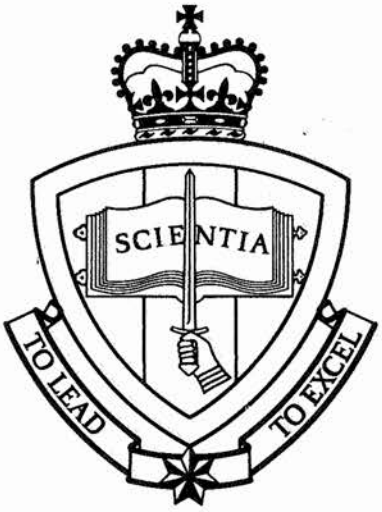

Australian Defence Force Academy

1993 Handbook

University College

The University of New South Wales

The address of the Australian Defence Force Academy is:

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

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

Correspondence on academic matters should be addressed to the College Secretary, University College.

ubjects, courses and any arrangements for courses including staff allocated, as stated in the alendar or any Handbook or any other publication, announcement or advice of the University, e an expression of intent only and are not to be taken as a firm offer or undertaking. The niversity reserves the right to discontinue or vary such subjects, courses, arrangements or staff locations at any time without notice.

formation in this Handbook has been brought up to date as at 1 September 1992 but may be nended without notice by the University Council.

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Chapter

1. Preface

The Australian Defence Force Academy

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

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

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

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

Establishment of the Academy

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

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

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

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

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

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

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

The Australian Defence Force Academy opened in January, 1986.

ıe University of ɜw South Wales

The University of New South Wales is in Sydney. It is one of the largest of the Australian universities, having a student population of more than 27,000 and full-time staff of some 4200, of whom more than 1500 are teaching and research staff.

On the Kensington campus there are ten faculties: applied science, architecture, arts, biological and behavioural sciences, commerce and economics, engineering, law, medicine, professional studies and science. There are also Boards of Studies in General Education and Science and Mathematics. A wide range of first degrees, higher degrees and graduate diplomas is offered, and there are appropriate research facilities in all the faculties. The University also operates the Australian Graduate School of Management.

In 1990, as a result of amalgamations, the University established the College of Fine Arts with campuses at Paddington and Surry Hills in Sydney, and the St George Campus at Oatley, which is integrated into the Faculty of Professional Studies.

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

The Act of Incorporation gave the University Council power to establish colleges and departments. 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.

2. Agreement between the Commonwealth and the University

Agreement between the Commonwealth of Australia and the University of New South Wales to establish a Universit 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 Forc 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 milita training of officer cadets successfully developed under arrangements at the Royal Australian Naval College, at the Facul 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 Acaden 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 ar by section 18 of that Act the Council of the University is empowered, if it deems fit and the Minister for Education of the Sta 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 with 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 a 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 tl College other than academic staff;

"the Academy" means the Australian Defence Force Academy to be established by the Commonwealth in accordance wi 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 tl 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 tc 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.

greement

(1) A reference in this agreement to the Minister for Defence shall include any other Minister of State of the Commonwealth ıo 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 rmits, include a person who is for the time being carrying out the duties of that office.

PART 2—OPERATION OF AGREEMENT

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

The entering into of this agreement shall not, except as is expressly provided herein or may be consequential upon the oper-ɔn of the provisions hereof, affect the continuance in operation until the date on which the Academy commences to function in ɔordance 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.

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

PART 3—ESTABLISHMENT OF THE ACADEMY

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

The Commonwealth and the University acknowledge and accept for the purposes of this agreement that the essential aims he 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, offer cadets a balanced and liberal university education in a military environment.

PART 4—THE MILITARY COMPONENT

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.

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

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

PART 5—THE UNIVERSITY COLLEGE

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

The College shall be known as University College.

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 tha changes in the range of disciplines and fields offered may be made by agreement between the University and th Minister for Defence; and

(b) to foster and make provision for the undertaking of higher studies and the carrying out of research, including work whic 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 managemer and supervision of the financial and administrative activities of the College. The Rector will have such other powers duties an 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 applie 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 Academ 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 Chair 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 th military component of the Academy nor a member of the Academy Council, elected by the graduates of the Universi 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 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 milita 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 f 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 de ignate an officer of the Department to be his substitute for the purposes of a particular meeting or meetings, or for the purpos 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 th Academy Council designate a member of the Defence Force to be his substitute for the purposes of a particular meeting or mee ings, 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 th University to be his substitute for the purposes of a particular meeting, or for the purposes of all meetings, of the Academy Coun that he is unable to attend.

greement

(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 which a person is his substitute in pursuance of such a notice, the substitute may attend the meeting in his place and, for the rpose 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 ch term stipulated in the By-laws of the University as the Registrar of the University determines are appropriate.

(1) The term of office of persons appointed to be members of the Academy Council shall be for such period not exceeding ee 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 riod of their appointment.

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

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.

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

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

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

0 Questions arising at a meeting of the Academy Council shall be determined by a majority of the votes of the members pre- nt and voting.

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

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

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

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

PART 7—ADMINISTRATIVE ARRANGEMENTS AND STAFF

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

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

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

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

(1) All appointments to the academic staff of the University at the College other than those provided for by clause 7.6 shall nade by the University in accordance with and subject to the provisions of the University of New South Wales Act, 1968 and n 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 nade by the University in accordance with and subject to the provisions of the University of New South Wales Act, 1968 and n terms and conditions adopted by the University.

The provisions of the Schedule to the agreement shall apply and shall be carried out and observed by the University with ject 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 appropriat 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, th 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 enab 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 amoun 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 th Academy in accordance with this Agreement including any claim or proceeding for negligence of the University or i staff, and

(b) meeting the cost of the University of any liabilities or expenses that the University may incur in connection with the pe formance by it of this agreement, including any liability that may continue in the event of and notwithstanding the term nation 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 th 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 co sultations between officers of the Department and the University and shall themselves undertake consultations when they co sider 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 Minist and the Vice-Chancellor and such other persons as they shall agree to co-opt shall for the purpose of facilitating the establis ment 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 pr visions of the University of New South Wales Act 1968 and of the regulations and by-laws made thereunder as are in force with 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 thr Service Colleges. The full text of the Schedule may be obtained on request from the Secretary 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. KILLE

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. MYEF
Vice-Chancellor and Principal

.....I. R. W
Registrar

3. The Academy Council

Membership of the Academy Council

Chair

The Hon Sir Edward Woodward, OBE, QC

Members

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

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

Air Vice Marshal R. J. Bomball, AO, AFC
Commandant, Australian Defence Force Academy

Midshipman J. G. Brewer
Member elected by the undergraduate students of the University College

Professor P. Dibb, AM
Member appointed by the Minister for Defence

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

Air Marshal R. G. Funnell, AC
Chief of the Air Staff

General P. C. Gration, AC, OBE
Chief of the Defence Force

Lieutenant General J. C. Grey, AO
Chief of the General Staff

Professor H. P. Heseltine, AO
Rector,
Australian Defence Force Academy

Mrs C. M. Kendrick
Member elected by the general staff of the University College

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

Dr S. P. Lever
Member elected by the academic staff of the University College

Vice Admiral I. D. G. MacDougall, AO, RAN
Chief of Naval Staff

Professor R. F. McLean
Member elected by the academic staff of the University College

Dr J. Y. Morrison
President of the Academic Board,
University of New South Wales

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

Colonel R. A. Powell
Director of Military Education and Training,
Member of the military staff
nominated by the Commandant

Dr J. Sneddon
Member elected by the academic staff
of the University College

Rear Admiral E. G. Stubington, AO, RAN
Assistant Chief of the Defence Force (Personnel)
Chairman of the Finance and Administration Committee

Lieutenant Colonel D. A. K. Urquhart
Member elected by the graduates of the University College

Mr F. E. Wassmann
Member elected by the
postgraduate students of the University College

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

Secretary
Mr K. E. Dean

4. Military Education and Training

Defence Force Staff

Headquarters

Commandant
Air Vice-Marshal R. J. Bomball, AO, AFC, rcds, jssc, psc, qfi, fci (to 8 March 1993)
Rear Admiral A. M. Carwardine, RAN, AO, jssc, fsc (from 9 March 1993)
Staff Officer—Plans
Lieutenant Colonel A. W. McClelland, RAA, jssc, psc.
Personal Staff Officer to the Commandant
Lieutenant Commander A. M. Atkinson, RAN, psc

Directorate of Military Education and Training

Director of Military Education and Training
Colonel R. A. Powell, BA(Mil) *N.S.W.*, MSc *Florida State* psc, jssc
Executive Officer
Wing Commander G. E. Tasker
Adjutant
Lieutenant R. S. T. Kenyon, RAN
Chief Instructor
Commander N. S. Coates, RAN
Staff Officer Co-ordination
Major E. J. Stevenson, BA (Mil) *N.S.W.*, psc
Chaplain—Anglican
Chaplain D. Hayman, ARA
Chaplain—Roman Catholic (located at RMC)
Chaplain P. Quilty
Chaplain—Other Denominations
Chaplain D. M. Thiem, RAN
Chaplain E. J. Blight, RAAF
Student Counsellors
Major L. P. Weber, BA *James Cook*, (Senior Counsellor)
Captain C. Clay, BA *W. Aust*
Ms P. M. Bowden, BA Grad Dip App Psych, *Chisholm I.T.*
Officer Commanding Advanced Student Squadron
Major W. Coates,
Academy Sergeant Major
Warrant Officer G. Mustow

Corps of Officer Cadets

Commanding Officer
Colonel R. A. Powell, BA(Mil) *N.S.W.*, MSc *Florida State*, psc, jssc
Executive Officer
Wing Commander G. E. Tasker
Officer Commanding A Squadron
Major I. T. Campbell, MA *N.S.W.*
Officer Commanding B Squadron
Lieutenant Commander S. A. Andrews
Officer Commanding C Squadron
Squadron Leader S. Spencer
Officer Commanding D Squadron
Major S. C. Hosking
Officer Commanding E Squadron
Lieutenant Commander J. Rousseau, RAN, psc
Officer Commanding F Squadron
Squadron Leader C. J. Wells, B Bus *D.D.I.A.E.*

Military Training Wing

Chief Instructor
Commander N. S. Coates, RAN
Training Development Officer
Squadron Leader P. J. McCarry
Operations Officer
Major G. J. Bassett, RAA
Officer in Charge of English Communications Program
Major R. J. Maxwell, RAAEC, B Ed *Melb*, Dip T *S.C.A.E.*
Officer in Charge of Field Training Section
Captain D. Burton.
Officer in Charge of Physical and Recreational Training
Lieutenant D. Turner, RAN, BSc AssDipRec *V.U.* Dip Ed *Melb.*

Directorate of Administration

Director of Administration
Wing Commander W. H. Foster
Officer Commanding Personnel and Administrative Support Squadron
Squadron Leader L. P. Robinson
Officer Commmanding Supply Squadron
Lieutenant Commander P. J. Cullinan, RAN
Officer Commanding Catering Squadron
Major R. K. McKenzie
Academy Engineer
Mr P. Bowler
Directorate Sergeant Major
Warrant Officer Class Two H. Mai

rectorate of Budgets, Finance, Civil Administration
ıd Secretariat Services

rector
Mr K. E. Dean
ıssistant Director Budgets and Finance
Mr P. W. McHardie
ıssistant Director Civil Administration and Secretariat
Mr B. P. Murphy, BA *A.N.U.*

ection 1—Military Organisation

ıe Military Staff

e principal elements of the military staff of the Academy are:

e Commandant. The Commandant (Major General equiv-ınt) has overall military responsibility for the Academy; all litary staff and the Corps of Officer Cadets are under his mmand.

e Director of Military Education and Training. The ector of Military Education and Training (Colonel equiva-t) is responsible for military training and education, and he nmands the Corps of Officer Cadets. The Executive Officer the Corps of Officer Cadets and the Chief Instructor (both utenant Colonel equivalent) report directly to him. He derstudies the Commandant and is responsible for admin-ering command of the Academy during the Commandant's sence.

e Corps of Officer Cadets. The staff of the Corps of Officer dets includes the Director of Military Education and Training the Commmanding Officer) and his immediate staff; the ecutive Officer, Officers Commanding Squadrons, isional Officers, the Academy Sergeant Major and other cers, non-commissioned officers, and other ranks respon-le for the command and administration of the Corps of icer Cadets. Most of these also fulfil various duties as itary Instructors.

e Military Training Wing. This Wing is a sub-unit of the ectorate of Military Education and Training and is headed the Chief Instructor. It is primarily responsible for the ign, scheduling and coordinating of the Common Military ining program undertaken by the Corps of Officer Cadets ing their three years at the Academy. It is also responsible liaison with the three single Service training authorities to ure the effective conduct of Single Service Training for the gle Service elements of the Corps of Officer Cadets.

e Directorate of Administration. This Directorate, headed he Director of Administration (Lieutenant Colonel equiva-), comprises a Personnel and Administrative Squadron, a pply Squadron, a Catering Squadron and an Engineering sion. These squadrons are headed by a Major (or equiva-) and the Engineering Division is headed by a Public vice Engineer Class Three. The Directorate of ninistration provides necessary administrative support for lements of the Academy.

e Directorate of Budgeting and Financial Services. This ectorate, headed by a senior Commonwealth Public vice Officer, is responsible to the Commandant for the nagement of Defence Department financial responsibilities in the Academy.

The Corps of Officer Cadets

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

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

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

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

Advanced Student Squadron

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

The Advanced Student Squadron (ADSS), commanded by a Major (or equivalent), administers all students who are taking fourth year courses. Navy and Air Force students remain at the Academy for four consecutive years of study. They have separate privileges and live in the Officers' Mess, during their fourth year. All Army officer cadets leave the Defence Academy at the end of the third year and move to the Royal Military College, Duntroon, for a year of military study, on completion of which they are commissioned as lieutenants. Those enrolling for a fourth year of a course in the University College return to the Defence Academy, and live in the Officers' Mess while they complete their course.

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

Military Training Wing

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

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

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

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

Field Training Section. This section is responsible for planning and conducting field training common to all three Services.

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

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

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

Student Counsellors. The student counsellors are qualified psychologists and Service personnel or civilian members of the public service. They provide counselling to all members of the COOC for personal, academic or military reasons. In addition they conduct courses in stress management and counselling skills for cadets.

Accommodation and Facilities

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

Section 2—Common Military Training

The Charter of the Australian Defence Force Academy is:

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

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

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

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

(b) Sessional CMT—March–October: Sessional CMT conducted throughout the Academic year. Officer cade are programmed into a maximum of six military lesso per week. These lessons are primarily programmed du ing the working day, the exceptions being lessons whi have visiting lecturers or by their nature require a nig venue. CMT is reduced during sessional breaks, ar examination periods, and in the week leading up to ea of the examination periods.

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

The source document for all CMT is the CMT Syllabus. Th Syllabus is maintained and updated by Training Developme and Services (TDS). Amendments for CMT are vetted by TD and approved by the CI on behalf of DMET. Major course co tent changes require the concurrence of the three Service

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

Section 3—Sessional Break Activitie

The Academic timetable allows for two sessional breaks a one week of reduced academic and military activity. The breaks are taken as two weeks in May, two weeks immediate following exams in July and one week in late Septemb During sessional breaks officer cadets are required to co plete a variety of academic and military activities.

May Break

During their three year tenure at the Academy all officer cade must undertake a selection of the following activities during t May sessional break, in the following order of priority:

(a) academic field trips;

(b) workshop practice/experience;

(c) Defence Studies tour;

) Australian Defence Force Warfare Centre course (ADFWC);

) motivational flying (pilots only);

motivational attachment to single Service units;

) adventurous training (including survival training); and

) programmed private study.

officer cadets are allocated to these activities based on eir respective academic and military requirements. The tivities are listed in priority order. However, allocation of offir cadets to activities is the responsibility of the CI and will be alised after academic enrolment and re-enrolment early ch year. Year 1 cadets will undertake one week of adven-e training and one week of study except engineers who are quired as part of their academic studies to do two weeks of rkshop practice. Cadets who enrol in Oceanography 1 will mplete a one week field trip in lieu of the one week study.

otivational Attachments. Motivational training consists of its to Single Service ships and units. Motivational training is signed to give officer cadets an opportunity to experience in a Service environment prior to graduation. Motivational ining will generally be restricted to year 2 cadets.

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

ar Three Defence Studies/ADFWC. The year 3 Defence udies program includes the five day Defence Studies Tour selected military bases around Australia and a three day rfare Course conducted by staff of the ADF Warfare ntre. These activities are programmed during May of each ar and involve all year 3 and selected year 2 officer cadets. ese activities are compulsory CMT programmed activities.

venture Training. Adventure training forms an essential part he officer cadet character and leadership development pro-m. While participation in most adventure training activities oluntary, officer cadets are encouraged to make maximum of the opportunities available.

venture training activities are conducted to provide officer lets with an extra dimension in training involving physical l mental challenge. The objectives are:

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

to exercise leadership, planning and organising skills;

to familiarise officer cadets with the terrain of Australia and of other countries within Australia's area of interest; and

to introduce officer cadets to a wide range of military orientated skills.

vival Training. The Academy offers training in desert and w survival. These exercises are of five days duration during ch officer cadets are taught the basics of survival in the field.

y Break

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

NAVY

	YR 1		YR 2		YR 3	
	MAY1<->MAY2		MAY3<->MAY4		MAY5<->MAY6	
ENGINEERS	WP	WP	MOTV	TL1/ MOTV	JWC	DS
REMAINDER	STUDY	ADV	MOTV	TL1/ MOTV	DS	JWC

ARMY

	YR 1		YR 2		YR 3	
	MAY1<->MAY2		MAY3<->MAY4		MAY5<->MAY6	
ENGINEERS	WP	WP	WE	WE	JWC	DS
BEAERO	WP	WP	DS	JWC	-	-
PILOTS	STUDY	ADV	M/FLY	M/FLY	DS	JWC
REMAINDER	STUDY	ADV	MOTV /ADV	MOTV /ADV	DS	JWC

RAAF

	YR 1		YR 2		YR 3	
	MAY1<->MAY2		MAY3<->MAY4		MAY5<->MAY6	
ENGINEERS	WP	WP	WE	WE	JWC	DS
BEAERO	WP	WP	DS	JWC	-	-
PILOTS	STUDY	ADV	M/FLY	M/FLY	DS	JWC
GDNAV	STUDY	ADV	MOTV	MOTV	DS	JWC
REMAINDER	STUDY	ADV	MOTV	MOTV	DS	JWC

NOTE:- BECIV NOT INCLUDED WITH OTHER ENGINEERS

LEGEND

WP	Workshop practice
WE	Workshop experience
DS	Defence Studies
JWC	Joint Warfare Course
ADV	Adventure Training
MOTV	Motivational training
M/FLY	Motivational flying
STUDY	Programmed study

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

July Break

The July break of two weeks immediately follows the mid year examination period. All officer cadets are required to take two weeks leave during this period. There are no organised Academy military or academic activities permitted during this period.

September Break

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

Civilian Participation

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

Section 4—Sport

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

(a) Rugby Union,

(b) Australian Rules Football,

(c) Soccer,

(d) Hockey,

(e) Touch Football,

(f) Volleyball,

(g) Basketball,

(h) Water polo,

(i) Netball,

(j) Rowing,

(k) Triathlon,

(l) Orienteering, and

(m) Sailing

Officer cadets are to participate in a team sport. All teams play in the Canberra competitions. Participation in Academy Sport is part of the CMT curriculum.

The Defence Academy provides excellent facilities for many other recreational activities. They are organised and conducted by various internal clubs, which are open to all staff and students. (See Section 7)

Section 5—Graduation Requirements

To graduate from the Corps of Officer Cadets, officer cadet must successfully complete the CMT program as well as b awarded their degree. Where officer cadets fail to satisfy mil tary training requirements but pass academically, and ar considered suitable for further military training, they will pas out of the Corps of Officer Cadets to Single Service College but will not be deemed Graduates of the Corps.

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

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

Year 3 officer cadets who have failed military training subject may also be retested to Academy standards at any mutual convenient time in the year following their passing out of th Corps of Officer Cadets. In this case their date of graduatic will be recorded as the date they successfully satisfied the mi itary requirements. Retesting is to be arranged through the C

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

Military Prizes

At the conclusion of each year all officer cadets have their pe formance reviewed by the Commandant. As a result of th review of performance, the following military prizes ai awarded to cadets annually.

Name of Prize/Donor	*Awarded For*
The Commander in Chief's Medal (Governor General)	Most outstanding third year cadet in the fields of military and academic achievement, leadership, personal example and performance of duty durin the Cadet's time at the Defenc Academy.
The Chief of Defence Force Prizes (one prize for each service)	Most outstanding performance in military and academic subjects over three years.
The RSL Prize	The third year cadet displaying the highest standard of leadership and officer development.
The Australian Defence Industries (ADI) Prize	Most promising first year cadet in military studies.
The A. J. Hayter Scholarship	The midshipman deemed to be the best Naval Honours prospect.

e Judge Advocate neral's Prize	Best performance in Military Law studies.
e Joint Services Staff llege Association Prize	Most outstanding third year cadet in the English Communications Program over three years.
e National Australia nk First Year Incentive vards (Presented after t semester)	The ten best academic results at the mid year examinations (3 x Arts, 3 x Science, 4 x Engineering)
	The first year cadet, one from each Squadron, who displays the best Officer Qualities for first semester.
st Year Military ining Award oubleday Australia and cific Defence Reporter)	Best first year cadet in Military Training.
cond Year Military ining Award oubleday Australia)	Best second year cadet in Military Training.
rd Year Military ining Award oubleday Australia)	Best third year cadet in Military Training.
e Navy Military Training ard (The John Palmer Prize)	Best performance by a midshipman in Military Training over three years.
e Army Military ining Award (National stralia Bank)	Best performance by an Army officer cadet in Military Training over three years.
e Air Force Military ining Award (University operative Bookshop Ltd)	Best performance by an Air Force officer cadet in Military Training over three years.

ection 6—Common Military Training MT)Subject Descriptions

this section each CMT subject has been further broken vn to indicate, by year, the subject content and the total time cated, in periods, to each lesson. CMT subjects are ructed throughout the year as either sessional or block cation. Sessional CMT programming allows for up to six ekly lessons. Most of this material is completed during the cated lesson times. Additional study, research or prepara- for assignments is indicated in the following subject break- vns. In all cases, no definitive quantitative assessment of -of-hours demand can be provided due to individual abili- . Accordingly, the week assignments are due has been cated, so that both academic and military staff are aware he CMT requirements on officer cadets' available study e and do not unnecessarily burden them with concurrent uirements. Block CMT activities are conducted outside the demic year and as such do not impinge upon study uirements. All lessons shown below appear as part of the T syllabus unless otherwise indicated. Additionally, military vities are reduced the week prior to and during examina- periods in June and October.

Each subject area has been broken down to give a broad outline of the subject matter. A more detailed breakdown of each subject is given in the CMT Syllabus.

A breakdown of CMT assignments and compulsory after hours activities is also included.

Common Military Training

Subject	*Yr 1*	*Yr2*	*Yr3*	*Total*
English and Military Communications	38	38	38	114
Defence Studies	13	13	82	108
Military Law	12	18	–	30
Weapon Training	23	29	–	52
Field Training	42	–	–	42
Physical and Recreational Training	51	45	45	141
Drill and Ceremonial	35	15	13	63
Leadership	12	57	7	76
Drug and Alcohol Awareness	–	4	–	4
Character Development	9	9	36	54
Methods of Instruction	–	52	–	52
Psychology and Leadership	–	–	12	12
Study Skills	4	–	–	4
TOTAL	239	280	233	752

English and Military Communications

This course is designed to develop the oral and written skills of the officer cadets during their three years at the Academy. One hour per week of the Common Military Training is devoted to this program. This course includes military communications, conventions and practices.

The English and Military Communications program consists of a total of 114 periods spread over three years. The subject breakdown is as follows:

English and Military Communications	*Yr 1*	*Yr 2*	*Yr 3*
Write an essay	12		
Write a synopsis	3		
Critical analysis writing	5		
Oral presentations	8		
Write a service minute	5		
Write a demi-official letter		4	
Conduct a meeting		6	
Write an information brief		6	
Present an oral information brief		7	
Write a service essay		12	
Write an administrative instruction		3	
Write official letters		2	
Write letters to the public		1	
Write a position brief			9
Present an oral brief			8
Write a service paper			12
Message writing			2
Examination			6
Counselling	1	1	1
TOTAL	34	42	38

Assessment: Officer cadets are required to complete sixteen formally assessed written and oral exercises over three years.

The assessment for the Military Communications component, Exercise Quick Quill, is conducted in session two of year three.

English Communications Programmed Assignments

Year	*Title*	*Length*	*Week Due*
1(1)	Minute	2 pages	18
	Essay	600 words	23
	Synopsis	2 pages	31
	Critical Thinking	600 words	34
	Demi-Official Letter	1 page	37
	Oral Presentation	5 minutes	40–42
2(2)	Information Brief	1000 words	15
	Administrative Instruction	5–6 pages	18
	Service Essay	1500 words	36
	Oral Brief	10 minutes	34–37
	Official Letters	2 pages	41
3(3)	Message	1 page	14
	Service Essay	1500 words	8 (16)
	Oral Brief	15 minutes	16–18
	Service Paper	2000 words	36
	Exercise Quick Quill	5 pages	37

Note: 1. These assignments should all be completed during programmed lessons.
2. 13 periods are allocated to assist in the completion of these assignments.
3. 15 periods are allocated to assist in the completion of these assignments.

There are no formal night lectures conducted by the ECP program. Instructors are, however, available after hours to assist students. Officer cadets are given a diagnostic test when they first arrive. Those who are found to have deficiencies are placed on remedial counselling. This remedial program varies depending on the officer cadet's deficiencies. This program is conducted entirely during an officer cadet's own time.

Defence Studies

This subject includes a study of military history of the three Services, Australia's role in past wars, a study of the profession of arms, current affairs and Australia's strategic situation. Year 3 officer cadets undertake a one-week tour of defence facilities which highlights aspects of the Defence Studies program. Officer cadets also participate in an introductory course run by the Australian Defence Force Warfare Centre.

The Defence Studies program consists of 108 periods spread over three years as follows:

Defence Studies	*Yr 1*	*Yr 2*	*Yr 3*
Introduction	1		
Single Service History	3		
ADF Weapons Systems	3		
ADF History	5		
Examination	1		
Operational Methods of the ADF		3	
Strategy		2	
Case Studies		3	
Major Treaties and Agreements		3	
Defence Options		2	
Australia's Current Strategic Situation			
Foreign Powers and Australia			
Joint US/Australian Facilities			
Relationships Between Major Powers			
Major Powers and World Stability			
Australia's Relationship with Regional Countries			
Defence Studies Tour			4
Joint Operations			2
TOTAL	13	13	8

Assessment: Defence Studies is assessed via a presentatio and written examination in year 2 and assessed participatio in year 3. Defence Studies is not assessed in year 1.

