and Stability
Staff Contact: Mr T. Huybers
UC3 S2 HPW2

This course 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
Leadership Studies

Note/s: Not offered in 2001.

ELECTRICAL ENGINEERING

GENZ2001
Telecommunications: Principles, Systems and Policy
Staff Contact: Professor J. Arnold
UC3 S1 HPW2

A course designed to provide an introduction to the fundamental concepts in telecommunications, and how telecommunications impacts the operation of society. Topics will be drawn from: The concept of frequency and bandwidth. Telecommunications channels: cables, optical fibres, radio systems and satellite links. A brief history and milestones in the development of telecommunications. Channel requirements of common communications signals. Legislation and policy issues, both national and international. Regulatory bodies and the use of the spectrum as an international resource. Military communications systems and the concept of encryption. Impact of telecommunications developments on society including commerce, trade, travel and tourism. Data as a commodity: Transnational data transfer and tariffs.

ENGLISH

GENZ5001
Writing and the Media
Note/s: Not offered in 2001

GENZ5002
Issues in Modern Australian Literature and Film
Note/s: Not offered in 2001

GENZ5003
Literature and Modern War
Note/s: Not offered in 2001

GENZ5004
Science and the Literary Imagination
Note/s: Not offered in 2001

GENZ5005
Australian Literature and Film
Note/s: Not offered in 2001

GENZ5006
American Literature
Note/s: Not offered in 2001

GENZ5007
Exciting Writing
Note/s: Not offered in 2001

GENZ5008
Re-presenting Gender
Staff Contact: A/Prof A. Caesar and Dr. P. Looker
UC3 S2 HPW2

Through a discussion of selected fiction, film, and non-fiction texts, we aim to analyse and discuss the construction of gender in contemporary Australian society. The course will place considerable emphasis upon the making of 'masculinity' as well as on feminist issues.

GENZ5009
The Journey of Legend
Staff Contact: Dr. H. Neilson
UC3 S1 HPW2

This course studies a selection of 'classic' works from the Bible and from ancient Greece and Rome. It examines not only original stories and myths in their own contexts, but also their 'journey' through subsequent cultures.

HISTORY

GENZ4508
Woman Warrior: Women, War and Peace
Staff Contact: Dr Linda Bowman
UC3 S1 HPW2

The course investigates case studies in the history of women, focussing on crises of war but also analysing the changing roles of women, the historical constructions of femininities and masculinities during peace. Students will explore the reasons why warrior and civilian women's experiences are not simply parallel to men's but are a rich weaving of gender, class, race and sexuality. The course also explores relations between the sexes and between the military and civilian spheres. It will cover the period from the sixteenth century to the present day and will take a global and comparative approach.

GENZ4507
Australia in the Twentieth Century
Staff Contact: Dr Frank Cain
UC3 S2 HPW2

This course will analyse the social, political, cultural and economic forces that have determined twentieth century Australian history. It will examine the impact of important events on Australia such as Australian Federalism, reactions to the Great War, Federal-State financial relationships, the Great Depression, the Second World War, the Australian film industry, women in Australia, the economic boom of post World War 2 and the Whitlam, Hawke and Keating years.

OCEANOGRAPHY

GENZ3501
Marine Environment
Staff Contact: CMDR J. Mathias
UC3 S1 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 oceanís role in weather, climate, and economics.

GENZ3502
Marine Resources
Staff Contact: CMDR J. Mathias
UC3 S2 HPW2

A discussion of resources of the oceans. These include fisheries, fossil fuels, desalinisation, mariculture and energy sources such as tides, waves and ocean thermal energy. 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

GENZ5501
Presenting and Analysing Data in the Social Sciences
Staff Contact: Ms B. Anderson
UC3 S1 HPW2

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
Statistical Modelling in the Social Sciences
Staff Contact: Ms B. Anderson
Note/s: This course follows on from GENZ5501 U.
UC3 S2 HPW2

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 course 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.

GENZ5503
The World of Mathematics

Staff Contact: Prof C. Pask
UC3 S2 HPW2

This course is designed to introduce students to the ideas and use of mathematics, the history of the subject and some of the personalities involved. (Only elementary mathematical ability will be assumed.)

AEROSPACE AND MECHANICAL ENGINEERING

GENZ2501
Mechanics of Flight 1 (Aircraft Aerodynamics)
UC3 S1 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
Mechanics of Flight 2 (Aircraft Performance)
UC3 S2 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

Co-ordinator: Dr G. Robinson

GENZ6002
Astronomy
Staff Contact : Dr G. Robinson/Dr R.G. Smith
UC3 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, and the similarities and differences between the planets. Then we learn how a star is formed, its life and 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 and with other possible intelligent life forms.

GENZ6003
Introductory Meteorology
Staff Contact: Dr V A. Drake
UC3 S1 HPW2

The course will examine the familiar synoptic chart and satellite imagery used by weather forecasters, with the twin aims of learning how to interpret them and of understanding what they represent. Students will learn how the atmosphere changes with altitude, how wind arises, why clouds and precipitation form, and what causes storms. We will examine some specific weather systems, learn to recognize them on charts and images, and see how meteorologists detect and predict them.

The course will be delivered flexibly, using internet technology supplemented by classes, visits and handouts.

GENZ6001
Physics for Society
UC3 HPW2
Note/s: Not offered in 2001

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. Topics to be considered will be selected from Mechanics and Relativity; Light, Optics, Lasers and Holography; Temperature and Heat; Electricity and Magnetism; the Atom, Nuclear Energy and Relativity.

GENZ6004
Environmental Physics
Staff Contact: Dr J. R. Taylor
UC3 S2 HPW2
Note/s: Not offered in 2001

Many environmental problems cannot be appreciated properly without a reasonable knowledge of the basic physical principles underlying them. In this course we will look at the physics of global greenhouse warming, depletion of the ozone layer, and the atmospheric dispersal of pollution and radioactive materials. We will also study aspects of the atmospheric environment affecting Australian Defence Force operations, such as visibility, turbulence, and marine and land microclimates.

POLITICS

GENZ4001
Why Politics Matters
Staff Contact: A/Prof D. W. Lovell
UC3 S2 HPW2

This course 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 course 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
Issues in Contemporary Australian Politics: foreign policy dimensions

Note/s: Not offered in 2001

GENZ4003
Introduction to Strategic and Security Studies
Staff Contact: A/Prof H. Smith
UC3 S1 HPW2

In the context of international politics, strategy deals with the use and threat of force by one state against another. The related concept of security deals with the protection of the state and its citizens from harms deriving from other states or non-state actors. Since Ancient China, many ideas have been put forward about what makes an effective strategy, how state security can be enhanced, and which state policies maximise strategic advantage and promote security. This introductory unit examines the principal theories of some classic strategists, considers the ways in which the pursuit of security has influenced the policies of states, and analyses how contemporary concepts of strategy and security are changing in the post-Cold War era and under the impact of globalisation.

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 defence force personnel and the general public.

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
	Geography and Oceanography	1081
	History	1241
	Language, Literature and Communication	1201
	Mathematics and Statistics	1881
	Physics	1892
	Politics	1321
ITD	Computer science	1893
MA(Honours)	Economics and Management	2271
	English	2281
	Geography	2301
	History	2321
	Politics	2401
ME	Aerospace Engineering	2693
	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 9000/9001
Chemistry	ACHM 9000/9001
Civil Engineering	ACIV 9000/9001
Computer Science	ACSC 9000/9001
Economics and Management	AECM 9000/9001
Electrical Engineering	AELE 9000/9001
Geography and Oceanography	AGOC 9000/9001
History	AHIS 9000/9001
Language, Literature and Communication	AENG 9000/9001
Mathematics and Statistics	AMAT 9000/9001
Physics	APHY 9000/9001
Politics	APOL 9000/9001

Coursework Degrees, Diplomas and Certificates

Candidates in these programs are required to attend formal lectures and/or seminars and, where applicable, submit a project report or sub-thesis. Most programs are usually of two sessions duration full-time or four sessions duration for a part-time program.

In some programs in any year, course quotas may be imposed. Where possible, candidates will be given notice of quotas.

Award	*Program*	*code*
ITD	Information Technology	1893
MA	English	8172
MDefStud	Defence Studies	9902
MDefStud	Defence Studies (Distance Education)	9903
MEngSc	Engineering Science	8568
MSc	Information Technology	8565
MMgtStud	Management Studies	8396
MMgtStud	Management Studies (Distance Education)	8397
MSc	Operations Research and Statistics	8559
Grad Dip	Arts (English)	5852
Grad Dip	Engineering Science	5888
Grad Dip	Defence Studies	5912
Grad Dip	Defence Studies (Distance Education)	5913
Grad Dip	Information Technology	5865
Grad Dip	Management Studies	5821
Grad Dip	Management Studies (Distance Education)	5822
Grad Dip	Operations Research and Statistics	5841
Grad Cert	Arts (English)	7386
Grad Cert	Engineering Science	7388
Grad Cert	Defence Studies	7389
Grad Cert	Information Technology	7397
Grad Cert	Management Studies	7391
Grad Cert	Management Studies (Distance Education)	7398
Grad Cert	Operations Research and Statistics	7395

Listed below are the pre-2000 program numbers for Defence Studies and Arts (English). Students remaining in these programs should ensure they are enrolled in a program with the pre-2000 code and should ensure that they enrol in the pre-2000 course codes.

All Defence Studies and Arts (English) students remaining in the pre-2000 programs will undertake additional assessment to take account of the unit of credit differential.

Program	*Course*	*code*
MA	English	8171
MDefStud	Defence Studies	9900
MDef Stud	Defence Studies (Distance Education)	9901
Grad Dip	Arts (English)	5851
Grad Dip	Defence Studies	5910
Grad Dip	Defence Studies (Distance Education)	5911

1893 Doctor of Information Technology ITD

The Doctor of Information Technology degree provides an opportunity to combine a doctoral thesis with the coursework component of the Master of Science in Information Technology. It allows research into an area of interest developed within the coursework, leading to a significant contribution to professional practice in information technology.

The degree consists of one half coursework (equivalent to three sessions full time) and one half research (three sessions full time) which may be in an area encountered by the student while undertaking coursework.

The coursework component of the degree begins with enrolment in the MSc in Information Technology. A candidate who has completed the requirements for that degree with an average mark of at least 70%, and who has a minimum of three years of relevant professional experience, may enrol in the Doctor of Information Technology. After completion of four more courses (three of which must be *Research Methods in Information Technology*, *Case Studies in Information Technology*, and *Professional Practices*), students may enrol in the ITD dissertation. All coursework must be completed before the commencement of the dissertation.

The topic of the dissertation will commonly be a development of at least one course, to be nominated by the candidate and approved by the Postgraduate Coursework Education Committee of University College. The dissertation must amount to an original contribution to a field of study, and be of publishable quality. It will be assessed by not less than three examiners appointed by the Postgraduate Coursework Education Committee. Assessment is as for other final research degrees. A final result of non-award of the ITD will lead to a MSc in Information Technology being conferred on the candidate.

MASTERS BY COURSEWORK

The following section contains general information relating to all Masters by coursework programs. Students should also refer to further details of requirements and course schedules under the individual program sections.

Entry Requirements

- A four year degree of Bachelor or Bachelor with Honours in the same or related discipline from The University of New South Wales or equivalent qualification; or
- a Graduate Diploma in the same or related discipline from The University of New South Wales or equivalent qualification; or
- a three year Bachelor degree at pass level in the same or related discipline from The University of New South Wales, or equivalent qualification, which includes a major in a related field of study together with relevant full-time work experience; or
- other academic and/or professional qualifications and/or significant work experience of a related nature as may be approved by the Postgraduate Coursework Education Committee.

Notes:

1. "equivalent qualification" means an equivalent qualification from a tertiary institution at a level acceptable to the Postgraduate Coursework Education Committee.
2. Entry to all Masters programs is subject to the recommendation of the relevant authority.

Program Structure

Students will be required to complete a minimum of 48 units of credit (UC48) of coursework from Group B courses as specified for each program. Each program comprises 8 Group B courses worth 6 units of credit (UC6) each.

In exceptional circumstances, the program authority may give approval for a student to substitute two Group A courses for one

Group B course towards a Master's degree or, in certain programs, three Group A for 2 Group B courses.

It is expected that full-time students will complete the program in a minimum of 2 sessions and a maximum of 4 sessions and that part-time students will complete in a minimum of 4 sessions and a maximum of 8 sessions. In special cases a variation of these times may be approved by the Postgraduate Coursework Education Committee.

A project course (UC12) may be undertaken in place of 2 Group B courses (UC6) subject to students meeting program-specific requirements (as indicated in the individual program entries in this Handbook) and subject to the approval of the program authority.

With the approval of the program authority, students may elect to take up to 25% of the program (2 Group B courses) from other postgraduate programs.

All study programs are subject to the approval of the program authority.

Students who fail more than one course or the same course twice may be asked to show cause as to why they should be permitted to continue in a program.

GRADUATE DIPLOMAS

The following section contains general information relating to all Graduate Diploma programs. Students should also refer to further details of requirements and course schedules under the individual program sections.

Entry Requirements

– a Bachelor degree at pass level in the same or related discipline from The University of New South Wales or equivalent qualification; or
– a Graduate Certificate in the same or related discipline from The University of New South Wales or equivalent qualification; or
– other academic and/or professional qualifications and/or significant work experience of a related nature as may be approved by the Postgraduate Coursework Education Committee.

Notes:

1. "equivalent qualification" means an equivalent qualification from tertiary institution at a level acceptable to the Postgraduate Coursework Education Committee.

2. Entry to all Graduate Diploma programs is subject to the recommendation of the relevant authority.

Transfer from Master's Program to Graduate Diploma Program

An applicant who has obtained suitable units of credit in the equivalent Master's program of the University College but has not taken out the Master's degree may apply to be admitted to a Graduate Diploma program and to be granted credit for work completed in the Master's program.

Program Structure

Students will be required to complete 36 units of credit (UC36) of coursework from Group A and Group B courses specified for the program. The program comprises 2 Group A courses and 4 Group B courses each of which is worth 6 units of credit (UC6).

It is expected that full-time students will complete the program in a minimum of 2 sessions and a maximum of 3 sessions and that part-time students will complete in a minimum of 3 sessions and a maximum of 6 sessions. In special cases a variation of these times may be approved by the Postgraduate Coursework Education Committee.

With the approval of the program authority, students may elect to take up to 25% of the program (one Group B course) from another postgraduate program.

All study programs are subject to the approval of the appropriate program authority.

Students who fail more than one course or the same course twice may be asked to show cause as to why they should be permitted to continue in a program.

Further Study

Articulation from a Graduate Diploma to a Master's Program
Students who have completed the requirements for a Graduate Diploma at University College but have not taken out the qualification are eligible to apply for articulated entry into the related Master's program within 4 years of completion of the Graduate Diploma requirements. Normally such students will need to complete a minimum of 4 Group B courses in order to be eligible for the Master's degree.

Entry to a Master's Program by a Holder of a Graduate Diploma

Students who have been awarded a Graduate Diploma in a related discipline are eligible to apply for entry into the related Master's program within 4 years of completion of the Graduate Diploma requirements, and may apply for credit for up to 2 Group B courses. Subject to the credit being granted, such students will need to complete a minimum of 6 Group B courses in order to be eligible for the Master's degree.

GRADUATE CERTIFICATES

The following section contains general information relating to all Graduate Certificate programs. Students should also refer to further details of requirements and course schedules under the individual program sections.

Entry Requirements

– a Bachelor degree at pass level in any discipline from The University of New South Wales or equivalent qualification, or
– other academic and/or professional qualifications and/or significant work experience of a related nature as may be approved by the Postgraduate Coursework Education Committee.

Notes:

1. "equivalent qualification" means an equivalent qualification from a tertiary institution at a level acceptable to the Postgraduate Coursework Education Committee.

2. Entry to all Graduate Certificate programs is subject to the recommendation of the relevant authority.

Transfer from Graduate Diploma Program to Graduate Certificate Program

A student who has obtained suitable units of credit in the equivalent Graduate Diploma program of the University College but has not taken out the Graduate Diploma may apply to be admitted to a Graduate Certificate program and to be granted credit for work completed in the Graduate Diploma program.

Program Structure

Students will be required to complete 24 units of credit (UC24) of coursework from Group A courses specified for the program. The program comprises 4 Group A courses worth 6 units of credit each (UC6).

It is expected that full-time students will complete the program in a minimum of one session and a maximum of 2 sessions and that part-time students will complete in a minimum of 2 sessions and a maximum of 4 sessions. In special cases a variation of these times may be approved by the Postgraduate Coursework Education Committee.

In exceptional cases, and with the approval of the program authority, students may elect to take up to 25% of the program (one Group A course) from other comparable postgraduate programs. This provision does not apply to the Graduate Certificate in Defence Studies program.

All study programs are subject to the approval of the program authority.

Students who fail more than one course or the same course twice may be asked to show cause as to why they should be permitted to continue in a program.

Further Study

Articulation from a Graduate Certificate to a Graduate Diploma Program

Students who have completed the requirements for a Graduate Certificate at University College but have not taken out the qualification are eligible to apply for articulated entry into the related Graduate Diploma program within 4 years of completion of the Graduate Certificate requirements. Normally such students will need to complete a minimum of 4 Group B courses in order to be eligible for the Graduate Diploma.

Entry to a Graduate Diploma Program by a Holder of a Graduate Certificate

Students who have been awarded a Graduate Certificate in a related discipline are eligible to apply for entry into the related Graduate Diploma program within 4 years of completion of the Graduate Certificate requirements, and may apply for credit for one Group A course. Subject to the credit being granted, such students will need to complete a minimum of one Group A course and 4 Group B courses in order to be eligible for the Graduate Diploma.

INDIVIDUAL PROGRAM DESCRIPTIONS

This section contains descriptions of the individual postgraduate coursework programs offered.

Arts (English) Program

8172 Master of Arts at Pass Level MA(English)

The degree of Master of Arts (English) by coursework requires the completion of UC48 from the Group B courses listed below. The program comprises 8 Group B courses worth UC6 each or 6 Group B courses and a Research Project worth UC12.

8171 Pre-2000 MA at Pass Level

The pre-2000 MA requires the completion of six UC8 courses from those listed under School course descriptions.

5852 Graduate Diploma in Arts (English) GradDipArts

The Graduate Diploma in Arts (GradDipArts) in English is designed for students with a Bachelor degree in the same or a related field who wish to gain an advanced understanding of literary and cultural forms. The Graduate Diploma requires the completion of UC36, UC12 from the Group A courses listed below and UC24 from the Group B course offerings. The Research Project option is not available. The program comprises 2 Group A courses and 4 Group B courses worth UC6 each.

5851 Pre-2000 GradDipArts (English)

The pre-2000 Graduate Diploma requires the completion of four UC8 courses from those listed under School course descriptions.

7386 Graduate Certificate in Arts (English) (GradCertArts)

The Graduate Certificate in Arts (in English) (GradCertArts) is designed for students with a Bachelor degree who wish to obtain a solid background in English studies or extend an existing one. The Graduate Certificate requires the completion of UC24 from the Group A courses listed below. The program comprises 4 Group A courses worth UC6 each.

7396 Pre-2000 GradCertArts (English)

The pre-2000 program requires the completion of three UC8 courses, two from Group A and one from Group B, listed under School course descriptions.

Schedule of Courses

All Group A and Group B courses have a value of UC6 each.

Not all of the courses listed will be available in 2001. Students proposing to enrol should check availability with the School at the earliest possible date. Completion of these programs in one academic year is possible, provided the selected courses achieve their minimum required enrolment.

No.	*Title*	*Session*
Group A Courses		
AENG7101	Essential Issues in Classics, Politics and Popular Culture (UC6)	S1
AENG7103	Essential Issues in Recent Criticism and Theory: Classic Texts (UC6)	S2
AENG7105	Introduction to Writing: Prose and Poetry (UC6)	S2
AENG7107	Writing Practices (UC6)	S1
Group B Courses		
AENG7301	Aboriginal Literatures and Themes (UC6)	S2
AENG7303	American Fiction and Film (UC6)	S2
AENG7305	Australia and the Asia-Pacific (UC6)	S1
AENG7307	Australian Literary Movements and Controversies (UC6)*	—
AENG7309	Australian Literature: The Canon and its Contexts (UC6)*	—
AENG7311	Australian War Literature of the Twentieth Century (UC6)*	—
AENG7313	British Fiction and Film (UC6)	S2
AENG7315	Contemporary Australian Writing (UC6)*	—
AENG7317	Literary Modernism in Context: 1900—1920 (UC6)*	—
AENG7319	One Hundred Years of Australian Women's Writing (UC6)*	—
AENG7321	One Hundred Years of Women's Writing (UC6)*	—
AENG7323	Post-Colonial Literature (UC6)*	—
AENG7325	Special Study (UC6)*	—
AENG7327	Texts and Textuality (UC6)	S1
AENG7329	Travelling Abroad (UC6)*	—
AENG7331	Twentieth Century Literary Theory (UC6)	S1
AENG7501	Research Project English (UC12)	S1,S2

* Not offered in 2001

Defence Studies Program

Defence Studies is an established field of study which brings scholarly insight and academic discipline to bear on such practical issues as defence policy and strategic planning as well as the operational aspects of warfare. The Defence Studies Program seeks to keep in balance both these practical concerns and the high demands of scholarship at the graduate level.

The award is offered through an interdisciplinary program provided by the Schools of History, Politics, Geography & Oceanography, Economics & Management, and English.

Current students in the pre-2000 programs may choose to remain in their program or transfer to the new program equivalent. Courses in the pre-2000 programs are identified as such in the section on course details below and students remaining in the pre-2000 programs must enrol in these courses.

9002 Master of Defence Studies MDefStud

The degree of Master of Defence Studies requires the completion of UC48 of coursework from the Group B courses listed below. The program comprises 8 Group B courses worth 6 units of credit each. Students enrolled in each UC6 course will be required to complete written work totalling 6,000 words.

In place of two Group B courses, a Masters student may apply to undertake a Research Project totalling UC12, provided always that resources are available. The Research Project should be on a topic in either History or Politics in an area of Defence Studies approved by the Head of School concerned. The normal prerequisite will be a Distinction average over 4 courses (the average of those marks). The project topic in either History or Politics will be determined by special consultation between the program authority and the student. The Research Project may be taken over one or two sessions. A student must enrol in both Part a and Part b over either one or two sessions. The total length of not more than 12,000 words will be strictly adhered to.

9900 Pre-2000 MDefStud

The Pre-2000 Master of Defence Studies degree requires the completion of UC48 of coursework from the Group B courses listed below. The program comprises 6 Group B courses worth UC8 each. Under the pre-2000 structure, a candidate is required to either: complete coursework to the value of UC48 chosen from the available Group B options, or complete coursework to the value of UC40 (chosen from the available Group B options) and an approved research project of not more than 12,000 words, provided that the student has attained a sufficiently high standard of achievement. Courses are listed under School course descriptions.

5912 Graduate Diploma in Defence Studies GradDipDefStud

The Graduate Diploma in Defence Studies requires the completion of UC36. The program comprises 2 Group A courses and 4 Group B courses (the research project option is not available) worth UC6 each. Students enrolled in each UC6 course will be required to complete written work totalling 6,000 words.

5910 Pre-2000 GradDipDefStud

The Graduate Diploma in Defence Studies requires the completion of UC32. The program comprises 4 Group B courses worth UC8 each. A research project option is not available. Courses are listed under School course descriptions.

7389 Graduate Certificate in Defence Studies GradCertDefStud

The Graduate Certificate in Defence Studies requires the completion of UC24 from the Group A courses listed below. The program comprises 4 Group A courses worth UC6 each.

Schedule of Courses:

Apart from the research projects, each of the courses listed below involves a two hour seminar each week throughout the session, written work and an examination, and is equivalent to UC6. A research project under the pre-2000 structure is equivalent to UC8.

No.	*Title*	*Session*
Group A courses		
AENG7107	Writing Practices History (UC6)	S1
AHIS7101	Australia and its Pacific Basin in Historical Perspective (UC6)*	S1
AHIS7103	Australia's Defence in Historical Perspective (UC6)	—
AHIS7105	The Great Power System in the 20th Century(UC6)	S1
APOL7101	Introduction to Australian Defence & Foreign Policy (UC6)#	S2
APOL7103	Security & Community in the Asia Pacific Region (UC6)	S1
Group B courses		
AECM7301	Asia-Pacific Political Economy (UC6)	—
AECM7306	Global Changes in Economy and Society (UC6)	—
AECM7502	Research Project - Economics and Management (UC12)	—
AGOC7301	Comparative Strategic Geography(UC6)	—
AGOC7303	Geographic Information Systems for Resource Assessment (UC6)	S2
AGOC7305	Resource and Environmental Evaluation (UC6)	S1
AGOC7307	Strategic Geographical Issues in Australia's Neighbourhood (UC6)	S1
AGOC7309	Environomental Issues in Northern Australia (UC6)	S2
AHIS7301	The ASEAN States, the South Pacific and Australia (UC6)#	S2
AHIS7303	Contemporary Warfare (UC6)	—
AHIS7305	History of Australian Defence and Foreign Policy (UC6)	S2
AHIS7307	History of Pre-Nuclear Military Thought (UC6)	S1
AHIS7309	Intelligence and National Security (UC6)	—
AHIS7311	Military Innovation and Adaptation in the C20 (UC6)	—
AHIS7313	Modern Naval History and Strategy (UC6)	S1
AHIS7315	Occasional Elective (UC6)	—
AHIS7317	The Mystique of Air Power (UC6)#	S1
AHIS7319	The Origins of the New World Disorder: Failed States, Ethnic Conflict and the Nature of War (UC6)	S2
AHIS7501	Research Project - History (UC12)	S1,S2
APOL7301	Armed Forces and Society (UC6)	S2
APOL7303	Australian Defence and Security after the Cold War (UC6)#	S1
APOL7305	Australian Foreign Policy: Contemporary Issues (UC6)#	S2
APOL7307	Global Security (UC6)#	S2
APOL7309	International Security Regimes (UC6)	—
APOL7311	Legal and Moral Problems of International Violence (UC6)	S1
APOL7313	Security Issues in Northeast Asia (UC6)	S2
APOL7315	Occasional Elective: Politics and Society in Indonesia (UC6)	—
APOL7317	Politics of the United Nations (UC6) #	S1
APOL7319	Regionalisation, Globalisation and the Asia-Pacific (UC6)	—
APOL7321	The Politics of China's Security (UC6)	S1
APOL7323	The Vietnam War 1954–75 (UC6)	—
APOL7325	East Timor: Intervention and Independence	S2
APOL7501	Research Project - Politics (UC12)	S1,S2

Offered by Distance mode in the same session (see separate entry, p.164)

* Offered by Distance mode only.

Defence Studies by Distance Education

For information about Distance Education study in the Defence Studies programs refer to the Distance Education section (p.164).

Engineering Science Programs

Students enrolled in program codes 8557, 8558, 5801, 5811, 7392 or 7393 should consult the 2000 Handbook for program details.

8568 Master of Engineering Science
MEngSc in Civil Engineering
MEngSc in Electrical Engineering
MEngSc in Project Management

The Engineering Science program offers the opportunity for graduate level study in the traditional engineering discipline areas. The Masters degree requires the completion of 8 Group B courses.

The degree may be obtained by pursuing a broad range of technical and professional studies in either Civil Engineering or Electrical Engineering from courses predominantly in the Schools of Civil Engineering or Electrical Engineering respectively.

The degree may also be obtained in the discipline of Project Management by a structured plan of study offered through the Schools of Civil Engineering, Economics and Management, and Computer Science. This plan provides a comprehensive study of the principles and processes required for the delivery of a successful project. The plan canvasses a wide range of decision support methods and software tools and graduates will be able to immediately participate in the project management team and to critically appraise the project management organisation and culture.

The US-based Project Management Institute (PMI) has identified a range of study areas which, in aggregate, contribute to the knowledge base required by a project management professional. PMI has audited the content of the Project Management Plan at University College and have formally advised that it is comprehensive in the issues explored, fully in accordance with the educational objectives of PMI, and the subject matter is taught at an advanced level.

Plan Structures

Civil Engineering. Students are required to complete at least 6 Group B courses from the offerings of the School of Civil Engineering.

Electrical Engineering. Students are required to complete at least 6 Group B courses from the offerings of the School of Electrical Engineering.

Project Management. Students are required to complete the following 4 core courses:

ACIV7309 Project Management Body of Knowledge,

ACIV7324 Project Administration,

ACIV7325 System Dynamics of Project Organisation,

ACIV7310 Project Systems Modelling.

A further 2 elective courses must be chosen from:

ACIV7305 Facility and Property Management,

ACIV7312 System Dynamics Modelling,

ACIV7315 Special Elective 1 (Project Management),

AECM7305 Finance and Investment Appraisal,

ACSC7331 Software Project Management, or

ACSC7332 Systems Planning.

Alternatively, with the approval of the Plan Authority and in place of either or both electives, students may take ACIV7501 Project Report 12UC.

5888 Graduate Diploma in Engineering Science
GradDipEngSc in Civil Engineering
GradDipEngSc in Electrical Engineering

The Graduate Diploma in Engineering Science is specially designed for students with an undergraduate degree in a related field who wish to develop an advanced understanding of Civil Engineering or Electrical Engineering. The diploma is intended to provide engineering professionals with professional academic qualifications. Students wishing to retrain may use the Graduate Diploma a first step in a full postgraduate program leading to the Master of Engineering Science. The diploma may be obtained in either Civil Engineering or Electrical Engineering by a plan of study predominantly in the Schools of Civil Engineering or Electrical Engineering respectively. The Graduate Diploma requires the completion of 2 Group A courses and 4 Group B courses.

Plan Structures

Civil Engineering. Students are required to complete 2 Group A and at least 3 Group B courses from the offerings of the School of Civil Engineering.

Electrical Engineering. Students are required to complete 2 Group A and at least 3 Group B courses from the offerings of the School of Electrical Engineering.

7388 Graduate Certificate in Engineering Science
GradCertEngSc
GradCertEngSc

The Graduate Certificate in Engineering Science 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 certificate 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 to the Graduate Diploma then Master of Engineering Science. The certificate may be obtained in either Civil Engineering or Electrical Engineering by a program of study predominantly in the School of Civil Engineering or the School of Electrical Engineering respectively. The Graduate Certificate requires the completion of 4 Group A courses.

Plan Structures

Civil Engineering. Students are required to complete at least 3 Group A courses from the offerings of the School of Civil Engineering.

Electrical Engineering. Students are required to complete at least 3 Group A courses from the offerings of the School of Electrical Engineering.

Schedule of Courses available in Civil Engineering and Project Management Plans in Engineering Science

No.	*Title*	*Session*
Group A Courses		
ACIV7101	Environmental Engineering Fundamentals*	—
ACIV7102	Introduction to Blast	S1
ACIV7103	Introduction to Engineering Management	S1
ACIV7104	Introduction to Geomatic Engineering*	—
ACIV7105	Introduction to Geotechnical Engineering*	—
ACIV7106	Introduction to Hydraulic Engineering *	—
ACIV7107	Introduction to Structures	—
ACIV7108	Materials of Construction*	—
ACIV7109	Occasional Elective 1	S1,S2
ACIV7110	Occasional Elective 2	S1,S2
ACIV7111	Occasional Elective 3	S1,S2

Group B Courses

ACIV7301	Applied Soil Mechanics*	—
ACIV7302	Basic Finite Elements*	—
ACIV7303	Coastal and Ocean Engineering*	—
ACIV7304	Coastal and Seabed Dynamics*	—
ACIV7305	Facility and Property Management#	S1
ACIV7306	Finite Elements in Structural Analysis*	—
ACIV7307	Foundation Engineering*	—
ACIV7308	Prestressed Concrete*	—
ACIV7309	Project Management Body of Knowledge#	S1
ACIV7310	Project Systems Modelling#	S2
ACIV7312	System Dynamics Modelling#	S2
ACIV7313	Reinforced Concrete*	—
ACIV7314	Site Investigations*	—
ACIV7315	Special Elective 1: Project Management	S1,S2
ACIV7316	Special Elective 2	S1,S2
ACIV7317	Special Elective 3	S1,S2
ACIV7318	Special Elective 4	S1,S2
ACIV7319	Special Elective 5	S1,S2
ACIV7320	Structural Dynamics*	—
ACIV7321	Structural Engineering Materials 1: Concrete Technology*	—
ACM7322	Structural Engineering Materials 2: Metals*	—
ACIV7323	Transportation Planning*	—
ACIV7324	Project Administration	S2
ACIV7325	System Dynamics of Project Organisation	S1
ACIV7501	Project Report - Civil Engineering**	S1,S2
AECM7305	Finance and Investment Appraisal	S2
ACSC7331	Software Project Management	S2
ACSC7332	Systems Planning	S2

Also available by Distance Education in 2001. See separate entry p.164)

*Not available in 2001.

**Not available to students enrolled in Graduate Diploma in Civil Engineering.

Schedule of Courses available in Electrical Engineering Plans in Engineering Science

No.	*Title*	*Session*
Group A Courses		
AELE7101	Analogue Communications	
AELE7102	Communications and Information Systems	
AELE7103	Communications Systems	
AELE7104	Digital Signal Processing	
AELE7105	Fundamentals of Surveillance Technologies	
AELE7106	Introduction to Optoelectronic Systems	
AELE7107	Occasional Elective 1	
AELE7108	Occasional Elective 2	
AELE7109	Occasional Elective 3	
AELE7110	Television and Image Transmission Systems	
ACSC7104	Introduction to Programming	
Group B Courses		
AELE7301	Adaptive Antenna Arrays	
AELE7302	Advanced Data Networks	
AELE7303	Advanced Digital Signal Processing Techniques	
AELE7304	Airborne Radar	
AELE7305	Antennas	
AELE7306	Digital Communications A	
AELE7307	Digital Communications B	
AELE7308	Digital Image Restoration	
AELE7309	Digital Video Communications	
AELE7310	Electrical Engineering Elective	
AELE7311	Introduction to Digital Image Processing	
AELE7312	Kalman Filtering	
AELE7313	Linear Systems	
AELE7314	Mobile Communications	
AELE7315	Neural Networks	
AELE7316	Robotics	
AELE7317	Satellite Communications	
AELE7318	Software Engineering	
AELE7319	Spaceborne Imaging Technology	
AELE7320	Special Elective 1	
AELE7321	Special Elective 2	
AELE7322	Special Elective 3	
AELE7323	Special Elective 4	
AELE7324	Systems Engineering Practice	
AELE7501	Project Report – Electrical Engineering**	
ACSC7303	C^{3}I Systems	
ACSC7305	Computer Security and Cryptography	
ACSC7306	Computer Speech Processing	
ACSC7307	Data Networks	
ACSC7324	Object Oriented Programming	

** Not available to students enrolled in 5811 Graduate Diploma in Electrical Engineering

Information Technology Programs

8565 Master of Science in Information Technology
MSc

The Master of Science in Information Technology 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.

5865 Graduate Diploma in Information Technology
GradDipInfoTech

The Graduate Diploma in Information Technology 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.

7397 Graduate Certificate in Information Technology
GradCertInfoTech

The Graduate Certificate in Information Technology 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 MSc.

Schedule of Courses

Courses are divided into three Groups: Group A Graduate Certificate/Graduate Diploma courses, Group B Graduate Diploma/ Masters courses, and Group C Masters/Doctorate courses. Not all courses may be available in any one year. However, should the demand be high for a specific course in any year, attempts will be made to make that course available in that year.

No.	*Title*	*Session*
Group A: Graduate Certificate/Graduate Diploma Courses		
ACSC7101	Introduction to Database Systems	S1, S2
ACSC7104	Introduction to Programming	S1, S2
ACSC7106	Introduction to Telecommunications	S1,S2
ACSC7107	Systems Analysis and Design	S1, S2
ACSC7108	Introduction to the Web	S1
Group B: Graduate Diploma/Masters Courses		
ACSC7302	Advanced Topics in Database Management	—
ACSC7303	C^{3}I Systems	S1

ACSC7304	Computer Graphics	—
ACSC7305	Cryptography	—
ACSC7306	Computer Speech Processing	S2
ACSC7307	Data Networks	S2
ACSC7309	Decision Support Systems	—
ACSC7316	IT Special Topic 1	SS
ACSC7317	IT Special Topic 2	SS
ACSC7318	IT Special Topic 3	SS
ACSC7319	IT Special Topic 4	SS
ACSC7320	Knowledge Based Systems	—
ACSC7321	Machine Learning	—
ACSC7324	Object Oriented Programming	S1
ACSC7325	Operating Systems	—
ACSC7330	Software Engineering and ADA	—
ACSC7331	Software Project Management	S2
ACSC7332	Systems Planning	S2
ACSC7333	Telecommunications Management	S2
ACSC7334	User Interface Construction	S1
ACSC7336	Computer Security	S2
ACSC7337	Data Mining	S2
ACSC7338	Data Structures and Algorithms	S2
ACSC7339	Electronic Business	S1
ACSC7340	Information Operations	S2
ACSC7341	Information Systems Policy and Strategy	S1
ACSC7342	Integrating the Enterprise and IS Functions	S2
ACSC7343	Integrating Information Systems Technologies	S1
ACSC7344	Languages of the Web	S2
ACSC7345	Object Oriented Analysis and Design	S2
ACSC7346	Systems Administration	S1
ACSC7347	Directed Studies in Information Technology 1	S1
ACSC7348	Directed Studies in Information Technology 2	S2
ACSC7501	Project - Information Technology	S1, S2
AELE7302	Advanced Data Networks	SS
AELE7308	Digital Image Restoration	SS
AELE7309	Digital Video Communications	SS
AELE7311	Introduction to Digital Image Processing	SS
AELE7315	Neural Networks	SS
AELE7317	Satellite Communications	SS
AELE7318	Software Engineering	SS
AELE7319	Spaceborne Imaging Technology	SS
AGOC7303	Geographic Information Systems for Resource Assessment	S1

Group C: Masters/Doctorate Courses

ACSC7601	Case Studies in Information Technology	S2
ACSC7602	Professional Practices	—
ACSC7603	Research Methods in Information Technology	S1

Management Studies Program

The Management Studies Program addresses the decision-making processes and techniques by which private and public sector organisations make the most effective use of their resources. The program draws on a variety of disciplines including economics, engineering, computer science and law and aims to develop skills in quantitative and qualitative analysis relevant to management issues.