Defence Studies Programmed Activities

Year	*Title*	*Duration*	*Week*	*SOR*
2	Presentation	1 period	16	2 hrs(1
	Examination	1 period	23	2 hrs
3	Australia's Current Strategic Situation	1 period	10	
	Foreign Powers and Australia	4 periods	12/14/16/18	
	Joint US/Australian Facilities	2 periods	22/24	
	Relationships Between Major Powers	2 periods	29/31	
	Major Powers and World Stability	1 period	33	
	Australia's Relations with Regional Countries	2 periods	37/41	
	Defence Studies Tour (includes one night lesson the week prior to departure)	45 periods	May	

Note: 1. This is an estimate of the preparation time required of eacl assignment.

All of the year 3 lessons are night lectures presented by visiting lecturers. While no study in own rooms is programmed, officer cadets are given projects such as mino presentations and questionnaires to complete. In general these assignments can be done during allocated instructional time.

Military Law

This subject provides officer cadets with the knowledg required to apply military law as a junior officer. It comprise study of the Defence Force Discipline Act, the Genev Conventions and national and international laws of arme conflict.

Military Law is taught to officer cadets during the first two yea at the Academy. The subject matter is broken up as follow

Military Law	*Yr 1*	*Yr 2*	*Yr*
Discipline Within the Academy	1		
Introduction to Military Law	1		
Components of the DFDA	1		
Identify Service Offences	2		
Natural Justice (LEGO)	1		
Interpret Service Offences	1		

ɔmpile Summary Proceedings Report	1	
ɜrvice Tribunals	1	
ɹnishments	1	
ɜvision	1	
ɜamination	1	
ɜvision		1
rest Procedures		1
ɹstody and Suspension		2
ɣestigation of Service Offences		1
ɜarch Procedures		1
ɾidence		1
ɹmmary Proceedings		1
ɹmmary Proceedings Playlet		1
ɹst Trial Procedures		8
ɜamination		1
ɔTAL	12	18

ɜsessment: Written examinations will be held at the end of ars 1 and 2. An assessed practical exercise is also con-cted in year 2.

ɹring each lesson, officer cadets are required to complete a estionnaire. These questionnaires are generally completed ring the programmed lessons and submitted prior to the fol-ving lesson. If officer cadets fail to complete the question-ire during the lesson they are expected to complete it in their ɾn time. There is no additional formal programmed night or signment work.

ɜapon Training

is subject covers the handling, firing and employment of ɹall arms common to the three Services.

ɜapon Training consists of 52 periods which are broken up follows:

ɜapon Training	*Yr 1*	*Yr 2*	*Yr 3*
ɜapon Handling—SLR	9		
ɐory of the Group	1		
ɐory of Small Arms	1		
ɹng the SLR	11		
ɜapon Handling—SLP		4	
ɹng the SLP		4	
R Continuation training		20	
vision	1	1	
TAL	23	29	

ɜapon Training is conducted during a cadet's first and sec-ɨ years. The entire program is conducted during the block IT periods prior to and after the academic year. The ɜapon Training package is conducted in conjunction with ld Training and First Aid. Most of the package is conducted he field at the range.

ld Training

s subject teaches officer cadets how to live in the field as a mber of a group, the basic principles for survival on land ɨ sea, how to operate service radio equipment, and how to ɾigate on land.

ld Training is conducted during block CMT in the first year ɲe Defence Academy. Field Training consists of 34 periods, ken up as follows:

Field Training	*Yr1*	*Yr 2*	*Yr 3*
Living in the Field	7		
Radio Communications	5		
Navigation	15		
First Aid	14		
Revision	1		
TOTAL	42		

Assessment: This program is not assessed.

Field training is conducted during first and second years. The entire program is conducted during the block CMT periods prior to and after the academic year. Officer cadets who fail to achieve a satisfactory standard or are absent from training may be required to attend a retraining session.

Physical and Recreational Training

This subject is designed to develop and maintain high personal standards of physical fitness and to prepare officer cadets for their physical and recreational responsibilities at the Defence Academy and in the Services. They are taught the importance of fitness, diet, sport and recreation and how to design sporting and physical training programs. Each officer cadet is expected to obtain a recognised referee or coaching qualification in at least one sport. Internal and representative sporting activities are also included.

The Physical and Recreational Training program consists of 141 periods over three years. The subject breakdown is as follows:

Physical and Recreational Training	*Yr 1*	*Yr 2*	*Yr 3*
Introduction	2		
Rowing	9	4	5
Resuscitation	–	6	–
Swimming	11	6	10
Fitness Conditioning	18	20	21
Sporting Injuries	1		
Team Sports	4	3	3
Testing	6	6	6
TOTAL	51	45	45

Assessment: Assessment for this subject is:

(a) Pass the following Defence Academy swimming test:
  (i) Safety jump;
  (ii) head first dive and swim 10m underwater;
  (iii) 10m underwater back scull;
  (iv) in clothing swim 50m (any stroke); and
  (v) tread water for a total of 15 min in one position in the pool including:
  —5 min unassisted, and
  —10 min using personal flotation device.

(b) Pass the following Defence Academy fitness test:
  (i) Situps 2 mins:
  —Men 59, and
  —Women 46.
  (ii) Vertical jump:
  —Men 50 cm, and
  —Women 37 cm.

(iii) Pull ups:
—Men 6, and
—Women nil.

(iv) Flexed Arm Hang:
—Men nil, and
—Women 21 sec

(v) Dips:
—Men 11, and
—Women nil.

(vi) Agility run:
—Men 17.7 sec, and
—Women 19 sec.

(vii) Aerobic run:
—Men 13.45 min for 3.2 km, and
—Women 12.00 min for 2.4 km

(viii) Body Mass
—Men 25 BMI, and
—Women 24 BMI.

(c) Attain the required level for Royal Life Saving Society Basic Swimming Rescue Certificate.

Each of the timings and standards indicated represents the minimum standard required to obtain a pass.

Physical and Recreational Training is programmed on a twice weekly basis throughout the year. Officer cadets must achieve the standard required in the prescribed Defence Academy physical fitness test. Any officer cadet who fails to achieve the required standard of physical fitness is required to attend remedial training. Remedial training is conducted Tuesday–Friday from 0550–0630 and on Saturday from 0750–0900.

Physical and Recreational Training also incorporates organised sport. Each officer cadet must participate in one of the organised team sports played by the Defence Academy. This sporting commitment, on average, includes approximately three hours per week training and a two to three hour commitment on the weekend.

With the exception of sport and remedial training there are no additional activities out of hours for Physical and Recreational Training.

Drill and Ceremonial

Instruction in this subject prepares officer cadets to participate in Defence Academy parades and to perform those drill and ceremonial duties required of a Service officer. The subject is designed to promote a sense of discipline and *esprit de corps*.

The Drill and Ceremonial program consists of 63 periods over three years. A subject breakdown is as follows:

Drill and Ceremonial	*Yr 1*	*Yr 2*	*Yr 3*
Customs and Traditions	2	4	3
Foot Drill	17		
Rifle Drill	8		
Sword Drill		6	
Colour Drill			4
Revision	7	4	5
Examination	1	1	1
TOTAL	35	1	13

Assessment: The assessment for this subject is to pass the prescribed Academy Drill Test each year and participate in ceremonial parades.

Each examination is conducted during Week 41. There is n requirement for officer cadets to practise drill in their ow time. Any retests required are conducted over one period i Week 42.

Leadership

This subject is fundamental to the training of junior officers fc all Services. It includes theoretical instruction and practic exercises.

Additional leadership training is received by third year offic cadets by participating in the administrative command of th Corps of Officer Cadets.

Leadership training consists of 76 periods over three year: The subject breakdown is as follows:

Leadership Studies	*Yr 1*	*Yr 2*	*Yr*
Introduction/Officer Standards	1	1	
Corps of Officer Cadets Mess (Dining in Night)	4		
Functions of a Mess	1		
Invitations and Replies	1		
Customs of the Service	1		
Financial Management	1		
Security	1		
Profession of Arms	1		
Leadership Studies		8	
Theory Examination	1		
Exercise Cryptic Challenge (Field Exercise) Case Studies		45	
TOTAL	12	57	

Assessment: A leadership theory examination will be held year 2. Leadership skills and potential will be evaluated in a practical leadership exercises and other CMT activitie (including sport) and within the Corps of Officer Cadet Exercise Cryptic Challenge is a formal assessment exercis conducted over a five day period in the field.

Leadership Studies Programmed Activities

Year	*Title*	*Duration*	*Week*
1	Squadron Dining In Night(1)	3 periods	As per Academy Planner
	Mess Etiquette	2 periods	10(2)
2	Squadron Dining In Night	3 periods	As per Academy Planner
	Theory Examination	1 period	41 (day)
	Exercise Cryptic Challenge	45 periods	Novembe
3	Squadron Dining In Night	3 periods	As per Academy Planner
	Case Study	1 period	40 (night)

Note: 1. All Squadron Dining In Nights are conducted in the Corps Officer Cadets Mess on a Friday evening. They require approximately three hours out-of-hours involvement. This an allocated lesson for Year 1 only.

2. The timing of this lesson varies as it is run for two Squadrons at a time.

rug and Alcohol Awareness

ıis subject is conducted by the Academy student counsel-rs. The course includes lectures on the impact of the misuse drugs and alcohol on individuals and military units.

lcohol and Drug Awareness	*Yr 1*	*Yr 2*	*Yr 3*
ɔrmal Lectures	–	4	–
)TAL	–	4	–

ssessment: This program is not assessed.

haracter Development

ıis subject aims to develop in officer cadets those factors at are important in character building and is closely aligned Leadership Studies. Character Development is presented ' the Academy Chaplains.

ıaracter Development consists of 54 periods conducted 'er three years. The subject matter can be broken up as fol-ws.

haracter Development	*Yr 1*	*Yr 2*	*Yr 3*
ɜrsonal Qualities	9		
ɔrality and Ethics		6	9
ɛcision Making		3	
ıaracter Development Seminar			27
)TAL	9	9	36

ɜsessment: This subject is not assessed. Character ɜvelopment consists of a total of nine single period lessons ch year, spread evenly throughout the Sessional CMT riod. No night lectures, weekend work or assignments are 'olved, with the exception of the three day seminar in Year 3.

ɜthods of Instruction

e methods of instruction package is designed to give officer dets a basic understanding of the Training System and the ɜthods of instruction within the Services. Year 3 officer dets are subsequently tasked with instruction to Year 1 offi-r cadets during the first year induction and orientation riod.

ɜthods of Instructions training is conducted over 52 periods ring block CMT at the end of second year.

detailed break up of instruction given is as follows:

ɜthods of Instruction	*Yr 1*	*Yr 2*	*Yr 3*
ıining System		1	
ɜrning Process		2	
truction Techniques		4	
ɜson Planning		4	
ıining Aids		2	
ɜthods of Instruction (Practical)		38	
ɜmination		1	
TAL		52	

sessment: Officer cadets are to complete two theory lessons ıo more than thirty minutes on military training topics.

The Methods of Instruction Course is conducted during the post examination period at the end of year 2. The course runs for five days including assessment. Night work programmed involves study in own rooms for about an hour each evening.

Psychology and Leadership

Year 3 officer cadets are instructed on a range of psychological issues that are considered germane to leadership in a military environment. Presentations are conducted by the Student Counsellors over twelve periods throughout the third year sessional CMT.

Psychology and Leadership	*Yr 1*	*Yr 2*	*Yr 3*
Introduction to Learning Theory			1
Personality			1
Individual Differences			1
Motivation			1
Psychology of Human Error			1
Problem Solving			2
Counselling and Communication Skills			5
TOTAL			12

Assessment: This program is not assessed.

Study Skills

Officer cadets are given guidance on how best to plan and organise their study time. Study Skills is instructed by the Academy student counsellors over four periods during session one.

Study Skills	*Yr 1*	*Yr 2*	*Yr 3*
Organisation and Timetabling	1		
Asking Questions and Notetaking	1		
Improving Concentration and Effective Reading	1		
Examination Preparation and Techniques	1		
TOTAL	4		

Assessment: This program is not assessed.

Stress Management

Officer cadets are instructed on the aetiology and management of stress. Particular emphasis is placed on coping with specific stressors associated with life at the Defence Academy.

Presentations are conducted by the Student Counsellors over four periods during Year 1 Common Military Training.

Stress Management	*Yr 1*	*Yr 2*	*Yr 3*
Stress and the Human Being	1		
Sources of Stress/Stress and Performance	1		
Coping with Stress	1		
Practical Stress Management Techniques	1		
TOTAL	4		

Assessment: This program is not assessed.

Section 7—Hobby Clubs

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

(a) Band and Choir,
(b) Car Repair and Maintenance,
(c) Debating,
(d) Performing Arts,
(e) Radio Electronics,
(f) Strategic Gaming,
(g) Martial Arts,
(h) Alpine Club,
(i) Skiing Club,
(j) Scuba Club,
(k) Parachuting Club,
(l) Rifle Shooting Club,
(m) Canoeing Club, and
(n) Sailing Club.

Membership is open to all officer cadets, staff and members of the University College.

Section 8—Single Service Training

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

5. The University College

Structure of the University College

There are twelve academic departments in the University College. The heads of the departments 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.

There are Advisory Committees associated with each of the Boards of Studies to advise them on educational programs and developments.

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

Chair

The Academic Board elects a Chair to preside over its meetings and to discharge any other duties which the University Council may assign.

Terms of Reference

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

Committees

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

Executive Committee of the University College Academic Board

Composition

- The Chair 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 departments of the University College and professors of the University College who are not heads of departments
- The Chairs of the three Boards of Studies of the Academic Board
- The College Secretary
- 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.

ligher Degree Committee

ɔmposition

The Chair of the University College Academic Board

The Rector

The heads of departments of the University College and professors of the University College who are not heads of departments

The College Secretary

Such other members of the University College Academic Board as the University College Academic Board may appoint.

ɹnction

ıe Higher Degree Committee is responsible for matters relatg to the candidature of higher degree students under author- delegated by the University Council, and for performing ıch duties as may be assigned to it by Council on the recnmendation of the Academic Board. The general supervi-ɔn of higher degree matters is the responsibility of the ıiversity College Academic Board.

he Boards of Studies in Humanities Social Sciences, Science and ngineering

ɔmposition

Appropriate groupings of members of the Academic Board, as determined by the Academic Board

Such other persons having appropriate qualifications as the University Council may appoint.

ıair

ɹch Board of Studies elects a chair from among its members r a period of office of two years.

ɪrms of Reference

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

the rules governing the award of the degrees with which it is primarily concerned;

the subjects of the degree courses with which it is primarily concerned;

the assessment of those subjects; and

teaching, scholarship and research in those subjects;

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

Assessment Committees in Humanities & Social Sciences, Science and Engineering

Composition of each

- The Chair of the relevant Board of Studies (Chair of the Committee)
- The Chair of the University College Academic Board
- The Rector
- The College Secretary
- Such other members of the University College Academic Board as the University College Academic Board may appoint.

Function

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

Admissions and Re-enrolment Committee

Composition

- The Chair of the University College Academic Board
- The Rector
- The College Secretary or his nominee
- Such other members as the University College Academic Board may appoint.

Functions

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

The Advisory Committees

There are Advisory Committees in Humanities and Social Sciences, and Science, Civil and Maritime Engineering, Electrical Engineering and Mechanical Engineering.

Composition of the Humanities and Social Sciences and Science Advisory Committee

1. Rector or nominee, as chair
2. Commandant or nominee
3. Chair of the University College Academic Board
4. Chairs of the Humanities and Social Sciences Board of Studies and the Science Board of Studies
5. Heads of the departments of Chemistry, Computer Science, Economics and Management, English, Geography and Oceanography, History, Mathematics, Physics, Politics
6. No more than two members appointed by and from the University College Academic Board
7. No more than five members appointed by the Chief of the Defence Force and the Secretary, Department of Defence
8. No more than five external academic and/or professional members appointed by the Vice-Chancellor.

(Each person appointed under items 6, 7 and 8 should be appointed for a period of three years.)

Composition of Engineering Advisory Committees

1. Rector or nominee, as chair
2. Commandant or nominee
3. Chair of University College Academic Board
4. Chair of the Engineering Board of Studies
5. Head of the relevant engineering department
6. No more than one member appointed by and from the University College Academic Board
7. No more than five members appointed by the Chief of the Defence Force and the Secretary, Department of Defence
8. No more than three external academic and/or professional members appointed by the Vice-Chancellor.

(Each person appointed under items 6, 7 and 8 should be appointed for a period of three years.)

Terms of Reference

To advise the Humanities and Social Sciences and the Science Boards of Studies on:

- the educational programs in Humanities, Social Sciences and Science;
- such other matters as requested by the Board of Studies.

To advise the Engineering Board of Studies on:

- the educational programs of the relevant academic department;
- such other matters as requested by the Board of Studies.

Staff of the University College

Rector
Professor Harry Payne Heseltine, AO, BA *W.Aust*, MA PhD *Louisiana State*

Deputy Rector
Professor John Alan Richards, BE PhD *N.S.W.*, FIREE, FIEAust, SMIEEE

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College Secretary
Terence Richard Earle, BCom *N.S.W.*

Deputy College Secretary (Academic)
Sally-Ann Phillips, BA *Monash*

Deputy College Secretary (Administrative Services)
John Dennis Harverson, BSc *N.S.W.* psc

Assistant College Secretaries
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Elizabeth Patricia Greenhalgh, BA *Manc.*
Ewan Douglas Morris, BA *A.N.U.*

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Rowland Alexander Sammut, BSc *N.S.W.*, PhD *A.N.U.*

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Bruce Alan Barnes, MSc DipEd *Syd.*
Peter Donald McIntyre, BSc PhD *A.N.U.*

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Adam Kucera, BMath PhD *W'gong*
Rodney Oscar Weber, BSc *Melb.*, PhD *Tas.*

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Caroline Houda Rasheed, BSc *Adel.*

Associate Lecturer (Half-Time)
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Teaching Fellow
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Visiting Military Fellow
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Teaching Fellow
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Susan Constance Moss, BA *A.N.U.*
Azita Parsamanesh, BCom MEc *Nagpur*, GradDip Economic of Development *A.N.U.*

Visiting Military Fellow
Ian MacFarling, BA *Qld*, Dip *RMCS*, MDef Stud *N.S.W.*

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6. 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 20 at 31st January in the year of entry
- 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 Recruiting Centre. The educational qualifications are set out in the section below.

Applications

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

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

Scholarships

Prospective applicants who are Year 11 students may apply for Defence Academy Scholarships. A scholarship is worth $1000, and is tenable in Year 12. About 150 scholarships are awarded annually.

Educational Qualifications for Admission to the University College in 1993

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

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

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

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

1. Admission

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

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

2. Subject Prerequisites

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

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

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

SCHEDULE I
FIRST YEAR SUBJECT PREREQUISITES
BA AND BSc COURSES

'irst year :ubjects	*HSC Subject and minimum required mark for 2 unit subjects (New South Wales)*
:hemistry I	As for Mathematics I plus 2 unit Science (Physics) 53% or 2 unit Science (Chemistry) 53% or 4 unit Science (Multistrand) or 2 unit Science (Geology) 60% or 2 unit Science (Biology) 60%
conomics and Management I	As for English I
nglish I	3 unit English or 2 unit English 53% or 2 unit English (General) 63% or 2 unit Contemporary English 63%
istory I	As for English I
lathematics I‡	4 unit Mathematics or 3 unit Mathematics or *2 unit Mathematics 67% *NOT 2 unit Mathematics (Mathematics in Society)
hysics I	As for Mathematics I, plus 2 or 4 unit Science (Including Physics or Chemistry)
olitics I	As for English I

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

SCHEDULE II
FIRST YEAR SUBJECT PREREQUISITES
BE COURSES

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

3. Standard of Performance

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

New Zealand Candidates

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

Enquiries

Specific enquiries related to educational qualifications should be addressed to:

The Deputy College Secretary (Academic),
University College,
Australian Defence Force Academy,
Canberra, A.C.T. 2600

Telephone (06) 268 8111

7. Facilities and Services

The Library

The Australian Defence Force Academy Library supports research and undergraduate and postgraduate study within the University College. The major national collection in international defence, strategic studies and military history, and major A.C.T. collections in engineering and Australian literature are included in the Library's holdings of approximately 310,000 volumes. There are current subscriptions to some 2900 periodical titles.

Materials in other Australian and overseas libraries may be obtained by inter-library loan. Online searches are available to identify material on particular topics, and a number of databases are available on CD-ROM for use in the library. A well equipped 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 may be checked from the computer terminals within the building, throughout the campus, and remotely via AARNet. Library materials are purchased, catalogued and lent by means of an integrated computer system.

The library maintains two in-house online databases: MIHILIST which covers Australasian military history, and AUSTLIT which covers Australian literature.

Assistance and guides to use the library are available at the information desk. Orientation classes and tutorials on library use for specific subject areas are held each year.

Persons other than staff and students at the Academy are welcome to use the Academy Library but if borrowing privileges are desired they should apply to the Librarian. The library has reciprocal borrowing arrangements with the Australian National University and University of Canberra libraries. Special arrangements exist for defence personnel.

The Computer Centre

The Computer Centre provides computer processing, pr gramming support, consultant services, and the electror information infrastructure for teaching, research, and admini tration throughout the Academy. It also offers a limited pr gram and data entry service. The facilities of the Centre a available for use upon application by all students and staff the Academy.

The Centre supports, as a major part of its role, the Acader wide Local Area Network (LAN), which provides for the co nection of terminals to any of the host interfaced to it. The LA also provides for high speed data transfers between the ma workstations and multiuser hosts around the Academy, a distribution of video signals around the accommodation are and the rest of the Academy.

The Centre also supports network links to other acaden institutions, both inside and outside Australia, principa through AARnet; these links are used heavily by the resear and teaching functions within the Academy.

The major items of equipment operated by the Centre are Convex C-120 for numerically intensive research applicatior a Prime 9955-II for general time sharing purposes, a Prir 7333 for administration, and two Sun Sparc Server 2 hosts news, mail, network name service, and other directory a information services. The centre also maintains one termi laboratory, and three microprocessor laboratories for gene use.

The Centre maintains a number of application packages av able on various machines; these include scientific and grap libraries, statistical and econometric analysis programs, sy bolic mathematics, text analysis and processing, and types ting, simulation and engineering design, and database wo Two members of staff are employed as full-time microproc sor consultants.

ounselling Services

e Student Counsellors offer counselling services for indi-
ual students who wish to approach them on academic, per-
ıal or motivational matters.

y student needing advice or assistance is invited to consult
ə of the Counsellors. At the student's request, the consul-
on will be in confidence.

well as individual assistance, the Student Counsellors con-
ɔt group workshops on study techniques and methods for
lucing stress and anxiety. Courses are also taught on lead-
hip dynamics, interviewing and counselling skills and drug
d alcohol awareness.

ə Student Counsellors have a special role in assisting first
ır officer cadets make the transition from civilian to military
, and from secondary to tertiary education. Their assistance
ludes advice on approaching academic work and study
hniques, and on courses and subjects in relation to stu-
ıts' abilities and vocational goals.

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

ıglish Communications Program

ə English Communications Program (ECP) is designed to
'elop and improve officer cadets' oral, aural and written
ls. The ECP is an integral part of the common military train-
program and augments other subject areas such as meth-
ı of instruction (MOI) and staff duties. Officer cadets must
ıs the course to graduate from the Academy.

ə 110 periods program consists of 16 modules taught over
ıe years. Each module is assessed. Each cadet is assigned
ɔunsellor who becomes the cadet's first point of contact if
ɒlems in communication skills become apparent. Cadets
/ seek assistance voluntarily or may be referred to ECP
f for counselling by any department at the Academy.

ıddition, specialist English as a Second Language (ESL)
istance is available to all overseas officer cadets if
ɹired. Limited assistance to postgraduate students and
f is also provided, resources permitting.

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.

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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 Business Manager at University College, Ms Beverley Cooper, University College, ADFA, Canberra ACT 2600, telephone (06) 268 8497, or to Mr Richard Kaan, Managing Director, Unisearch Ltd, PO Box 1, Kensington, NSW 2033, telephone (02) 697 5401.

8. 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 subject for the degree of Bachelor of Arts or the degree of Bachelor of Science if enrolled at the same time for any other degree or diploma in this University or elsewhere.

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

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

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

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

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

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

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

Economics
English
History
Information Systems
Management
Politics

and in the following fields of study as Science subjects,

Chemistry
Computer Science
Mathematics
Oceanography
Physics

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

Geography

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

Subjects are allotted credit points (CP) as defined in th schedules.

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

(c) A major is a sequence of subjects from one field of stud or from two approved fields of study. It consists of a Level subject to the value of 6CP, a Level II subject to the value c 8CP, and a Level III subject to the value of 12CP. Similarly sub-major is a sequence of a Level 1 subject to the value c 6CP and a Level II subject to the value of 8CP.

(d) A sub-major may also be either:

(i) a combination of a Level II subject to the value of 8CI and a Level III subject to the value of at least 6CP.

or

(ii) Level III subjects to the value of 24CP in the same fiel of study as the major, but additional to it.

6. To qualify for the degree of Bachelor of Arts, a candidat shall, in accordance with the provisions of Rule 8, complet subjects totalling in value at least 66CP which shall include

(a) Level I subjects each of value 6CP chosen from at leas three fields of study,

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

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

(d) one or more Science subjects totalling at least 6CP, o alternatively, any combination, of total value 6CP, of ger eral studies electives for the Arts course and special elec tives;

and may include:

(e) special electives totalling up to 6CP.

7. To qualify for the degree of Bachelor of Science, a cand date shall, in accordance with the provisions of Rule 8,con

ete subjects totalling in value at least 66CP which shall clude:

) Level I subjects each of value 6CP chosen from at least three fields of study,

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

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

) one or more Arts subjects totalling at least 6CP, or, alternatively, general studies electives for the Science course of total value 6CP;

ıd may include:

) special electives totalling up to 6CP.

To qualify for the degree of Bachelor of Arts or Bachelor of ience, a candidate shall be enrolled for a minimum of six ssions and gain a total of at least 66CP of which:

) no more than 6CP may be gained from any general studies electives,

) no more than 6CP may be gained from special electives,

) no more than 30CP may be gained from Level I subjects,

) no more than 6CP may be completed in any one Department in the first year,

) no more than 50CP may be gained from subjects presented by any one Department,

no General Studies elective may be taken concurrently with, or subsequent to, a Level I subject presented by the same Department.