Awards are offered at the level Master, Graduate Diploma and Graduate Certificate on the basis of courses offered through the Schools of Economics and Management, Civil Engineering and Computer Science, and inputs from the Schools of Mathematics and Statistics, Electrical Engineering and Aerospace and Mechanical Engineering. At the Masters level, candidates are required to structure their studies according to a coherent plan. Candidates may take a general management approach to the degree (the General Management plan) or follow a specialised plan in Human Resource Management, Equipment and Technology Management, Project Management or Defence Capability Development and Acquisition. Each plan has minimum requirements in terms of Group B (higher level) courses, details of which may be found below. Candidates undertaking plans at the Masters level are expected to possess bodies of knowledge covered in Group A courses.

8396 Master of Management Studies MMgtStud

The Master of Management Studies is designed for students who wish to develop an advanced understanding of management.

Generic rules for Masters awards are on page 172. The following rules are specific to the Graduate Management Studies Program.

Specialised Plans

Specialised Plans (a particular stream or structure of courses) exist in the Management Studies program and students at this level must complete a plan to meet the requirements of the degree. The details of each plan may be found below. Candidates undertaking specialised plans of study are expected to possess bodies of knowledge covered in a number of Group A courses.

General Management Plan. Students are required to undertake five specified courses, to which any three further Group B courses may be added to complete the degree. The specified courses are AECM7318 Strategic Management, AECM7104 Organisational Behaviour, AECM7308 Human Resource Management, AECM7305 Finance and Investment Appraisal, and AECM7311 Legal Process and Procedure.

Human Resource Management Plan. Students are required to complete AECM7318 Strategic Management, AECM7104 Organisational Behaviour, and AECM7308 Human Resource Management, and two further courses from a group of electives in the HRM area comprising AECM7310 Leadership in Organisations, AECM7314 Public Sector Human Resource Management, and AECM7313 Organisation Development and Change. Any three further Group B courses may be taken to complete the degree.

Equipment and Technology Plan. Students are required to complete AEMC7318 Strategic Management and any four of the following courses: AECM7323 Technology and Innovation, AECM7319 Strategic Procurement, AECM7322 Logistics, AECM7304 Case Studies in Technology Management, AECM7305 Finance and Investment Appraisal. Any three further Group B courses may be taken to complete the degree.

Project Management Plan. Students are required to undertake AECM7318 Strategic Management, ACIV7309 Project Management Body of Knowledge, ACIV7324 Project Administration, and ACIV7325 System Dynamics of Project Organisation, and two further courses from a group of electives comprising AECM7305 Finance and Investment Appraisal, ACIV7310 Project Systems Modelling, ACIV7305 Facilities and Property Management, ACIV7312 System Dynamics Modelling, and ACSC7331 Software Project Management. Any two further Group B courses may be taken to complete the degree.

Defence Capability Development and Acquisition Plan. Students are required to complete the military technology courses AINT7301 Firepower and Protection, AINT7302 Vehicles and Mobility, AELE7102 Communications and Information Systems, and AELE7105 Fundamentals of Surveillance Technologies, and, in addition, AECM7319 Strategic Procurement and AECM7322 Logistics. The remaining two courses required for completion of the degree are to be selected from a group comprising AELE7324 Systems Engineering Practice, ACIV7310 Project Systems Modelling, ACSC7331 Software Project Management, ACSC7349 Military Operations Analysis, and AMAT7303 Reliability and Maintainability. (Note: An admission requirement for this plan is that Technical staff Wing students complete as a pre- or co-requisite the two Group A courses AECM7107 Introduction to Defence Capability Management and AECM7102 Introduction to Project Management. AINT7301 and AINT7302 are taught as four-week full-time courses. Introduction to Defence Capability Management is taught prior to the start of Session 1 each year. Quotas may apply in AINT courses. Non-Technical Staff Wing students who wish to enrol in these courses should consult the program coordinator and the Technical Staff Wing Director.)

Specialised Plans for pre-2001 Masters students only:

Human Resource Management*
Logistics Management
Military Technology**
Project Management*
Technology Management

*Specialised plan of this name differs between pre-2001 and current arrangements.

**Masters Candidates undertaking the Military Technology Plan must complete one other specialist plan.

Self Assessment

Candidates entering the program may self-assess in respect of whether they have appropriately covered Group A foundation material by reason of their previous studies or their professional experience. Some courses have specific pre- or co-requisites.

Course Concession

Under exceptional circumstances, the Program Coordinator may give approval for a candidate in the Masters program to substitute two Group A courses for one Group B course, or three Group A courses for two Group B courses.

Research Project

The option of completing a research project is available to Masters candidates who attain a high credit average or better in four courses, and subject to the approval of the appropriate Head of School.

5821 Graduate Diploma in Management Studies GradDipMgtStud

The Graduate Diploma in Management Studies is directed to students with some practical and/or theoretical experience in management. The goal is to give graduates an understanding of the fundamental principles involved in successfully managing resources of all kinds. Mastery of certain disciplinary foundations are viewed as essential to the achievement of this goal.

A specialised plan (see plan listing under 8396 Masters entry) is optional at this level.

Rules for this program are on page 173. The following rules are specific to the Management Studies program.

Self Assessment

Candidates entering the program may self-assess in respect of whether they have appropriately covered Group A foundation material by reason of their previous studies or their professional experience. Some courses have specific pre- or co-requisites.

Course Concession

Under exceptional circumstances, the Program Coordinator may give approval for a candidate in the Graduate Diploma to substitute two Group A courses (in addition to the two included under the general rules) for one Group B course.

7391 Graduate Certificate In Management Studies GradCertMgtStud

The program is intended to provide students who have little background in management with an opportunity to pursue study in this area. Rules for the Graduate Certificate are at p.174.

No.	*Title*	*Session*
Group A: Graduate Certificate/Graduate Diploma Courses		
AECM7102	Introduction to Project Management	S1,S2*
AECM7105	Introduction to Management	S1**
AECM7106	Economics for Managers+	S1*,S2
AECM7107	Introduction to Defence Capability Management	S1++
ACSC7103	Introduction to Management Science	S1**,S2**
AMAT7101	Introduction to Data Analysis +++	S1**,S2*

Note: A range of Special Electives may be available.

* Offered only as a Distance Education course in Session indicated (see separate entry, p. 164)

** Offered both by distance and on-campus in Session indicated (see separate entry, p. 164)

+ Replaces Microeconomics for Managers

++ Taught prior to start of Session

+++ Replaces Introduction to Applied Statistics

Group B: Graduate Diploma/Masters Specialised Plan Courses

For plan structures, see above.

AECM7304	Case Studies in Technology Management	S2
AECM7305	Finance and Investment Appraisal	S2
AECM7308	Human Resource Management	S1, S2*
AECM7310	Leadership in Organisations	S1
AECM7311	Legal Process and Procedure	S1*,S2
AECM7313	Organisation Development and Change#	—
AECM7314	Public Sector Human Resource Management	S2
AECM7318	Strategic Management	S1**,S2
AECM7321	Organisational Behaviour	S1, S2*
AECM7322	Logistics	S1
AECM7323	Technology and Innovation	S1
AECM7324	Strategic Procurement	S2
ACIV7325	System Dynamics of Project Organisation	S1
ACIV7312	System Dynamics Modelling	S2**
ACIV7305	Facility and Property Management	S1**
ACIV7309	Project Management Body of Knowledge	S1**
ACIV7310	Project Systems Modelling	S2*
ACIV7324	Project Administration	S2
ACSC7349	Military Operations Analysis	S2
ACSC7331	Software Project Management	S2
AMAT7303	Reliability and Maintainability	S2
AINT7301	Firepower and Protection	S1
AINT7302	Vehicles and Mobility	S2
AELE7102	Communications & Information Systems	S1
AELE7105	Fundamentals of Surveillance Technologies	S2
AELE7324	Systems Engineering Practice	SS

Quotas apply in all AINT courses. Non-Technical Staff Wing students who wish to enrol in these courses should consult the Program Coordinator and the Technical Staff Wing Director.

* Offered only as a distance education course in Session indicated (see separate entry, p.164)

** Offered both by distance and on campus in Session indicated (see separate entry, p.164)

#Not offered 2001

Group B: Graduate Diploma/ Masters Courses unaligned with Plans

AECM7303	Case Studies in Australian Government Process#	—
AECM7315	Special Elective 1	SS
AECM7316	Special Elective 2	SS
AECM7317	Special Elective 3	SS
AECM7501	Research Project - Management Studies	S1,S2
ACIV7501	Project Report	S1,S2

Note: A range of other Special Electives may be available.

Not offered in 2001.

Technical Staff Wing Course

The Technical Staff Wing 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 to complete a specific program within the Graduate Management Studies program at masters level, the Defence Capability Development and Acquisition plan (see main entry for program). Candidates are nominated by Defence and must meet University College entry requirements. In addition to completing the award program, students undertake additional studies not offered by the University College as well as a number of industrial visits.

No.	*Technical Staff WingCourses*
AECM7107	Introduction to Defence Capability Management*
AINT7301	Firepower and Protection**
AINT7302	Vehicles and Mobility**
AELE7102	Communications & Information Systems
AELE7105	Fundamentals of Surveillance Technologies

* Taught prior to start of session 1.

** Taught over four weeks full-time.

Operations Research and Statistics Program

8559 Master of Science in Operations Research and Statistics MSc

The Master of Science in Operations Research and Statistics is designed for students who wish to develop an advanced understanding of operations research and statistics. The degree aims to provide analysts and statistics professionals with an opportunity for professional upgrading or an extension of qualifications and experience.

5841 Graduate Diploma in Operations Research and Statistics GradDipOpResStats

The Graduate Diploma in Operations Research and Statistics is specially designed for students with an undergraduate degree in the same or a related field who wish to develop an advanced understanding of operations research and/or statistics. The degree is intended to provide analysts and statistics professionals with professional academic qualifications.

7395 Graduate Certificate in Operations Research and Statistics GradCertOpResStats

The Graduate Certificate in Operations Research and Statistics is specially designed for students with an undergraduate degree or established profession in another field who wish to gain an understanding of operations research and statistics. The degree is intended to assist professionals in coming to terms with the fields of operations research and statistics and their uses. Mature students wishing to retrain may use the Graduate Certificate as a first degree in a full postgraduate program leading up to the MSc.

Schedules of Courses

Courses are divided into two Groups: Group A Graduate Certificate/Graduate Diploma courses, and Group B Graduate Diploma/Masters courses. Not all courses may be available in any one year. However, should the demand be high for a specific course in any year, attempts will be made to make that course available in that year.

No.	*Title*	*Session*
Group A: Graduate Certificate/Graduate Diploma Courses		
AMAT7101	Introduction to Data Analysis	S1, S2
AMAT7102	Introduction to Quantitative Methods and Reasoning	S2
ACSC7103	Introduction to Management Science	S1, S2
ACSC7105	Introduction to Simulation	S2
Group B: Graduate Diploma/Masters Courses		
AMAT7301	Advanced Statistics and Trials Analysis	S2
AMAT7302	Mathematical Modelling	—
AMAT7303	Reliability and Maintainability	S2
AMAT7304	Statistical Forecasting	S1
AMAT7305	Workforce Resource Planning	—
AMAT7306	Statistical Modelling	S2
ACSC7301	Advanced Simulation and Wargaming	—
ACSC7308	Decision Analysis	S1
ACSC7322	Modelling of Combat and Conflict	—
ACSC7323	Modern Heuristic Techniques	S1
ACSC7326	ORS Special Topic 1	SS
ACSC7327	ORS Special Topic 2	SS
ACSC7328	ORS Special Topic 3	SS
ACSC7329	ORS Special Topic 4	SS
ACSC7349	Military Operations Analysis	S2
ACSC7350	Deterministic Operations Research	S1
ACSC7501	Project	S1, S2
APHY7335	Weapons Assessment	S1
AELE7105	Fundamentals of Surveillance Technologies	S2
AINT7301	Firepower and Protection	S1
AINT7302	Vehicles and Mobility	S2

Graduate Study

Course Descriptions

This section contains descriptions of the graduate courses offered by University College. The courses are in alphabetical School order:

- Civil Engineering
- Computer Science
- Economics and Management
- Electrical Engineering
- Geography and Oceanography
- History
- Language, Literature and Communication
- Mathematics and Statistics
- Politics
- Interdisciplinary Subjects (University College)

Identification of Graduate Courses by Numbers

A *course* 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 program offered by the University'.

The University uses numbers to identify courses. At University College the system of numbering is based on the following:

- Each course has a unique identifier comprising an alphabetic prefix and a numeric suffix.
- The authority offering a course, normally a School, is indicated by the alphabetic prefix.
- The particular graduate course is identified by four digits.
- Graduate courses have a '7' as the first digit of the suffix to the identifier code.
- Each identifying number is allocated to one course only.

The identifying alphabetic prefixes for courses in each of the Schools are set out below.

AMEC	Aerospace and Mechanical Engineering (including Aeronautical Engineering)
ACIV	Civil Engineering
AELE	Electrical Engineering
AECM	Economics and Management
AENG	Language Literature and Communication
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 course 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 course:

- 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)
- UC (units of credit).

Aerospace & Mechanical Engineering

AMEC7301
Engineering Logistics
UC6 S2
(For the Management Program)
Prerequisite and/or corequisite: AECM8252 (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

Group A Courses

ACIV7102
Introduction to Blast
Staff Contact: Mr G Barker
UC6 S1

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.

ACIV7103
Introduction to Engineering Management
Staff Contact: Mr K Linard
UC6 S1

An introduction to management in the engineering environment. Review of the characteristics of engineering projects and the project systems required for effective management. Planning techniques for engineering projects. Network analysis, time management and resource planning. Budgeting techniques and the identification of quality and risk issues in engineering projects. An introduction to engineering contracts.

ACIV7109
Occasional Elective 1

ACIV7110
Occasional Elective 2

ACIV7111
Occasional Elective 3
Staff Contact: A/Prof SR Yeomans
UC6 S1 and S2

Occasional electives are given by members of staff, external lecturers or visitors on a topic of immediate relevance to civil engineering.

Additional Group A Courses that may be offered in this and other years:
Staff Contact: A/Prof SR Yeomans

ACIV7101
Environmental Engineering Fundamentals

ACIV7104
Introduction to Geomatic Engineering

ACIV7105
Introduction to Geotechnical Engineering

ACIV7106
Introduction to Hydraulic Engineering

ACIV7107
Introduction to Structures

ACIV7108
Materials of Construction

Group B Courses

ACIV7305
Facility and Property Management#
Staff Contact: Mr A White
UC6 S1
#Also available by Distance Education in S1

This course focuses on the procurement, management and disposal of Defence facilities. The course structure includes organisation design and evaluation procedures and their translation to facilities. Location theory, dynamic simulation and virtual reality support the planning and evaluation process. The iterative facility. Brief development phase is integrated with Through Life cost models. Facility procurement strategies, finance, delivery, conversion and disposal are modelled on a comparative basis. Information systems support the management of the facility's physical and logical configuration. The course is designed to support both the policy development process and the facility procurement process. Students will receive a thorough overview of the building design, construction and management phases.

ACIV7309
Project Management Body of Knowledge#
Staff Contact: Mr A White
UC6 S1

Also available by Distance Education in S1

This course 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.

ACIV7310
Project Systems Modelling#
Staff Contact: Mr A White
UC6 S2
Prerequisite: ACIV8273 Project Management Body of Knowledge

Also available by Distance Education in S2

This course 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.

ACIV7312
System Dynamics Modelling#
Staff Contact: Mr K Linard
UC6 S2

Also available by Distance Education in S2

Systems Dynamics is a science that has its origins in engineering control theory, although systems concepts cross most disciplines. System Dynamics is the rigorous study of organisational problems, from a holistic or systemic perspective, where there is dynamic behaviour (quantities changing over time) and where feedback impacts significantly on system behaviour. It provides the framework and rules for qualitative description, exploration and analysis of such systems in terms of their processes, information, boundaries and strategies, thereby facilitating quantitative computer simulation modelling and analysis to assist understanding of system structure and control. This course focuses on the application of system dynamics modelling in strategic and corporate environments, with an emphasis on Defence. However, the course has wide applicability across technical, environmental and social systems.

ACIV7324
Project Administration
Staff Contact: Mr K Linard
UC6 S2

This course provides a framework for understanding the political, financial, legal and ethical framework in which Defence projects are defined and delivered. The demands of the Parliament and Government with respect to project initiation, approval and monitoring are reviewed. The law underpinning contracts is canvassed together with the design of forms of agreement. Procedures for eliciting supplier information, international standards and tender evaluation methodologies are examined in detail. Dispute resolution options and business ethics are discussed in an international context.

ACIV7325
System Dynamics of Project Organisation
Staff Contact: Mr K Linard
UC6 S1

"Systemic Failure" became a familiar summation for project disasters of the 20th century, from bridge collapses to hospital demolition. This course focuses on understanding the "systemic' in complex projects, to minimise risk of failure. This unit provides a foundation in general systems theory and then focuses on systems thinking competencies relevant to the project organisation, addressing methodologies and tools such as soft systems methodology, cognitive mapping, causal loop and influence diagrams and system archetypes. These methodologies provide insight into the capability maturity of project delivering organisations.

ACIV7315
Special Elective 1: Project Management

ACIV7316
Special Elective 2

ACIV7317
Special Elective 3

ACIV7318
Special Elective 4

ACIV7319
Special Elective 5
Staff Contact: A/Prof SR Yeomans
UC6 S1 and S2

These special electives are given by members of staff and 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.

ACIV7501
Project Report - Civil Engineering
Staff Contact: A/Prof SR Yeomans
UC12 S1 and S2

Research project on a topic of relevance to the program undertaken plus report in approved form.