Upon sufficient cause being shown, the University College ademic Board may vary the provisions of Rules 4, 6, 7 and in particular cases on the recommendation of a Head of partment concerned.

chedules of subjects for the egrees of Bachelor of Arts and achelor of Science

CHEDULE A—ARTS SUBJECTS

bject No.	Subject Name	Level	Credit Points
onomics and Management			
CM.1600 U	Economics and Management 1	I	6
CM.2601 U	Economics 2	II	8
CM.2603 U	International Trade	II	4
CM.2703 U	Foundations of Management	II	4
CM.2704 U	Introduction to Corporate and Government Accounting	II	4
CM.2604 U	Quantitative Methods in Economics and Management	II	4
CM.2690 U	Economics 2 (Honours)	II	—
CM.2790 U	Management 2 (Honours)	II	—
CM.3603 U	Quantitative Analysis and Econometrics	III	6
CM.3604 U	Industrial Economics	III	6
CM.3605 U	Public Sector Economics	III	6
AECM.3606 U	Economic Development	III	6
AECM.3607 U	Economies of Asia and the Pacific	III	6
AECM.3608 U	Labour Economics and Industrial Relations	III	6
AECM.3703 U	Public Sector Management	III	6
AECM.3704 U	Human Resource Management	III	6
AECM.3609 U	Advanced Economic Theory and Policy	III	6
AECM.3610 U	International Economic Theory and Policy	III	6
AECM.3611 U	Economics of Regulation	III	6
AECM.3612 U	Resource Economics	III	6
AECM.3705 U	Logistics	III	6
AECM.3706 U	Accounting Information for Management	III	6
AECM.3707 U	Finance	III	6
AECM.3613 U	Capitalism, Socialism and Economic Growth	III	6
AECM.3690 U	Economics 3 (Honours)	III	—
AECM.3790 U	Management 3 (Honours)	III	—
AECM.3692 U	Economics 3 (Combined Honours)	III	—
AECM.3792 U	Management 3 (Combined Honours)	III	—
AECM.4690 H	Economics 4 (Honours) F/T	IV	—
AECM.4691 H	Economics 4 (Honours) P/T	IV	—
AECM.4790 H	Management 4 (Honours) F/T	IV	—
AECM.4791 H	Management 4 (Honours) P/T	IV	—
AECM.4692 C	Economics 4 (Combined Honours) F/T	IV	—
AECM.4693 C	Economics 4 (Combined Honours) P/T	IV	—
AECM.4792 C	Management 4 (Combined Honours) F/T	IV	—
AECM.4793 C	Management 4 (Combined Honours) P/T	IV	—
English			
AENG.1600 U	English 1	I	6
AENG.2601 U	English 2A	II	8
AENG.2602 U	English 2B	II	8
AENG.2690 U	English 2 (Honours)	II	8
AENG.3601 U	English 3A	III	12
AENG.3602 U	English 3B	III	12
AENG.3690 U	English 3 (Honours)	III	12
AENG.3692 U	English 3 (Combined Honours)	III	—
AENG.4690 H	English 4 (Honours) F/T	IV	—
AENG.4691 H	English 4 (Honours) P/T	IV	—
AENG.4692 C	English 4 (Combined Honours) F/T	IV	—
AENG.4693 C	English 4 (Combined Honours) P/T	IV	—
History			
AHIS.1600 U	History 1	I	6
AHIS.1601 U	History 1: The Second World War	I	6
AHIS.2601 U	Revolts and Counter-insurgency	II	4
AHIS.3601 U	In Southeast Asia	III	6
AHIS.2602 U	Modern American	II	4
AHIS.3602 U	Foreign Policy	III	6

Subject No.	Subject Name	Level	Credit Points
AHIS.2603 U	Colonial Australia	II	4
AHIS.3603 U		III	6
AHIS.2604 U	Modern Australia:	II	4
AHIS.3604 U	Politics and Culture	III	6
AHIS.2605 U	The Origins of Modern War	II	4
AHIS.3605 U		III	6
AHIS.2606 U	From Democracy to Dictatorship	II	4
AHIS.3606 U		III	6
AHIS.2607 U	Mariners, Merchants and	II	4
AHIS.3607 U	Missionaries	III	6
AHIS.2608 U	Pacific History: From European	II	4
AHIS.3608 U	Contact to Fijian Coups	III	6
AHIS.2609 U	War and Society in	II	4
AHIS.3609 U	Australia 1788–1988	III	6
AHIS.2610 U	Southeast Asia: Revolution,	II	4
AHIS.3610 U	Nation and Society, 1870–1965	III	6
AHIS.2611 U	Russian History	II	4
AHIS.3611 U		III	6
AHIS.2612 U	Soviet History	II	4
AHIS.3612 U		III	6
AHIS.2613 U	The American Civil War	II	4
AHIS.3613 U		III	6
AHIS.2614 U	East Asia: Between Tradition	II	4
AHIS.3614 U	and Modernity	III	6
AHIS.2615 U	Social Change in	II	4
AHIS.3615 U	East Asia	III	6
AHIS.2616 U	Science and Technology	II	4
AHIS.3616 U	in Australia	III	6
AHIS.2617 U	War, Society and	II	4
AHIS.3617 U	the State	III	6
AHIS.2618 U	America from Revolution	II	4
AHIS.3618 U	to Civil War	III	6
AHIS.2619 U	The Fall and Rise of Europe	II	4
AHIS.3619 U		III	6
AHIS.2620 U	The Sea and Seafarers	II	4
AHIS.3620 U		III	6
AHIS.2690 U	History 2 (Honours)	II	—
AHIS.3690 U	History 3 (Honours)	III	—
AHIS.3692 U	History 3 (Combined Honours)	III	—
AHIS.4690 H	History 4 (Honours) F/T	IV	—
AHIS.4691 H	History 4 (Honours) P/T	IV	—
AHIS.4692 C	History 4 (Combined Honours) F/T	IV	—
AHIS.4693 C	History 4 (Combined Honours) P/T	IV	—
Information Systems			
ACSC.1700 U	Information Systems 1	I	6
ACSC.2700 U	Information Systems 2	II	8
ACSC.2790 U	Information Systems 2 (Honours)	II	—
ACSC.3700 U	Information Systems 3	III	12
ACSC.3790 U	Information Systems 3 (Honours)	III	—
ACSC.4790 H	Information Systems 4 (Honours) F/T	IV	—
ACSC.4791 H	Information Systems 4 (Honours) P/T	IV	—
ACSC.4792 C	Information Systems 4 (Combined Honours) F/T	IV	—
ACSC.4793 C	Information Systems 4 (Combined Honours) P/T	IV	—
Politics			
APOL.1600 U	Politics I	I	6
APOL.2601 U	Politics of Russia	II	4
APOL.3614 U		III	6
APOL.2603 U	Politics of the USA	II	4
APOL.3615 U		III	6
APOL.2604 U	Politics of China	II	4
APOL.3618 U		III	6
APOL.2607 U	Special Study in Politics	II	4
APOL.3608 U		III	6
APOL.2608 U	Understanding Revolutions	II	4
APOL.3617 U		III	6
APOL.2609 U	A History of Socialism	II	4
APOL.3619 U		III	6
APOL.2610 U	The Collapse of Communism	II	4
APOL.3620 U		III	6
APOL.2611 U	The Politics of	II	4
APOL.3611 U	Australian Defence Policy	III	6
APOL.2612 U	Parties, Voters and	II	4
APOL.3612 U	Public Opinion	III	6
APOL.2613 U	Electoral Systems	II	4
APOL.3613 U		III	6
APOL.2614 U	Issues and Problems in	II	4
APOL.3609 U	Australian Foreign Policy	III	6
APOL.2615 U	War in International	II	4
APOL.3607 U	Politics	III	6
APOL.2616 U	The Military, Society and	II	4
APOL.3616 U	Politics in Indonesia	III	6
APOL.2617 U	Introduction to	II	4
APOL.3616 U	Comparative Politics	III	6
APOL.2690 U	Politics 2 (Honours)	II	—
APOL.3690 U	Politics 3 (Honours)	III	—
APOL.3692 U	Politics 3 (Combined Honours)	III	—
APOL.4690 H	Politics 4 (Honours) F/T	IV	—
APOL.4691 H	Politics 4 (Honours) P/T	IV	—
APOL.4692 C	Politics 4 (Combined Honours) F/T	IV	—
APOL.4693 C	Politics 4 (Combined Honours) P/T	IV	—

SCHEDULE S—SCIENCE SUBJECTS

Subject No.	Subject Name	Level	Credit Points
Chemistry			
ACHM.1600 U	Chemistry I	I	
ACHM.2601 U	Chemistry 2A	II	
ACHM.2602 U	Chemistry 2B	II	
ACHM.3601 U	Chemistry 3A	III	1
ACHM.3602 U	Chemistry 3B	III	1
ACHM.3603 U	Chemistry 3C	III	
ACHM.4690 H	Chemistry 4 (Honours) F/T	IV	–
ACHM.4691 H	Chemistry 4 (Honours) P/T	IV	–
ACHM.4692 C	Chemistry 4 (Combined Honours) F/T	IV	–
ACHM.4693 C	Chemistry 4 (Combined Honours) P/T	IV	–
Computer Science			
ACSC.1600 U	Computer Science 1	I	
ACSC.2601 U	Computer Science 2A	II	
ACSC.2602 U	Computer Science 2B	II	
ACSC.3601 U	Computer Science 3A	III	
ACSC.3602 U	Computer Science 3B	III	
ACSC.3603 U	Computer Science 3C	III	
ACSC.4690 H	Computer Science 4 (Honours) F/T	IV	–
ACSC.4691 H	Computer Science 4 (Honours) P/T	IV	–
ACSC.4692 C	Computer Science 4 (Combined Honours) F/T	IV	–
ACSC.4693 C	Computer Science 4 (Combined Honours) P/T	IV	–
Mathematics			
AMAT.1600 U	Mathematics I	I	
AMAT.2601 U	Mathematics 2A	II	
AMAT.2602 U	Mathematics 2B	II	

ibject No.	Subject Name	Level	Credit Points
IAT.3601 U	Mathematics 3A	III	12
IAT.3602 U	Mathematics 3B	III	12
IAT.3603 U	Mathematics 3C	III	6
IAT.4690 H	Mathematics 4 (Honours) F/T	IV	—
IAT.4691 H	Mathematics 4 (Honours) P/T	IV	—
IAT.4692 C	Mathematics 4 (Combined Honours) F/T	IV	—
IAT.4693 C	Mathematics 4 (Combined Honours) P/T	IV	—
ɜeanography			
iOC.1700 U	Oceanography 1	I	6
iOC.2700 U	Oceanography 2	II	8
iOC.3700 U	Oceanography 3	III	12
iOC.4790 H	Oceanography 4 (Honours) F/T	IV	—
iOC.4791 H	Oceanography 4 (Honours) P/T	IV	—
iOC.4792 C	Oceanography 4 (Combined Honours) F/T	IV	—
iOC.4793 C	Oceanography 4 (Combined Honours) P/T	IV	—
ysics			
HY.1600 U	Physics I	I	6
HY.2601 U	Physics 2A	II	8
HY.2602 U	Physics 2B	II	8
HY.3605 U	Physics 3A	III	12
HY.3606 U	Physics 3B	III	12
HY.3607 U	Physics 3C	III	15
HY.3608 U	Physics 3D	III	6
HY.4690 H	Physics 4 (Honours) F/T	IV	—
HY.4691 H	Physics 4 (Honours) P/T	IV	—
HY.4692 C	Physics 4 (Combined Honours) F/T	IV	—
HY.4693 C	Physics 4 (Combined Honours) P/T	IV	—

HEDULE AS—ARTS OR SCIENCE SUBJECTS

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

ɔject No.	Subject Name	Level	Credit Points
ɔgraphy			
OC.1600 U	Geography I	I	6
OC.2601 U	Geography 2A	II	8
OC.2602 U	Geography 2B	II	8
OC.2603 U	Geography 2C	II	8
OC 2690 U	Geography 2(Honours)	II	—
OC.3601 U	Geography 3A	III	12
OC.3602 U	Geography 3B	III	12
OC.3603 U	Geography 3C	III	8
OC.3690 U	Geography 3(Honours)	III	—
OC.3692 U	Geography 3(Combined Honours)	III	—
OC.4690 H	Geography 4 (Honours) F/T	IV	—
OC.4691 H	Geography 4 (Honours) P/T	IV	—
OC.4692 C	Geography 4 (Combined Honours) F/T	IV	—
OC.4693 C	Geography 4 (Combined Honours) P/T	IV	—

SCHEDULE SE—SPECIAL ELECTIVES

Subject No.	Subject Name	Credit Points
AMEC.0500 U	Mechanics of Flight	3
APHY.0501 U	Meteorology A	3
ACMA.0500 U	Surveying	4

SCHEDULE GS—GENERAL STUDIES ELECTIVES

Subject No.	Subject Name	Credit Points
For the Arts Course		
AELE.0500 U	Engineering GS	3
AMAT.0500 U	Mathematics GS	3
AMAT.0501 U	Mathematics GS: Statistics in the Social Sciences	3
APHY.0500 U	Physics for Society	3
ACHM.0500 U	Chemistry and Society	3

Subject No.	Subject Name	Credit Points
For the Science Course		
AHIS.0501U	History GS1	*
AHIS.0502 U	History GS2	*
AHIS.0503 U	History GS3	*
AHIS.0504 U	History GS4	*
AENG.0501 U	English GS1	*
AENG.0502 U	English GS 2	*
AENG.0503 U	English GS 3	*
AENG.0504 U	English GS 4	*
AENG.0505 U	English GS 5	*
AECM.0500 U	Economics GS	3

*See departmental entry for credit point values.

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 admission as a candidate for this degree shall choose either one field of study or, in the case of a combined honours program, two fields of study from the following:

Economics	History
English	Information Systems
Geography	Politics Management

3. A student who has enrolled for the degree of Bachelor of Arts in the University College may be permitted to transfer to candidature for the degree of Bachelor of Arts with Honours at any of the following three levels.

(a) For entry into an honours program at Level II the student must:
  (i) obtain or be deemed to have obtained at least 24 credit points in Level I subjects;
  (ii) complete all subjects attempted in the Arts program;
  (iii) achieve the result of Credit or higher in the Level I subject or subjects (with a total value of six credit points) in the field of study of the proposed honours program or, in the case of a combined honours program, Level I subjects (with a total value of 12 credit points) in two fields of study;
  (iv) apply in writing to the Head(s) of Department(s) concerned; and
  (v) obtain support for the application from the Head(s) of Department(s) concerned and receive approval from the Academic Board.

  An application under Rule 3(a) may be made up to the end of the first session in the year in which the student intends to enter the honours program provided that the student is already enrolled in the relevant pass subject or subjects.

(b) For entry into an honours program at Level III the student must:
  (i) obtain or be deemed to have obtained at least 48 credit points;
  (ii) complete all subjects attempted in the Arts program;
  (iii) achieve the result of Credit, Distinction or High Distinction in the appropriate Level II subject or subjects (with a total value of 8 credit points) in the field of study of the proposed honours program or, in the case of a combined honours program, Level II subjects (with a total value of 16 credit points) in two fields of study;
  (iv) apply in writing to the Head(s) of Department(s) concerned; and
  (v) obtain support for the application from the Head(s) of Department(s) concerned and receive approval from the Academic Board.

  An application under Rule 3(b) must be made by the end of the first week of the first session in the year in which the student intends to enter the honours program. In addition to the normal honours program, the student shall undertake such additional or bridging studies as may be prescribed by the Head(s) of Department(s) concerned.

(c) In exceptional circumstances, a student may apply for entry into an honours program at Level IV, subject to meeting the following requirements:
  (i) obtain or be deemed to have obtained at least 72 credit points;
  (ii) complete all subjects attempted in the Arts program;
  (iii) achieve the results of Distinction or High Distinction in the appropriate Level III subject or subjects (with a total value of 12 credit points) in the field of study of the proposed honours program or, in the case of a combined honours program, Level III subjects (with a total value of 24 credit points) in two fields of study;
  (iv) apply in writing to the Head(s) of Department(s) concerned; and
  (v) obtain support for the application from the Head(of Department(s) concerned and receive approv from the Academic Board.

An application under Rule 3(c) must be made to the releva Head(s) of Department(s) before the end of the second se sion of the year in which the student completes Level III. addition to the normal honours program, the student sh undertake such additional or bridging studies as may be pr scribed by the Head(s) of Department(s) concerned.

4. To be eligible to undertake Level IV of an honours progra a candidate must have obtained at least 72 credit points accordance with the Rules governing the Award of the Degr of Bachelor of Arts, including:

(a) at least 38 credit points from subjects in the field of stu of the honours program in which the student h obtained a result averaging Credit or higher or, in t case of a combined honours program, at least 52 cre points in two fields of study in which the student h obtained a result averaging Credit or higher.

(b) such additional work taken at Level II and Level III of t degree program from special subjects in the field(s) study of the honours program, as prescribed by t Head(s) of the Department(s), in which the student h obtained a result averaging Credit or higher.

  For a candidate who entered an honours program und Rule 3(b) or Rule 3(c) the requirements of Rule 4(b) v be modified by the prescription of additional or bridgi studies by the Head(s) of Department(s) concerned.

5. There shall be no re-examination of a Level of IV honou subject.

6. (a) A candidate for the degree of Bachelor of Arts w Honours who withdraws from or fails to meet the requir ments of the honours program at Level II or III may trar fer to the program for the degree of Bachelor of A under conditions determined by the Academic Board.

  (b) A candidate for the degree of Bachelor of Arts w Honours who has completed the academic requiremer up to and including Level III but who withdraws from or fa to complete the Level IV honours year program, shall qualified for the award of the degree of Bachelor of Ar

7. In special circumstances, a graduate who has be awarded the Bachelor of Arts degree in the University Colle may be admitted by the Academic Board to candidature for t degree of Bachelor of Arts with Honours, provided he or s satisfies the requirements of Rule 4.

8. Upon sufficient cause being shown, the provisions of Rul 3 and 4 may be varied in particular cases on the recomme dation of a Head of Department concerned.

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

1. The degree of Bachelor of Science with Honours shall conferred in the following categories:
  Honours Class I
  Honours Class II Division I
  Honours Class II Division II
  Honours Class III.

A student seeking recognition as a candidate for this gree shall choose either one, or, with the approval of the rel-ant Heads of Departments, two fields of study from the fol-wing in which to undertake the honours program:

Chemistry	Computer Science
Physics	Geography
Oceanography	Mathematics

Admission to candidature for the degree of Bachelor of ience with Honours shall be considered only after an appli-nt has completed the requirements for the degree of chelor of Science in the University College. To qualify for mission he or she must have completed subjects at required ades as determined by the Head(s) of the relevant partment(s). In order to ascertain such requirements a stu-nt contemplating honours is advised to consult the Head(s) the Department(s) not later than the end of the first year of dy. Admission is subject to the approval of the Academic ard.

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

A candidate for the degree of Bachelor of Science with nours who withdraws from or fails to complete the final hon-s year program shall be qualified for the award of the gree of Bachelor of Science.

On the recommendation of the Head(s) of Department(s) ncerned, graduates who have been awarded the degree of chelor of Science in the University College may be admit-l by the Academic Board to candidature for the degree of chelor of Science with Honours with credit for all subjects npleted if, during their studies for the pass degree, they ve satisfied the prerequisites or the equivalent of those pre-quisites for entry to the honours levels laid down by the partment or departments concerned.

ules governing the award of the egree of Bachelor of Engineering

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

Honours Class I

Honours Class II, Division I

Honours Class II, Division II

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

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

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

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

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

5. Academic Requirements:

(a) *Standard Program.* The candidate shall complete in the years prescribed the qualifying subjects prescribed for all engineering students and those pertaining to one particular branch of engineering as set out in Schedules E1, E2, E3 and E4. The general studies electives shall be chosen from those listed in Schedule E5. Subject to the approval of the Heads of Departments concerned, students may substitute for two general studies electives one level one subject from Schedule A-Arts subjects for the degree of Bachelor of Arts and Bachelor of Science.

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

6. Practical Engineering Experience Requirements:

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

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

Schedule of Subjects for the BE Degree
Schedule E1-The First Year Course

All Engineering Students
AMAT.1800 U Mathematics 1E
ACSC.1800 U Computer Science 1E

Civil Engineering
ACMA.1800 U Civil Engineering 1
APHY.1801 U Physics 1CE
ACHM.1800 U Chemistry 1E

Maritime Engineering
ACMA.1900 U Maritime Engineering 1
APHY.1801 U Physics 1CE
ACHM.1800 U Chemistry 1E

Electrical Engineering
AELE.1800 U Electrical Engineering 1
APHY.1800 U Physics 1E

Mechanical Engineering
AMEC. 1800 U Mechanical Engineering 1
APHY.1800 U Physics 1E

Aeronautical Engineering
AMEC.1900 U Aeronautical Engineering 1
APHY.1800 U Physics 1E

Schedule E2-The Second Year Course

All Engineering Students		*Prerequisite Subjects*
AMAT.2800 U	Mathematics 2E	*Mathematics 1E*
Civil Engineering		
ACSC.2801 U	Computer Science 2CE	*Mathematics 1E and Computer Science 1E*
AMAT.2801 U	Engineering Mathematics 1E	*Mathematics 1E and Computer Science 1E*
ACMA.2800 U	Civil Engineering 2	*Civil Engineering 1, Physics 1CE, Chemistry 1E, Mathematics 1E, and Computer Science 1E*
	General Studies elective	
Maritime Engineering		
ACSC.2801 U	Computer Science 2CE	*Mathematics 1E and Computer Science 1E*
AMAT.2801 U	Engineering Mathematics 1E	*Mathematics 1E and Computer Science 1E*
ACMA.2900 U	Maritime Engineering 2	*Maritime Engineering 1, Physics 1CE, Chemistry 1E, Mathematics 1E and Computer Science 1E*
AGOC.1700 U	Oceanography 1	
Electrical Engineering		
ACSC.2802 U	Computer Science 2EE	*Mathematics 1E and Computer Science 1E*
APHY.2801 U	Physics 2E	*Mathematics 1 or 1E and Physics 1 or 1E*
AELE.2800 U	Electrical Engineering 2	*Mathematics 1E, Computer Science 1E, Electrical Engineering 1 and Physics 1E*
	General Studies elective	
Mechanical Engineering		
ACSC.2800 U	Computer Science 2E	*Mathematics 1E and Computer Science 1E*
AMEC.2800 U	Mechanical Engineering 2	*Mechanical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*
Aeronautical Engineering		
AMEC.2900 U	Aeronautical Engineering 2	*Aeronautical Engineering 1, Physics 1E, Mathematics 1E, and Computer Science 1E*

Schedule E3—The Third Year Course

ivil Engineering		*Prerequisite Subjects*
CMA.3800 U	Civil Engineering 3 General Studies elective	*Civil Engineering 2*
laritime Engineering		
CMA.3900 U	Maritime Engineering 3 General Studies elective	*Maritime Engineering 2*
lectrical Engineering		
ELE.3800 U	Electrical Engineering 3	*Electrical Engineering 2, Computer Science 2EE and Physics 2E*
MAT.3800 U	Mathematics 3E (Probability 3E, Statistics 3E, Complex Analysis 3E & Differential Equations 3E) General Studies elective	*Mathematics 2E*
echanical Engineering		
MAT.3800 U	Mathematics 3E (Probability 3E, Statistics 3E, Complex Analysis 3E & Differential Equations 3E)	*Mathematics 2E*
MEC.3800 U	Mechanical Engineering 3 2 General Studies electives	*Mechanical Engineering 2*

Schedule E4—The Final Year Course

vil Engineering		*Prerequisite Subjects*
CMA.4800 U	Civil Engineering 4	*Civil Engineering 3*
CMA.4801 U	Project, Thesis and Seminar	*Civil Engineering 3*
CMA.4802 U	Design and Seminar	*Civil Engineering 3*
aritime Engineering		
CMA.4900 U	Maritime Engineering 4	*Maritime Engineering 3*
CMA.4901 U	Project and Seminar General Studies Elective	*Maritime Engineering 3*
ectrical Engineering		
ELE.4801 U	Project, Thesis and Specialist Lectures	*Electrical Engineering 3 and Mathematics 3E*
ELE.4800 U	Electrical Engineering 4	*Electrical Engineering 3 and Mathematics 3E*
echanical Engineering		
MEC.4801 U	Project and Thesis	*Mechanical Engineering 3*
MEC.4800 U	Mechanical Engineering 4	*Mechanical Engineering 3*

fourth year engineering students must complete the appropriate Practical Experience subject

Schedule E5—General Studies Electives

ECM.0500 U	Economics GS
ENG.0501 U	English GS1
ENG.0502 U	English GS2 (Not offered in 1993)
ENG.0503 U	English GS3 (Not offered in 1993)
ENG.0504 U	English GS4 (Not offered in 1993)
ENG.0505 U	English GS5
HIS.0501 U	History GS1(Not offered in 1993)
HIS.0502 U	History GS2 (Not offered in 1993)
HIS.0503 U	History GS3
HIS.0504 U	History GS4

Combined BSc/BE Degree Courses

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

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

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

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

The substitution of a Level 1 6CP Arts subject for the general studies requirement of the engineering degree is an option in all programs.

BSc/BE Programs

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

Details of each program are available from the Deputy Colleg Secretary (Academic).

9. Undergraduate Course Programs

The Undergraduate Courses

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

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

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

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

Undergraduate Course Codes

Degree	*Department*	*Course Code*
BA Bachelor of Arts	Various	4400
BSc Bachelor of Science	Various	4410
BE Bachelor of Engineering		
	Civil Engineering	4421
	Electrical Engineering	4422
	Mechanical Engineering	4423
	Aeronautical Engineering	4424
	Maritime Engineering	4444

Arts and Science

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

Many subjects have prerequisites and/or corequisites. A st dent must have completed a prerequisite for a subject befo being permitted to enrol in that subject. A corequisite must b taken concurrently with the subject, unless the student ha completed it already. In general, a level I subject is a pr requisite for a level II subject, and a level II for a level III. Oth prerequisites may be prescribed in subject syllabuses or in th degree rules.