Additional Group B courses that may be offered in this and other years:
Staff Contact: A/Prof SR Yeomans

ACIV7301
Applied Soil Mechanics

ACIV7303
Coastal and Ocean Engineering

ACIV7304
Coastal and Seabed Dynamics

ACIV7306
Finite Elements in Structural Analysis

ACIV7307
Foundation Engineering

ACIV7308
Prestressed Concrete

ACIV7312
Basic Finite Elements

ACIV7313
Reinforced Concrete

ACIV7314
Site Investigations

ACIV7320
Structural Dynamics

ACIV7321
Structural Engineering Materials 1: Concrete Technology

ACM7322
Structural Engineering Materials 2: Metals

ACIV7323
Transportation Planning

Computer Science

Group A Courses

ACSC7101
Introduction to Database Systems
Staff Contact: Mrs J. Backhouse
UC6 S1 and S2
(Also offered in Flexible mode in S1 and S2.)

This course provides a theoretical and practical introduction to modern relational database management systems. It covers data

analysis and modelling using entity-relationship techniques, relational theory and normalization, database query languages (SQL and QBE), database security and integrity, physical design principles, and it describes the elements of transaction management and concurrency control. An introduction to distributed databases concludes the course, time permitting.

ACSC7103
Introduction to Management Science
Staff Contact: Dr R. Sarker
UC6 S2
(Also offered in Distance mode in S1 and S2.)

This introductory course examines the quantitative techniques of management science. An introduction to the analytical method is presented together with discussion of the various models including linear programming, network analysis, queuing and inventory modelling, simulation and game theory. Examples will illustrate the application of the models.

ACSC7104
Introduction to Programming
Staff Contact: Mr C. Freeman
UC6 S1and S2
(Offered only in Distance mode)

A first course in computer programming using the Java 2 language. Exercises and assignments will introduce the student to the basics of program development methodology, program statements, Objects and primitive data types, Java Class structure and methods, graphical user interfaces, and Java on the World Wide Web. Basic program development will be within the Java Development Kit environment.

ACSC7105
Introduction to Simulation
Staff Contact: Prof C. Newton
UC6 S2

The aim of this course is to introduce students to the principles of simulation. These cover: concepts of modelling, continuous and discrete systems, time stepped and event stepped simulation of queue systems and inventory systems, exposure to simulation languages in particular SIMVIEW packages.

ACSC7106
Introduction to Telecommunications
Staff Contact: Mr C. Cooper
UC6 S1 and S2

The course introduces students to the principal components of telecommunications. These cover: telecommunication architectures and standards, concepts and issues in data and multimedia communications, network fundamentals, local and wide area networks, network management, applications of techniques and technology and future directions.

ACSC7108
Introduction to the Web
Staff Contact: Mrs J. Backhouse
UC6 S1

Web architecture, protocols and standards; web page construction, design issues, style sheets, use of multimedia, web scripting languges, web application/database interfaces, security, e-commerce issues.

ACSC7107
Systems Analysis and Design
Staff Contact: Dr C. Lokan
UC6 S1 and S2
(Offered only in Distance mode)
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.

Group B Courses

ACSC7301
Advanced Simulation and Wargaming
Staff Contact: Prof C. Newton
UC6 S1

The course addresses topics such as engagement models, terrain models, representation of human factors, simulation for training and distributed interactive simulation, manual and computer assisted wargames, evaluation wargames and virtual reality.

ACSC7302
Advanced Topics in Database Management
Staff Contact: Mr D. Hart
UC6 S2
Assumed knowledge: ACSC7101 Introduction to Database Systems or equivalent

This course 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 practice on an OODB to understand how these OO concepts can be used to best effect.

ACSC7303
C^3 I Systems – Design, Management and Operation
Staff Contact: Mr M. Ford
UC6 S1

This course 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.

ACSC7304
Computer Graphics
Staff Contact: Dr G. Freeman
UC6 S1

Interactive graphics of 2D and 3D scenes, rubber shape drawing, graphical input event handling, perspective and orthographic views, transformation of coordinate spaces, colour perception and specification, animation, double buffering, ray tracing, surface properties, scene rendering. X-windows, Java and Postscript. Rasterization algorithms. Programming to produce graphics.

ACSC7336
Computer Security
Staff Contact: Dr L. Brown
UC6 S2
(Also offered in Distance mode in S2)
Assumed knowledge: ACSC7106 Introduction to Telecommuncations or equivalent, ACSC7346 Systems Administration or equivalent

Overview of computer and communications security, risk assessment, security policies, identification and authentication, access controls, cryptographic techniques, security models,

security kernels, trusted computer systems, TCSEC, ITSEC, common criteria. Practical Unix and NT security, network security, network attacks and defences, firewall design and management. Database security. Legal and ethical issues.

ACSC7306
Computer Speech Processing
Staff Contact: Dr F. Clermont
UC6 S2

This course introduces theoretical and practical concepts of computer speech processing: speech digitisation; sampling theorem; fundamentals of digital signal processing; human speech production; fundamentals of acoustic phonetics; time-domain and frequency-domain speech analysis; linear-predictive coding; fundamentals of speech synthesis and speech/speaker recognition by computer.

ACSC7305
Cryptography
Staff Contact: Dr L. Brown
UC6 S2

Computer security overview, classical cryptography and cryptanalysis, modern private key block ciphers, modes of use, cryptanalysis, stream ciphers, number theory, public key encryption algorithms, digital signatures, hash functions, key management, key servers, certificates, X.509, certificate authorities, practical applications, quantum cryptography.

ACSC7337
Data Mining
Staff Contact: Mr H. Abbass
UC6 S2
Assumed knowledge: ACSC7104 Introduction to Programming or equivalent, ACSC7101 Introduction to Database Systems or equivalent

Introduction to information theory, statistical view of data mining, machine learning view of data mining, regression and linear models, feed-forward artificial neural networks (ANN), recurrent ANN, rule extraction from ANN, univariate decision trees, multivariate decision trees, clustering techniques, Association rules, Bayesian statistics, Bayesian ANN, Bayesian clustering, kernels, and support vector machines.

ACSC7307
Data Networks
Staff Contact: Dr W. Toomey
UC6 S2

This course 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.

ACSC7338
Data Structures and Algorithms
Staff Contact: Mr D. Essam
UC6 S2
Assumed knowledge: ACSC7104 Introduction to Programming or equivalent

Dynamic data structures: linked lists with application to stacks, queues, rings; binary heaps; binary and general trees. hash tables. Recursive algorithms. Programming tools: make files, version control. Searching and sorting. Algorithm complexity. File access mechanisms.

ACSC7308
Decision Analysis
Staff Contact: Prof C. Newton
UC6 S1

The aim of this course is to expose students to various methods of structuring and analysing decision making problems and demonstrate their use. The topics covered will include pay-off matrices, multifactor evaluation techniques, decision trees, AHP, influence diagrams, mindmaps and group decision making techniques.

ACSC7309
Decision Support Systems
Staff Contact: Mr D. Munro
UC6 S2

This course addresses the principles and practice of decision support systems (DSS). Areas addressed are the design, development and applications of DSS. Conceptual framework, cognitive styles, evaluating and using 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.

ACSC7350
Deterministic Operations Research
Staff Contact: Dr R. Sarker
UC6 S1

Overview of OR modelling approach; linear programming; network analysis; integer programming; multi-objective mathematical programming; dynamic programming; inventory models; nonlinear programming; large-scale optimisation systems; optimisation software.

ACSC7347
Directed Studies in Information Technology 1
Staff Contact: Dr C. Lokan
UC6 S1

This reading course allows a student to carry out independent study, supervised by a member of staff, in an area of information technology not offered in any other MSc(IT) course. Details for the reading course will be defined and approved individually for each student, and will include objectives, assessment, and an initial reading list.

ACSC7348
Directed Studies in Information Technology 2
Staff Contact: Dr C. Lokan
UC6 S2

This reading course allows a student to carry out independent study, supervised by a member of staff, in an area of information technology not offered in any other MSc(IT) course. Details for the reading course will be defined and approved individually for each student, and will include objectives, assessment, and an initial reading list.

ACSC7339
Electronic Business
Staff Contact: Mr G. Millar
UC6 S1
(Also offered in Distance mode in S1)

This course seeks to provide students with an overview of the technical and management issues associated with electronic business (EB). The different categories of EB applications are examined together with the technologies that underpin them. Technologies reviewed include: markup languages, web-programming languages, telecommunications, security, and electronic payment systems. Business-to-business (B2B), business-to-consumer (B2C), and business-to-employee (B2E) applications are discussed. Other topics covered include: strategic planning, privacy and legal issues.

ACSC7340
Information Operations
Staff Contact: Dr C. Lokan
UC6 S2

This course traces the development of the concept of Information Operations (IO) from its Gulf War origins through Command and Control Warfare and Information Warfare to its present day formulation as a broad range of activities, both military and non-military, and provides a theoretical basis for the course in the context of both Knowledge and Information Management. While many of the elements of IO have been around for as long as conflict has existed, modern Information Technology is at the heart of IO in the physical, information infrastructure and perceptual realms. One of the challenges of IO is to achieve synergies between these realms, particularly with so-called "cyberwar". Protection of the National Information Infrastructure is discussed. The course discusses theories of both Offensive and Defensive IO. Information Assurance, including Internet security issues, is discussed. Management of IO, including policy issues. Research issues. The application of IO in military operations.

ACSC7341
Information Systems Policy and Strategy
Staff Contact: Dr E. Lewis
UC6 S1
(Also offered in Distance mode in S1)

The top management, strategic perspective for aligning competitive strategy, core competencies, and information systems. The development and implementation of policies and plans to achieve organisational goals. Defining the systems that support the operational, administrative, and strategic needs of the organisation, its business units, and individual employees. Approaches to managing the information systems function in organisations, including examination of the dual challenges of effectively controlling the use of well-established information technologies, while experimenting with selected emerging technologies. Role of the CIO.

ACSC7342
Integrating the Enterprise and IS Functions
Staff Contact: Dr E. Lewis
UC6 S2

Information systems role in transforming organisations and industries. An integrated view of the organisation from an external and internal perspective. IS's internal role in integrating the enterprise through a cohesive set of business processes and functional applications to meet business needs. Enterprise resource planning and enterprise functionality. Collaborative systems. Consideration of external relations with suppliers, outsourcers, and customers. The tactical/operational responsibilities of the CIO. Governance considerations that link the IS-business organisations. Current/emerging issues in creating and coordinating the key activities necessary to manage the day-to-day operations of the IS function. Coordinating skills and organisational infrastructure.

ACSC7343
Integrating Information Systems Technologies
Staff Contact: Dr D. Munro
UC6 S1
(Also offered in Distance mode in S1)

Development of an integrated technical architecture (hardware, software, networks, and data) to serve organisational needs in a rapidly changing competitive and technological environment. Technologies for intra- and inter-organisational systems.

ACSC7316 IT Special Topic 1

ACSC7317 IT Special Topic 2

ACSC7318 IT Special Topic 3

ACSC7319 IT Special Topic 4

UC6 SS

Occasional topics of relevance in the area of Information Technology, given by visitors or external lecturers or members of staff.

ACSC7320
Knowledge Based Systems
Staff Contact: Dr R. McKay
UC6 S2

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.

ACSC7344
Languages of the Web
Staff Contact: Dr R. McKay
UC6 S2

The core current and future web standards: their history and motivation, potential evolution paths. Encoding information: generic markup languages, specific markup languages. Linking information: linkage mechanisms. Transforming information: transformation languages. Presenting information: presentation languages. Negotiating information: e-commerce standards. Finding information: metadata standards, search technologies, agent technologies. Theoretical and practical issues in the use and integration of web standards.

ACSC7321
Machine Learning
Staff Contact: Dr R. McKay
UC6 S1

This is an introductory course to machine learning. No prior knowledge about artificial intelligence is assumed. The course consists of the following components: an introduction to artificial 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 course.

ACSC7349
Military Operations Analysis
Staff Contact: Prof C. Newton
UC6 S2

This course will describe the operations analysis process, data collection, validation of models, sensitivity analysis, and the applicability of models. The areas of military and defence operations analysis such as search, detection and damage assessment, simulation and wargames, cost effectiveness and cost benefit analysis, linear and integer programming, heuristic optimisation, AHP and SMART technologies, combat models and threat assessment will be covered. The course will also address the validation of results from operations research tasks and the implementation difficulties. The present process of tasking OR agencies and the management of tasks will be outlined.

ACSC7322
Modelling of Combat and Conflict
Staff Contact: Prof C. Newton
UC6 S12

This course covers descriptive models of combat such as catastrophe theory and Lanchester equations, time dependent models of combat, chaotic behaviour, structural models of combat including fractal modelling and structural modes of combat.

ACSC7323
Modern Heuristic Techniques
Staff Contact: Mr H. Abbass
UC6 S1

This course covers a number of new heuristic techniques in operations research, especially in optimisation and scheduling. These new techniques have been proposed to deal with nonlinear and complex problems where traditional programming methods failed. The topics covered in this course include: the theory and applications of simulated annealing, fast and very fast simulated annealing, genetic algorithms, evolutionary programming, evolution

strategies, tabu search, Hopfield-type artificial neural networks and mean-field annealing.

ACSC7345
Object Oriented Analysis and Design
Staff Contact: Dr D. Hart
UC6 S2

This course addresses the object-oriented approach to information system development, particularly in reference to the earlier stages of analysis and design. It covers the principles and basic concepts of object orientation and the different aspects of OO modelling (e.g. static/functional/state) as represented by the Unified Modelling Language (UML) technique. Experience in using and designing with a typical UML-based CASE tool forms an important part of the course.

ACSC7324
Object Oriented Programming
Staff Contact: Dr C.Lokan
UC6 S1
(Also offered in Distance mode in S1)
Assumed knowledge: ACSC7104 Introduction to Programming or equivalent

This course emphasises the data abstraction and encapsulation techniques that 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 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.

ACSC7325
Operating Systems
Staff Contact: Dr W. Toomey
UC6 S1

This course 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.

ACSC7326 ORS Special Topic 1

ACSC7327 ORS Special Topic 2

ACSC7328 ORS Special Topic 3

ACSC7329 ORS Special Topic 4

UC6 SS

Occasional topics of relevance in the areas of Operations Research and/or Statistics, given by visitors or external lecturers or members of staff.

ACSC7330
Software Engineering and ADA
Staff Contact: Mr C. Cooper
UC6 S2
Assumed knowledge: ACSC7104 Introduction to Programming or equivalent

This course 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.

ACSC7331
Software Project Management
Staff Contact: Mr G. Millar
UC6 S2

This course presents 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.

ACSC7346
Systems Administration
Staff Contact: Dr W. Toomey
UC6 S1

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.

ACSC7332
Systems Planning
Staff Contact: Dr E. Lewis
UC6 S2

This course provides a detailed examination of the process for preparing proposals for computer support. Topics include planning processes, format of Business Cases and support proposals, methods for gathering required values and preparing measures, methods for option generation, especially systematic creativity, constructing Cost models, and the theory and practice for the evaluation of options. There is a special emphasis upon the techniques involved in risk removal.

ACSC7333
Telecommunications Management
Staff Contact: Mrs C. Enright
UC6 S2

This course reviews 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.

ACSC7334
User Interface Construction
Staff Contact: Dr G. Freeman
UC6 S1

Designing and implementing user-interfaces. Interfaces in web documents and in a client-server architecture. Criteria for judging interfaces. Information presentation techniques. Programming to respond to and control interfaces. Java, CGI, X-widgets, command languages.

ACSC7501
Project - Information Technology
Staff Contact: Dr C. Lokan
UC12 S1, S2

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.

Group C Courses

ACSC7603
Research Methods in Information Technology
Staff Contact: Dr F. Clermont
UC6 S1

This course aims to provide students undertaking research with an understanding of basic frameworks in research. The course 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.

ACSC7601
Case Studies in Information Technology
Staff Contact: Mr D. Munro
UC6 S2

This course offers perspectives on information technology through case studies. The case studies address issues that are covered more generally in other courses within the Information Technology degrees. The course is designed to raise awareness of generic questions at the level of particular cases, and to illustrate general principles through specific experience. There will be an emphasis on in-class participation and on real workplace situations.

ACSC7602
Professional Practices
Staff Contact: Dr E. Lewis
UC6 S2

Contract management, including client relationship management and performance measurement, from the viewpoint of purchaser and provider. Making presentations about politically-intense projects. Methods of costing professional services (value pricing, performance based specifications). Legal obligations of purchaser and provider. Ethical implications of professional activity. Development of professional standards. Students must work with mentors from adjunct professional services firms or major users of professional services on a commercial project for at least three months.

Economics and Management

Group A Courses

AECM7105
Introduction to Management
Staff contact Dr. Ian McEwin
6UC S1
(On campus and distance) HPW 3

This course offers a general introduction to the field of management appropriate to the needs of students who have not undertaken formal study in the area before. It comprises a survey of management theory and approaches to management practice, and a systematic treatment of the elements of management: planning, organisation, leadership and control.

AECM7107
Introduction to Defence Capability Management
Staff Contact: Mr Sid Knell
6UC S1(Taught prior to start of session) HPW 7 (equivalent)

This course examines the defence capability development process by way of preparing students for employment in the capability development or acquisition areas of Defence. The course focuses on the areas of defence management and finance in relation to major and minor capital equipment projects with emphasis on the concept and acquisition phases. It covers the main processes and organisations involved and provides an introduction to key issues including project and risk management, Australian industry and intellectual property. The emphasis of the course is on Army projects.

AECM7106
Economics for Managers
Staff contact: Mr. Twan Huybers (S1); S2 TBA
6UC S1 (Distance) and S2 HPW 3

The course is an introduction to economics with a special focus on managerial applications. Topics covered include the operation of markets generally and in the Australian context, business decision making, the role of government in the economic environment, the determinants of system-wide levels of economic activity and the drivers of change in major economic aggregates.

AECM7102
Introduction to Project Management
Staff Contact: Mrs E. Barber and Mr S. Knell
UC6 S1; S2(Distance)

This course 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.

Notes: 1) AMAT7101Introduction to Data Analysis replaces AECM7101 Introduction to Applied Statistics from 2001.
2) A range of Group A Special Electives may be available.

Group B Courses

AECM7321
Organisational Behaviour
Staff Contact: Dr. Gary Manger (On Campus); Dr James Warn (Distance)
Units of credit: 6UC S2(On Campus and Distance) 3hrs/wk

This course analyses the behaviour of individuals and groups within organisational structures and the interactions that occur between the individual, the group and the organisation. Students will analyse the relationships between patterns of human behaviour and management concepts and practices, and will develop the conceptual framework required to assess the effectiveness and efficiency of those practices. The course draws on the literatures and research findings of management and social and organisational psychology. Assessment will include a significant research-based component.

(Note: This Group B course replaces the Organisational Behaviour course taught until 2000 as part of Group A.)

AECM7310
Leadership in Organisations
Staff Contact: Dr I. Densten
UC6 S1

The various ways in which leadership has been understood in academic and practitioner media are identified and examined. The course 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 course 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.

AECM7313
Organisation Development and Change

Not offered 2001

AECM7304
Case Studies in Technology Management
Staff Contact: TBA
UC6 S2
Pre- or co-requisites: AECM7323 Technology and Innovation, or equivalent

This course 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 plan. The course is designed to raise awareness of generic questions at the level of particular cases and to illustrate general principles through specific management experience.

AECM7305
Finance and Investment Appraisal
Staff Contact: Dr. Ian McEwin
UC6 S2

The course 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.

AECM7308
Human Resource Management
Staff Contact: Dr H.B. Cheah (S1); A/Prof P.A. McGavin(S2)
UC6 S1(on campus); S2(Distance)

This course 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.

AECM7303
Case Studies in Australian Government Process

Note: Not offered in 2001

AECM7322
Logistics
Staff Contact: Dr S. Markowski
UC6 S1

In this course students examine the basic concepts and techniques of logistics management within the framework of an integrated logistics system. The course addresses topics in strategic logistics management, supply chain analysis, logistics engineering, choice of location, and transport management. Various civilian and military applications are considered.

(Note: this course replaces AECM7312 Logistics Management and AMEC7301 Engineering Logistics.)

AECM7318
Strategic Management
Staff Contact: A/Prof S. Markowski (On Campus); Dr G. Manger (Distance)
UC6 S1(on campus and distance); S2 (on campus) HPW 3

The objective of this course is to investigate the role of strategy in achieving organisational success in the commercial and public sector environments. It examines the nature of organisational objectives, capabilities and strategies and, in particular, the role of corporate and business strategies as determinants of superior performance and commercial success. The focus of the course is on the analysis of the components of superior performance, both those related to the organisation itself and those associated with its operating environment. The course integrates strategy analysis, formulation, implementation and evaluation into a holistic process of strategic management. It also examines aspects of organisational design as an element of strategic management. Throughout the course, there is an underlying focus on change management in pursuit of competitive advantage and shareholder value in the commercial environment and enhanced value for money in public sector activities.

AECM7323
Technology and Innovation
Staff Contact: Professor Peter Hall
6UC S1 HPW 3

This course offers perspectives on the nature of technology and the management of technological innovation as the basis for analysing the strategic role of technological investment in competition and the achievement of organisational goals. It examines the generation and diffusion of new scientific and technological knowledge, the incentives driving these processes and the uses to which new technology is put. Government technology policy is examined. Assessment includes a significant research-based component in the area.

(Note: This course replaces AECM7309 Technology Management:Innovation Theory and Economic Analysis and AECM7320 Technology Management:Strategy and Human Resource Aspects.)

AECM7311
Legal Process and Procedure
Staff Contact: Mr S. Fridman
UC6 S1(Distance) and S2 (on campus)

This course is designed to provide students with an introduction to the Australian legal system and the substantive areas of law affecting contractual relationships. The course 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 course provides a basis for examining contract negotiation, standard forms of agreement, the administration of contract variations, dispute resolutions, including commercial arbitration and alternatives.

AECM7314
Public Sector Human Resource Management
Staff Contact: Mr A. Thompson
UC6 S2
Pre- or co-requisite: AECM7308 or equivalent

The focus of this course is the examination of human resource management in the Australian public sector from the viewpoint of the middle manager. The analysis will consider both the theoretical framework of human resource management in the Australian Public Service and the realities of management as shown through observation. There will be an emphasis on in-class participation and on real workplace situations.

AECM7324
Strategic Procurement
Staff Contact: Mr Sid Knell
UC6 S2 HPW 3

This course offers a critical economic and managerial analysis of all aspects of the process of capability development and strategic procurement, with special reference to the public sector. It examines the translation of broad policy directions into the design specification and purchase of major systems; analyses the arguments for and against outsourcing and the principles of source selection; considers the rationale for the strategic use of different contracting arrangements; examines the economic and other implications for procurement of government-industry relationships and industry policy; and addresses the strategic role of R&D. It may be expected that defence procurement will

receive particular attention. Assessment includes a significant research-based component.

(Note: This course replaces AECM7319 Strategic Public Sector Procurement and Capability Development)

AECM 7501
Research Project — Management Studies
UC12 S1 and S2

An option of completing a research project of c.12,000 words spanning two sessions 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 plan 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 program; 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 (course authority) or the Program Coordinator.

AECM7315
Special Elective 1
UC6 SS

AECM7316
Special Elective 2
UC6 SS

AECM7317
Special Elective 3
UC6 SS

Note: A range of other Group B Special Electives may be available.

Courses in Defence Studies Program

Note: Within this program, the School of Economics and Management offers only the research project in 2001.

AECM7306
Global Changes in Economy and Society
UC6

AECM7301
Asia-Pacific Political Economy, Security and Defence Perspectives
UC6

AECM7502
Research Project– Economics and Management
UC12 S1 and S2

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 Course Authority, provided resources are available. The normal prerequisite will be a Distinction average over four courses. The project topic will be determined by special consultation with the program authority and the student. The total length should not exceed 12,000 words.

Electrical Engineering

Group A Courses

AELE7106
Introduction to Optoelectronic Systems
UC6 SS

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.

AELE7101
Analogue Communications
UC6 SS

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.

AELE7104
Digital Signal Processing
UC6 SS

Discrete time systems, Nyquist frequency and Shannonís 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.

AELE7103
Communications Systems
UC6 SS

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.

AELE7110
Television and Image Transmission Systems
UC6 SS

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.

AELE7102
Communications and Information Systems
UC6 SS

This course 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.

AELE7105
Fundamentals of Surveillance Technologies
UC6 SS

This course 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.

AELE7107
Occasional Elective 1
UC6 SS

AELE7108
Occasional Elective 2
UC6 SS

AELE7109
Occasional Elective 3
UC6 SS

The syllabuses for these electives change 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.

Group B Courses

AELE7304
Airborne Radar
UC6 SS

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.

AELE7309
Digital Video Communications
UC6 SS

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.

AELE7312
Kalman Filtering
UC6 SS

Review of probability, random variables and random signals. Linear systems course 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 factorisation algorithms. Application to global positioning systems.

AELE7314
Mobile Communications
UC6 SS

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, co-channel interference and design parameters; methods of capacity improvement, outage probability and handoff reduction; performance analysis.

AELE7305
Antennas
UC6 SS

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.

AELE7311
Introduction to Digital Image Processing
UC6 SS

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 the future of machine vision.

AELE7308
Digital Image Restoration
UC6 SS

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.

AELE7306
Digital Communications A
UC3 SS

AELE7307
Digital Communications B
UC3 SS

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, channel coding, error correction and error detection, linear block codes (Hamming, Golay, BCH and RS), convolutional encoding and Viterbi decoding, link analysis.

AELE7303
Advanced Digital Signal Processing Techniques
UC6 SS

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.

AELE7316
Robotics
UC6 SS

Classification of robots; dynamical models of a manipulator arm; flexible and rigid arms analysis; control of a manipulator arm; design of adaptive controllers; mobile robots; self-learning intelligent robots.

AELE7302
Advanced Data Networks
UC6 SS

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.

AELE7319
Spaceborne Imaging Technology
UC6 SS

Planckís 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.

AELE7313
Linear Systems
UC6 SS

State space models. The solution to state equations. The state transition matrix. Internal stability and Lyapunov stability. Controllability and observability. Realisability and minimal realisations. Input-output Stability. Controller and observer forms. Linear feedback. State observation and observers. Polynomial fraction descriptions. Applications of polynomial fraction descriptions.

AELE7318
Software Engineering
UC6 SS

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.

AELE7315
Neural Networks
UC6 SS

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 processing, image processing and machine vision, including associative memory, supervised and unsupervised classifiers and pattern recognition.

AELE7301
Adaptive Antenna Arrays
UC6 SS

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.

AELE7317
Satellite Communications
UC6 SS

Fundamentals of satellites, including; applications, orbits, propagation and link calculations, system hardware for space and ground segments, multiplexing and multiple access techniques, network design, and future trends. Fundamentals of signals and noise associated with satellite communications. Transmission concepts: calculate analogue transmission rates with respect to distortionless transmission, amplitude and delay distortions with equalisation, nonlinear distortion with companding, and carrier-to-noise ratio and signal-to-noise ratio; and calculate digital transmission rates with respect to line codes, intersymbol interference, pulse shaping and equalisation, bit energy-to-noise density and error probabilities.

AELE7310
Electrical Engineering Elective
UC6 SS

An occasional elective on an electrical engineering topic, selected according to the specific expertise and experience of visitors to the School of Electrical Engineering.

AELE7320
Special Elective 1

AELE7321
Special Elective 2

AELE7322
Special Elective 3

AELE7323
Special Elective 4
UC6 SS

Occasional electives given by members 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.

AELE7324
Systems Engineering Practice
UC6 SS

This course provides students with an overview of Systems Engineering theory including process, management, related disciplines and tools. A simulated design exercise allows students to apply knowledge of Systems Engineering processes and management to a real-life system development. Throughout the exercise, design reviews are conducted to evaluate progress and introduce realistic development issues.

AELE7501
Project Report – Electrical Engineering
UC12

Research project plus report in approved form.

Language, Literature and Communication

Group A Courses

AENG7107
Writing Practices
UC6

AENG7108
Writing Practices
UC8 (pre-2000)
Staff Contact: Ms Fiona Cotton
S1

This course is designed primarily for students from language backgrounds other than English but will benefit all students who would like to review and strengthen their writing skills. The course will enhance the writing skills of both humanities and non-humanities students, encouraging them to read critically and write clear, effective prose. With the emphasis on practical writing modules, it will be of direct benefit to students enrolled in courses college-wide. The course will increase knowledge and understanding of the English language in its everyday uses and in academic contexts.

AENG7105
Introduction to Writing: Prose and Poetry
UC6

AENG7106
Introduction to Writing: Prose and Poetry
UC8 (pre-2000)
Staff Contact: A/Prof S. Lever
S2

This course examines the formal aspects of writing in prose and poetry. The constraints, freedoms and implied audiences of the two forms will be examined. Students will undertake a series of exercises designed to develop their own skills as writers, and they will complete a portfolio of work for assessment.

AENG7101
Essential Issues in Classics, Politics and Popular Culture
UC6

AENG7102
Essential Issues in Classics, Politics and Popular Culture
UC8 (pre-2000)
Staff Contact: Dr C. Pratt
S1

This course deals with works outside traditional canons. Feminist, Aboriginal, postcolonial and genre writing are discussed in relation to recent critical theories.

AENG7103
Essential Issues in Recent Criticism and Theory: Classic Texts
UC6

AENG7104
Essential Issues in Recent Criticism and Theory
UC8 (pre-2000)
Staff Contact: Dr H. Neilson
S2

The classic texts are selected from the Old and New Testaments, Homer's *Odyssey* and Shakespeare to Wordsworth. They are discussed in the light of recent critical and theoretical perspectives.

Group B Courses

AENG7331
Twentieth Century Literary Theory: Orientalism, Globalisation and the Asia-Pacific
UC6

AENG7332
Twentieth Century Literary Theory: Orientalism, Globalisation and the Asia-Pacific
UC8 (pre-2000)
Staff Contact: Mr J. Doyle
S1

This course deals with the most influential literary and cultural theories of the last half century and their application to the literary and artistic and wider cultural products of the Australasian and Asia-Pacific regions. Theories, ideas and movements such as Structuralism and Post-Structuralism, through to Post-Modernity, and the developments of Deconstructionist, Feminist and Marxist approaches will be looked at both philosophically and as they pertain to textual analysis. The major focus of the course will be how such matters impinge on the development and analysis of Orientalism and Globalisation.

AENG7327
Texts and Textuality: The New Bibliography and the History of the Book
UC6

AENG7328
Texts and Textuality: The New Bibliography and the History of the Book
UC8 (pre-2000)
Staff Contact: A/Prof P. Eggert
S1

This course is an introduction to the specialised skills of literary scholarship: the use of literary archives, bibliographies, printing and the production of books, together with research in the manuscript collection at ADFA, activities which underpin wider questioning of some traditional concepts of authorship, authenticity, text versus 'work', biographical and sociological contexts and the production of literature and readerships.

AENG7303
American Fiction and Film
UC6

AENG7304
American Fiction and Film
UC8 (pre-2000)
Staff Contact: Dr H. Neilson
S2

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 on it, and then continue with an examination of a range of novels, novellas, and stories from the 19th and 20th centuries, together with a number of a films which complement those texts.

AENG7313
British Fiction and Film
UC6

AENG7314
British Fiction and Film
UC8 (pre-2000)
Staff Contact: Dr P. Looker
S2

This course examines British fiction and film from the last forty years with an emphasis on two areas: contemporary Britain from the perspective of immigrants and descendants of recent immigrants; and the use of the past to interpret the present. There will be an emphasis on London as a city which allows both historical consciousness and ethnic pluralism scope in the creation of identities.

AENG7305
Australia and the Asia-Pacific
UC6

AENG7306
Australia and the Asia-Pacific
UC8 (pre-2000)
Staff Contact: Prof B. Bennett and Mr J. Doyle
S1

This course explores literary, cultural and media links between Australia and countries of the Asia-Pacific. Focus on specific countries of the region will vary from year to year. A major theme in this course for 2001 will be literary and cinematic imaginings of 'home', 'homeland' and 'community'. Constructions of 'Asia' and 'Asian-ness' will be considered from Australian and other international perspectives. Theories of 'Orientalism' and 'Occidentalism' and issues of race, nationalism and gender will be examined as part of a broadening of cultural awareness of Australia's role in the Asia-Pacific.

AENG7301
Aboriginal Literatures and Themes—Unaipon to Recent Oral Testimony Material
UC6

AENG7302
Aboriginal Literatures and Themes—Unaipon to Recent Oral Testimony Material
UC8 (pre-2000)
Staff Contact: Dr D. Headon
S2

This course 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 last decade of debate receiving particular emphasis.

AENG7501
Research Project (English)
UC12

AENG7502
Sub-thesis (English)
UC16 (pre-2000)
Staff Contact: Dr D. Headon and Mr J. Doyle
S3

Students who choose to undertake a Project as part of their MA program must submit the chosen topic for approval by the Head of School. The Project is worth 12 units of credit. Students must be enrolled in the Project over at least two sessions.

Courses not being offered in 2001

AENG7315(UC6)/AENG7316 (UC8)
Contemporary Australian Writing

AENG7307 (UC6)/AENG7308 (UC8)
Australian Literary Movements and Controversies

AENG7319 (UC6)/AENG7320 (UC8)
One Hundred Years of Australian Women's Writing

AENG7311 (UC6)/AENG7312 (UC8)
Australian War Literature of the Twentieth Century

AENG7317 (UC6)/AENG7318(UC8)
Literary Modernism in Context: 1900–1920

AENG7325 (UC6)/AENG7326(UC8)
Special Study: Making Literary Histories

AENG7309 (UC6)/AENG7310 (UC8)
Australian Literature: The Canon and its Contexts

AENG7321(UC6)/AENG7322(UC8)
One Hundred Years of Women's Writing

AENG7323(UC6)/AENG7324(UC8)
Post-Colonial Literature

AENG7329(UC6)/AENG7330(UC8)
Travelling Abroad: Representing the Foreign

Geography and Oceanography

AGOC7301
Comparative Strategic Geography
UC6

AGOC7302
Comparative Strategic Geography
UC8 (pre-2000)

Note/s: Not offered in 2001

AGOC7303
Geographic Information Systems for Resource Assessment
UC6

AGOC7304
Geographic Information Systems for Resource Assessment
UC8 (pre-2000)
Staff Contact: Dr K. White

S2

A systems approach to the collection, capture, analysis, interpretation and integration of spatial and attribute data for resource assessment. Data types and sources. GIS design process; integration of remotely sensed image data including georectification; classification techniques; and spatial modelling techniques; hardware/software requirements; networking considerations; and map composition and production.

AGOC7305
Resource and Environmental Evaluation Using Remote Sensing
UC6

AGOC7306
Resource and Environmental Evaluation Using Remote Sensing
UC8 (pre-2000)
Staff Contact: Prof. R McLean
S1

This course is concerned with the evaluation of environmental conditions and natural resources through assessment and analysis techniques using remote sensing technologies; spatial concepts applied to natural resources and environmental management; the concept of environmental health; biophysical and ecological indicators of environmental health; survey design and analysis, including the application of remote sensing; resource and environmental evaluation principles.

AGOC7307
Strategic Geographical Issues in Australia's Neighbourhood
UC6

AGOC7308
Strategic Geographical Issues in Australia's Neighbourhood
UC8 (pre-2000)
Staff Contact: Dr G. Banks
S1

This course is concerned with the geographical context underlying contemporary strategic issues in the Australian neighbourhood. It begins by addressing the implications of such matters as the pattern of landforms, oceans and islands within Australia's strategic sphere and the dynamics and diversity of terrain form and land cover. The course then takes in a range of contemporary geographical issues including urbanisation, poverty and rural development in SE Asia, resource development and management, the current and potential impact of regional environmental issues. The course will include discussion of broad issues and specific case studies at a range of geographical scales and through a diversity of geographical approaches. Students will be encouraged to undertake project work which focusses on the strategic implications of resource, environmental, social or developmental issues in the Asia-Pacific.

AGOC7309
Environmental Issues in Northern Australia
Staff Contact: Dr C. Robinson
UC6 S2

The course examines some of the key environmental, strategic and social issues that are central to the conservation and sustainable use of Northern Australia and are relevant to Defence and other agencies. This includes a diverse population of people who co-exist in a landscape that is environmentally challenging and ecologically sensitive, is severely damaged from the invasion of exotic plants and animals, and continues to be challenged and changed by Aboriginal and European tenure and management regimes. A range of geographical approaches and survey techniques will be used to evaluate the unique constraints on and opportunities for environmental management activities. The course may include a field-based study in the Northern Territory and will provide students with a sound understanding of Australia's northern landscapes, including the significant role of the Defence Force and its impacts in this region.

History

Group A Courses

AHIS7101
Australia and its Pacific Basin in Historical Perspective
Staff Contact: Dr R. Thompson
UC6 S1
(available by Distance only)

The aim of the course is to provide an introduction to the twentieth century history of Australia's relations with countries in the Pacific Basin region. The emphasis will be on Australian foreign policy and other relationships with countries of the Pacific rim and the Pacific Islands. The time period covered is 1901 to 2000.

AHIS7105
The Great Power System in the 20th Century
Staff Contact: Ms Debbie Lackerstein
UC6 S1

This course will aim to provide an introduction to the modern state system in the 20th Century. It will discuss the factors that constitute power in a modern state and how this has changed over time. It will also discuss the 'rise and fall' of various great powers over the century, noting in particular implications of great power rivalry for smaller and medium size states

Group B Courses

AHIS7319
The Origins of the New World Disorder: Failed States, Ethnic conflict & The Nature of War
UC6 S2

AHIS7320
The Origins of the New World Disorder: Failed States, Ethnic conflict & The Nature of War
UC8 (pre-2000) S2
Staff Contact: *A/Prof Robin Prior*

This is an historically based course, which is aimed at helping students understand the background to a range of contemporary world conflicts. For example it will deal with colonial factors in Africa which have played a role in war in the Congo and Sierra Leone, the long term factors operating in Russia and the Soviet Union which have led to instability there, the origins and problems of the Yugoslavia Federation and so on. The case studies used in the course will vary from year to year.