Students are strongly advised to read the section 'Informatic for Students' in the yellow pages at the end of this *Handboo*

Course

				Credit Points
t 1	Pol 1	Eng 1	Maths GS/Phys Soc	24
evel II Hist	2 Level II Pol	Eng 2A		24
evel III Hist			Geog 1	18
				66
1	Eng 1	Hist 1	Chem Soc/Phys Soc	24
evel II Pol	2 Level II Pol	2 Level II Hist		24
evel III Pol	2 Level III Pol			24
				72
n and Mgmt 1	Geog 1	Inf Sys 1	Chem 1	24
evel II Econ	2 Level II Mgmt	Inf Sys 2		24
evel III Econ	2 Level III Mgmt			24
				72
1	Pol 1	Geog 1	Chem Soc/Maths GS	24
2A	Eng 2B	Geog 2A		24
3A		Geog 3A		24
				72
hs 1	Inf Sys 1	Eng 1	Hist 1	24
hs 2A	Inf Sys 2	Eng 2A		24
hs 2B		Eng 3A		20
				68
m 1	Comp Sc 1	Maths 1	Pol 1	24
	Comp Sc 2A	Hist 1	2 Level II Pol	22
		2 Level II Hist	2 Level III Pol	20
				66
ns 1	Econ and Mgmt 1	Inf Sys 1	Phys 1	24
ns 2A	2 Level II Mgmt		Maths 2B	24
	2 Level III Mgmt	Inf Sys 2		20
				68
g 1	Inf Sys 1	Chem 1	Math 1	24
g 2A	Inf Sys 2	Chem 2A		24
g 3A			Eng 1	18
				66

BSc Course

				Cre Poi
Chem 1 Chem 2A Chem 3A	Maths 1 Maths 2A Inf Sys 1	Geog 1 Geog 2A	Econ and Mgmt 1	
Chem 1 Chem 2A	Maths 1 Maths 2A	Phys 1 Phys 2A Phys 3A	Eng GS/Hist GS Geog 1	
Comp Sc 1 Comp Sc 2A	Geog 1 Geog 2A	Maths 1 Maths 2A Maths 3A	Pol 1 Ocean 1	
Geog 1 Geog 2A	Econ GS Ocean 1 Ocean 2	Maths 1 Hist GS	Comp Sc 1 Comp Sc 2A Comp Sc 3A	
Econ and Mgmt 1 2 Level II Mgmt	Comp Sc 1 Comp Sc 2	Geog 1 Geog 2A Geog 3A	Maths 1 Ocean 1	
Chem 1 Chem 2A	Maths 1 Maths 2A Maths 3A	Geog 1	Hist 1 2 Level II Hist 2 Level III Hist	
Chem 1 Chem 2A	Phys 1 Phys 2A	Ocean 1 Ocean 2 Ocean 3	Maths 1 Econ and Mgmt 1	
Maths 1 Maths 2A Maths 3A	Phys 1 Phys 2A Phys 3A	Comp Sc 1 Comp Sc 2A	Pol 1	

ıgineering

ɜ programs shown below are standard programs, i.e. those ch can be completed in minimum time. A student may be nted an extension of time in order to complete a course, l this often necessitates a non-standard program, which is wn up by the Departments concerned.

ore completing their academic studies engineering stu- ıts must complete 60 working days of approved practical ıerience, which must be done in periods of 20 or more work- days at a time.

ɜ Head of Department may require students to maintain an ɔroved record for each period of work experience and return record to the Department to obtain credit for the work expe- ıce.

ndard Programs for the BE degree

il Engineering		*Prerequisite subjects*
ɜr *I*	Mathematics 1E	
	Physics 1CE	
	Computer Science 1E	
	Chemistry 1E	
	Civil Engineering 1	
ɜr *II*	Mathematics 2E	*Mathematics 1E*
	Engineering Mathematics 1E	*Mathematics 1E and Computer Science 1E*
	Computer Science 2CE	*Mathematics 1E and Computer Science 1E*
	Civil Engineering 2	*Civil Engineering 1, Computer Science 1E, Mathematics 1E, Physics 1CE and Chemistry 1E*
	General Studies elective	
ɜr *III*	Civil Engineering 3	*Civil Engineering 2*
	General Studies elective	
ɜr *IV*	Civil Engineering: Project and Seminar *or*	*Civil Engineering 3*
	Civil Engineering: Design and Seminar	
	Civil Engineering 4	*Civil Engineering 3*

ritime Engineering		
ɜr *I*	Mathematics 1E	
	Physics 1CE	
	Computer Science 1E	
	Chemistry 1E	
	Maritime Engineering 1	
ɜr *II*	Mathematics 2E	*Mathematics 1E*
	Engineering Mathematics 1E	*Mathematics 1E and Computer Science 1E*
	Computer Science 2CE	*Computer Science 1E, Mathematics 1E*
	Maritime Engineering 2	*Maritime Engineering 1, Computer Science 1E, Mathematics 1E, Physics 1CE and Chemistry 1E*
	Oceanography 1	
ɜr *III*	Maritime Engineering 3	*Maritime Engineering 2*
	General Studies elective	
ɜr *IV*	Maritime Engineering: Project and Seminar	*Maritime Engineering 3*
	Maritime Engineering 4	*Maritime Engineering 3*
	General Studies elective	

Electrical Engineering

Year I	Mathematics 1E	
	Physics 1E	
	Computer Science 1E	
	Electrical Engineering 1	
Year II	Computer Science 2EE	*Mathematics 1E and Computer Science 1E*
	Physics 2E	*Mathematics 1 or 1E and Physics 1 or 1E*
	Electrical Engineering 2	*Mathematics 1E, Computer Science 1E, Electrical Engineering 1 and Physics 1E*
	Mathematics 2E	*Mathematics 1E*
	General Studies elective	
Year III	Electrical Engineering 3	*Electrical Engineering 2, Computer Science 2EE and Physics 2E*
	Mathematics 3E (Probability 3E, Statistics 3E Complex Analysis 3E and Differential Equations 3E)	*Mathematics 2E*
	General Studies elective	
Year IV	Electrical Engineering: Project and Thesis and Specialist Lectures	*Electrical Engineering 3 and Mathematics 3E*
	Electrical Engineering 4	*Electrical Engineering 3 and Mathematics 3E*

Mechanical Engineering

Year I	Mathematics 1E	
	Physics 1E	
	Computer Science 1E	
	Mechanical Engineering 1	
Year II	Mathematics 2E	*Mathematics 1E*
	Computer Science 2E	*Mathematics 1E and Computer Science 1E*
	Mechanical Engineering 2	*Mechanical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*
Year III	Mathematics 3E (Probability 3E, Statistics 3E Complex Analysis 3E and Differential Equations 3E)	*Mathematics 2E*
	Mechanical Engineering 3	*Mechanical Engineering 2*
	2 General Studies electives	
Year IV	Mechanical Engineering: Project and Thesis	*Mechanical Engineering 3*
	Mechanical Engineering 4	*Mechanical Engineering 3*

Aeronautical Engineering

Year I	Mathematics 1E	
	Physics 1E	
	Computer Science 1E	
	Aeronautical Engineering 1	
Year II	Mathematics 2E	*Mathematics 1E*
	Aeronautical Engineering 2	*Aeronautical Engineering 1, Physics 1E, Mathematics 1E and Computer Science 1E*

10. Subject Descriptions

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

1. Arts and Science disciplines, listed alphabetically
2. The First Year Engineering courses
3. Second and later year Engineering courses, listed alphabetically
4. General Studies electives
5. Special Electives.

Identification of Undergraduate Subjects and Units by Numbers

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

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

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

- Each subject and unit has a unique Subject Identifier comprising an alphabetic prefix and a numeric suffix together with a separate alphabetic subject code.
- The authority offering a subject or unit is indicated by an alphabetic prefix before a decimal point.
- The particular undergraduate subject or units identified by four digits after the decimal point. Subjects will have a Subject Code 'U' and units a Subject Code 'E'.
- An undergraduate subject has a number in the range 5 to 9 as the second digit of the suffix to the subject identifier.
- An undergraduate unit has a '0' as the second digit of the suffix to the subject identifier.
- The level of a particular subject or unit is indicated by the first digit of the numeric suffix of the subject identifier.
- Each identifying number is allocated to one subject or one unit only. A number which has been used previously is not used for a new subject or unit.

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

ACMA	Civil and Maritime Engineering
AELE	Electrical Engineering
AMEC	Mechanical Engineering (including Aeronautical Engineering)
AECM	Economics and Management
AENG	English
AHIS	History
APOL	Politics
ACHM	Chemistry
ACSC	Computer Science (including Information Systems)
AGOC	Geography and Oceanography
AMAT	Mathematics
APHY	Physics
AINT	University College (Interdisciplinary)

The following subject codes identify undergraduate subject and units:

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

Prerequisites and Corequisites

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

First year prerequisites are defined in terms of the NSW Higher School Certificate examination. With the approval c the Academic Board, students who completed Year 12 i another State will meet a particular prerequisite if the obtained a comparable result in an equivalent Year 12 subjec or, in the case of a Tasmanian candidate, an equivalent Lev III subject.

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

Any queries relating to prerequisites and corequisites shoul be referred to the relevant Heads of Departments.

The following summary shows the prerequisites and corequ sites for subjects in the Arts and Science courses. It also ind cates, where relevant, that a subject or unit would exclud other subjects or units from being counted towards th requirements for a degree.

ımmary of subjects and units in the ts and Science courses

ı	
el	indicates first, second, third or fourth year
V	credit point value
en offered	S1—Session 1 S2—Session 2
	SS—single session, (S1 or S2 not yet determined)
	F—full year
W	hours per week of class contact

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

emistry

o.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites
CHM.1600 U	Chemistry 1	I	6	F	7	*	
CHM.2601 U	Chemistry 2A	II	8	F	9	ACHM.1600 U & AMAT 1600 U	
CHM.2602 U	Chemistry 2B	II	8	—	9	ACHM.1600 U & AMAT.1600 U	
CHM.3601 U	Chemistry 3A	III	12	F	13	ACHM.2601 U	
CHM.3602 U	Chemistry 3B	III	12	—	13	ACHM.2602 U	
CHM.3603 U	Chemistry 3C	III	6	F	5		ACHM.3601 U
CHM.4690 H	Chemistry 4 (Honours) F/T	IV	—	F	—		**
CHM.4691 H	Chemistry 4 (Honours) P/T	IV	—				
CHM.4692 C	Chemistry 4 (Combined Honours) F/T	IV	—				
CHM.4693 C	Chemistry 4 (Combined Honours) P/T	IV	—				
CHM.0500 U	Chemistry & Society	—	3	F	2		

See Chapter 6 for details

To enrol in an honours year a student must seek permission initially from the Head of Department.

This subject may be taken only by students in the Arts course.

il Engineering

o.	Name	Level	CPV	When Offered	HPW
CMA.0500 U	Surveying	—	4	F	+

special elective for BA and BSc students, presented by the Department of Civil and Maritime Engineering. For further details see p 135

Computer Science

No.	*Name*	*Level*	*CPV*	*When Offered*	*HPW*	*Prerequisites*	*Corequisites*	*Excluded*
ACSC.1600 U	Computer Science 1	I	6	F	6	*		ACSC.1700 U
ACSC.1700 U	Information Systems 1	I	6	F	6			ACSC.1600 U
ACSC.2601 U	Computer Science 2A	II	8	F		ACSC.1600 U & AMAT.1600 U		
+ ACSC.2602 U	Computer Science 2B	II	8	F		ACSC.1600 U & AMAT.1600 U	ACSC.2601 U	
ACSC.2700 U	Information Systems 2	II	8	F		ACSC.1700 U		
ACSC.2790 U	Information Systems 2 (Honours)	II	—	F	‡			
ACSC.2001 E	Data Structures 2	II	2	S1	4	ACSC.1600 U *or* ACSC.1800 U		
+ ACSC.2002 E	Logic Design 2	II	2	—	4	ACSC.1600 U & APHY.1600 U *or* APHY.1800 U		
ACSC.2003 E	Numerical Analysis 2	II	2	S1	4	ACSC.1600 U	AMAT.2601 U	
ACSC.2004 E	Introductory Operations Research 2	II	2	S1	4	AMAT.1600 U		
ACSC.2005 E	Computer Architecture 2	II	2	S2	4	ACSC.1600 U *or* ACSC.1800 U		
ACSC.2006 E	Operating Systems 2	II	2	S2	4	ACSC.2001 E		
ACSC.2007 E	Applied Op. Research 2	II	2	S2	4	ACSC.2004 E		
ACSC.2008 E	Numerical Linear Algebra 2	II	2	S2	4	ACSC.2003 E	AMAT.2601 U	
ACSC.2009 E	Knowledge Programming 2	II	2	S1	4	ACSC.1600 U		
ACSC.2010 E	Data Abstraction 2	II	2	S2	4	ACSC.2001 E		
ACSC.2011 E	Information Processing 2	II	2	S1	4			
ACSC.2012 E	Data Base Management Systems 2	II	2	S2	4			
ACSC.2013 E	Information in Organisations 2	II	2	S1	4			
ACSC.2014 E	Information Analysis 2	II	2	S2	4			
ACSC.3601 U	Computer Science 3A	III	12	F				
+ ACSC.3602 U	Computer Science 3B	III	12	F			ACSC.3601 U	
ACSC.3603 U	Computer Science 3C	III	6	S1, S2 *or* F				
ACSC.3700 U	Information Systems 3	III	12	F	4			
ACSC.3790 U	Information Systems 3 (Honours)	III	—	F	‡			
ACSC.3001 E	Artificial Intelligence 3	III	2	S2	4	ASCS.2009 E		
ACSC.3002 E	Data Networks 3	III	2	S1	4	ACSC.2001 E *or* ACSC.2011 E		
+ ACSC.3003 E	Compiler Design 3	III	2	S2	4	ACSC.2001 E & ACSC.2005 E		
+ ACSC.3004 E	Real Time Systems 3	III	2	—	4	ACSC.2002 E & ACSC.2005 E		
+ ACSC.3005 E	Numerical Analysis 3	III	2	—	4	ACSC.2003 E & AMAT.2601 U		
ACSC.3006 E	Computer Graphics 3	III	2	S2	4	ACSC.2001 E		
+ ACSC.3007 E	Computer Architecture 3	III	2	S2	4	ACSC.2002 E, ACSC.2005 E & ACSC.2006 E		
ACSC.3008 E	Operating Systems 3	III	2	S1	4	ACSC.2005 E & ACSC.2006 E		
+ ACSC.3009 E	Theoretical Comp. Science 3	III	2	—	4	ACSC.2001 E		
ACSC.3011 E	Comp Science Project 3	III	4	S2	4	ACSC.3014 E		
ACSC.3012 E	Applied Stochastic Processes 3	III	2	—	4	AMAT.2004 E *or* ACSC.2004 E		
ACSC.3013 E	Opt. System Control 3	III	2	S2	4	AMAT.2004 E *or* ACSC.2004 E		
ACSC.3014 E	Software Engineering 3	III	2	S1	4	ACSC.2001 E		

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
ACSC.3015 E	Cryptography & Computer Security 3	III	2	S2	4			
ACSC.3016 E	Comparative Programming Languages 3	III	2	S1	4	ACSC.2001 E		
ACSC.3017 E	Simulation 3	III	2	S2	4	ACSC.2004 E		
ACSC.3018 E	Systems Planning 3	III	2	S1				
ACSC.3019 E	Systems Design 3	III	2	S1				
ACSC.3020 E	Modelling & Decision Systems 3	III	2	S1				
ACSC.3021 E	Information Systems Communications 3	III	2	S2				
ACSC.3022 E	Management Information Systems Practices 3	III	2	—				
ACSC. 3023 E	Knowledge Based Systems 3	III	2	S2				
ACSC. 3024 E	Quantitative Techniques 3	III	2	S2				
ACSC. 3025 E.	Information Systems Project 3	III	4	S2				
ACSC.3026 E	Information Systems Programming 3	III	2	S2				
ACSC.4690 H	Comp. Science 4 (Honours) F/T	IV	—	F		‡		
ACSC.4691 H	Comp. Science 4 (Honours) P/T	IV	—					
ACSC. 4692 C	Computer Science 4 (Combined Honours) F/T	IV	—			‡		
ACSC.4693 C	Computer Science 4 (Combined Honours) P/T	IV	—					
ACSC.4790 H	Information Systems 4 (Honours) F/T	IV		F		‡		
ACSC.4791 H	Information Systems 4 (Honours) P/T	IV						
ACSC.4792 C	Information Systems 4 (Combined Honours) F/T	IV				‡		
ACSC.4793 C	Information Systems 4 (Combined Honours) P/T	IV						

Students who have not completed 3 Unit HSC Maths or equivalent, are not recommended to take this subject.
To enrol in an honours year a student must seek permission initially from the Head of the Department.
Consult the Department regarding availability of these subjects or units.

onomics and Management

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AECM.1600 U	Economics & Management	I	6	F	4	*	—	
AECM.2601 U	Economics 2	II	8	F	4	AECM.1600 U	—	
AECM.2690 U	Economics 2 (Honours)	II		F	1	†	AECM.2601 U & AECM.2604 U or AECM.2703 U *or* AECM.2704 U	
AECM.2790 U	Management 2 (Honours)	II		F	1	†	AECM.2604 U, AECM.2703 U & AECM.2704 U	
AECM.2603 U	International Trade	II	4	S1	4	AECM.1600 U	—	
AECM.2703 U	Foundations of Management	II	4	S2	4	AECM.1600 U	—	
AECM.2704 U	Introduction to Corporate & Government Accounting	II	4	S1	4	AECM.1600 U	—	
AECM.2604 U	Quantitative Methods in Economics and Management	II	4	S2	4	AECM.1600 U	—	
AECM.3603 U	Quant. Analysis and Econometrics	III	6	SS	4	AECM.2604 U	—	

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AECM.3604 U	Industrial Economics	III	6	SS	4	AECM.2601 U	—	
AECM.3605 U	Public Sector Economics	III	6	SS	4	AECM.2601 U	—	
AECM.3606 U	Economic Development	III	6	SS	4	AECM.2601 U *or* AECM.2603 U	—	
AECM.3607 U	Economies of Asia and the Pacific	III	6	SS	4	AECM.2601 U or AECM.2603 U	—	
AECM.3608 U	Labour Economics and Industrial Relations	III	6	SS	4	AECM.2601 U *or* AECM.2703 U	—	
AECM.3703 U	Public Sector Management	III	6	SS	4	AECM.2703 U		
AECM.3704 U	Human Resource Management	III	6	SS	4	AECM.2703 U		
AECM.3609 U	Advanced Economic Theory and Policy	III	6	SS	4	AECM.2601 U	—	
AECM.3610 U	International Economic Theory and Policy	III	6	SS	4	AECM.2601 U	—	
AECM.3611 U	Economics of Regulation	III	6	SS	4	AECM.2601 U	—	
AECM.3612 U	Resource Economics	III	6	SS	4	AECM.2601 U	—	
AECM.3705 U	Logistics	III	6	SS	4	AECM.2703 U	—	
AECM.3706 U	Accounting Information for Management	III	6	SS	4	AECM.2704 U	—	
AECM.3707 U	Finance	III	6	SS	4	AECM.2703 U	—	
AECM.3613 U	Capitalism, Socialism and Economic Growth	III	6	SS	4	AECM.2601 U	—	
ACEM.3690 U	Economics 3 (Honours)	III	—	F	1	†		
AEMC.3790 U	Management 3 (Honours)	III	—	F	1	†		
AECM.3692 U	Economics 3 (Combined Honours)	III	—					
AECM.3792 U	Management 3 (Combined Honours)	III	—					
AECM.4690 H	Economics 4 (Honours) F/T	IV	—	F	112 hpa	†	—	
AECM.4691 H	Economics 4 (Honours) P/T	IV	—					
AECM.4790 H	Management 4 (Honours) F/T	IV	—	F	112 hpa	†	—	
AECM.4791 H	Management 4 (Honours) P/T	IV	—					
AECM.4692 C	Economics 4 (Combined Honours) F/T	IV	—					
AECM.4693 C	Economics 4 (Combined Honours) P/T	IV	—					
AECM.4792 C	Management 4 (Combined Honours) F/T	IV	—					
AECM.4793 C	Management 4 (Combined Honours) P/T	IV	—					
AECM.0500 U	Economics GS	—	3	F	2	—	—	

* See Chapter 6 for details.

** All honours units will involve one additional tutorial per week.

† To undertake any of these subjects/units students must be enrolled in an Honours program.

Electrical Engineering

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AELE.0500 U	Engineering GS	—	3	F	2	—	—	

nglish

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AENG.1600 U	English 1	I	6	F	3	+	—	
AENG.2601 U	English 2A	II	8	F	4	AENG.1600 U	—	
AENG.2602 U	English 2B	II	8	F	4	AENG.1600 U	AENG.2601 U	
AENG.2001 E	Introduction to the Literature of the Renaissance	II	—	S1	2	AENG.1600 U	—	
AENG.2002 E	Introduction to Australian Literature	II	—	S2	2	AENG.2001 E	—	
AENG.2003 E	Old English B	II	—	—	2	AENG.1600 U	AENG.2001 E	
AENG.2004 E	Middle English A	II	—	S1	2	AENG.1600 U	AENG.2001 E	
AENG.2005 E	Linguistics and Literary Criticism	II	—	S2	2	AENG.1600 U	AENG.2001 E	
AENG.2006 E	Renaissance Drama	II	—	—	2	AENG.2001 E	AENG.2001 E	
AENG.2007 E	C19 American Literature	II	—	S1	2	AENG.1600 U	AENG.2001 E	
AENG.2008 E	Modern English Drama	II	—	—	2	AENG.2001 E	AENG.2002 E	
AENG.2009 E	Modern Women Writing	II	—	—	2	AENG.1600 U	AENG.2001 E	
AENG.2010 E	Old English A	II	—	S2	2	AENG.2001 E	AENG.2002 E	
AENG.2011 E	Middle English B	II	—	—	2	AENG.2004 E	AENG.2002E	
AENG.2012 E	English Literature of the Civil War, Commonwealth, and Restoration	II	—	—	2	AENG.2001 U	AENG.2002 E	
AENG.2013 E	Victorian Fiction	II	—	S1	2	AENG.1600 U	AENG.2001 E	
AENG.2014 E	C20 American Literature	II	—	S2	2	AENG.2001 E	AENG.2002 E	
AENG.2015 E	C19 Australian Literature	II	—	S1	2	AENG.2001 E	AENG.2002 E	
AENG.2016 E	Australian War Literature	II	—	—	2	AENG.2001 E	AENG.2002 E	
AENG.2017 E	Literature & Society in England in the 1930s	II	—	S2	2	AENG.1600 U	AENG.2001 E	
AENG.2018 E	Literature of the Great War	II	—	S1	2	AENG.1600 U	AENG.2001 E	
AENG.2019 E	Australian Childhoods	II	—	—	2	AENG.1600 U	AENG.2001 E	
AENG.2020 E	Modern Drama	II	—	S2	2	AENG.1600 U	AENG.2001 E	
AENG.2021 E	Literature and Society 1900–1920	II	—	S1	2	AENG.1600 U	AENG.2001 E	
AENG.2022 E	Commonwealth Literature	II	—	—	2	AENG.1600 U	AENG.2002 E	
AENG.2023 E	After Modernism	II	—	S1	2	AENG.1600 U	AENG.2001 E	
AENG.2024 E	Literature of Scientific and Mythopoeic Speculation	II	—	—	2	AENG.2001 E	AENG.2002 E	
AENG.2026 E	Restoration Literary Culture	II	—	—	2	AENG.1600 U	AENG.2002 E	
AENG.2027 E	18th Century Poetry and Prose	II	—	—	2	AENG.1600 U		
AENG.2029 E	C20 Australian Literature	II	—	S2	2	AENG.1600 U		
AENG.2030 E	Mythopoeic Literature	II	—	S2	2	AENG.1600 U		
AENG.2690 U	English 2 Honours	II	8	F	4	*AENG.1600 U	AENG.2601 U	AENG.2602 U
AENG.3601 U	English 3A	III	12	F	4	AENG.2601 U	—	
AENG.3001 E	Intro. to English Literature 1800–1900 A	III	—	S1	2	AENG.2601 U	—	
AENG.3002 E	Intro. to English Literature 1800–1900 B	III	—	S2	2	AENG.3001 E	—	
AENG.3003 E	Old English B	III	—	—	2	AENG.2601 U	AENG.3001 E	
AENG.3004 E	Middle English A	III	—	S1	2	AENG.2601 U	AENG.3001 E	AENG.3690 U
AENG.3005 E	Linguistics and Literary Criticism	III	—	S2	2	AENG.2601 U	AENG.3001 E	
AENG.3006 E	Renaissance Drama	III	—	—	2	AENG.3001 E	AENG.3002 E	
AENG.3007 E	C19 American Literature	III	—	S1	2	AENG.2601 U	AENG.3001 E	
AENG.3008 E	Modern English Drama	III	—	—	2	AENG.3001 E	AENG.3002 E	
AENG.3009 E	Modern Women Writing	III	—	—	2	AENG.2601 U	AENG.3001 E	
AENG.3010 E	Old English A	III	—	S2	2	AENG.3001 E	AENG.3002 E	AENG.3690 U
AENG.3011 E	Middle English B	III	—	—	2	AENG.3004 E	AENG.3002 E	
AENG.3012 E	English Literature of the Civil War, Commonwealth, and Restoration	III	—	—	2	AENG.3001 E	AENG.3002 E	
AENG.3013 E	Victorian Fiction	III	—	S1	2	AENG.2601 U	AENG.3001 E	
AENG.3014 E	C20 American Literature	III	—	S2	2	AENG.2601 U	AENG.3002 E	
AENG.3015 E	C19 Australian Literature	III	—	S1	2	AENG.3001 E	AENG.3002 E	

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AENG.3016 E	Australian War Literature	III	—	—	2	AENG.3001 E	AENG.3002 E	
AENG.3017 E	Literature & Society in England in the 1930s	III	—	S2	2	AENG.3001 E	AENG.3002 E	
AENG.3018 E	Literature of the Great War	II	—	S1	2	AENG.2601 U	AENG.3001 E	
AENG.3019 E	Australian Childhoods	III	—	—	2	AENG.3001 E	AENG.3002 E	
AENG.3020 E	Modern Drama	III	—	S2	2	AENG.3001 E	AENG.3002 E	
AENG.3021 E	Literature and Society 1900–1920	III	—	S1	2	AENG.3001 E	AENG.3002 E	
AENG.3022 E	Commonwealth Literature	III	—	—	2	AENG.3001 E	AENG.3002 E	
AENG.3023 E	After Modernism	III	—	S1	2	AENG.2601 U	AENG.3001 E	
AENG.3024 E	Literature of Scientific and Mythopoeic Speculation	III	—	—	2	AENG.3001 E	AENG.3002 E	
AENG.3026.E	Restoration Literary Culture	III	—	—	2	AENG.2601 U	AENG.3002 E	
AENG.3027 E	C18 Century Poetry and Prose	III	—	—	2	AENG.2601 U	—	
AENG.3029 E	C20 Australian Literature	III	—	S2	2	AENG.2601 U		
AENG.3030 E	Mythopoeic Literature	III	—	S2	2	AENG.2601 U		
AENG.3602 U	English 3B	III	12	F	4	AENG.2601 U	AENG.3601 U	
AENG.3690 U	English 3 (Honours)	III	12	F	4	AENG.2690 U	AENG.3601 U	AENG.3602 U
AENG.3692 U	English 3 (Combined Honours)	III	—					
AENG.4690 H	English 4 (Honours) F/T	IV	—	F		AENG.3690 U		
AENG.4691 H	English 4 (Honours) P/T	IV	—					
AENG.4692 C	English 4 (Combined (Honours) F/T	IV	—	F				
AENG.4693 C	English 4 (Combined Honours) P/T	IV	—					
AENG.0501 U	English GS1—Issues in Modern Australian Literature	—		S2	2			
AENG.0502 U	English GS2—Literature and Modern War	—		—	—			
AENG.0503 U	English GS3—Science and the Literary Imagination	—	‡	—	—			
AENG.0504 U	English GS4—Australian Literature and Film		‡	—	—			
AENG.0505 U	English GS5—American Literature		‡	S1	2			

† See Chapter 6 for details.
‡ Credit will accrue from English General Studies electives only when two have been passed, giving 3 CP, or four, giving 6 CP.

Geography

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AGOC.1600 U	Geography 1	I	6	F	7	—	—	*
AGOC.2601 U	Geography 2A	II	8	F	8	AGOC.1600 U	AGOC.2001 E	
AGOC.2602 U	Geography 2B	II	8	F	8	AGOC.1600 U	AGOC.2005 E	
AGOC.2603 U	Geography 2C	II	8	F	8	AGOC.1600 U *or* AGOC.1700 U, ACSC.1600 U,** AMAT.1600 U**	AGOC.2003 E	
§AGOC.2690 U	Geography 2(Honours)	II	—	F		AGOC 1600 U	AGOC 2601 U & AGOC 2602 U	
AGOC.2001 E	Geomorphology	II	—	S2	8	AGOC.1600 U	AGOC.2601 U	
AGOC.2002 E	Social Geography	II	—	S2	8	AGOC.1600 U	AGOC.2601 U *or* AGOC.2602 U	
AGOC.2003 E	Cartographic Methods	II	—	S1	8		AGOC.2603 U	
AGOC.2004 E	Biogeography	II	—	S1	8	AGOC.1600 U	AGOC.2601 U *or*	

o.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
GOC.2006 E	Remote Sensing Applications	II	—	S2	8	AGOC.1600 U	AGOC.2601 U AGOC.2602 U *or* AGOC.2603 U	
GOC.2007 E	Geography of Economic Activity	II	—	S1	8	AGOC.1600 U	AGOC.2601 U	
GOC.3601 U	Geography 3A	III	12	F	8	AGOC.2601 U *or* AGOC.2602 U	AGOC.3601 U	
GOC.3602 U	Geography 3B	III	12	F	8		AGOC.3601 U	
GOC.3603 U	Geography 3C	III	8	S1,2	4	AGOC.2601 U *or* AGOC.2602 U	AGOC.3601 U	
AGOC.3690 U	Geography 3(Honours)	III	—	F		AGOC.2601 U & AGOC.2602 U	AGOC.3601 U & AGOC.3602 U	
GOC.3692 U	Geography 3(Combined Honours	III	—	F				
GOC.3001 E	Geographic Research Methods	III	—	S1	—			
GOC.3002 E	Geographic Information Analysis	III	—	S1	—			
GOC.3003 E	Geomorphological Systems	III	—	S2	—			
GOC.3004 E	Ecological Systems	III	—	S1	—	AGOC.2601 U *or*		
GOC.3005 E	Population Development	III	—	S2	—	AGOC.2602 U		
GOC.3006 E	Transport Geography	III	—	—	—			
GOC.3007 E	Environmental Hazards	III	—	S2	—			
GOC.3009 E	Selected Special Topics	III	—	S1	—			
GOC.3010 E	Political Geography	III	—	—	—			
GOC.3011 E	Resource Management	III	—	—	—			
GOC.4690 H	Geography 4 (Honours) F/T	IV		F		§		
GOC.4691 H	Geography 4 (Honours) P/T	IV	—					
GOC.4692 C	Geography 4 (Combined Honours) F/T	IV	—					
GOC.4693 C	Geography 4 (Combined Honours) P/T	IV	—					

: Students should note that not all level III elective units will be available in any one year. Further information on this matter should be obtained from the Department.
Students may not take AGOC.1600 U Geography 1 and AGOC.1700 U Oceanography 1 in the same year.
ACSC.1600 U (Computer Science 1) and AMAT.1600 U (Mathematics 1) may be taken as corequisites if the Head of the Department approves.
Field work of up to three days may be required for third year units.
To enrol in an honours year a student must seek approval initially from the Head of the Department.

tory

).	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
HIS.1600 U	History 1:Modern History	I	6	—	3	*	—	—
HIS.1601 U	History 1:The Second World War	I	6	F	3	*	—	—
HIS.2601 U	Revolts and Counter-Insurgency in SE Asia	II	4	—	3	AHIS.1600 U	—	AHIS.3601 U
HIS.2602 U	Modern American Foreign Policy	II	4	S1	3	AHIS.1600 U	—	AHIS.3602 U
HIS.2603 U	Colonial Australia	II	4	S1	3	AHIS.1600 U	—	AHIS.3603 U
HIS.2604 U	Modern Australia: Politics and Culture	II	4	S2	3	AHIS.1600 U	—	AHIS.3604 U

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AHIS.2605 U	The Origins of Modern War	II	4	—	3	AHIS.1600 U	—	AHIS.3605 U
AHIS.2606 U	From Democracy to Dictatorship	II	4	S2	3	AHIS.1600 U	—	AHIS.3606 U
AHIS.2607 U	Mariners, Merchants and Missionaries	II	4	—	3	AHIS.1600 U	—	AHIS.3607 U
AHIS.2608 U	Pacific History:From European Contact to Fijian Coups	II	4	—	3	AHIS.1600 U	—	AHIS.3608 U
AHIS.2609 U	War and Society in Australia 1788–1988	II	4	S2	3	AHIS.1600 U	—	AHIS.3609 U
AHIS.2610 U	Southeast Asia: Revolution, Nation and Society 1870–1965	II	4	S2	3	AHIS.1600 U	—	AHIS.3610 U
AHIS.2611 U	Russian History	II	4	S1	3	AHIS.1600 U	—	AHIS.3611 U
AHIS.2612 U	Soviet History	II	4	S2	3	AHIS.1600 U	—	AHIS3612 U
AHIS.2613 U	The American Civil War	II	4	—	3	AHIS.1600 U	—	AHIS.3613 U
AHIS.2614 U	East Asia: Between Tradition and Modernity	II	4	—	3	AHIS.1600 U	—	AHIS.3614 U
AHIS.2615 U	Social Change in East Asia	II	4	S1	3	AHIS.1600 U	—	AHIS.3615 U
AHIS.2616 U	Science and Technology in Australia	II	4	S2	3	AHIS.1600 U	—	AHIS.3616 U
AHIS.2617 U	War, Society and the State	II	4	—	3	AHIS.1600 U	—	AHIS.3617 U
AHIS.2618 U	America from Revolution to Civil War	II	4	—	3	AHIS.1600 U	—	AHIS.3618 U
AHIS.2619 U	The Fall and Rise of Europe	II	4	—	3	AHIS.1600 U	—	AHIS.3619 U
AHIS.2620 U	The Sea and Seafarers	II	4	S1	3	AHIS.1600 U	—	AHIS.3620 U
AHIS.2690 U	History 2 (Honours)	II	—	F	2	†AHIS.1600 U	8CP in Level II History	—
AHIS.3601 U	Revolts and Counter-Insurgency in SE Asia	III	6	—	3		—	AHIS.2601 U
AHIS.3602 U	Modern American Foreign Policy	III	6	S1	3	—	AHIS.2602 U	
AHIS.3603 U	Colonial Australia	III	6	S1	3	—	AHIS.2603 U	
AHIS.3604 U	Modern Australia:Politics and Culture	III	6	S2	3	—	AHIS.2604 U	
AHIS.3605 U	The Origins of Modern War	III	6	S1	3		—	AHIS.2605 U
AHIS.3606 U	From Democracy to Dictatorship	III	6	S2	3		—	AHIS.2606 U
AHIS.3607 U	Mariners, Merchants and Missionaries	III	6	—	3		—	AHIS.2607 U
AHIS.3608 U	Pacific History: From European contact To Fijian Coups	III	6	—	3	—	AHIS.2608 U	
AHIS.3609 U	War and Society in Australia 1788–1988	III	6	S2	3	—	AHIS.2609 U	
AHIS.3610 U	Southeast Asia: Revolution, Nation and Society 1870–1965	III	6	S2	3	14CP in History	—	AHIS.2610 U
AHIS.3611 U	Russian History	III	6	S1	3		—	AHIS.2611 U
AHIS.3612 U	Soviet History	III	6	S2	3		—	AHIS.2612 U
AHIS.3613 U	The American Civil War	III	6	—	3		—	AHIS.2613 U
AHIS.3614 U	East Asia: Between Tradition and Modernity	III	6	—	3		—	AHIS.2614 U
AHIS.3615 U	Social Change in East Asia	III	6	S1	3	—	AHIS.2615 U	
AHIS.3616 U	Science and Technology in Australia	III	6	S2	3	—	AHIS.2616 U	
AHIS.3617 U	War, Society and the State	III	6	—	3	—	AHIS.2617 U	

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AHIS.3618 U	America from Revolution to Civil War	III	6	—	3	14CP in History	AHIS.2618 U	
AHIS.3619 U	The Fall and Rise of Europe	III	6	—	3		—	AHIS.2619 U
AHIS.3620 U	The Sea and Seafarers	III	6	S1	3	—	AHIS 2618 U	
AHIS.3690 U	History 3 (Honours)	III	—	F	2	†AHIS.2690 U & 14CP in History	24CP in Level III History	—
AHIS.3692 U	History 3 (Combined Honours)	III	—					
AHIS.4690 H	History 4 (Honours) F/T	IV	—	F	—	†	—	—
AHIS.4691 H	History 4 (Honours) P/T	IV	—					
AHIS.4692 C	History 4 (Combined Honours) F/T	IV	—					
AHIS.4693 C	History 4 (Combined Honours) P/T	IV	—					
AHIS.0501 U	History GS1—Suakin to Saigon	—	‡	—	2			
AHIS.0502 U	History GS2—Black-White Relations in Australia	—	‡	—	2			
AHIS.0503 U	History GS3-Japan in the Modern World	—	‡	S2	2			
AHIS.0504 U	History GS4-The American Civil War	—	‡	S1	2			

See Chapter 6 for details.
To enrol in an honours subject a student must seek permission from the Head of the Department.
Credit will accrue from History General Studies electives only when two have been passed, giving 3 CP.

athematics

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AMAT.1600 U	Mathematics 1	I	6	F	6	*		
AMAT.2601 U	Mathematics 2A	II	8	F	6	AMAT.1600 U		
AMAT.2602 U	Mathematics 2B	II	8	F	6	AMAT.1600 U	AMAT.2601 U	
AMAT.2001 E	Discrete Mathematics 2	II	—	—	3	AMAT.1600 U		
AMAT.2002 E	Differential Equations 2	II	—	S2	3	AMAT.1600 U		
AMAT.2003 E	Classical Mechanics 2	II	—	—	3	AMAT.1600 U & APHY.1600 U		
AMAT.2004 E	Probability 2	II	—	S2	3	AMAT.1600 U		
AMAT.2005 E	Statistics 2	II	—	S1	3 ½	AMAT.1600 U		
AMAT.2006 E	Core Mathematics 2 (Part I)	II	—	S1	3	AMAT.1600 U		
AMAT.2007 E	Core Mathematics 2 (Part II)	II	—	S2	3	AMAT.2006 E		
AMAT.2008 E	Mathematical Modelling 2	II	—	S1	3	AMAT.1600 U		
AMAT.3601 U	Mathematics 3A	III	12	F	9	AMAT.2601 U		
AMAT.3602 U	Mathematics 3B	III	12	F	9	AMAT.2601 U	AMAT.3601 U	
AMAT.3603 U	Mathematics 3C	III	6	S1 *&/or* S2	—	AMAT.2601 U		
AMAT.3001 E	Compressible Fluid Dynamics 3	III	—	—	3	AMAT.3002 E		
AMAT.3002 E	Continuum Mech. 3	III	—	S1	3	AMAT.2002 E & AMAT.2003 E *or* APHY.1600 U		
AMAT.3003 E	Differential Equations 3	III	—	S1	3	AMAT.2002 E		
AMAT.3006 E	Applied Probability 3	III	—	—	3	AMAT.2004 E		
AMAT.3008 E	Multivariate Statistics 3	III	—	—	3 ½	AMAT.3031 E		
AMAT.3010 E	Manpower Planning 3	III	—	S1	3	AMAT.2004 E		
AMAT.3011 E	Numerical Fluid Dynamics 3	III	—	—	3	AMAT.3002 E		
AMAT.3012 E	Advanced Differential Equations 3	III	—	—	3	AMAT.3003 E		
AMAT.3013 E	Incompressible & Viscous Fluid Dynamics 3	III	—	S2	3	AMAT.3002 E		

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No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
AMAT.3014 E	Generalized Linear Models 3	III	—	S2	3	AMAT.3031 E		
AMAT.3016 E	Advanced Mathematical Techniques 3	III	—	S2	3	AMAT.3003 E		
AMAT.3017 E	Projectiles 3	III	—	—	3	AMAT.2002 E & AMAT.2003 E *or* APHY.1600 U		
AMAT.3018 E	Projects 3	III	—	S2	3	—		
AMAT.3019 E	Special Topics 3	III	—	—	3	—		
AMAT.3020 E	Statistical Forecasting 3	III	—	S2	3	AMAT.2005 E		
AMAT.3021 E	Waves 3	III	—	S1	3	—	AMAT.3003 E	
AMAT.3002 E	Integral Equations 3	III	—	—	3	AMAT.2002 E		
AMAT.3023 E	Integral Transforms & Asymptotics 3	III	—	—	3	AMAT.2002 E		
AMAT.3024 E	Calculus of Variations 3	III	—	—	3	AMAT.2002 E & AMAT.2003 E *or* APHY.1600 U		
AMAT.3025 E	Waveguide Theory 3	III	—	S2	3	AMAT.3021 E		
AMAT.3026 E	Complex Analysis 3	III	—	S1	3	—		
AMAT.3027 E	Industrial Mathematics 3	III	—	S2	3	AMAT.2002 E		
AMAT.3028 E	Case Studies in Statistics 3	III	—	S2	3½	AMAT.3031 E		
AMAT.3029 E	Modern Techniques in Data Analysis 3	III	—	—	3½	AMAT.2005 E		
AMAT.3030 E	Statistical Modelling 3	III	—	S1	3½	AMAT.2005 E		
AMAT.3031 E	Linear Models and Experimental Design	III	—	S1	3½	AMAT.2005 E		
AMAT.4690 H	Mathematics 4 (Honours) F/T	IV	—	F	—	‡		
AMAT.4691 H	Mathematics 4 (Honours) P/T	IV	—					
AMAT.4692 C	Mathematics 4 (Combined Honours) F/T	IV	—					
AMAT.4693 C	Mathematics 4 (Combined Honours) P/T	IV	—					
§ AMAT.0500 U	Mathematics GS	—	3	F	2			
§ AMAT.0501 U	Mathematics GS:Statistics in the Social Sciences	—	3	F	3			

* See Chapter 6 for details.
‡ To enrol in an honours year a student must seek approval from the Head of the Department.
§ These subjects may be taken only by students in the Arts course.
† These subjects comprise a selection of the listed units and the particular units offered will be specified each year.

Mechanical Engineering

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
* AMEC.0500 U	Mechanics of Flight	—	3	F	2	HSC Physics & Mathematics *or* equivalent		

* A special elective for BA and BSc students, presented by the Department of Mechanical Engineering. For further details see p. 135

Oceanography

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
† AGOC.1700 U	Oceanography 1	I	6	F	6	—	*	
**† AGOC.2700 U	Oceanography 2	II	8	F	6	AGOC.1700 U & AMAT.1600 U		
**† AGOC.3700 U	Oceanography 3	III	12	F	8	AGOC.2700 U		
‡ AGOC.4790 H	Oceanography 4 (Honours) F/T	IV	—	F		AGOC.3700 U		

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
GOC.4791 H	Oceanography 4 (Honours) P/T	IV	—					
GOC.4792 C	Oceanography 4 (Combined Honours) F/T	IV	—					
GOC.4793 C	Oceanography 4 (Combined Honours) P/T	IV	—					

Students may not take AGOC.1600 U Geography 1 and AGOC.1700 U Oceanography 1 in the same year.
Field Excursion of 5 days duration.
For Prerequisite requirements for these subjects see subject descriptions.
To enrol in an honours year a student must seek approval from the Head of Department

ıysics

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
APHY.1600 U	Physics 1	I	6	F	7	*	AMAT.1600 U	
APHY.2601 U	Physics 2A	II	8	F	9	AMAT.1600 U& APHY.1600 U	‡AMAT.2601 U	
APHY.2602 U	Physics 2B	II	8	F	9	AMAT.1600 U & APHY.1600 U	‡AMAT.2601 U	
APHY.2001 E	Thermal Physics 2	II	—	S2	—	AMAT.1600 U & APHY.1600 U		
APHY.2004 E	Circuit Theory & Electronics	II	—	S1	—	AMAT.1600 U & APHY.1600 U		
APHY.2005 E	Physics of the Atmosphere 2	II	—	S1	—	AMAT.1600 U & APHY.1600 U		APHY.0501 U
APHY.2006 E	Marine Acoustics & Optics 2	II	—	S2	—	AMAT.1600 U & APHY.1600 U		
APHY.2007 E	Electromagnetism 2	II	—	S2	—	AMAT.1600 U & APHY.1600 U		
APHY.2008 E	Quantum Physics 2	II	—	S1	—	AMAT.1600 U & APHY.1600 U		
APHY.2009 E	Solid State Physics & its Applications 2	II	—	S2	—	AMAT.1600 U & APHY.1600 U		
APHY.2010 E	Optics 2	II	—	S1	—	AMAT.1600 U & APHY.1600 U		
APHY.2011 E	Meteorology 2	II	—	S1	—	AMAT.1600 U & APHY.1600 U		APHY.0501 U
APHY.3605 U	Physics 3A	III	12	F	13	APHY.2601 U *or* APHY.2602 U		
APHY.3606 U	Physics 3B	III	12	F	13	‡AMAT.2601 U & APHY.2601 U		
APHY.3607 U	Physics 3C	III	15	F	16	‡AMAT.2601 U & APHY.2601 U		
APHY.3608 U	Physics 3D	III	6	F	8	APHY.2601 U *or* APHY.2502 U		
APHY.3001 E	Electromagnetism 3	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3002 E	Quantum Mechanics	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3003 E	Solid State Physics 3	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3004 E	Data Analysis in Experimental Physics	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3006 E	Electronics of Digital Systems	III	—			APHY.2601 U *or* APHY.2602 U		
APHY.3009 E	Infrared Physics	III	—	—		APHY.2601 U *or* APHY.2602 U		

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
APHY.3010 E	Laser and Quantum Electronics	III	—			APHY.2601 U *or* APHY.2602 U		
APHY.3011 E	Marine Acoustics. and Optics 3	III	—			APHY.2601 U *or* APHY.2602 U		
APHY.3013 E	Nuclear Physics	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3014 E	Particle Physics	III	—			APHY.2601 U *or* APHY.2602 U		
APHY.3015 E	Plasma Physics	III	—			APHY.2601 U *or* APHY.2602 U		
APHY.3016 E	Statistical Mechanics 1	III	—			APHY.2601 U *or* APHY.2602 U		
APHY.3017 E	Super-conductivity & Low Temperature	III	—			APHY.2601 U *or* APHY.2602 U		
APHY.3019 E	Occasional Elective	III	—					
APHY.3020 E	Astronomy and Astrophysics	III	—	—	—	APHY.2601 U *or* APHY.2602 U		
APHY.3021 E	Cosmic Ray Physics and High Energy Astrophysics	III	—	—	—	APHY.2601 U *or* APHY.2602 U		
APHY.3022 E	Space Physics	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3023 E	Techniques for Studying Advanced Materials	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3024 E	Meteorology 3					APHY.2601 U *or* APHY.2602U		APHY.0501 U
APHY.3025 E	Atmospheric Physics 3	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3026 E	Boundary Layer Physics	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3027 E	Non-Linear Dynamics	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3028 E	Computational Physics	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.3029 E	Circuit Theory and Electronics 3	III	—	—		APHY.2601 U *or* APHY.2602 U		
APHY.4690 H	Physics 4 (Honours) F/T	IV	—	F	—	‖	—	
APHY.4691 H	Physics 4 (Honours) P/T	IV	—	—	—			
APHY.4001 E	Solid State Physics 4	IV	—	—	—	‖	—	
APHY.4002 E	Astrophysics	IV	—	—	—	‖	—	
APHY.4003 E	Micro-computers & Meteorology	IV	—	—	—	‖	—	
APHY.4004 E	Experimental Magnetism	IV	—	—	—	‖	—	
APHY.4005 E	Group Theory in Quantum Mechanics	IV	—	—	—	‖	—	
APHY.4006 E	Statistical Mechanics 2	IV	—	—	—	‖	APHY.3016 E	
APHY.4007 E	Nuc. Physics and Hyperfine Interactions	IV	—	—	—	‖	—	
APHY.4692 C	Physics 4 (Combined Honours) F/T	IV	—					
APHY.4693 C	Physics 4 (Combined Honours) P/T	IV	—					
¶ APHY.0500 U	Physics for Society	—	3	F	2	—	—	
** APHY.0501 U	Meteorology A	—	3	F	2	—	—	APHY.3102 E & APHY.2005 E

* See Chapter 6 for details.
† See Subject description for further details on units to be taken.
‡ AMAT.2601 U Mathematics 2A must include the units AMAT.2006 E and AMAT.2007 E (units AMAT.2002 E and AMAT.2008 E are strong advised).
‖ To enrol in an honours year a student must seek permission initially from the Head of the Department.
¶ This subject may be taken only by students in the Arts course.
** Schedule SE subject—*for details see p. 135*

olitics

No.	Name	Level	CPV	When Offered	HPW	Prerequisites	Corequisites	Excluded
APOL.1600 U	Politics 1	I	6	F	3	*	—	
APOL.2601 U	Politics of Russia	II	4	S1	3	APOL.1600 U	—	
APOL.2603 U	Politics of the USA	II	4	S1	3	APOL.1600 U	—	
APOL.2604 U	Politics of China	II	4	S2	3	APOL.1600 U	—	
APOL.2607 U	Special Study in Politics	II	4	S2	3	APOL.1600 U		
APOL.2608 U	Understanding Revolutions	II	4	S1	3	APOL.1600 U		
APOL.2609 U	A History of Socialism	II	4	S2	3	APOL.1600 U		
APOL.2610 U	The Collapse of Communism	II	4	S2	3	APOL.1600 U		
APOL.2611 U	The Politics of Australian Defence Policy	II	4	S1	3	APOL.1600 U		
APOL.2612 U	Parties, Voters and Public Opinion	II	4	S1	3	APOL.1600 U		
APOL.2613 U	Electoral Systems	II	4	S2	3	APOL.1600 U		
APOL.2614 U	Issues and Problems in Australia Foreign Policy	II	4	S1	3	APOL.1600 U		
APOL.2615 U	War in International Politics	II	4	S2	3	APOL.1600 U		
APOL.2616 U	The Military, Society and Politics in Indonesia	II	4	S1	3	APOL.1600 U		
APOL.2617 U	Introduction to Comparative Politics	II	4	S1	3	APOL.1600 U		
APOL.2690 U	Politics 2 (Honours)	II	—	F	2	‡ APOL.1600 U	8 credit points in Level II Politics	
APOL.3607 U	War in International Politics	III	6	S2	3			
APOL.3608 U	Special Study in Politics	III	6	S2	3			
APOL.3609 U	Issues and Problems in Australian Foreign Policy	III	6	S1	3			
APOL.3611 U	The Politics of Australian Defence Policy	III	6	S1	3			
APOL.3612 U	Parties, Voters and Public Opinions	III	6	S1	3			
APOL.3613 U	Electoral Systems	III	6	S2	3			
APOL.3614 U	Politics of Russia	III	6	S1	3			
APOL.3615 U	Politics of the USA	III	6	S1	3			
APOL.3616 U	The Military, Society and Politics in Indonesia	III	6	S1	3			
APOL.3617 U	Understanding Revolutions	III	6	S1	3			
APOL.3618 U	Politics of China	III	6	S2	3			
APOL.3619 U	A History of Socialism	III	6	S2	3			
APOL.3620 U	The Collapse of Communism	III	6	S2	3			
APOL.3621 U	Introduction to Comparative Politics	III	6	S1	3			
APOL.3690 U	Politics 3 (Honours)	III	—	F	2	‡ APOL.2690 U	Any 4 Level III Politics subjects	
APOL.3692 U	Politics 3 (Combined Honours)	III	—					
APOL.4690 H	Politics 4 (Honours) F/T	IV	—	F	—	‡ APOL.3690 U, APOL.3604 U		
APOL.4691 H	Politics 4 (Honours) P/T	IV	—					
APOL.4692 C	Politics 4 (Combined Honours) F/T	IV	—					
APOL.4693 C	Politics 4 (Combined Honours) P/T	IV	—					

See Chapter 6 for details.
To enrol in an honours subject a student must seek permission from the Head of Department.

Department of Chemistry

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

At the least technical level, Chemistry and Society is a 3 credit point elective in which chemistry is discussed solely in a societal context.

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

Students may select a major or a submajor in chemistry.

The major comprises Chemistry 1, 2A and 3A and is designed to meet the needs of the majority of science or arts graduates of University College who will not be practising scientists, but who may require a broad fundamental understanding of chemistry at university level. After the first year, students study chemistry in the context of units selected to illustrate and develop basic chemical principles from the viewpoint of the chemical generalist. Thus, in second year, attention is given to the study of biological chemistry, chemistry of the earth, fuel chemistry, polymers, combustion and explosives, metals, electrochemical processes and devices, and purification and separation. In third year the core topics comprise additional study in biological chemistry, chemistry of the earth, electrochemical processes and devices, metals, fuel chemistry and polymers as well as an introduction to radiochemistry, and spectroscopy. In addition complementary topics will be offered to broaden the scope of the course. Particular care is taken in the overall presentation of units to provide a balance among the four traditional branches of chemistry: analytical, inorganic, organic, and physical.

Students majoring in chemistry may elect to prepare for an honours program or round out their course of study by enrolling in the 6 credit point subject Chemistry 3C in which two of the three topics inorganic, organic and physical chemistry are studied in depth.

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 individual student.

Entry to the honours program is subject to approval by the Head of Department. Students requesting honours entry from the 26 point chemistry major will normally be expected to have completed other relevant science subjects.

For students majoring in subjects other than chemistry, there is a submajor consisting of Chemistry 1 and Chemistry 2A.

An alternative major or submajor option, Chemistry 2B and Chemistry 3B, has been available but will not be offered in 1993.