AHIS7301
The ASEAN States, the South Pacific and Australia: Political and Defence Issues since 1945
UC6 S2

AHIS7302
The ASEAN States, the South Pacific and Australia: Political and Defence Issues since 1945
UC8 (pre-2000) S2
(also offered by Distance)
Staff Contact: Dr R. Thompson

This course will examine 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 2000.

AHIS7305
History of Australian Defence and Foreign Policy
UC6 S2

AHIS7306
History of Australian Defence and Foreign Policy
UC8 (pre-2000) S2
Staff Contact: Dr F. Cain

This course examines the history of defence and foreign policy in Australia over this century. It examines not only how defence and foreign policy is formed and carried out by political leaders, governments and the official departments, but also the responses to those policies by the Australian people. It analyses how such government policies are moulded or changed in response to electoral and popular demand. The course commences with the defence and foreign policy elements surrounding WW1 in Australia and thereafter examines issues relating to defence and foreign policy in the following decades including the breaking of ties with Britain, the US alliance and connections with Asia. Such issues will be examined against events in Australia relating to the economy, political change, industrial development and trading relationships.

AHIS7307
History of Pre-Nuclear Military Thought
UC6 S1

AHIS7308
History of Pre-Nuclear Military Thought
UC8 (pre-2000) S1
Staff Contact: Prof P. Dennis

The course surveys the development of military theory from the mid 18th to the mid 20th centuries, 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. The attraction of this course is that while at first glance it has no obvious relevance to contemporary defence preoccupations, least of all in Australia, a closer examination of pre-nuclear theorists shows that the questions with which they have grappled over the past two centuries have been remarkably constant, and that a study of those questions in their historical context can help to clarify and sharpen an assessment of contemporary issues.

AHIS7313
Modern Naval History and Strategy
UC6 S1

AHIS7314
Modern Naval History and Strategy
UC8 (pre-2000) S1
Staff Contact: Dr J. Reeve

This course reflects upon the roles of navies and sea power in the modern world. It will concentrate on a series of thematic issues while ranging historically from the 1890s to the present. The focus will be international, including Australia and the Asia-Pacific region. The emphasis will be on wider historical and on strategic rather than tactical questions. Topics will include how far classical arguments for sea power, such as those of Mahan and Corbett, remain valid in the light of twentieth century naval history and current developments, how far there are naturally navalist and non-navalist states, how far there are differing national naval strategic traditions, and how far navies have special capabilities. There will also be discussion of issues relating to naval command, sea power and grand strategy, contemporary circumstances and the future of sea power, and the nature of naval historical and strategic writing.

AHIS7317
The Mystique of Air Power
UC6 S1

AHIS7318
The Mystique of Air Power
UC8 (pre-2000) S1
(also offered as Distance)
Staff Contact: Dr A. Stephens

The rise of air power in World War I represented the twentieth century's first revolution in military affairs. Like most revolutions, air power's has been attended by some mystique, in this instance by the assertion that the air weapon alone would decide future

conflicts. Yet while few scholars dispute the contribution made to warfighting by such air roles as interdiction, close support, maritime strike and reconnaissance, the merit of others like strategic strike and control of the air continues to generate robust debate. This course will encourage students to compare air power's performance to its promise, starting with the First World War and working through to contemporary conflicts in Asia, the Middle East and central Europe. Attention will be paid to the classical theorists (Douhet, Trenchard and Mitchell) and selected strategists like Slessor, Boyd and Warden; while other study areas will include the relationship between ideas, capabilities and technology; the bombing of Germany and Japan (with special reference to the morality of those campaigns); and air power and "small" wars. And after less than a century of air power history, the course's final sessions will examine the future of traditional air forces, dominated by pilots and manned aircraft, in the light of the rapidly improving capabilities of uninhabited aerial vehicles and space-based air power systems.

AHIS7501
Research Project - History
UC12 S1,S2

In place of two Group B courses Masters students may apply to undertake a Research Project on a topic in the area of Defence Studies with the approval of the History Course Authority, provided always resources are available. The normal prerequisite will be a Distinction average over four courses (the average of those marks). The project topic will be determined by special consultation between the Course Authority and the student. The Research Project may be taken over one or two sessions. Student must enrol in both Part a and Part b over either one or two sessions. The total length should not exceed 12,000 words.

AHIS7502
Research Project - History
UC8 (pre-2000) S1 and S2

Masters students may apply to undertake a Research Project on a topic in the area of Defence Studies with the approval of the History Course Authority, provided always resources are available. The normal prerequisite will be a Distinction average over three courses. The project topic will be determined by special consultation between the Course Authority and the student. The total length should not exceed 12,000 words.

Mathematics and Statistics

Group A Courses

AMAT7101
Introduction to Data Analysis
Staff Contact: A/Prof E. Catchpole
UC6 S1(on campus, distance), S2 (distance only)

Summarising Data. Sampling. Making inferences about the population from the sample. The Central Limit Theorem. Confidence intervals and hypotheses testing, quality control. Single sample problems. Two sample problems and several sample problems. Correlation, simple linear regression, multiple regression. Extensive use of computing software for analysis.

AMAT7102
Introduction to Quantitative Methods and Reasoning
Staff Contact: Dr R. Weber
UC6 S2

The formulation of mathematical problems and modelling applications. Matrix models. Studying change using difference equations, the calculus limit and evolution equations in linear algebra. Introducing randomness: combinatorics, set theory and probabilistic models.

Group B Courses

AMAT7301
Advanced Statistics and Trials Analysis
Staff Contact: Dr W. Catchpole
UC6 S2

This course teaches the principles of good experimental design - maximizing precision, blocking, selecting sample size, sensitivity and efficiency. Emphasis throughout is on understanding concepts and analysing practical data using a modern statistical package. Topics include: randomised blocks, Latin squares, and factorial designs; analysis of variance and multiple comparisons; fixed and random effects models; repeated measures designs.

AMAT7302
Mathematical Modelling
Note: Not offered in 2001

AMAT7303
Reliability and Maintainability
Staff Contact: Dr M. Collins
UC6 S2

The objectives of this course are: to develop familiarity with the probabilistic and statistical techniques needed in survival analysis; to develop familiarity with the various mathematical models for survival; to develop skills in modelling reliability data using a modern statistical language, and the ability to rapidly transport these skills into any other high-level language; to learn to model the survival of complex systems containing many components; to study repairable and maintainable systems, and to perform cost-benefit analyses of competing management strategies; to appreciate the applicability of all of the above to military situations.

AMAT7304
Statistical Forecasting
Staff Contact: Dr W. Catchpole
UC6 S1

This course teaches techniques for forecasting in the short and long term, calculation of uncertainty limits on the forecasts, and testing how good a forecasting technique has been on past data. Techniques studied include time series decomposition, indices, exponential smoothing methods, regression methods and Box-Jenkins methodology. There is strong emphasis on the analysis of practical data using statistical packages. There will be an opportunity to practice the techniques on your own chosen set of data.

AMAT7305
Workforce Resource Planning
Note: Not offered in 2001

AMAT7306
Statistical Modelling
Staff Contact: Dr M. Collins
UC6 S2

This course is an introduction to the techniques used by professional statisticians to model non-standard data. The basic principles of maximum likelihood and generalised linear models are introduced and later applied to cross-classified data, binomial data, and survival data. Topics include: Maximum likelihood, Generalised linear models, Loglinear models, Logistics regression, Survival models and Case studies.

Politics

Group A Courses

APOL7101
Introduction to Australian Defence & Foreign Policy: Patterns, Process and Competing Paradigms
UC6 S2

APOL7102
Introduction to Australian Defence & Foreign Policy: Patterns, Process and Competing Paradigms
UC8 (pre-2000) S2
Staff Contact: Dr Graeme Cheeseman
(Also offered by Distance education)

This course seeks to familiarise students with how Australia's defence and foreign policies have changed in recent years and why, and some of the issues that have exercised the minds and intellects of our policy makers and those who advise them. It begins by looking at what shapes Australia's defence and foreign policies, how they are made, and how they have evolved since the end of the Second World War. The second part of the course focuses on the post-Cold War era and examines such issues and themes as engaging Asia, 'good international citizenship', regional security, 'middle power diplomacy', Australia and the environment and the United Nations and UN peacekeeping. Particular emphasis is given to the key differences in approach to these issues by the Hawke/Keating and Howard governments.

APOL7103
Security & Community in the Asia-Pacific Region
UC6 S1

APOL7104
Security & Community in the Asia-Pacific Region
UC8 (pre-2000) S1
Staff Contact: Dr John Walker

This course reviews the development of the idea of a 'Pacific community' through the emergence of such institutions as ASEAN, APEC and the ASEAN Regional Forum, against the backdrop of still divergent political forms and modernisation strategies, the existence of significant differences regarding security, and the trend towards 'globalisation'. Topics considered will include security and economic cooperation, regional confidence building, territorial disputes, environmental concerns and arms control issues.

Group B Courses

APOL7301
Armed Forces and Society
UC6 S2

APOL7302
Armed Forces and Society
UC8 (pre-2000) S2
Staff Contact: A/Prof Hugh Smith

This course deals with the complex and manifold relationships between armed forces and the society of which they are part. It makes use of concepts such as socialisation, the nature of professions, representativeness, convergence, and the institution/occupation hypothesis. The focus is on armed forces and society in Australia but examples from overseas are used extensively. Particular issues to be examined include: the nature of the military profession; military ethics; the education of officers; senior officer development; recruitment and retention; ethnic representation; women in the armed forces; questions of individual rights in the armed forces; the service family; armed forces and civilian bureaucracy; political-military relations; aid to the civil power; public attitudes and the media; and the impact of peacetime roles on the military ethos.

APOL7303
Australian Defence and Security After the Cold War
UC6 S1

APOL7304
Australian Defence and Security After the Cold War
UC8 (pre-2000) S1
Staff Contact: Dr Graeme Cheeseman
(Also offered by Distance education)

This course is concerned with examining how Australia is adjusting its defence and security thinking to the challenges and opportunities of the post-Cold War era. The first half examines the various changes occurring in Australia's international and regional environment and some of the debates taking place in the academic and policy communities about their implications for the role of military force(s) in global affairs. We then examine Australia's response to these developments. Are the prescriptions contained in the government's latest foreign and defence white papers appropriate to Australia's future needs? Does Australia need to alter its basic approach to security and defence, and if so, in what ways? How well is the Australian Defence Force preparing itself for the advent of 'new times'?

APOL7305
Australian Foreign Policy: Contemporary Issues
UC6 S2

APOL7306
Australian Foreign Policy: Contemporary Issues
UC8 (pre-2000) S2
Staff Contact: A/Prof Anthony Bergin
(Also offered by Distance education)

This course 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 and Australia's bilateral and multi-lateral relations.

APOL7307
Global Security
UC6 S2

APOL7308
Global Security
UC8 (pre-2000) S2
Staff Contact: Dr Paul Keal and Dr Graeme Cheeseman
(Also offered by Distance education)

This course considers the nature of security and security studies in the context of global politics. Attention is given to contending theoretical perspectives, the role of strategic culture in defining interests, globalisation, the changing nature of deadly conflict, the dilemmas of weak states, the growing desperation of the world's poor, and ethnic conflict. The course also takes a particular interest in non-military cross border threats such as environmental degradation and change, migration, drugs and other issues that influence how security is understood.

APOL7309
International Security Regimes
UC6

APOL7310
International Security Regimes
UC8 (pre-2000)

Not offered in 2001

APOL7311
Legal and Moral Problems of International Violence
UC6 S1

APOL7312
Legal and Moral Problems of International Violence
UC8 (pre-2000) S1
Staff Contact: A/Prof Hugh Smith and A/Prof William Maley

This course analyses some of the legal and moral problems raised by violence, actual and potential, among states. After considering the relationship between politics, law and morality, a number of major topics are examined: conscription and conscientious objection; the laws of armed conflict; the just war and self-defence; armed intervention short of war; international tribunals;

and the use of force by the United Nations. The legal and moral dimensions of international conflict are often overlooked or dismissed out of hand. Nonetheless, most states most of the time seek to justify their actions to others, especially actions involving violence. By the end of the course students should be aware of the principal legal and moral arguments surrounding the use of force among states and have a deeper understanding of important dimensions of international conflict.

APOL7313
Security Issues in Northeast Asia
UC6 S2

APOL7314
Security Issues in Northeast Asia
UC8 (pre-2000) S2
Staff Contact: Dr Aurelia George Mulgan

The purpose of this course is examine in depth the contemporary strategic dynamics of the Northeast Asian region. Central to the course will be an examination of the security strategies of the major powers in the region, focussing on the United States, Russia, China and Japan, and US bilateral relations with Japan and China. Attention is given to potential sources of conflict (China and Taiwan) and territorial disputes (Japan-Russia, Japan-China, Japan-South Korea, and the Spratlys). An assessment is made of North Korea as a 'rogue' state, current moves towards reunifying the Korean Peninsula and the emergence of a nascent regional security architecture.

APOL7315
Occasional Elective: Politics and Society in Indonesia
UC6

APOL7316
Occasional Elective: Politics and Society in Indonesia
UC8 (pre-2000)

Note: Not offered in 2001

APOL7317
Politics of the United Nations
UC6 S1

APOL7318
Politics of the United Nations
UC8 (pre-2000) S1
Staff Contact: A/Prof William Maley
(Also offered by Distance education)

This course 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.

APOL7319
Regionalisation, Globalisation and the Asia-Pacific
UC6

APOL7320
Regionalisation, Globalisation and the Asia-Pacific
UC8 (pre-2000)

Not offered in 2001

APOL7321
The Politics of China's Security
UC6 S1

APOL7322
The Politics of China's Security
UC8 (pre-2000) S1
Staff Contact: Dr Jian Zhang

This courses familiarises students with security issues in contemporary China. China's security concerns, especially in the (post-1978) modernization era, will be assessed. These include shifts in the regional balance, problems of internal order, and territorial disputes. Particular attention will be paid to the People's Liberation Army (PLA) as the most important actor in the making of security policy. The historical and political background of the PLA, its manifold roles in Chinese society, and its inseparable links with the political scene are placed in the context of an overview of modern Chinese political history. The domestic and international political role of the PLA will be pursued through case studies. Ongoing shifts in the military's ideological alignment and strategic doctrine will lead to consideration of current and potential power projection capabilities.

APOL7323
The Vietnam War 1954–75: American, Australian and Vietnamese Perspectives
UC6

APOL7324
The Vietnam War 1954–75: American, Australian and Vietnamese Perspectives
UC8 (pre-2000)
Not offered in 2001

APOL7325
East Timor: Intervention and Independence
UC6 S2

APOL7326
East Timor: Intervention and Independence
UC8 (pre-2000) S2
Staff Contact: Prof James Cotton

This course reviews the national, regional and international factors that have led to the creation of an independent East Timor. Topics considered include the background to the annexation of 1975, the role of the United Nations, the resistance to Indonesian rule, and the decision by some regional countries, including Australia, to recognise the incorporation of the territory into Indonesia. The 1999 ballot conducted by UNAMET, the intervention by INTERFET, and the reconstituting of the local political system under United Nations auspices will then be reviewed. Finally, the East Timor case will be examined in the light of the debates regarding intervention in and on the potential for independence of third world political systems.

APOL7501
Research Project - Politics
UC12 S1and S2

In place of two Group B courses Masters students may apply to undertake a Research Project on a topic in the area of Defence Studies with the approval of the Politics Course Authority, provided always resources are available. The normal prerequisite will be a Distinction average over four courses (the average of those marks). The project topic will be determined by special consultation between the Course Authority and the student. The Research Project may be taken over one or two sessions. The total length should not exceed 12,000 words.

APOL7502
Research Project - Politics
UC8 (pre-2000) S1 and S2

Masters students may apply to undertake a Research Project on a topic in the area of Defence Studies with the approval of the Politics Course Authority, provided always resources are available. The normal prerequisite will be a Distinction average over three courses. The project topic will be determined by special consultation between the Course Authority and the student. The total length should not exceed 12,000 words.

Interdisciplinary Studies

AINT7301*
Firepower and Protection (Military Technology Course)
UC6 S1

This course 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.

AINT7302*
Vehicles and Mobility (Military Technology Course)
UC6 S2

This course 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.

* Taught in 4-week blocks

Distance Education

The College offers the following programs by distance education:

The Defence Studies Program
9903 Master of Defence Studies
9901 Master of Defence Studies (pre 2000)
5913 Graduate Diploma in Defence Studies
5911 Graduate Diploma in Defence Studies (pre 2000)
7399 Graduate Certificate in Defence Studies

The Management Studies Program
8397 Master of Management
5822 Graduate Diploma in Management
7391 Graduate Certificate in Management

The Information Technology Program
Doctor of Information Technology
Master of Science in Information Technology
Graduate Diploma in Information Technology
Graduate Certificate in Information Technology

The Operations & Research Statistics Program
Master of Science in Operations Research & Statistics
Graduate Diploma in Operations Research & Statistics
Graduate Certificate in Operations Research & Statistics

The Engineering Science Program
Master of Engineering Science
Graduate Diploma in Engineering Science
Graduate Certificate in Engineering Science

Entry Requirements

For entry requirements, program structure and requirements, refer to the program entries in this Handbook.

Program Delivery Mode

Courses in these programs will be delivered to off-campus students with a mixture of media drawn from print-based; video/ telephone conferencing; e-mail; www electronic bulletin board discussion, and/or a weekend school.

Candidates will be required to establish a telecommunications link with the College.

The courses available in 2001 are listed below with the School offering the course indicated in brackets. Further details are available under the course entries section of this Handbook.