Outline Course Structures

	HPW[1]	*CPV*[2]
(a) Major		
Chemistry 1	7	6
Chemistry 2A	9	8
Chemistry 3A	13	12
or		
Chemistry 1	7	6
Chemistry 2B§	9	8
Chemistry 3B§	13	12
(b) Major/submajor§		
Chemistry 1	7	6
Chemistry 2A	9	8
Chemistry 2B	9	8
Chemistry 3A	13	12
Chemistry 3B	13	12
(c) Submajor		
Chemistry 1	7	6
Chemistry 2A	9	8
or§		
Chemistry 1	7	6
Chemistry 2B§	9	8
(d) General Studies elective		
Chemistry and Society*	2	3
(e) Honours program		
Chemistry 4 (Honours)	**	*
Chemistry 4 (Combined Honours)		

1 Hours per week.
2 Credit point value.
* A student cannot enrol in ACHM.0500 U Chemistry and Society subsequently to or concurrently with ACHM.1600 U Chemistry 1.
** Fourth year students are committed full time to their Honours work
§ Not offered in 1993

ACHM.1600 U Chemistry 1

Credit points 6
Lectures and Tutorials 4 hours per week
Laboratory 3 hours per week.

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

There are no formal chemistry co- or prerequisites for entry into Chemistry 1. Students who have not studied chemistry in years 11 and 12 are advised to examine the prescribed Chemistry 1 textbook and consult with chemistry staff to determine their suitability for enrolment.

Subject Outline:

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

Intermolecular forces are introduced in relation to the transition from the gaseous to the liquid and solid phases on cooling. In this context phase equilibria are introduced, together with the nature of liquids and crystals, and bonding and stereochemistry in crystal lattices. This leads logically to the chemistry of solutions

ıtailing a consideration of solubility, acids and bases, col-ıgative properties and other phenomena. Electron transfer ədox reaction) is introduced as an important area of chem-try, together with the principles of electrochemical cells.

ıe direction in which chemical reactions proceed (thermody-ıamics), and the speed with which they occur (kinetics), are ıenomena commonly confused. Examples are chosen to ıstrate the fallacy in this connection, and thereafter the two ıenomena are treated separately. There is an introduction to e three laws of thermodynamics, while in kinetics the tem-ɜrature and concentration dependences for rates of reaction e discussed. The latter includes the concepts of rate laws, ːtivation energy, and mechanism.

ithin the framework of the foregoing development there is a ending of the descriptive chemistry of the elements and their ɔmpounds, including those of the transition elements.

ıe chemistry of the element carbon is an important area in ; own right, largely because of its relevance to living systems. ɔpics including classes of organic compounds, and common nctional groups are presented. Also, additional aspects of ɔnding and stereochemistry are given in this context.

ıe associated laboratory work is designed to teach experi-ental skills, to introduce chemical techniques and their appli-ıtion in the modern world, and to illustrate principles ɜveloped in the theory course.

CHM.2601 U Chemistry 2A

Credit points 8
Lectures 4 hours per week
Tutorials 1 hour per week
Laboratory 4 hours per week

ɜrequisites: ACHM.1600 U Chemistry 1 and AMAT.1600 U Mathematics 1.

ıemistry 2A is designed to fit in with any other major or sub-ajor within the BSc and BA degree.

ological Chemistry 2
Lectures 15 hours

this unit, metabolic processes in living organisms are exam-ɜd at the molecular level. Aspects of mechanistic and struc-ˈal organic and inorganic chemistry are developed and tended to biological reactions. A study of the structure, ɜreochemistry and reactivity of biomolecules such as pro-ns, nucleic acids, carbohydrates and lipids precedes a dis-ssion of the chemistry of selected enzymes, including the le of metal ions in activating co-ordinated organic molecules ɯards highly specific reactions. The synthesis of proteins in ing cells provides a forum to unite aspects of enzyme and ːleic acid chemistry and permits insight into the action of me antibiotics. The role of phosphates such as ATP and ƆP crucial to biological processes like respiration are exam-ɜd and rationalised in terms of chemical mechanisms.

ıemistry of Combustion and Explosives
Lectures 14 hours

ames and explosions are treated as chemical reactions ıich supply energy for industrial and military applications. An ːtorical survey summarises events from the early Chinese ːcovery of gunpowder to the more recent creation of chem-ıl explosives following studies of the chemistry of combus-n. Fast reactions are considered through extensions of the ıdamental kinetic principles of chain reactions and the Arrhenius equation. The temperature dependence of the Arrhenius rate constant, heat of reaction and heat capacity are used to develop the mechanism of auto-catalytic reactions in relation to explosions. Chemical thermodynamic principles are used to calculate flame temperatures which relate to energy availability. Detonation is described and a simplified develop-ment of the hydrodynamic theory of detonation is given. The classification of explosives into detonants, high explosives and propellants is discussed. The manufacture, properties, and applications of representatives of the three groups are described. These include detonants such as lead azide, high explosives such as TNT and ANFO, and propellants based on nitrocellulose. Recent approaches to the synthesis of new high explosives and other energetic materials are discussed and conclusions are drawn about the predictability of explo-sive properties from molecular structure and composition.

Chemistry of the Earth 2
Lectures 20 hours

The unit is concerned principally with the atmosphere and nat-ural waters. The genesis of the elements in stars and their dis-tribution on earth and in the universe is also considered. The evolution of the atmosphere is related to chemical reactions that have occurred near the surface of the Earth, and the role of photosynthesis is discussed, including the part played by metal ions. The study of natural waters begins with an exam-ination of the physical and chemical properties of pure water, sea water and other waters. The principles of chemical equi-libria are used to explain the composition of aquatic systems. Factors that affect water quality are discussed, for example, dissolved gases, colloidal suspensions, biological oxygen demand and the presence of detergents and heavy metals.

Fuel Chemistry 2
Lectures 15 hours

Fossil fuel materials, principally coal, petroleum and natural gas, are considered as a source of energy to society. These fuels are studied in the contexts of the organic geochemistry of their formation, their chemical compositions and structures, combustion properties. Fuel technology involving the modifi-cation of fuels to suit particular engines is discussed in terms of chemical processes. Included are brief descriptions of the operation and fuel requirements of some important engines (gas turbine, steam turbine, rocket and internal combustion piston).

Metals 2
Lectures 10 hours

The unit begins with an historical study of the chemical impor-tance of metals, including abundance, distribution and pro-cesses of extraction and purification. Properties such as atomic size, ionization and reduction potentials are considered in the context of the coordination chemistry of selected metals and metal ions, as a basis for understanding commercial iso-lation and purification processes.Optional topics include the descriptive chemistry of activated metals, high purity metals and metal complexes relevant to modern industry and the con-sideration of the chemical basis for the catalytic synthesis of some widely used organic and inorganic chemicals.

Electrochemical Processes and Devices 2
Lectures 10 hours

Three of the many areas of concern to society in which chem-istry plays an important role are: energy production and trans-fer; chemicals in the environments; and efficient manufacture

of new materials. This unit introduces some of the electrochemical principles underlying these areas by considering electrochemical cells as sources of electrical energy and as analytical devices which can be used to measure the levels of trace elements in natural waters and biological samples.

Polymers 2
Lectures 10 hours

This unit relates mainly to artificial macromolecules 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 discussed as the reverse of polymerisation. Specific properties of polymers are related to molecular, crystalline and amorphous structures. These structure-property relationships are used to demonstrate the classification of polymers into plastics, fibres and elastomers. The crystalline melting point and the glass-transition temperatures are discussed in relation to structures and intermolecular forces.

Purification and Separation
Lectures 10 hours

Distillation, solvent separation and chromatography are studied as techniques important to chemical operations in the laboratory and industry. The unit begins with a brief survey of the thermodynamics of mixing and separation, including entropy of mixing of gases, heats of fusion, vapourisation and solution, and the relationship to the energetics of large scale purification of air and water. Fractional distillation is explained with reference to phase diagrams of two component liquid/vapour systems, the formation of azeotropes and the theoretical plate concept. Laboratory and industrial distillations of petroleum, alcohol, liquid air and heavy water are described.The theory of partition between liquid/solid, liquid/liquid and gas/liquid systems is described for static, countercurrent and continuous flow systems, and is used to explain solvent extraction and chromatography. The unit concludes with descriptions of gas chromatography and selected forms of liquid chromatography.

Special Unit

*Marine Chemistry 2**
Lectures 20 hours
Laboratory 21 hours

The structure of liquid water and hydrated ions are examined in detail. The sampling of seawater and its properties; composition salinity, chlorinity are discussed, as is the influence of particulate matter and dissolved gases. Key cycles in the sea, namely those involving carbonate, silicate, phosphorus and nitrogen are also examined. The unit finishes with a study of selected topics including the recovery of chemicals from seawater, desalination, sea-ice, and corrosion in the marine environment.

*This unit is available as an oceanography elective for students enrolled in Oceanography 2. Students enrolled in both Oceanography 2 and Chemistry 2A may elect Marine Chemistry 2 in place of Chemistry of the Earth 2 if they do not elect the unit as part of Oceanography 2. Other Chemistry 2A students may be permitted to replace Chemistry of the Earth 2 with Marine Chemistry 2 at the discretion of the Head of Department.

ACHM.2602 U Chemistry 2B
(Not offered in 1993)

Credit points 8
Lectures 4 hours per week
Tutorials 1 hour per week
Laboratory 4 hours per week
Prerequisites: ACHM.1600 U Chemistry 1 and AMAT.1600 U Mathematics 1.

Analytical Chemistry 2
Lectures 26 hours

Titrimetric and gravimetric analysis; colorimetry and absorption spectroscopy; electrochemical end-point detection in titrimetric analysis; methods of electro-gravimetry; separation techniques in analysis.

Inorganic Chemistry 2
Lectures 26 hours

Electronic structure, bond type and stereochemistry of main group, transition metal and organometallic compounds Electronic structure models of inorganic chemistry: VSEPR theory, valence bond theory, crystal and ligand field theory and molecular orbital theory. Introduction to the stability, kinetics and reactivity of inorganic compounds.

Organic Chemistry 2
Lectures 26 hours

A systematic study of mechanistic organic chemistry introducing functional groups bearing electrophillic carbon e.g., alcohols, alkyl halides, ethers, aldelydes, ketones and carboxylic acids. The nucleophilic character of carbon-carbon π bonded systems is discussed in terms of the chemistry of alkenes and benzene.

Physical Chemistry 2
Lectures 26 hours

Introduction to wave and quantum mechanics: solutions of the Schrödinger equation for translational, vibrational and rotational motion; spin; quantum mechanics of the atom and atomic spectra. Rotational and vibrational spectroscopy and molecular structure; applications. Electronic spectroscopy Franck-Condon principle and electronically excited states applications. Chemical reaction kinetics: basic concepts of rate measurement—composition and temperature dependence; evaluation of rate constants from experimental results mechanisms leading to the common rate laws; applications to chain, photochemical and catalytic reactions.

ACHM.3601 U Chemistry 3A

Credit points 12
Lectures 5 hours per week
Tutorials 2 hours per week
Laboratory 6 hours per week
Prerequisite: ACHM.2601 U Chemistry 2A

Core units

Biological Chemistry 3
Lectures 15 hours

Attention is concentrated on the role of small molecules in biological processes, especially with reference to mechanistic and stereochemical analyses of key metabolic sequences such as glycolysis and the citric acid cycle. The area of

ızyme chemistry developed in Chemistry 2A is extended to clude a study of selected enzyme, co-enzyme systems. The ıit concludes with a discussion of socially and medically ıportant molecules and their modes of action.

hemistry of the Earth 3
Lectures 10 hours
Prerequisite: Chemistry of the Earth 2

ıis unit is a continuation of Chemistry of the Earth 2 and nphasizes the chemistry of the Earth's crust and the action solar radiation on the Earth. The formation and properties rocks and minerals are studied, including the structure and ımposition of aluminosilicates. The formation and chemical odification of soils is then studied. Photochemical reactions the atmosphere are examined. Interception of radiation by mospheric gases is considered, especially in relation to the reenhouse Effect and the ozone layer.

etals 3
Lectures 10 hours

ıis unit examines the chemical concepts underlying metal-gy, especially those relating to the structure, composition, ınductivity and stability of metals and their alloys. Both grain ıd crystal structure are examined, together with the effects imperfections and alloying on the strength and hardness of etals. The constitution and properties of alloys are discussed ing phase equilibrium diagrams, using such examples as onzes, brasses, steels, and aerospace alloys: brief mention also made of composite materials. Methods of chemical ıalysis are also examined.

ectrochemical Processes and Devices 3
Lectures 15 hours

ıing a unified analysis of the flow of current through an elec-ıchemical cell and of the emf of the cell reaction, the princi-es of electrochemistry are applied in detail to several areas technological and scientific interest: included are specific amples of batteries and fuel cells used as power sources d energy storage devices, metallic corrosion and its pre-ntion and advanced methods of electrochemical analysis, th an optional topic selected from either photoelectrochem-ry or neurochemistry.

ıel Chemistry 3
Lectures 10 hours

is unit is a continuation of Fuel Chemistry 2 and is con-rned with production of energy from sources other than the ditional fossil fuels. The generation of nuclear energy is ıdied in terms of the metallurgy of uranium, the preparation uranium fuel for reactors, the reprocessing of spent fuel, the fe disposal of radioactive waste, with particular emphasis on vironmental problems. Alternatives to traditional energy urces are discussed, including available, but as yet unused ssil fuels (oil shales and tar sands), solar energy (with ıphasis on chemical storage of absorbed energy), hydro-n, liquid fuels derived from non-petroleum sources, includ-ı coal conversion processes, methanol from natural gas, d ethanol from fermentation of agricultural products.

ılymers 3
Lectures 20 hours
is unit is concerned with some physical parameters and emical processes which determine the use and production of the materials discussed in Polymers 2. Molecular weight is discussed as a measure of the number of monomer units in a polymer molecule. Methods for measuring average molecular weight are considered, including determinations based on equilibrium properties, especially osmotic pressure, determinations from the non-equilibrium property of viscosity, and determinations from light-scattering. Light-scattering is also discussed with reference to the measurement of molecular dimensions. The mechanism and kinetics of polymerization are described with reference to free-radical initiated polymerization and step-growth polymerization, and are related to the polydispersity of polymer samples.

Radiochemistry
Lectures 15 hours
This unit is concerned with the chemical aspects of radioisotope methods in applications such as, for example, radiotherapy and diagnostic medicine. The unit commences with the rudiments of nuclear chemistry, radiation chemistry and radiochemistry, and the distinction between them. Methods of synthesis, isolation and separation of radioisotopes are introduced in the wider context of the chemistry of the elements, especially those of the lanthanides and actinides. The use of radioisotopes in the study of kinetics and mechanism of chemical reactions, equilibrium chemistry and analytical chemistry is illustrated. Radioisotopic dating and the chemical effects of ionizing radiation are considered.

Spectrometric Methods of Structure Determination
Lectures 15 hours
In this unit selected aspects of spectroscopy are applied to the solution of problems of analysis and structural determination in diverse areas like pollution, toxin identification, and explosives. A wide range of such problems is examined and resolved using spectrometric techniques including nuclear magnetic resonance, infra-red, visible, ultra-violet spectroscopy and mass spectrometry.

Complementary unit

Special Applications of Chemistry
Lectures 20 hours

Two topics of 10 lectures each on specialised applications of chemistry, for example, Forensic Chemistry, The Development and Nature of Chemotherapeutic Agents, Medicinal Chemistry, Environmental Toxicology, Food Chemistry, Data Analysis and Chemical Instrumentation, Photographic Chemistry, and Surfaces, Colloids and Adhesion.

Special Unit

Marine Chemistry 3
Lectures 10 hours
Laboratory 12 hours
Prerequisite: Marine Chemistry 2

This unit continues Marine Chemistry 2. Chemical equilibria in the ocean are discussed using a graphical "mastervariable" technique. Detailed examination is made of effects of ionic strength, temperature and pressure on important carbonate equilibria using this approach. Diverse applications of the technique are considered from the mixing of fresh and saline waters to analytical errors in modern alkalinity measurements. The role of the ion-exchange equilibria at the sediment/water interface is discussed in relation to the evolution of seawater

composition. The commercial recovery of natural products and fine chemicals from marine sources is discussed, together with the use of organic molecules as biogeochemical markers in sediments and ice.

This unit is available as an oceanography elective for students enrolled in Oceanography 3A. Students of Chemistry 3A who had elected to enrol in Marine Chemistry 2 in place of Chemistry of the Earth 2 in Chemistry 2A are required to elect Marine Chemistry 3 in place of Chemistry of the Earth 3. Other Chemistry 3A students may elect Marine Chemistry 3 in place of Chemistry of the Earth 3 or in place of a specified complementary unit, at the discretion of the Head of the Department provided the prerequisite is met. No student may use Marine Chemistry 3 to meet both the requirements of Oceanography 3A and Chemistry 3A. All substitutions of Marine Chemistry 3 for either Chemistry of the Earth 3 or a complementary unit must be elected in writing prior to the time the latter units are taught.

ACHM.3602 U Chemistry 3B
(Not offered in 1993)

Credit points 12
Lectures 5 hours per week
Tutorials 2 hours per week
Laboratory 6 hours per week
Prerequisite: ACHM.2602 U Chemistry 2B

Advanced Instrumental Chemistry
Lectures 32 hours

Survey of modern instrumental methods for analysis and structure determination: Principles, applications and limitations; microprocessor enhancement and data analysis. An in-depth study of two or three of these techniques including NMR spectroscopy and advanced chromatography.

Inorganic Chemistry 3
Lectures 32 hours

Physical methods applied to transition metal complexes including organometallic compounds. Interpretation of physical data using techniques of NMR, IR, UV/VIS, PE spectroscopy; magnetochemistry; potentiometry; diffraction; thermochemistry. Inorganic mechanisms: tools for determining reaction schemes; square planar and octahedral metal ion substitution; isomerization and other rearrangement processes; electron transfer; catalysis; asymmetric synthesis; reactions of coordinated ligands.

Organic Chemistry 3
Lectures 33 hours

This unit completes the survey of nucleophilic carbon and expands the chemistry of carbanions particularly those derived from carbonyl compounds. Advanced topics will include stereochemistry, reactive intermediates, pericyclic reactions, and rearrangements. A discussion of heteroatom derivatives of carbon will conclude the unit.

Physical Chemistry 3
Lectures 32 hours

Statistical thermodynamics: the partition function and its application to the calculation of the energy, free energy, heat capacity, entropy and related properties of ideal gases. Chemical kinetics: rate laws, reaction order, molecularity and mechanism. Simple theory of reactive and non-reactive collisions. Energy surfaces and reaction pathways. Unimolecular rate theory and activated complex theory. Photochemical reactions. Relation of theory to experiment.

ACHM.3603 U Chemistry 3C

Credit points 6
Lectures/Laboratory/Project Average 5 hours per week
Corequisite: Chemistry 3A

Chemistry 3C augments Chemistry 3A and will be of particular interest to students who may wish to enrol in chemistry honours. Chemistry 3C is not open to students who are completing (or have completed) Chemistry 2B or Chemistry 3B. Two of the following three options are to be elected. Contact hours may vary from 2 to 8 hours per week but the yearly total will be about 130 hours.

Inorganic Chemistry

This unit comprises four topics of approximately equal weight: (i) Structure and bonding. (ii) Inorganic reactions which will include aspects of bioinorganic and organometallic chemistry, kinetics and mechanism. (iii) Spectroscopy, including theory and inorganic applications of photochemistry, NMR, visible and ultraviolet, IR, ORD, and CD spectroscopy. (iv) Main Group chemistry, covering patterns of reactivity for B, Si and Ge, P and As, S and Se. Each student will carry out a project based on a selected research publication, requiring a survey of the cited literature and investigation of reported experiments.

Organic Chemistry

This unit brings together common themes that run through all branches of organic chemistry, resulting in connections between seemingly separate areas. Fundamental organic reaction mechanisms, functional group transformation and synthetic strategies are examined. A detailed discussion is presented of topics such as addition, substitution and elimination reactions; leaving groups; stereochemistry; resonance and inductive effects. A library research assignment also forms part of the unit. The laboratory work illustrates the principles of manipulating organic compounds with respect to their preparation, purification, properties and identification.

Physical Chemistry
Prerequisite: Mathematics 1

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 to theoretically model molecules, spectroscopic experiments for the determination of molecular energies and dimensions, and comparisons of the theoretical calculations with the experimental results.

ɔHM.4690 H Chemistry 4 (Honours) F/T
ɔHM.4691 H Chemistry 4 (Honours) P/T

ıe subject will consist of study in a specialized field (or fields) chemistry and will comprise such lectures, seminars, examıtions, research projects, reports, as prescribed by the Head Department.

ɔHM.4692 C Chemistry 4 (Combined Honours) F/T
ɔHM.4693 C Chemistry 4 (Combined Honours) P/T

the Combined Honours program candidates are required to ɜsent a thesis or research project on a topic that is conrned with Chemistry and the interests of the other ıpartment involved, the thesis or project being supervised d examined by the two Departments conjointly. In addition, ndidates are required to complete course work as approved the Head of Department.

ɔHM.0500 U Chemistry and Society

Full-year Elective
Credit points 3
Lectures and tutorials 2 hours per week

Basic vocabulary of chemistry: physical and chemical properties of substances; symbols, formulas and equations; molecular structure; carbon compounds; important industrial compounds.

Chemistry in society: examination of societal issues such as defoliants, explosives and propellants, food additives, fuels, genetic engineering, heavy metals, medicinals, nuclear energy and nuclear waste, toxic chemicals in warfare.

Balancing benefits and risks: The nature of personal and societal risk; acceptance risk; the chemist's role in identifying, analysing and controlling the problems arising from the production and use of chemicals and chemical energy.

ACHM.1800 U Chemistry 1E

Introduction. Atoms, molecules, bonding and cohesion. Molecules and Matter. Concepts of Physical Chemistry. Chemistry of Materials.

There are no formal chemistry prerequisites for entry into Chemistry 1E. Students who have not studied chemistry in years 11 and 12 are advised that supplementary study may be needed for successful completion of the subject.

epartment of Computer Science

ıtline of subject structures for the ts and Science degrees.

	HPW	*CPV*
Single subject		
mputer Science 1 or	6	6
ɔrmation Systems 1	6	6
the sub-major		
mputer Science 1	6	6
mputer Science 2A or	8	8
ɔrmation Systems 1	6	6
ɔrmation Systems 2	8	8
the single major		
mputer Science 1	6	6
mputer Science 2A	8	8
mputer Science 3A	12	12
ɔrmation Systems 1	6	6
ɔrmation Systems 2	8	8
ɔrmation Systems 3	12	12

	HPW	*CPV*
(d) *the major/sub-major combination*		
Computer Science 1	6	6
Computer Science 2A	8	8
Computer Science 2B	8	8
Computer Science 3A	12	12
Computer Science 3B	12	12

(e) *the Honours program*

The standard for entry to the Honours program is at least a good credit grade at Level III in Computer Science or Information Systems.

Note:
1. Students are not permitted to take both Computer Science 1 and Information Systems 1 in the one degree course.
2. Students proceeding to a Computer Science major or sub-major from Computer Science 1E are required to complete Session 2 of Computer Science 1.
3. Availability of some units is conditional on class size.

ɪrequisites for Level II Units

ɪits	*Prerequisites*
ɜsion 1	
ɪata Structures 2	*Computer Science 1 or 1E*
ogic Design 2	*Computer Science 1 and Physics 1 or 1E*
ıformation in Organisations 2	*Information Systems 1*
ıformation Analysis 2	*Information Systems 1*
lumerical Analysis 2	*Computer Science 1 and coreq. Mathematics 2A*
ıtroductory Operations Research 2	*Mathematics 1*
nowledge Programming 2	*Computer Science 1*

Session 2

Computer Architecture 2	*Computer Science 1 or 1E*
Operating Systems 2	*Data Structures 2*
Numerical Linear Algebra 2	*Numerical Analysis 2 and coreq. Mathematics 2A*
Data Abstraction 2	*Data Structures 2*
Database Management Systems 2	*Information Systems 1*
Information Processing 2	*Information Systems 1*
Applied Operations Research 2	*Introductory Operations Research 2*

Note: 1. Mathematics 1 is a prerequisite for Computer Science 2A and Computer Science 2B.
2. Students must complete introductory material on the use of the UNIX environment as prescribed by the Department for Computer Science 2A, Computer Science 2B and Information Systems 2.

Prerequisites for Level III Units

Units	*Prerequisites*
Session 1	
Operating Systems 3	*Computing Architecture 2 and Operating Systems 2*
Comparative Programming Languages 3	*Data Structures 2*
Real Time Systems 3	*Computer Architecture 2 and Logic Design 2*
Software Engineering 3	*Data Structures 2*
Theoretical Computer Science 3	*Data Structures 2*
Data Networks 3	*Information Processing 2 or Data Structures 2*
Applied Stochastic Processes 3	*Probability 2 or Introductory Operations Research 2*
Session 2	
Computer Graphics 3	*Data Structures 2*
Compiler Design 3	*Data Structures 2 and Computer Architecture 2*
Computer Architecture 3	*Computer Architecture 2, Logic Design 2 and Operating Systems 2*
Artificial Intelligence 3	*Knowledge Programming 2*
Computer Science Project 3	*Software Engineering 3*
Numerical Analysis 3	*Numerical Analysis 2 and Mathematics 2A*
Optimal System Control 3	*Probability 2 or Introductory Operations Research 2*
Cryptography & Computer Security 3	*Data Structures 2*
Simulation 3	*Probability 2 or Introductory Operations Research 2*

Note: 1. Students must complete introductory material on the use of the UNIX environment as prescribed by the Department for Computer Science 3A, Computer Science 3B and Computer Science 3C.

ACSC.1600 U Computer Science 1

Credit points 6
Excluded: Information Systems 1

3 lectures and 3 laboratory/tutorial periods per week for 2 sessions (Students who have not completed HSC 3 Unit Mathematics, or equivalent, are not recommended to undertake this course).

Problem solving methods and algorithm development: programs, graphical methods, pseudocode, stepwise refinement, top down design, modularity. Pascal programming language: identifiers; variables, input/output, simple data types, assignment statement, expressions, operators, standard functions, procedures, block structure, local and global identifiers, scope, program control, Boolean variables and expressions, loops, user defined types. Elementary structures: arrays, records, serial files, sets, searching and sorting methods. FORTRAN programming language: application to numeric programming. Introduction to computer systems: functional components, program execution, representation of information, binary arithmetic, fixed and floating point, signed numbers. Introduction to logic design: truth tables, basic laws of Boolean algebra, de Morgan's theorems, duality, derivation Boolean expressions, logic symbols and diagrams, Karnaug maps. Introduction to information systems: system flow di grams, data validation, elementary transaction processin sequential file update. Artificial intelligence: Turing tes ELIZA, game-playing, difficulties associated with natural la guage and vision. Elementary computability and complexit examples of non-computable problems, meaning of comput tional complexity with examples from linear and binary searc Operating system fundamentals: compiling, loading, multipr cessing, I/O, device characteristics. Social issues: privacy data, security.

ACSC.1700 U Information Systems 1

Credit points 6
Excluded: Computer Science 1.

3 hours lectures, 3 hours laboratory/tutorials for 2 sessions.

Computer programming: computer organisation—a overview identifying components and their functions, pr gramming languages and programming, algorithm develo

ənt. Quantitative methods: introduction to management sci-
ce and operations research, fundamentals of probability
d statistics, decision analysis, linear programming, queue-
ɟ theory, network analysis, inventory systems, game theory,
nulation. Computer concepts and software systems, com-
ter structure and architecture, operating environment for
plication programs, introduction to systems analysis, data
ɜnagement concepts, managerial issues, applications, use
information systems to enhance personal productivity.

:SC.2601 U Computer Science 2A

Credit points 8
Prerequisite: Mathematics 1

.evel II units, each unit of 2 credit points consisting of 2 lec-
es and 2 laboratory/tutorial periods per week for 1 session.

addition, students must complete introductory material on
ɜ use of the UNIX environment as prescribed by the
partment.

:SC.2602 U Computer Science 2B
ɔt offered in 1993)

Credit points 8
Corequisite: Computer Science 2A

.evel II units, excluding units chosen in Computer Science
, each unit of 2 credit points consisting of 2 lectures and 2
oratory/tutorial periods per week for 1 session.

addition, students must complete introductory material on
use of the UNIX environment as prescribed by the
partment.

SC.2001 E Data Structures 2 S1

Prerequisite: Computer Science 1 or Computer Science 1E

oduction to UNIX operating system use. Unlinked data
ɹctures: algorithms and storage mapping for records, vari-
records, arrays; fixed and variable length strings.
orithms: complexity, O-notation, time-space tradeoff, anal-
ɜ of some sorting algorithms. Linked structures and point-
: single linked lists, doubly linked lists, rings, stacks,
ɜues, deques; application and implementation. Binary
ɜs: ordered traversals , insertion and deletion, analysis, bal-
ɜed trees, B-trees. Hashing: basic methods, collisions,
ılysis of performance. Programming theory and methodol-
': loop invariants, simple program development from pre-
l post-conditions; macros and procedures; modularity,
ɾrmation hiding, data type abstraction, separate compila-
. Recursion: comparison with iteration, use and abuse, ele-
ɳtary stack implementation of block structured language.

SC.2002 E Logic Design 2
t offered in 1993)

'rerequisite: Computer Science 1 and Physics 1 or 1E.

ital logic circuits as simulators of Boolean functions, Digital
c families; Standard notations; Boolean forms, Karnaugh
ɔs, prime and other implicants, synthesis of combinational
uits; Analysis of asynchronous sequential circuits, stability,
uits with more than one feedback variable, synthesis of
nchronous sequential circuits, flip-flops, memories, syn-
ɜis of FSMs using synchronous circuits, coupled FSMs.

ACSC.2003 E Numerical Analysis 2 S1

Prerequisite: Computer Science 1
Corequisite: Mathematics 2A

Computer calculations: Computer representation of numbers, Floating point arithmetic, sources of errors, error propagation in computations, error analysis, numerical instability of algorithms. Numerical solution of non-linear equations: Bi-section method, simple iteration, Newton's method, method of false position, secant method, Convergence criteria. Interpolation and approximation: Finite differences, interpolation formulae, nested multiplication, deflation of a polynomial, Lagrange interpolation polynomial, cubic spline interpolation, error analysis. Numerical integration and differentiation: Newton-Cotes integration formulae, composite formulae, Richardson extrapolation, Romberg integration, Gaussian quadrature, adaptive quadrature, error propagation in numerical integration, numerical differentiation. Numerical solution of ordinary differential equations: Taylor Series methods, Euler and modified Euler method, Runge-Kutta methods, error analysis. Solution of linear simultaneous equations: Elimination methods, Gaussian elimination, matrix inversion, iterative methods, Jacobi method, Gauss-Seidel method, condition of a linear system, convergence criteria, error analysis. Mathematical software: Design criteria, efficiency considerations, mathematical software libraries.

ACSC.2004 E Introductory Operations Research 2 S1

Prerequisite: Mathematics 1

Introduction; process of operations research, model formulation, mathematical techniques. Probability concepts; Bayes' theorem, distributions, expectations. Decision analysis; trees, choice criteria, utility. Linear programming; simplex procedure, duality, sensitivity, LP packages.

ACSC.2005 E Computer Architecture 2 S2

Prerequisite: Computer Science 1 or Computer Science 1E

Information representation and encoding. Introduction to computer organization: processor, memory, data bus; stored program concept, instruction/data ambiguity. Assembly language: instructions, operands, symbolic labels, pseudo-operations, directives, local symbols, location counters, simple macros. Programming techniques: arithmetic, manipulating representations, record and pointer manipulation, space- and time-efficiency. Subroutine linkage: call and return, parameter passing, recursion. I/O processing: polling and interrupt handling. Instruction and operand encoding.

ACSC.2006 E Operating Systems 2 S2

Prerequisite: Data Structures 2

Function and evolution of operating systems; Single-user, batch, time-sharing, real-time systems; Types of service offered, user and operating system viewpoints; Concurrent process, concurrency, resource sharing, process state, critical sections, locks, semaphores, deadlocks; File operations, directories, protection, organization; Memory management, relocation, segmentation, paging, protection; CPU scheduling.

ACSC.2007 E Applied Operations Research 2 S2

Prerequisite: Introductory Operations Research 2.

Allocation models; transportation, degeneracy, balancing, assignment. Game theory; two person zero sum models, graphical, algebraic and iterative techniques. Dynamic programming; networks, resource allocation, reliability. Networks, shortest path, minimal spanning tree, maximal flow. Integer programming; branch and bound, cutting plane methods.

ACSC.2008 E Numerical Linear Algebra 2 S2

Prerequisite: Numerical Analysis 2
Corequisite: Mathematics 2A

The solution of linear equations: Elimination methods, Gauss' method, computational efficiency, pivoting strategies, scaling, Gauss' method adapted to banded matrices, triangular decomposition methods, iterative methods, Jacobi's method, Gauss-Seidel method, successive over-relaxation, convergence criteria, error analysis, condition number and ill-conditioned matrices, iterative improvement of solutions, accelerated convergence. Computation of eigenvalues and eigenvectors: Properties of eigenvectors and eigenvalues, similarity transformations, the power method, deflation of a matrix, eigenvalue problem for tri-diagonal matrices, householder's method, given's method, the QR algorithm, method of inverse iteration, rounding errors in eigenvalue problems. Applications of numerical linear algebra: Applications to boundary value problems for ordinary differential equations. Finite difference methods for solving partial differential equations, use of mathematical software libraries.

ACSC.2009 E Knowledge Programming 2 S1

Prerequisite: Computer Science 1

Theorem proving; resolution; Prolog. Expert systems: characteristics; production rules; separation of knowledge base and inference engine; forms of inference and explanation; expert systems shell; examples of expert systems.

ACSC.2010 E Data Abstraction 2 S2

Prerequisite: Data Structures 2

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.

ACSC.2700 U Information Systems 2

Credit points 8

4 compulsory Level II units, each of 2 credit points consisting of 4 periods per week for 1 session.

In addition, students must complete introductory material on the use of the UNIX environment as prescribed by the Department.

ACSC.2011 E Information Processing 2 S1

Prerequisite: Information Systems 1

Advanced programming: programming languages, structured programming concepts. Data organization and accessing: data structures and indexing, sequential access, random access, file I/O, implementation considerations.

ACSC.2012 E Database Management Systems 2 S

Prerequisite: Information Systems 1

The data environment. Basic technical concepts: data stru tures, operating system topics, file organization. Databas concepts, database management systems, logical data mo els, internal data models, use and management of database database management system facilities in building informa tion system applications, database administration, DBM evaluation, distributed databases.

ACSC.2013 E Information in Organisations 2 S

Prerequisite: Information Systems 1

Information systems and organizations: management info mation systems, relating systems and information to orgar zational objectives, information systems and organizatic structure and management. Individual behaviour and grou dynamics in the development process. Information and dec sion theory: information concepts, decision processe Information system applications.

ACSC.2014 E Information Analysis 2 S

Prerequisite: Information Systems 1

Application development strategies, application system deve opment life cycle, representation and analysis of systen structure, systems theory, application system developme management, information requirements determinatio requirement analysis and logical specification.

ACSC.2790 E Information Systems 2 (Honours)

The Information Systems 2 Honours program consists of ACSC.2700 U Information Systems 2 plus additional readir and assignment work in the units: ACSC.2012 E Informatio in Organizations 2 and ACSC.2014 E Information Analysis Honours Students will be expected to achieve a high standard in the Information Systems 2 program.

ACSC.3601 U Computer Science 3A

Credit points 12

6 Level III units, each unit of 2 credit points consisting of 2 le tures and 2 laboratory/tutorial periods per week for 1 sessic

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

In addition, students must complete introductory material the use of the UNIX environment as prescribed by t Department.

ACSC.3602 U Computer Science 3B
(Not offered in 1993)

Credit points 12

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

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

In addition, students must complete introductory material the use of the UNIX environment as prescribed by t Department.

:SC.3603 U Computer Science 3C

Credit points 6

.evel III units, excluding units chosen in Computer Science , each unit of 2 credit points consisting of 2 lectures and 2 ıoratory/tutorial periods per week for 1 session.

vel II units may be substituted for Level III units with the proval of the Head of Department.

addition, students must complete introductory material on : use of the UNIX environment as prescribed by the partment.

:SC.3001 E Artificial Intelligence 3 **S2**

Prerequisite: Knowledge Programming 2.

›blem solving: problem representation, search methods, prob- ı reduction, game playing. Knowledge representation. Natural guage understanding. Automatic deduction: theorem proving, olution, logic programming, prolog. Computer vision: scene ılysis, blocks world, pattern recognition. Speech recognition. chine learning. Robotics. Expert systems.

SC.3002 E Data Networks 3 **S1**

Prerequisite: Information Processing 2 or Data Structures 2.

mmunication concepts: one way, half-duplex, full-duplex des of operation. Datacommunication and its application in ninal and computer networks. Serial and parallel, local and ıote links. Codes and terminal types. Synchronous and nchronous transmission. Analogue and digital transmis- ı, modulation, modems, noise and errors. Error recovery. ex and telephone networks. Designing for economy: point ›oint, multidrop, multiplexors. Switching network technolo- s: Circuit, message and packet switching. The X25 network ırface. Local area networks. The ISO/OSI reference model. rent availability and standard products.

SC.3003 E Compiler Design 3 **S2**

Prerequisites: Data Structures 2 and Computer rchitecture 2.
lecommended: Comparative Programming Languages 3.

ıctions of a compiler: phases, intermediate data forms, mple recursive-descent compiler for expressions. mmars: lexical, syntactic, semantic description; Chomsky ıses, power of context free and regular grammars, recog- ırs. Lexical analysers: regular expressions, NFA, DFA, pro- n construction. Top-down parsing: recursive descent, l) property, table-driven; error reporting, recovery. Bottom- ›arsing: simple operator precedence, LR table driven, sim- ed construction, error reporting. Syntax-directed actions: cept of compiler-compiler, use in general software con- ction. Symbol tables: single-scoped, modular and block ctured languages; alternative implementations. Run-time ctures: composite types, array addressing, descriptors; c data areas, block structure, procedure call and return, ımeter mechanisms. Code generation: quadruples, post- anslations; final code generation, naive, using descriptors.

3C.3004 E Real Time Systems 3

: offered in 1993)

rerequisites: Computer Architecture 2 and Logic Design 2.

Types of real-time systems, distinguishing features; real-time system structure, processes, communication, synchronization; high-level language constructs for real-time systems, processes, semaphores, event queues, monitors, send and receive primitives; implementation, dedicated and shared resources, synchronization, inter-process communication, protection, device drivers and interrupts; scheduling, priorities, strategies, starvation and deadlock; reliability of software, fault tolerance, fault detection and recovery; system design and performance prediction and measurement, modelling, monitoring techniques.

ACSC.3005 E Numerical Analysis 3

Prerequisites: Numerical Analysis 2 and Mathematics 2A.

Numerical solution of ordinary differential equations: predictor-corrector techniques, solutions of systems of equations, higher order equations, methods for solution of boundary value problems.

Curve fitting and approximation of functions: orthogonal polynomials, chebyshev polynomials, fast fourier transforms, piecewise polynomial approximations.

Numerical solution of partial differential equations: stability and convergence criteria for finite difference methods; introductions to: instability in non-linear equations, Rayleigh-Ritz and Galerkin techniques, finite element techniques.

The course will include project work on the development of mathematical software.

ACSC.3006 E Computer Graphics 3 **S2**

Prerequisite: Data Structures 2.
Recommended: Operating Systems 2.

Computer graphics applications areas; display system taxonomy; picture primitives and attributes; coordinate systems; windows, viewports and clipping; segmentation; geometric transformations: Translation, rotation, scaling, shearing; homogeneous coordinate systems; computer graphics standards (GKS, CORE, CGI, CGM, NAPLPS); models for interactive computer graphics; interactive devices; ergonometrics; logical input devices: choice, location, pick, string, stroke, valuation; input modes: request, sample, event; interaction techniques; 3-D graphics; 3-D transformations; projections: parallel, perspective; 3-D viewing; raster devices; scan conversion algorithms; hidden-surface removal algorithms; colour perception; colour models.

ACSC.3007 E Computer Architecture 3 **S2**

Prerequisites: Computer Architecture 2, Logic Design 2, Operating Systems 2.

Hierarchical description of computer systems; computer organization at the instruction set level, data structures, control structures, reference structures; computer organization at the register-transfer level, Von Neumann machine, functional units and data paths, CPU timing and control, arithmetic logic unit structure, zero and multi-address and general register architectures; data paths and I/O control, serial and parallel, and asynchronous and synchronous buses, referencing I/O devices, polling, interrupts; memories; microprogram control organization; microprocessor architecture.

ACSC.3008 E Operating Systems 3 **S1**

Prerequisites: Computer Architecture 2 and Operating Systems 2.

Virtual memory systems, demand paging and replacement algorithms, memory allocation algorithms and interaction with paging, storage hierarchy; physical characteristics of disc-like devices, scheduling algorithms; concurrency within and between processes, parallelism constructs in high level languages, static versus dynamic creation of processes, modularization, synchronization using shared variables, system calls, shared channels, concurrent languages; protection, policies and mechanisms, access and capability lists; operating system design principles, layered and virtual machines, user interfaces, implementation and systems generation.

ACSC.3009 E Theoretical Computer Science 3
(Not offered in 1993)

Prerequisite: Data Structures 2
Recommended: Discrete Mathematics 2

Theory of finite machines; the abstract automation, electronic reliability, fundamental theorem of automata, limitations of finite automata. Theory of infinite machines: computable functions, sets, real numbers and problems, effectively enumerable sets, limitations of infinite machines, the halting problem, Church-Turing thesis, the universal Turing machine. Operational and denotational semantics, structured programming languages and their formal semantics. Correctness of programs: testing and proving, program verification. Theory of complexity of programs, algorithms and problems: practical measures of complexity, theory of NP-completeness, parallel computations.

ACSC.3011 E Computer Science Project 3 (4 CP) S2

Prerequisite: Software Engineering 3

A substantial supervised project in consultation with an appropriate member of the department. The topic of this project will depend on the individual student and will be chosen in consultation with staff.

ACSC.3012 E Applied Stochastic Processes 3 S1

Prerequisite: Probability 2 or Introductory Operations Research 2.

Queueing theory; arrival and servicing distributions, queue discipline, queueing models, single and multiple servers. Markov processes; state and transition properties, steady state probabilities, first passage times, applications to decision rules and optimal maintenance. Optimization; analytic techniques, Taylor series approximation, Newton-Raphson, numerical techniques, unconstrained and constrained algorithms for linear and multidimensional models. Search theory; motion of searcher and target, search patterns, barrier patrols.

ACSC.3013 E Optimal System Control 3 S2

Prerequisite: Probability 2 or Introductory Operations Research 2.

Project Management; CPM, event and activity analysis, resource allocation, crashing, PERT. Inventory theory; deterministic models. EOQ, quantity discounting, shortages, multiple products, constraints, probabilistic models, safety stock. Reliability and replacement theory; inflation, obsolescence, failure rates, servicing strategies.

ACSC.3014 E Software Engineering 3 S1

Prerequisite: Data Structures 2.

The software life cycle, consequences of unreliable programs rationale for engineering approach, programming in the larg vs programming in the small. Specification and design: dat flow diagrams, program description language, structur charts. Implementation; module design, data-directed meth ods, choice of language, top-down bottom-up developmer and testing. Programming style: recognising quality, concep tual abstraction. Performance analysis: analysis, measure ment, tools, characteristics of large programs. Reliabilit semi-formal correctness proofs, defensive programmin Testing and debugging: elementary theory, techniques Documentation: standards, tools.

ACSC.3015 E Cryptography & Computer Security 3 S

Prerequisite: Data Structures 2

Introduction; description of problems in the protection of info mation; classification of methods of protection. Mathematic methods; complexity theory; information theory. Encryptio methods of information protection: classical ciphers; symme ric algorithms; asymmetric algorithms. Authentication met ods; elementary methods of authentication based o symmetric algorithms; authentication based on asymmetr algorithms; digital signatures; user authenticatio Cryptographic techniques: block and stream ciphers, linea feedback shift registers; one-way ciphers and password homomorphic techniques. Application of cryptography databases; cryptographic methods which preserve data bas structures; tradeoff between degree of protection and ef ciency; data processing of encrypted data. The role of cry tography in computer network security; key managemer generation and storage of cryptographic keys; cryptograph protocols. Classification of operating systems securit Minimum knowledge protocols. Smart cards.

ACSC.3016 E Comparative Programming Languages 3 S

Prerequisite: Data Structures 2

Brief history of programming languages. Programming la guage description: lexics, syntax, semantics, syntax definitic methods, grammars, properties of regular expressions ar BNF, informal context-sensitive syntax and semantics descri tions, varieties of programming language standard definition Binding: static, semi-static, dynamic. Acceptors: interpreto and compilers. Comparative programming language feature control structures, data typing, storage structures, I/O mech nisms, procedures, parameter mechanisms, exception abstraction, modularity; elementary run-time structure Factors governing language choice: power implementatic efficiency, portability, clarity, maintainability standardisatio ease of programming.

ACSC.3017 E Simulation 3 S

Prerequisites: Probability 2 or Introductory Operations Research 2
Recommended: Statistics 2, Comparative Modelling 2, Applied Stochastic Processes 3

Concepts of modelling, continuous and discrete systems, ra dom number generation, continuous and discrete distrib tions, time-stepped simulation, event-stepped simulatic simulation languages, SIMSCRIPT programming languag simulation of queueing systems, simulation inventory sy tems, statistical analysis of output, verification and validatic

ːSC.3700 U Information Systems 3

Credit points: 12

2 weeks work attachment may be required as part of this ɔject.

ɪmpulsory units	*Credit points*
ːSC.3018 E Systems Planning 3	2
ːSC.3019 E Systems Design 3	2
ɛctives	
ːSC.3020 E Modelling and Decision Systems 3	2
ːSC.3021 E Information Systems Communications 3	2
SC.3022 E Management Information Systems Practices 3	2
SC.3023 E Knowledge Based Systems 3	2
SC.3024 E Quantitative Techniques 3	2
SC.3025 E Information Systems Project 3	4
SC.3026 E Information Systems Programming 3	2

SC.3018 E Systems Planning 3 **S1**

ɪblem need identification and feasibility assessment, sys- ı evaluation and selection, application software make or ' decision, hardware and system software selection, project nagement methods, acquisition procedures. The course include project work on the development of mathematical ːware.

SC.3019 E Systems Design 3 **S1**

ality assurance review of logical design, planning to accom- ɗate change, detailed logical design, system design, pro- ɪ development and testing.

SC.3020 E Modelling and Decision Systems 3 **S1**

ıciples of decision making, modelling, tools in decision lysis, decision support systems, knowledge acquisition, ımon aspects of management information systems, knowl- e based systems, and common support systems.

ɜC.3021 E Information Systems Communications 3 **S2**

ɪmunications environment, communications systems ıponents, networks and control, common carrier services, ign of communications networks, networks management distributed environment, local area data networks, future vorks.

ɜC.3022 E Management Information Systems Practices 3 **S2**

ıning an organizational information system, organization ıformation system function, computer centre administra- management of information systems development, ɛlopment of information systems personnel, the social and l environment, the information systems executive.

ɜC.3023 E Knowledge Based Systems 3 **S2**

wledge acquisition and representation, expert systems ɜ, use of shells to examine applications in Defence, com- ɜon between tools.

ACSC.3024 E Quantitative Techniques 3 **S2**

Graph theory, stochastic processes, dynamic programming, forecasting, multiple-attribute utility methods, marginal analysis linear programming, transport and allocations methods, queuing methods network analysis, simulation.

ACSC.3025 E Information Systems Project 3 (4 CP) **S2**

Preparation of project in one of the areas of knowledge-based systems, management information systems, command support systems, or quantitative methods.

ACSC.3026 E Information Systems Programming 3 **S2**

User-interface design (command language, graphical user interfaces), table-driven design, compiler-compilers, computer graphics, processes and interprocess communication, dynamic simulation, tools for building packages.

ACSC.3790 E Information Systems 3 (Honours)

The Information Systems 3 Honours program consists of ACSC.3700 U Information Systems 3 plus additional reading and assignment work in the units:

ACSC.3018 E Systems Planning 3; ACSC.3019 E Systems Design 3; ACSC.3025 E Information Systems Project 3.

ACSC.4690 H Computer Science 4 (Honours) F/T
ACSC.4691 H Computer Science 4 (Honours) P/T
ACSC.4790 H Information Systems 4 (Honours) F/T
ACSC.4791 H Information Systems 4 (Honours) P/T

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

ACSC.4692 C Computer Science 4 (Combined Honours) F/T
ACSC.4693 C Computer Science 4 (Combined Honours) P/T
ACSC.4792 C Information Systems 4 (Combined Honours) F/T
ACSC.4793 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 Department involved, the thesis or project being supervised and examined by the two Departments conjointly. In addition, candidates are required to complete course work as approved by the Head of Department.

ENGINEERING UNITS

ACSC.1800 U Computer Science 1E

2 lectures per week for 2 sessions and 48 practical hours.

Problem solving methods and algorithm development: programs, graphical methods, pseudocode, stepwise refinement, top down design, modularity. Pascal programming language: identifiers, variables, input/output, simple data types, assignment statement, expressions, operators, standard functions,

procedures, block structure, local and global identifiers, scope program control, Boolean variables and expressions, loops, user defined types. Elementary structures: arrays, records, serial files, sets, searching and sorting methods. FORTRAN programming language: application to numeric programming. Introduction to computer systems: functional components, program execution, representation of information, binary arithmetic, fixed and floating point, signed numbers.

ACSC.2800 U Computer Science 2E

Prerequisite: Computer Science 1E.
Corequisite: Mathematics 2E.

2 lectures and 1 laboratory period per week for 2 sessions, consisting of the units Numerical Analysis 2E and Numerical Linear Algebra 2E.

ACSC.2802 U Computer Science 2EE

Prerequisite: Computer Science 1E.
Corequisite: Mathematics 2E.

4 lectures and 3 laboratory periods per week for the first session, consisting of the units Numerical Analysis 2E and Data Structures 2.

In addition, students must complete introductory material on the use of the UNIX environment as prescribed by the Department.

ACSC.2801 U Computer Science 2CE

Prerequisite: Computer Science 1E
Corequisite: Mathematics 2E

2 lectures and 2 laboratory periods per week for the first session consisting of Numerical Analysis 2.

ACSC.2401 E Numerical Analysis 2E S1

Prerequisite: Computer Science 1E
Corequisite: Mathematics 2E

Computer calculations: computer representation of numbers, floating point arithmetic, sources of errors, error propagation in computations, numerical instability of algorithms. Numerical solution of non-linear equations: bisection method, simple iteration, Newton's method, method of false position, secant method, convergence criteria. Interpolation and approximation: finite differences, interpolation formulae, nested multiplication, deflation of a polynomial, Lagrange interpolation polynomial, cubic spline interpolation. Numerical integration and differentiation: Newton-Cotes integration formulae, composite formulae, Richardson extrapolation, Romberg integration, Gaussian quadrature, adaptive quadrature, numerical differentiation. Numerical solution of ordinary differential equations: Taylor series methods, Euler and modified Euler method, Runge-Kutta methods. Solution of linear simultaneous equations: elimination methods, Gaussian elimination, matrix inversion, iterative methods, Jacobi method, Gauss-Seidel method, condition of a linear system, convergence criteria. Use of mathematical software libraries.

ACSC.2403 E Numerical Linear Algebra 2E S2

Prerequisite: Numerical Analysis 2E.
Corequisite: Mathematics 2E.

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

ACSC.3401 E Operations Research 3E F

Prerequisites: Mathematics 1E and Computer Science 1E

2 lectures per week

Introduction; process of operations research, model formulation, mathematical techniques. Probability concepts; Bayes' theorem, distributions, expectations. Decision analysis; trees, choice criteria, utility. Linear programming; simplex procedure, duality, sensitivity, LP packages. Allocation models; transportation, degeneracy, balancing, assignment. Game theory; two person zero sum models, graphical, algebraic and interative techniques. Dynamic programming; networks, resource allocation, reliability. Networks; shortest path, minimal spanning tree, maximal flow. Project management. CPM, resource allocation, crashing, PERT.

Department of Economics and Management

The Department of Economics and Management offers subjects that contribute towards the degrees of Bachelor of Arts and Bachelor of Arts with Honours. These subjects may also contribute to the degrees of Bachelor of Science and Bachelor of Science with Honours. The Department also contributes to economics and management programs in the Engineering courses.

The Department of Economics and Management also offers programs leading to the degree of Master of Arts with Honours, a Master of Management Economics by coursework, and Doctor of Philosophy.

The Department offers an undergraduate program that aims to combine a balanced liberal education in economics and/or management. The integration of economics and management in the Department's teaching and research programs has the advantage of complementing the consistency of economic theory with the relevance and enrichment provided by management studies.

Students seeking a self-contained, general introduction to the area may take Economics and Management 1.