Defence Studies Program

No.	*Title*	*Session*
Group A Courses		
AHIS7101	Australia and its Pacific Basin in Historical Perspective (History)	S1
APOL7101	An Introduction to Australian Defence & Foreign Policy: Patterns, Process and Competing Paradigms (Politics)	S2
Group B Courses		
APOL7317	Politics of the United Nations (Politics)	S1
APOL7303	Australian Defence & Security after the Cold War (Politics)	S1
AHIS7317	The Mystique of Air Power (History)	S1
AHIS7301	The ASEAN States, the Southwest Pacific and Australia (History)	S2
APOL7307	Global Security (Politics)	S2
APOL7305	Australian Foreign Policy: Contemporary Issues (Politics)	S2

Graduate Management Program

No.	*Title*	*Session*
Group A Courses		
ACSC7103	Introduction to Management Science (Computer Science)	S1,S2
AECM7105	Introduction to Management (Economics & Management)	S1
AECM7106	Economics for Managers (Economics & Management)	S1
AMAT7101	Introduction to Data Analysis (Mathematics & Statistics)	S1,S2
AECM7102	Introduction to Project Management (Economics & Management)	S2
Group B Courses		
AECM7318	Strategic Management (Economics & Management)	S1
AECM7311	Legal Process and Procedure (Economics & Management)	S1
ACIV7305	Facility and Property Management (Civil Engineering)	S1
ACIV7309	Project Management Body of Knowledge (Civil Engineering)	S1
ACIV7310	Project Systems Modelling (Civil Engineering)	S2
ACIV7312	System Dynamics Modelling (Civil Engineering)	S2
AECM7321	Organisational Behaviour (Economics& Management)	S2
AECM7308	Human Resource Management (Economics & Management)	S2

Information Technology Program

No.	*Title*	*Session*
Group A Courses		
ACSC7101	Introduction to Database Systems (Computer Science)	S1,S2
ACSC7104	Introduction to Programming (Computer Science)	S1,S2
ACSC7107	Systems Analysis and Design (Computer Science)	S1,S2
Group B Courses		
ACSC7341	Information Systems Policy and Strategy (Computer Science)	S1
ASCS7324	Object Oriented Programming (Computer Science)	S1
ACSC7339	Electronic Business (Computer Science)	S1
ACSC7343	Integrating IS Technologies (Computer Science)	S1
ACSC7336	Computer Security (Computer Science)	S2
ACSC7332	Systems Planning (Computer Science)	S2

Operations & Research Statistics Program

No.	*Title*	*Session*
Group A Courses		
ACSC7103	Introduction to Management Science (Computer Science)	S1,S2
AMAT7101	Introduction to Data Analysis (Mathematics & Statistics)	S1

Engineering Science Program

No.	*Title*	*Session*
Group A Courses		

Students should contact the relevant School to determine availability of courses for distance delivery in 2001

Group B Courses		
ACIV7305	Facility and Property Management (Civil Engineering)	S1
ACIV7309	Project Management Body of Knowledge (Civil Engineering)	S1
ACIV7310	Project Systems Modelling (Civil Engineering)	S2
ACIV7312	System Dynamics Modelling (Civil Engineering)	S2
ACSC7332	Systems Planning (Computer Science)	S2

Students should contact the relevant School to determine availability of other courses for distance delivery in 2001.

Note: Students enrolling in pre-2000 programs must select the pre-2000 course codes description - refer to the course section of this Handbook.

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 Research 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. (See later entry in this section.)

(6) It shall be understood that the University has the right to retain 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 no 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 Research 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.

Following examination and before graduation, a final hard-bound copy of the thesis is to be provided for lodgement by Student Administration in the ADFA Library.

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 Research 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. (See later entry in this section.)

(6) It shall be understood that the University has the right to retain 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 Research 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.

Following examination and before graduation, a final hard-bound copy of the thesis is to be provided for lodgement by Student Administration in the ADFA Library.

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 Research 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 has the right to retain 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 Research 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.

Doctor of Information Technology

1. The degree of Doctor of Information Technology may be awarded by the Council on the recommendation of the Postgraduate Coursework Education Committee of 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 an appropriate degree of Bachelor with Honours or Master by formal coursework 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. In addition, a candidate shall have a minimum of three years of relevant professional experience.

(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 Registrar at least two calendar months 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 research 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 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 ie 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 a program 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 Registrar 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;

(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 as to 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 has the right to retain 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 no 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 Postgraduate Coursework Education 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.

The rules that appear in the remainder of this section of the handbook apply to new programs introduced in or after 2000. Candidates who choose to remain in the pre-1997 programs should refer to the 1999 handbook for rule information.

Master of Arts (MA)
Master of Defence Studies (MDefStud)
Master of Engineering Science (MEngSc)
Master of Management Studies (MMgtStud)
Master of Science in Information Technology (MSc)
Master of Science in Operations Research and Statistics (MSc)

1. The degree of Master of Arts at Pass Level, Master of Defence Studies, Master of Engineering Science, Master of Management Studies, Master of Science in Information Technology or Master of Science in Operations Research and Statistics may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Entry Requirements

2. A candidate for the degree:

(1) shall have been awarded a four year degree of Bachelor or Bachelor with Honours in the same or related discipline from The University of New South Wales or equivalent qualification; or

(2) shall have been awarded a Graduate Diploma in the same or related discipline from The University of New South Wales or equivalent qualification; or

(3) shall have been awarded a three year Bachelor degree at pass level from The University of New South Wales in the same or related discipline, or equivalent qualification, which includes a major in a related field of study together with at least three years relevant full-time work experience; or

(4) shall submit evidence of such academic and/or professional qualifications and/or significant work experience of a related nature as may be approved by the Postgraduate Coursework Education Committee of the University College (hereinafter referred to as the Committee).

Notes:

1. "equivalent qualification" means an equivalent qualification from a tertiary institution at a level acceptable to the Committee.
2. Entry to all Masters programs is subject to the recommendation of the relevant authority.

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 by the advertised date.

(2) A candidate for the degree shall undertake such courses and pass such assessment as prescribed.

(3) The program of study shall total a minimum of 48 units of credit.

(4) The progress of a candidate shall be reviewed at the end of each main session by the Committee under the Academic Standing scheme. Movement between levels of academic standing is based on progress, measured by cumulative number of failures. As a result of its review the Committee may change the academic standing of a student or cancel enrolment.

(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 eight sessions for a part-time candidate. In special cases a variation 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.

Graduate Diploma

1. A Graduate Diploma may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Entry Requirements

2. A candidate for the Diploma:

(1) shall have been awarded a Bachelor degree at pass level in the same or related discipline from The University of New South Wales or equivalent qualification; or

(2) shall have been awarded a Graduate Certificate in the same or related discipline from The University of New South Wales or equivalent qualification; or

(3) shall submit evidence of such academic and/or professional qualifications and/or significant work experience of a related nature as may be approved by the Postgraduate Coursework Education Committee of the University College (hereinafter referred to as the Committee).

Notes:

1. "equivalent qualification" means an equivalent qualification from a tertiary institution at a level acceptable to the Committee.
2. Entry to all Graduate Diploma programs is subject to the recommendation of the relevant authority.

3. An applicant who has obtained suitable units of credit in the equivalent Master's program of the University College but has not taken out the Master's degree may apply to be admitted to a Graduate Diploma program and to be granted credit for work completed in, or be deemed to have met the requirements of, the Master's program.

Enrolment and Progression

4. (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 by the advertised date.

(2) A candidate for the diploma shall be required to undertake such courses and pass such assessment as prescribed.

(3) The program of study shall total a minimum of 36 units of credit.

(4) The progress of a candidate shall be reviewed at the end of each main session by the Committee under the Academic Standing scheme. Movement between levels of academic standing is based on progress, measured by cumulative number of failures. As a result of its review the Committee may change the academic standing of a student or cancel enrolment.

(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 three sessions in the case of a part-time candidate. The maximum period of candidature shall be three academic sessions from the date of enrolment for a full-time

candidate and six sessions for a part-time candidate. In special cases a variation of these times may be granted by the Committee.

Fees

5. 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.

Entry Requirements

2. A candidate for the Certificate:
(1) shall have been awarded a Bachelor degree in any discipline from The University of New South Wales or equivalent qualification; or
(2) shall submit evidence of such academic and/or professional qualifications and/or significant work experience of a related nature as may be approved by the Postgraduate Coursework Education Committee of the University College (hereinafter referred to as the Committee).

Notes:
1. "equivalent qualification" means an equivalent qualification from a tertiary institution at a level acceptable to the Committee.
2. Entry to all Graduate Certificate programs is subject to the recommendation of the relevant authority.

3. An applicant who has obtained suitable units of credit in the equivalent Graduate Diploma program of the University College but has not taken out the Graduate Diploma degree may apply to be admitted to a Graduate Certificate program and to be granted credit for work completed in, or be deemed to have met the requirements of, the Graduate Diploma program.

Enrolment and Progression

4. (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 by the advertised date.
(2) A candidate for the Certificate shall be required to undertake such formal courses and pass such assessment as prescribed.
(3)The program of study shall total a minimum of 24 units of credit.
(4) The progress of a candidate shall be reviewed at the end of each main session by the Committee under the Academic Standing scheme. Movement between levels of academic standing is based on progress, measured by cumulative number of failures. As a result of its review the Committee may change the academic standing of a student or cancel enrolment.
(5) No candidate shall be awarded the Certificate until the lapse of one full-time or two part-time academic sessions from the date of enrolment. The maximum period of candidature shall be two full-time or four part-time academic sessions from the date of enrolment. In special cases a variation of these times may be granted by the Committee.

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) an abstract which 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 to the best of my knowledge 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 at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by colleagues, with whom I have worked at UNSW or elsewhere, during my candidature, is fully acknowledged.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.'

(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. The data sheet is to be glued to the inside front cover of the thesis. Candidates are encouraged to provide a further 3 copies of the data sheet loosely inserted in the thesis. This wll speed Library processing of the abstract for inclusion in Dissertation Abstracts International and other 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 12-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 ADFA Library before graduation. 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:

* ADFA candidates may submit the examination copies soft-bound securely by the heat-binding process with transparent covers.

(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 program 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 program 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 program 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	8557—8558
Master of Management Studies	8396

Note: This schedule may be varied from time to time as the University adds new programs, deletes old ones or amends the conditions of existing degrees.

Policy with respect to the Use of Higher Degree, 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, or on the web). 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 a full-time undergraduate student in the first year of the Bachelor of Arts program.

Board of Studies in Humanities and Social Sciences Prize

V $250

C The most distinguished performance by a full-time undergraduate student in the second year of the Bachelor of Arts program.

Board of Studies in Humanities and Social Sciences Prize

V $250

C The most distinguished performance by a full-time undergraduate student in the third year of the Bachelor of Arts program.

Board of Studies in Science Prize

V $250

C The most distinguished performance by a full-time undergraduate student in the first year of the Bachelor of Science program.

Board of Studies in Science Prize

V $250

C The most distinguished performance by a full-time undergraduate student in the second year of the Bachelor of Science program.

Board of Studies in Science Prize

V $250

C The most distinguished performance by a full-time undergraduate student in the third year of the Bachelor of Science program.

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) program.

Board of Studies in Engineering Prize

V $250

C The most distinguished performance by a full-time undergraduate student in the second year of the Bachelor of Engineering or Bachelor of Technology (Aeronautical) program.

Board of Studies in Engineering Prize

V $250

C The most distinguished performance by a full-time undergraduate student in the third year of the Bachelor of Engineering program.

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 program.

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 program.

Women in Engineering Award

V $100

C The maintenance of academic standards whilst contributing to the academic life at the College through the mentoring and fostering of excellence amongst other students by a female in the final year of a Bachelor of Engineering or Bachelor of Technology (Aeronautical) program.

Aerospace and Mechanical 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 in the teaching courses Transportation Engineering in Year 4.

The AISC Undergraduate Steel Design Award

V Books and software to the value of $200

C The best performance by a student who attains at least a distinction in the steel design component of the teaching courses ACIV3513 Structural Design A and ACIV4513 Structural Design C, and also attains at least a credit in ACIV3508 Structural Analysis A and ACIV3509 Structural Analysis B.

The Landinfo Prize for Geomatic Engineering

V $200

C The best performance in the teaching courses in Engineering Surveying in Year 2 and Year 3.

The Institute of Explosives Engineers Prize

V $150

C The best performance in the teaching course ACIV4514 Blast Design.

Computer Science

The Second Year Information Systems Prize (Price Waterhouse Coopers)

V $200

C The best performance by an officer cadet in second year Information Systems.

The Second Year Computer Science Prize (Australian Computer Society)

V $200

C The best performance by an officer cadet in second year Computer Science.

The Most Outstanding Computing Project Prize (Cisco Systems)

V $1000

C The most outstanding project submitted for ACSC3003 Computer Project.

The Highly Commended Computing Project Prize (Cisco Systems)

V $600

C The highly commended project submitted for ACSC3003 Computer Project.

The Commended Computing Project Prize (Cisco Systems)

V $400

C The commended project submitted for ACSC3003 Computer Project.

Electrical Engineering

The Boeing Australia Limited Award

V $170 and a plaque

C The best performance by an officer cadet in Level I Electrical Engineering.

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 $250, a certificate and two years' free membership of the Institution

C The best overall performance by a student in third year studies in Electrical Engineering.

Language, Literature and Communication

The E. R. Bryan Prize

V $80

C Distinguished performance by a first year officer cadet in Level I English.

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 $250 - 1st prize
$150 - 2nd Prize
$100 - 3rd Prize

C The best examples of creative writing by officer cadets.

Co-op Bookshop Prizes

$75 - 1st prize
$75 - 2nd prize
$75 - 3rd prize

C For excellence in Indonesian studies

History

The L. C. F. Turner Prize

V $500

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 Level I Oceanography.

Physics

The Sir Leslie Martin Prize

V $100

C Distinguished performance by a first year officer cadet in Level I Physics.

The Australian Institute of Physics Prize (ACT Branch)

V $150, one year's membership of the Institute and books to the value of $100

C Most distinguished performance in Level II Physics.

Statistics

The Statistical Society of Australia Prize

V $150

C The best performance by an officer cadet in second year Statistics.

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 Science in Information Technology 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.

Postgraduate Research Scholarships

Australian Postgraduate Award

('APA with stipend') $17,071 (2000 rate)

Available to Australian citizens or to permanent residents for full-time research study. Awarded on the basis of academic excellence and research potential. Applications close 30 October.

Overseas Postgraduate Research Scholarship

Available to overseas applicants. Covers the cost of tuition fees for full-time research study. Awarded on the basis of academic excellence and research potential. Applications close 30 September.

University College Postgraduate Research Scholarship $18,415

Available to Australian and New Zealand citizens, and to permanent residents for full-time research study. Awarded on the basis of academic excellence and research potential. Applications close 30 October.

Re-entry Research Scholarship for Women

$17,071 (2000 rate)

Applicants must be women who have been out of full-time paid professional employment for a period of time and who wish to take up or resume a full-time research or coursework program of postgraduate study. Priority will be given to applicants wishing to update their research skills or those who wish to gain further experience in order to return to employment in industry, business or education. Applications close 31 October.

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.

New Online Services For Students

The University of New South Wales has introduced a new student administration system called **NewSouth Student.**

Students have access to the System through the Web using **NewSouth Student *Online.*** They are able to look up their current enrolment, academic record and results, and maintain their address and contact details.

For the 2001 academic year students will be able to re-enrol via the Web using **NewSouth Student *Online.*** This means that, in most cases, they are able to enrol and add and drop classes without the need to fill in forms or attend the Student Enquiry Counter.

Access Requirements

NewSouth Student *Online* is accessible from the enrolled students web page at www.student.unsw.edu.au. Simply click on the **NewSouth Student *Online*** icon.

To use **NewSouth Student** you need:

- Your Student ID
- Octarine password

(Students who don't have, or don't remember their Octarine password should contact the information Technology Services Centre at ADFA.)

Email Services

The University now uses email as an official form of communication for staff and students. All ADFA students have their own email account. Students need to know how to use it and ensure that they check it regularly.

Enrolment

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 attend a Market Day soon after their arrival at the Academy. On this day advice about courses and programs is available from academic staff of all the University College schools. Subsequently, enrolment sessions are held before the academic year begins, at a place and time to be advised.

New postgraduate students will be required to attend enrolment sessions in mid February.

Change of Degree

New first year students enter the Academy on the understanding that they will take up the places allotted to them in particular programs of study. In exceptional circumstances a student may be permitted to enrol in a different program, provided there is a vacancy and provided he or she is appropriately qualified.

It may be possible for a student to transfer from one program 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 program or enrol as a second year student but with a restricted choice of program.

Students seeking to change degree should consult their Divisional Officer in the first instance. Changes of degree are not permitted after 31 March.

Attendance at Classes

Students are expected to be regular and punctual in attendance at all classes in the programs and courses 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 course may be exempted from attending some classes in that course.

If students attend less than eighty per cent of their possible classes they may be refused final assessment.

Examinations

End of session examinations in the University College are held in June—July and October—November.

A provisional timetable indicating the dates and times of examinations is issued well in advance of each examination period and will be inserted on the ADFA website. 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 also available on the ADFA website approximately two-three weeks before the examination period begins. 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 electronic devices of calculation and data retrieval will only be permitted in examinations when specifically prescribed by the examiner. In these circumstances students will be required to comply with the examiner's directions concerning the properties and use of the device.

Students are reminded that the use of calculators in examinations is governed by the rules for the conduct of the examination. Misuse of the calculator, or any other electronic device, may be considered as a form of academic misconduct. In particular, the use of the stored memory capability of programmable calculators in **closed book** examinations, except where expressly allowed by the examiner, is contrary to the conduct of such examinations. 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.

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 sit in the seat allocated to them by an examination supervisor.

5. 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.

6. Candidates shall not be admitted to an examination after thirty minutes from the time of commencement of the examination.

7. Candidates shall not be permitted to leave the examination room before the expiry of thirty minutes from the time the examination commences.

8. 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.

9. 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.

10. 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.

11. Smoking, eating and drinking are not permitted during the course of examinations.

12. 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.

Writing in Examinations

Candidates are permitted to take pens, pencils and erasers into the examination room, but are advised that all answers must be written in ink. Except where expressly required, pencils may only be used for drawing, sketching or graphical work.

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:

1. taking unauthorised materials into an examination;
2. submitting work for assessment knowing it to be the work of another person;
3. improperly obtaining prior knowledge of an examination paper and using that knowledge in the examination;
4. failing to acknowledge the source of material in an assignment;
5. impersonation in an examination;
6. permitting another student to copy answers in an examination;
7. plagiarism;
8. exchanging notes between students in an examination;
9. removing an examination paper from an examination room where it is specified that the paper is not to be retained by the student.

Acknowledgement of Sources

Students are expected to acknowledge the source of ideas and expressions used in submitted work. To provide adequate documentation is not only an indication of academic honesty but also a courtesy enabling the marker to consult sources with ease. Failure to do so may constitute plagiarism, which is subject to a charge of academic misconduct.

Examination Results

To obtain examination results students need to access the enrolled students web page at **www.student.unsw.edu.au**

Passes in courses 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 course 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 course 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 publication of results, 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 course 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 course. 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 course 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 course, 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 course.

When submitting a request for special consideration a student should provide a medical certificate or other appropriate evidence to support it.

Further Assessment

In special circumstances, such as medical or compassionate grounds, a student may be granted further assessment in a course.

Further assessment may be given by a course authority at his or her discretion at any time before the meeting of the relevant assessment committee. Further assessment in a course may also be awarded to a student by the Assessment Committee. In such cases the students will be notified to contact the course authorities concerned, and they should do so at the earliest opportunity.

Students awarded further assessment by the Assessment Committee for courses 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.

Provision of Information on Student Assessment

The University is committed to a policy of openness regarding exchange of information in matters involving the assessment of students. To this end:

(a) Course authorities are responsible for ensuring that there is provided for each course a clear written statement of expectations which should include a statement of objectives of the course; its assessment plan, including weights allocated to each significant assessable component and related submission dates; the kind of evidence required for consideration to be given to late submissions; attendance, timetable and other requirements; to be presented at the first class of each session/term, recognising always the ability to negotiate changes with the students concerned within the first week.

(b) All items of assessment completed during session should be marked promptly and returned to students with a mark or grade and, where appropriate, comments. Course authorities where appropriate should provide information on the distribution of results in all items of assessment so that students can gauge their own performance against that of the other members of the class.

(c) Final composite marks in courses as determined by the faculty/board of studies Assessment Committees should continue to be provided to students on result notifications.

(d) Final examination scripts (other than those returned to students) are to be retained in the School for six months. Students should have access to their own scripts and be able to consult the examiner or the course authority on their performance. Faculties and boards of studies may determine the conditions under which access may be granted.

(e) Where examination question papers or other forms of assessment need to be kept confidential (e.g. multiple choice question papers where questions are re-used in later examinations) arrangement should be made for students to receive advice on their own performance with reference to their own examination script but in a way which does not prejudice the examination mode.

(f) In the case of the examination of theses and project reports, the examiners' reports should be released to the student, following determination of the student's results. The names of examiners, while remaining undisclosed prior to assessment, should be released subsequently unless a particular examiner requests that this information be not released.

Academic Standing Processes

Overview

In October 1999, the Academic Board adopted a new system to replace Show Cause. Academic Standing, consisting of good standing and several other levels, will be assigned to students at the end of each main session. Movement between levels is based on progress, measured by proportion of load passed (undergraduate), or cumulative number of failures (postgraduate). Research and non-award students do not participate in the Academic Standing scheme. The Program Authority assigns an adviser to each student not in good standing. Continued poor progress can lead to suspension (one year) or exclusion (two years, no auto-readmission).

Academic Standing Rules for Undergraduate Students

Levels

Academic standing levels for undergraduate students are

Good: the student's current progress is deemed satisfactory. Undefined standing (as when a student is first admitted) is also assumed to be good standing.

Referral: it is *recommended* that the student consult their assigned adviser.

Probation 1, **Probation 2**: the student *must* consult their assigned adviser, who approves the next semester's enrolment.

Suspension: the student is not permitted to enrol for one year.

Probation 3: an additional probation level that applies after return from suspension.

Exclusion: the student is not permitted to enrol for two years, and must reapply for admission after that period.

Unsatisfactory Progress

Students are assigned a level of standing based on their previous standing and their progress in the current (main) semester. Progress is either satisfactory, unsatisfactory, nil, or undefined.

Satisfactory: the student has attempted more than 6 units of credit and passed at least 50% of the attempted load.

Nil: the student has attempted more than 6 units of credit and failed all courses.

Unsatisfactory: the student has attempted more than 6 units of credit and failed more than 50% of the attempted load (but not all attempted courses); or has attempted up to 6 units of credit and has failed all courses.

Table 1 **Progress Rules**

No of Units Attempted	*Number of Units Passed*	*Progress*
0		Indeterminate
6 units or fewer	Some	Indeterminate
6 units or fewer	None	Poor
More than 6	At least half	Good
More than 6	Some, but less than half	Poor
More than 6	None	Nil

If insufficient load is attempted, the student retains the previous semester's standing.

Standing for students with unresolved results cannot always be determined.

Depending on the session's performance a student may move down or up the levels of academic standing.

Transitions

During the first phase (prior standing is Good, Referral, Probation 1 or Probation 2), if progress in the current semester is *satisfactory*, standing is set to Good. If progress is *unsatisfactory*, standing is set one step beyond the previous level, and if it is *nil*, two steps are applied. Suspension is the last point in this phase.

After return from suspension, (Phase 2) satisfactory progress returns the student to Probation 1, unsatisfactory progress moves the student to the final probation level (Probation 3), and nil progress leads to exclusion.

Levels are shown in the following table:

Table 2 Levels of Academic Standing

Phase	*Academic Standing*	*Implications for student*
1	Good Standing	None
	Referral	Recommended to consult assigned adviser
	Probation 1	Enrolment must be approved by adviser
	Probation 2	As for Probation 1; last chance to avoid suspension
	Suspension	Not permitted to enrol for 2 sessions

Phase	*Academic Standing*	*Implications for student*
2	Probation 3	As for Probation 1 or 2; last chance to avoid exclusion
	Exclusion	Excluded from the University for two years

Academic Standing Rules for Postgraduate Students

Levels

Academic standing levels for coursework postgraduate students are

Good: the student's current progress is deemed satisfactory. Undefined standing (as when a student is first admitted) is also assumed to be good standing.

Probation: the student must consult their assigned adviser, who approves the next semester's enrolment.

Exclusion: the student is not permitted to enrol for two years, and must reapply for admission after that period.

Setting Standing Level by Rule

Students are assigned a level of standing based only on the number of units of credit failed throughout the program.

No failures: **Good**.

Up to 16uc failed, or 18uc for programs of at least 72uc in length: **Probation**.

More than 16uc failed (18uc for longer programs): **Exclusion**.

Managing Student Progress - Re-Enrolment Appeal Procedures

In June 2000, the University's Academic Board adopted the following rules governing appeals against suspension or exclusion:

1. Students who are suspended or excluded from a program have the right of appeal. An Undergraduate Re-enrolment Appeal Committee and a Postgraduate Re-Enrolment Appeal Committee of the Academic Board will be constituted for the purpose of hearing such appeals.
2. Each Committee will have a membership of five members of academic staff (with a quorum of three) and will be chaired by a member of the Academic Board nominated by thPresident. The remaining members of the Committee need not bemembers of the Academic Board but will be nominated by the President taking into account their relevant experience and expertise. Members will not currently be involved in managing student progress and will disqualify themselves if they have previously been involved in the case of a particular student.
3. The decision of the Committee shall be final.
4. The notification to students that they have been suspended or excluded shall indicate that they may appeal that decision to the relevant Re-Enrolment Appeal Committee. The appeal must be lodged with the Registrar within fourteen days of the date of notification; in special circumstances a late appeal may be accepted at the discretion of the chairperson of the Appeal Committee.
5. In lodging such an appeal with the Registrar, students should provide a complete statement of all grounds on which the appeal is based.
6. The Appeal Committee shall determine appeals after consideration of each appellant's academic record and stated grounds of appeal. Students may elect to appear before the Committee and/or be represented.

Student Records

Academic records of students in the University College are kept on NewSouth Student *Online*. Students may view their full academic record as an Academic Statement, which can be verified by Student Administration for unofficial purposes. Official Academic Transcripts are issued to all graduates following the conferral of their degree. Additional transcripts may be requested at any time, but a charge is imposed

Change of Address

Students must ensure that their address on NewSouth Student *Online* remains current. All communications from the University will be addressed to students at their Session address at the University College. Graduating students must update their home address before leaving the Academy.

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 programs and related matters are welcome to call on a member of the Student Administration staff.

Procedures for the Resolution of Student Grievances and Disputes

The University of New South Wales recognises that all decisions which affect a student's standing or progress in a program or course must be made fairly and must be based on appropriate academic criteria.

Guidelines

The University is committed to providing a harmonious work and study environment, and will seriously listen to complaints and resolve them quickly if possible. The resolution procedures ensure that students are able to air legitimate complaints knowing that ad hoc, vindictive or arbitrary action will not be taken against them or the staff complained about. By providing a clear set of procedures, it is hoped that grievances can be dealt with satisfactorily and expeditiously, and will prevent a minor grievance from becoming a major problem.

These procedures apply to all enrolled students and to any decisions which may affect a student's standing in a course or program. Many of these decisions concern assessment, but they may relate to other matters which could adversely affect a student's standing such as the granting of advanced standing, discontinuation, supervision arrangements, access to facilities, the award of scholarships and prizes, and decisions regarding fees. Research students may have a grievance concerning a thesis topic, access to facilities or supervision.

As there are many different decision-making processes in the University potentially affecting academic standing, not all of them can be covered specifically in one set of procedures. It is however the University's intention that a student's right to resolution of a grievance or dispute is not limited by this statement of procedures. Existing appeal procedures established for the re-enrolment rules for undergraduate students or for decisions on allegations of academic misconduct are not affected by these procedures. Information on these procedures is available earlier in the *Handbook,* or from Student Administration.

A student is required to make his/her grievance known within a reasonable time frame, normally within a month of the decision being communicated.

The University expects that student grievances and claims of unfair treatment should in most instances be able to be resolved through informal discussion and consultation without recourse to formal appeal. However, where resolution is not possible, the University is committed to listen seriously to complaints and resolve them quickly, if possible, by the following procedures.

Grievance Procedure

Step 1

The student should attempt to resolve the grievance with the staff member(s) concerned within a reasonable time frame.

Step 2

If the grievance is still unresolved, it should be directed to the Head of School (or other responsible officer nominated by the Faculty) who will attempt to resolve the grievance informally. Reasons should be provided by the Head of School (or nominated officer) for any recommendation or decision in respect of the matter.

Step 3

If the matter is not satisfactorily resolved at this stage, the student should refer the grievance to the Registrar.

Step 4

Except when insufficient or unfounded reasons have been given by the student to support the complaint, the Registrar will take the complaint in writing, inform the respondent officially, commence an investigation, including reference to the Rector or Presiding Member of the University College Academic Board, and give an answer (including reasons) normally within 7 days.

Step 5

If the student is still dissatisfied, an appeal may be lodged in writing with the Presiding Member of the Postgraduate or Undergraduate Studies Committee within 14 days of receiving the Registrar's notification. The Presiding Member may decline to take action in cases where insufficient or unfounded reasons have been given by the student and shall inform the student accordingly.

If the matter has not already been considered by the Postgraduate or Undergraduate Studies Committee, this appeal will be heard by an Appeal Sub-Committee, empanelled for the purpose by the Presiding Member of the appropriate Studies Committee. The presiding member will appoint as Chair of the Appeal Sub-Committee a member of the corresponding Studies Committee.

If the matter has already been considered by the Postgraduate or Undergraduate Studies Committee, this appeal will be heard by an Appeal Sub-Committee of the Academic Board, empanelled for the purpose by the President of the Board. The President will appoint as Chair of the Appeal Sub-Committee a member of the Academic Board.

The Appeal Sub-Committee will consist of at least three members, one of whom will be a student. The student member will be drawn from the Academic Board or from the current list of student members of faculties and boards of studies.

No member of the Appeal Sub-Committee will have been associated with either the original decision or any earlier step in the appeal process.

Within two months the Appeal Sub-Committee will make a decision on the matter. Decisions made by the Appeal Sub-Committee will be reported annually to the Academic Board. There will be no further right of appeal.

Each stage is to be handled expeditiously.

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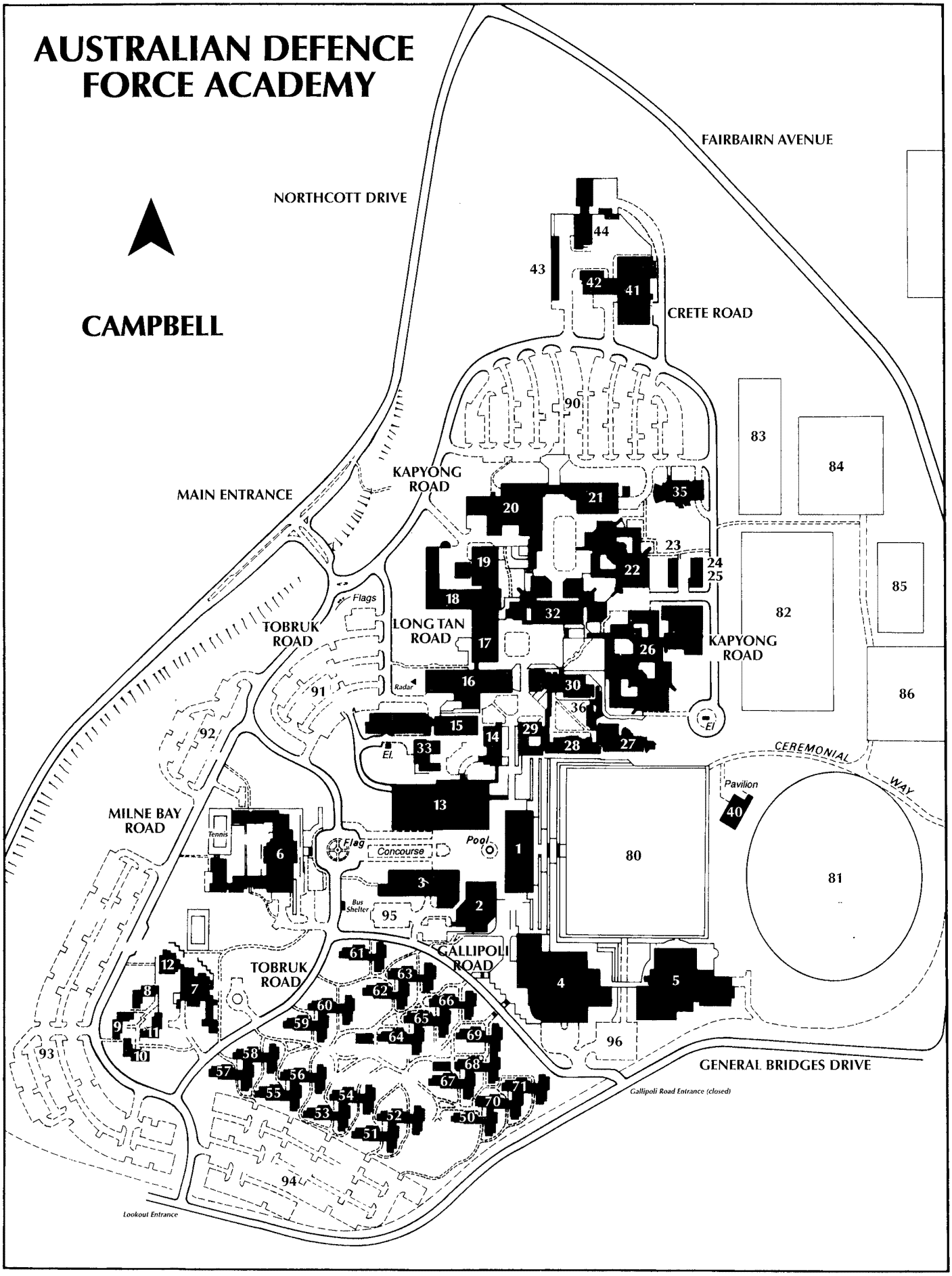
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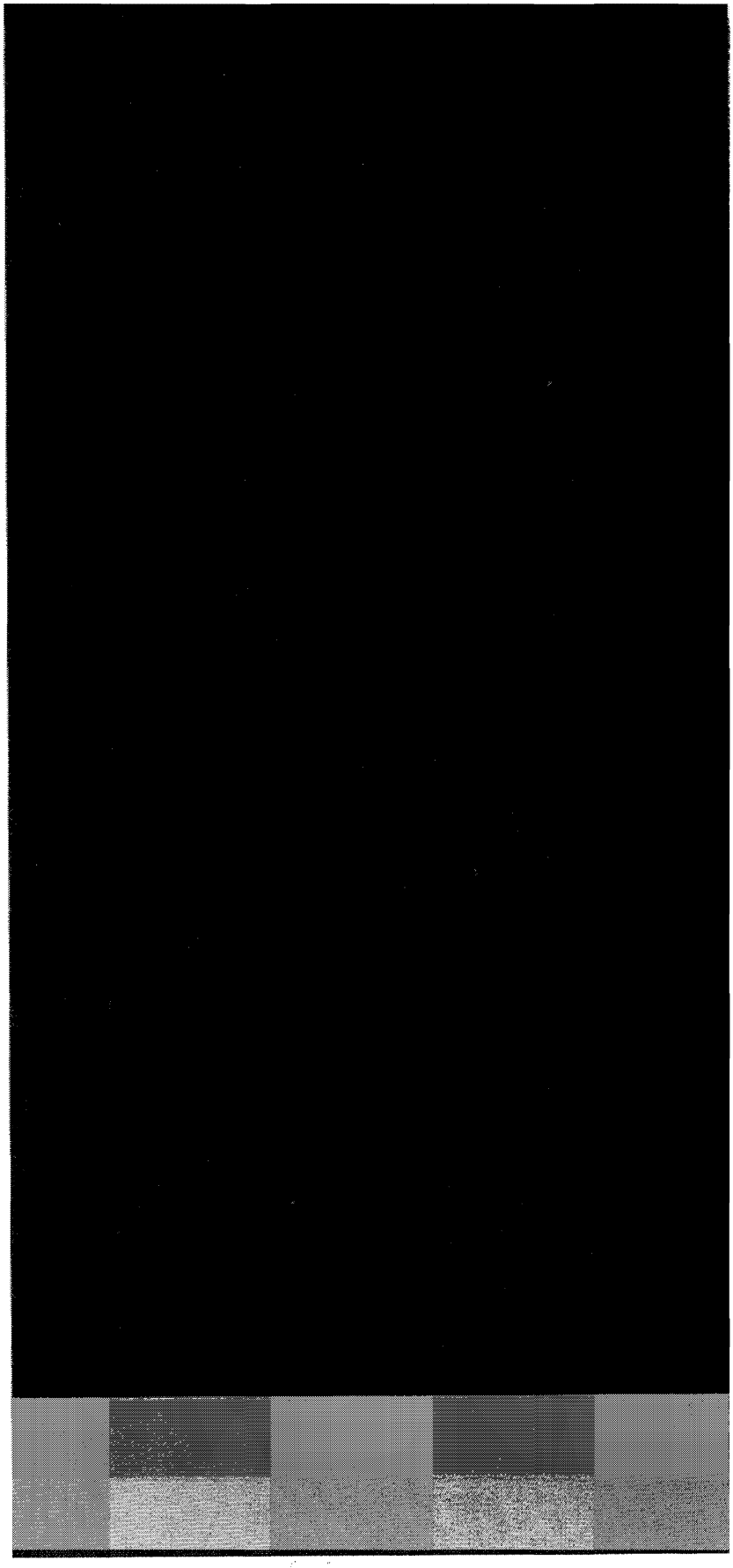

UNSW

This Handbooks 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:
Arts and Social Sciences
Built Environment
College of Fine Arts
Commerce and Economics
Engineering
Law
Medicine
Science
Australian Graduate School of Management (AGSM)
Australian Taxation Studies Program (ATAX)
University College, Australian Defence Force Academy(ADFA)
General Education.

For further information about the University – its organisation; 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.