Pass students may take a major or sub-major in either Economics or Management and may also take a major in one of these fields with a sub-major in either. To obtain a major or sub-major in Economics students must at Level II take either Economics 2, or Quantitative Methods in Economics and Management *and* International Trade. To obtain a major or sub-major in Management, students must at Level II take any

vo of Foundations of Management, Quantitative Methods in conomics and Management, and Introduction to Corporate nd Government Accounting. To complete a major, students ıust take at least two subjects at Level III from the field in hich their major falls.

o subject at any level may count, for credit point purposes, ıwards sequences in both of the fields of Economics and lanagement.

onours students wishing to concentrate on Economics will ɔrmally take Economics and Management 1; at Level II, conomics 2 (with additional Honours tuition), Quantitative lethods and either International Trade *or* Foundations of lanagement *or* Corporate and Government Accounting; at ɜvel III, Advanced Economic Theory and Policy, International conomic Theory and Policy, Quantitative Analysis and conometrics, at least one further Level III Economics or lanagement subject and Economics 3 (Honours). Economics ⊣ completes the Honours program.

onours students wishing to concentrate on Management will ɔrmally take Economics and Management 1; at Level II, ɔundations of Management, Quantitative Methods, and orporate and Government Accounting and Management 2 ⊣onours); and at Level III, Quantitative Analysis and conometrics, two other Management subjects, a fourth sub-ct from either Management or Economics and Management (Honours). Management 4H completes the Honours pro-ɜam.

ther options may be exercised, but these should be dis-ıssed beforehand with the Deputy College Secretary ıcademic) and the Head of the Department of Economics ıd Management.

ıe relevant Rules of the University College apply to the struc-ring of programs for all undergraduates and postgraduate ɜgrees.

ƎVEL I SUBJECTS

ECM.1600 U Economics and Management 1

ɾinciples of Economics

Full-year subject
Credit points 6
Lectures 3 hours per week
Tutorials 1 hour per week

ıis subject can serve either as a self-contained introduction the principal ideas in economics and management or as a ɜsis for a sub-major or major in economics or management. ɹccessful completion of this subject will be a prerequisite for l second-year economics and management units.

ɣllabus

ɜrt I: *Introduction*

Basic concepts; the economic problem; specialisation and ɔchange; rational action under risk and uncertainty. 2. Supply ıd demand: the market mechanism. 3. The social functions economic competition.

ɜrt II: *Households and Firms*

Households: Consumption and saving (possible choices), ɔrk and leisure. 5. Firms: Choice of technology, output and ɒut levels; capacity and capital investment. 6 Market structures and performance. 7. Basic managerial economics: objectives of management; risk and uncertainty; the production process and operations management. 8. Principles of financial management. 9. Principles of personnel management; motivation and incentives.

Part III: Aggregate Economics

10. National economic and social objectives; national accounts; principal concepts of macroeconomics. 11. Aggregate supply: production function; labour market; wage and formation. 12 Aggregate demand: consumption, investment, public expenditure and exports. 13. Money and banking. 14. Overall stability and stabilisation policy. 15. Economic growth and development. 16. International economic relations.

LEVEL II SUBJECTS

AECM.2601 U Economics 2

Intermediate Economics: Theory and Policy

Full-year subject
Credit points 8
Lectures 3 hours per week
Tutorials 1 hour per week
Prerequisite: AECM.1600 U Economics and Management 1

This subject covers at an intermediate level microeconomic and macroeconomic analysis and the policy implications that ensue. It is a prerequisite for most third-year Economics units.

AECM.2603 U International Trade S1

Single session Subject
Credit points 4
Lectures and tutorials 4 hours per week
Prerequisite: Economics and Management 1

This unit provides an exposition of the theoretical underpinnings of international trade as related to current economic events. It covers theories aimed at explaining the pattern, basis and consequences of international trade. Australia's trade policies and the strategic relevance of international economic issues are highlighted in the course.

AECM.2604 U Quantitative Methods in Economics and Management S2

Single session Subject
Credit points 4
Lectures and tutorials 4 hours per week
Prerequisite: Economics and Management 1

The subject is aimed at giving students a grounding in quantitative methods used in economics, commerce and management. In all parts of the course, the emphasis is on the use of the methods in economics and management, rather than on the theoretical derivation of the mathematical results. It is a prerequisite for many third-year units in the Department.

AECM.2703 U Foundations of Management S2

Single session Subject
Credit points 4
Lectures and tutorials 4 hours per week
Prerequisite: Economics and Management 1

This subject introduces students to the underlying theories of management. The approach is to apply theories to solving practical problems in such areas as decision analysis, organisational principles and strategic planning and implementation.

AECM.2704 U Introduction to Corporate and Government Accounting **S1**

Single session Subject
Credit points 4
Lectures and tutorials 4 hours per week
Prerequisite: Economics and Management 1

Preparation and use of balance sheets, income statements and funds statements, including the valuation of assets and treatment of inventories and cost of goods sold.

AECM.2690 U Economics 2 (Honours)

Lectures and Tutorials 1 hour per week
Corequisites: AECM.2601 U and AECM.2604 U; and AECM.2603 U *or* AECM.2703 U *or* AECM.2704 U

AECM.2790 U Management 2 (Honours)

Lecturesand Tutorials 1 hour per week
Corequisites: AECM.2703 U, AECM.2604 U *and* AECM.2704 U

LEVEL III SUBJECTS

For the purposes of completing a major or sub-major in Economics, the following subjects may be taken: AECM.3603 U, 3604 U, 3605 U, 3606 U, 3607 U, 3608 U, 3609 U, 3610 U, 3611 U, 3612 U, 3613 U.

For the purposes of completing a major or sub-major in Management, the following subjects may be taken: AECM.3603 U, 3608 U, 3703 U, 3704 U, 3705 U, 3706 U and 3707 U.

Honours subjects

AECM.3690 U Economics 3 (Honours)

Prerequisite: AECM.2690 U

AECM.3790 U Management 3 (Honours)

Prerequisite: AECM.2790 U

Honours students in Economics or Management must enrol in the relevant pass subjects as stated on p. 77

Enrolment in an Honours subject will involve an additional tutorial per week.

Level III 6CP sessional subjects Economics and Management

AECM.3603 U Quantitative Analysis and Econometrics **S2**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2604 U

This unit introduces students of economics and management to the methods and tools of applied regression analysis. It is designed to familiarise the students with the problems involved in the empirical measurement of relationships in economics and management, and the techniques that can solve these problems. Emphasis is placed on developing practical skills in building and testing models with the use of computers.

AECM.3604 U Industrial Economics **S1**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U

The unit aims to analyse the factors which account for differences among industries in economic behaviour, performance and evolution. Analysis focuses on business firms and their decisions in relation to strategic variables including price, capital investment and innovation. Industry outcomes are discussed in the framework of oligopolistic competition and illustrated by reference to Australian and international evidence. The scope and potential for policy to influence industrial performance are also examined.

AECM.3605 U Public Sector Economics

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U

The aim of the unit is to deepen students' understanding of the principles and effects of government involvement in the economy. Topic areas include direction of the public sector in pursuit of socio-economic goals; analysis of government provision of goods and services such as defence, health and education; the design and implementation of techniques to enhance returns from public sector projects and policies, and the evaluation of public sector performance.

AECM.3606 U Economic Development

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U or AECM.2603 U

The aim of this unit is to deal with the specific problems of less developed countries, covering the theories, empirical evidence and policy issues of economic development. Issues of rural, industrial, financial and infrastructural development will be included, as well as relations with the world economy. The approach of different economic systems with regard to allocative mechanisms, property rights and the organisation of production will be explored and the experience and performance of different approaches will be evaluated.

AECM.3607 U The Economies of Asia and the Pacific

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U or AECM.2603 U

This unit will enable students to examine major changes in the Asia-Pacific region. It will examine the changes and experience in countries such as Japan, China, the newly industrialising countries in east and southeast Asia, and in selected Pacific economies. Attention will also be given to the theoretical and policy implications of these developments and to the economic and strategic role of Australia in the Asia-Pacific region.

ECM.3608 U Labour Economics and Industrial Relations **S1**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U or AECM.2703 U

his unit develops the economic understanding of the use of bour in productive activity within the social and institutional ontexts found in Australia. Attention is given to key selected sues including employment and unemployment, human cap- al formation, and labour productivity. These are related to pical policy issues in Australia (such as changes in the ganisation of households and firms, changes in rewards to bour, and changes in the processes of industrial relations).

ECM.3609 U Advanced Economic Theory and Policy **S1**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U

he unit aims to provide an understanding in the Australian ontext of the rationale for government intervention in the conomy and a critical appreciation of what economic policy an (and cannot) contribute to delivering major objectives. nalysis from welfare economics is used to characterise effi- ency in allocating resources and the strengths and weak- esses of the market in delivering such an allocation are entified. The role of the government is discussed in terms of ountering market imperfections, assisting the operation of the arket, redistributing incomes, and stabilising fluctuations in ggregate real income and employment. Problems arising om government intervention in the economy are presented nd possible counter-measures suggested.

ECM.3610 U International Economic Theory and Policy **S2**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U

his unit aims to provide an understanding of international conomic relations and policies based on theories of interna- onal trade, factor flows, and financial relations, with particu- r reference to Australia. The unit offers reviews of trade eory and its applications, and extended analysis of the bal- nce of payments, international mobility of factors and firms, nd international capital and foreign exchange markets. Major eoretical issues and policies and recent reforms in world ade and international financial institutions are examined.

ECM.3611 U Economics of Regulation

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U

his unit aims to develop understanding of the rationale and npact of regulation of economic activity at a microeconomic vel. Private and public interest theories of regulation and var- us policy approaches to regulation are examined. Particular tention is given to selected regulatory issues of relevance in n Australian context, such as product and workplace safety, ompanies and securities, and anti-discrimination.

AECM.3612 U Resource Economics

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U

This unit introduces students to the complex interaction between economic activity and the natural environment and uses economic principles to analyse these interactions and suggest rational policies. Resource and environmental issues like the use of renewable and non-renewable resources, local and global pollution of water and the atmosphere, and preservation of natural environment will be covered and the prospects for future growth in a sustainable natural environment will be discussed.

AECM.3613 U Capitalism, Socialism and Economic Growth **S2**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2601 U

The objective of this unit is to introduce students to the preconditions for long-term economic growth, including the impact of different social and political systems on dynamic efficiency. Students will explore historic and international experiences, based on a theory of long-term economic growth which is set in a comparative-systems framework (comparing centrally planned and market economies). Economic and industrial evolution will also be examined as to the relevance to national defence, with particular reference to Australia.

AECM.3703 U Public-Sector Management

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2703 U

This unit describes and analyses the management of government departments and public enterprises in Australia. Administrative techniques are examined by reference to key topics, including budgeting in the public sector, evaluation and control of public sector activities, and project management.

AECM.3704 U Human Resource Management **S2**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM. 2703 U

This unit aims to develop students' understanding of the personnel management function and to help them to appreciate the vital role of this function in the successful operation of organisations. The evolution of this function will be 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.

AECM.3705 U Logistics **S1**

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2703 U

In this unit students examine the basic concepts and techniques of logistics management within the framework of an

integrated logistics system. Various civilian and military applications are considered, such as, systems engineering; reliability, maintainability and supportability of systems; systems effectiveness; operational requirements and logistics planning; and life-cycle costing.

AECM.3706 U Accounting Information for Management S1 S2

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2704 U

This unit concentrates on the ways in which the use of accounting information can improve managerial effectiveness. Among the areas covered are the application of information on budgeting and on cost behaviour to both routine and non-routine decisions. Students gain an appreciation of the economic and organisation contexts in which accounting information is employed.

AECM.3707 U Finance S1

Single session subject
Credit points 6
Lectures and tutorials 4 hours per week
Prerequisite: AECM.2703 U

This unit aims to develop understanding of financial decision-making. Basic tools of financial analysis are treated (such as the calculation of rates of return and the cost of capital, and portfolio analysis under risk and uncertainty). Sources of finance and institutional arrangements in Australian financial markets are also examined.

AECM.3692 U Economics 3 (Combined Honours)

In this program, course work is divided between the Department of Economics and Management and another Department as approved by the Heads of the two departments concerned.

AECM.3792 U Management 3 (Combined Honours)

In this program, course work is divided between the Department of Economics and Management and another Department as approved by the Heads of the two departments concerned.

AECM.4690 H Economics 4 (Honours) F/T
AECM.4691 H Economics 4 (Honours) P/T

Applied Economics

Full-year subject
Lectures/Tutorials/Seminars 112 hours per annum

Candidates will be expected to attend lectures, seminars and tutorials on five topics determined by the Head of Department, to submit regular written work and to write a supervised thesis of normally between 10,000 and 15,000 words.

Coursework will account for 60% and the thesis will account for the remaining 40% of the total marks.

With some modifications, the above program may be taken as a qualifying year towards a Masters (Honours) degree.

AECM.4790 H Management 4 (Honours) F/T
AECM.4791 H Management 4 (Honours) P/T

Applied Management

Full-year subject
Lectures/Tutorials/Seminars 112 hours per annum

Candidates will be expected to attend lectures, seminars and tutorials on five topics determined by the Head of Department, to submit regular written work and to write a supervised thesis of normally between 10,000 and 15,000 words.

Coursework will account for 60% and the thesis will account for the remaining 40% of the total marks.

With some modifications, the above program may be taken as a qualifying year towards a Masters (Honours) degree.

AECM.4692 C Economics 4 (Combined Honours) F/T
AECM.4693 C Economics 4 (Combined Honours) P/T

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

AECM.4792 C Management 4 (Combined Honours) F/T
AECM.4793 C Management 4 (Combined Honours) P/T

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

AECM.0500 U Economics GS

Full-year elective
Credit Points 3
Lectures and Tutorials 2 hours per week

This course provides a broad-based treatment of essential concepts and major themes characterising contemporary economics at the micro- and macro-economic levels. It draws heavily on illustrative material from the Australian experience.

The following subjects are offered in the Engineering Program.

AECM.3401 E *Engineering Economics* *Total 27 Hours*

Basic concepts in management economics. Project evaluation techniques in private and public enterprise, introduction to management accounting.

AECM.3402 E *Theory of Management* *Total 27 hours*

The role of management in a technologically advanced society. Human behaviour in the work situation; communications; influence; decision making. Models of organisations from static structural notions to dynamic open systems. Engineering managernent, technical change and automation.

Department of English

The English Department offers subjects which may be included in the Bachelor of Arts (Pass and Honours), Bachelor of Science (Pass and Honours) or Bachelor of Engineering degree programs. Additionally, the Department offers programs leading to the MA (Pass and Honours) and PhD degrees. Details of the Department's post-graduate courses are set out on p.138 of this handbook.

ndergraduate subjects are offered at first, second, and third ear level. For a Bachelor's degree, a major sequence in nglish will normally consist of English 1, 2A, and 3A; a sub-ıajor, of English 1 and 2A. Students wishing to construct a ub-major, as well as a major sequence in English may do so y combining four options from the Schedule taken at second ear level into English 2B (8 CP) and four options taken at third ear level into English 3B (12 CP).

cience and Engineering students may satisfy their General tudies requirements, either completely or in part, by passing ither (a) English 1 (6 CP) , or (b) four English General Studies lectives (6 CP), or (c) any two English General Studies elec-ves (3 CP).

etails of all undergraduate subjects offered in 1993 are set ut below.

EVEL 1

ENG.1600 U English 1

Full-year subject
Credit points 6
Hours per week 3 hrs (2 hrs lectures 1 hr tutorial)

his course is designed to introduce students to some major orks of literature, to teach ways of reading the three main enres of English literature, and to make students aware of ome contemporary approaches to writing. In Semester 1 udy will be focused on the techniques of critical reading pplied particularly to *Wuthering Heights, Dubliners* and *Sons nd Lovers,* together with a range of poetry, and plays by hakespeare and Stoppard. In Semester 2 the course con-ntrates on the close, critical reading of recent poetry, prose ction, and drama, in the context of history and contemporary itical discussion. Texts include poetry by Sylvia Plath and ed Hughes, and fiction by D.M. Thomas and Peter Carey.

EVELS II and III

ubjects offered at levels II and III consist of (a) a series of ore subjects devoted to chronological and introductory sur-eys of major periods of English and Australian writing, sup-orted and enriched by (b) a range of options which either tensify or extend the work done in the core subjects.

tudents enrolled in English 2A or English 3A will, in each ses-on, take a core subject, together with one of the options set ut in the Schedule below.

ENG.2601 English 2A

Full-year subject
Credit points 8
Hours per week 4hrs (2 core and 2 option)
Prerequisite: English 1

ENG.3601 English 3A

Full-year subject
Credit points 12
Hours per week 4hrs (2 core and 2 option)
Prerequisite: English 2A

nglish 2A Core Subjects

***Session 1.* AENG.2001 E—Introduction to the Literature of the English Renaissance.**

his course deals with English literature from 1580 to 1620, cluding such writers as Shakespeare, Donne, Marlowe, Jonson, and Webster. The period covers the reigns of Elizabeth I and James I, and an attempt is made to relate the literary texts to their historical, political , and cultural contexts. This includes an examination of the characteristic features of the literature produced in the reign of Elizabeth and in the reign of James, comparisons and contrasts between these two bodies of literature, and a study of texts which challenge the prevailing literary conventions.

***Session 2.* AENG.2002 E—Introduction to Australian Literature.**

This course will survey a range of Australian literature from the late nineteenth century to the present. It will consider continuing debates about white civilisation's relationship to the land and to the Aborigines, as well as mapping changing approaches to writing, through realism and modernism to postmodernism. Work by Henry Lawson, Xavier Herbert, Patrick White and Helen Garner is included in the course texts.

English 3A Core Subjects

AENG.3001 E & AENG.3002 E—An Introduction to English Literature 1800–1900 Parts A and B

This course uses readings of several major writers in English (most from Britain) between the late eighteenth and nineteenth centuries to study changes in literary expression in relation to social and cultural change in England.

First semester begins with a study of the major, exciting break in modes of writing which coincided with the French Revolution at the end of the eighteenth century. This section of the course concentrates on the work of poets but moves on to include the work of both essayists and novelists as the new writing of the new century is evolved. Here problems to do with 'writing the city' are introduced (especially through the work of writers like Blake and Dickens) but a sense of England's changing provincial life is also sustained.

Second Semester uses varied reading to pursue these themes and later the use of colonial text(s) brings attention to the complicated effects of England's imperial adventure, to the diverse production of new and hybrid societies from the transposition of this studied Victorian world to distant places and cultures. Students should be alert throughout the course to the relevance of their own post-colonial perspective on English literary production.

Schedule of English 2/3 Options offered in 1993

N.B. Options attempted at third year level will be assessed at a higher standard than those attempted at second year level.

Session 1.

AENG.2004 E/AENG.3004 E—Middle English A
AENG.2007 E/AENG.3007 E—C19 American Literature
AENG.2013 E/AENG.3013 E—Victorian Fiction
AENG.2015 E/AENG.3015 E—19th Century Australian Literature
AENG.2018 E/AENG.3018 E—Literature of the Great War
AENG.2021 E/AENG.3021 E—Literature and Society 1900–1920
AENG.2023 E/AENG.3023 E—After Modernism

Session 2.

AENG.2005 E/AENG.3005 E—Linguistics and Literary Criticism
AENG.2010 E/AENG.3010 E—Old English A
AENG.2014 E/AENG.3014 E—C20 American Literature
AENG.2017 E/AENG.3017 E—Literature and Society in

England in the 1930s
AENG.2020 E/AENG.3020 E—Modern Drama
AENG.2029 E/AENG.3029 E—20th Century Australian Literature
AENG.2030 E/AENG.3030 E—Mythopoeic Literature

AENG.2004 E/AENG.3004 E—Middle English A

This course deals with English literature of the fourteenth and fifteenth centuries. It includes: (1) Thomas Malory's *Le Morte Arthure,* the most important and influential version in English of the legend of King Arthur. (2) A selection from Geoffrey Chaucer's *Canterbury Tales.* (3) The Mystery Plays. These plays were performed in most major cities and towns in the medieval period, and they deal with the entirety of Christian history—beginning with the creation and fall of Lucifer and ending with Doomsday. We will study a selection of the plays, and we will also examine the ways these plays were staged in the medieval period. (4) *Sir Gawain and the Green Knight.* This is a romance which tells the story of the testing of Gawain's prowess and virtue by the supernatural Green Knight.

AENG.2005 E/AENG.3005 E—Linguistics and Literary Criticism

The course undertakes a brief history of the main linguistic and literary theories which have influenced the practice of English criticism in the twentieth century. Beginning with the work of Leavis and the New Critics the course dissects the development and methods of critical thinking including structuralist, post-structuralist, and feminist critiques, together with a sprinkling of cultural studies applied to non-literary texts such as *Dr Who* and *Star Wars.* These studies are very practical with a considerable element of 'hands-on' work in which students dissect both selected texts and the various methods applied to them.

AENG.2007 E/AENG.3007 E—C19 American Literature

After a brief survey of the development of American society and literature in the seventeenth and eighteenth centuries, this course will examine some of the principal works and authors from the 1830s onwards—from the New England Transcendentalist (white) writers Ralph Waldo Emerson and Henry David Thoreau to the African-American writer William Du Bois. Particular attention will be given to the radical aspects of the New England tradition, the expansion of American democracy (and its republican parallels with nineteenth-century Australia) and emergent black, feminist and regional literatures. Students will be asked to consider important social and political issues, in addition to literary and cultural issues.

AENG.2010 E/AENG.3010 E—Old English A

This course deals with the literature of the Anglo-Saxon period, with the central text being the epic poem *Beowulf.* An attempt is made to relate the set texts to cultural and historical aspects of the Anglo-Saxon period; the legacy of the Roman occupation of Britain; evidence of Anglo-Saxon paganism; the effects of the coming of Christianity; the Viking invasions of Britain; the reign of King Alfred; and so on. Where relevant, the texts will also be related to various aspects of Anglo-Saxon art and archaeology. Students who have special interests in any of these areas are encouraged to pursue those interests.

AENG.2013 E/AENG.3013 E—Victorian Fiction

A study of a narrow range of major Victorian novels, most of which have a strong autobiographical basis and continue to challenge and interest contemporary readers. Some, such as *Jane Eyre* and *The Mill on the Floss,* have enjoyed an extraordinary revival in the last two decades due to the increased interest in issues of gender and the role of language in the presentation of 'reality'. Several are accounts of youthful difficulties and the search for identity and significance and one influential factual narrative, Edmund Gosse's *Father and Son,* is included partly because it shares the same theme of a difficult growth to adulthood and partly to illustrate the close links between this genre of autobiography and its fictional counterpart. Students are advised that this course requires extensive reading although the number of texts is limited and that some pre-reading is highly recommended in order to keep pace with classes.

AENG.2014 E/AENG.3014 E—C20 American Literature

After a brief summary of American society and literature prior to this century, this course will examine a cross-section of the principal works and authors 1910–1980—from more familiar white male writers such as O'Neill, Fitzgerald and Faulkner to African-Americans such as Jean Toomer, Zora Neale Hurston, James Baldwin, Alex Haley and Alice Walker. This will be an issues-related course, attempting to understand the twentieth-century phenomenon that America has become. We will discuss the marked contrast between the moral and ethical challenges inherent in the literature of some of America's most gifted creative writers and the image of the USA abroad: its hypocritical Puritanism; racism; preoccupation with material success and military posturing as flawed 'Super Power'.

AENG.2015 E/AENG.3015 E—19 Century Australian Literature

Students in this course will read a range of 19th century Australian fiction, from Marcus Clarke's *For the Term of His Natural Life* to Henry Handel Richardson's great trilogy *The Fortunes of Richard Mahony.* The course will map some of the influences of European literature on Australian writing, and consider the ways in which the great intellectual debates of the nineteenth century emerged in Australian literature. The different modes of nineteenth century fiction—melodrama, satire, romance—will also come under discussion through readings of work by Joseph Furphy, Ada Cambridge and Rolf Boldrewood.

AENG.2017 E/AENG.3017 E—Literature and Society in England in the 1930s.

Through a selection of prose and poetry by young writers , this course aims to explore various literary-historical and literary-critical problems. The relationship of a work to its historic moment, to politics and to public events will be of central concern. Other themes to be discussed will include the part social class plays in literary production, the complex construction of literary reputations and literary-historical myths, and the competing claims of 'realism' and 'modernism' during the decade.

AENG.2018 E/AENG.3018 E—Literature of the Great War

A study of selected prose and poetry by the most celebrated writers of the First World War. The course is concerned to question the widely held assumptions about this work that it is predominantly anti-war, that it constitutes a public and political

:atement of that position, and that it achieves this end by rtue of its 'realism'. In discussing these ideas, other problems re broached which focus attention on metaphors of violence nd pain, on ideas concerning mateship, sexuality and 'man-ness', and on some feminist perspectives.

ENG.2020 E/AENG.3020 E—Modern Drama

study of significant international dramas from Ibsen's *A oll's House* to Orton's *Loot*. The plays selected for the course ither represent major turning points in theatre history or have ad significant political or social impact or, more usually, both. leanwhile all these dramas engage with different ways of pproaching the representation of 'reality' on stage and the hilosophical connection between life and art. Although we hall be studying the plays as literary texts with some interde-endent history, we shall also concentrate as far as possible n their problems, challenges and opportunities for actors and roducers. In order to enhance the students' experience of live ieatre, voluntary group attendances of local and interstate roductions will be arranged and possibly a voluntary drama orkshop. Video representations will be used to some extent illustrate key areas for discussion. There will be some pportunity for those with an interest in acting or in technical spects of theatre to exercise their skills but such skills are not necessary qualification for undertaking the course.

ENG.2021 E/AENG.3021 E—Literature and Society 1900–1920.

he course outlines the social and cultural environments sur-)unding the rise of the various Modernist movements at the eginning of the century. Ideas inherited from and developed reaction to the philosophies of the late nineteenth and early ventieth centuries, as in the work of Nietzsche, Arnold, arwin and Freud, and the political ramifications of the period nclosing the Great War, are used to provide the contextual round from which the flowering of literary and artistic works ikes root.

ENG.2023 E/AENG.3023 E—After Modernism

his course examines fiction published after the period of nodernism' (post 1960) and in response to recent questions bout the relationship of writing to experience. Each text rep-esents technical experimentation of some kind, and a dissat-faction with the limitations of conventional representations of eality. Definitions of 'postmodernism' and their political impli-ations will be considered. Novels on the course include abokov's *Pale Fire,* Lessing's *The Golden Notebook,* De llo's *White Noise* and Rushdie's *Midnight's Children.*

ENG.2029 E/AENG.3029 E—20th Century Australian iterature

his course is intended to complement other Australian litera-ire courses by focussing on writing published since the econd World War. In particular, the course will consider the alance between a concern for representing Australian expe-ence and an interest in developing new literary techniques to press and question that experience. Students will read oetry by Judith Wright, Les Murray and others, and fiction by ecent writers including Frank Moorhouse.

ENG.2030 E/AENG.3030 E—Mythopoeic Literature

ythopoeic or 'fantasy literature' (as it is often called) has een an important literary genre in the twentieth century, espe-cially after the publication of J.R.R. Tolkien's *The Lord of the Rings.* The genre represents a resurgence of the kind of literature which explores human concerns through worlds which seem divorced from 'real life' (in this case, often an 'other-world' of magic and fairy) but which depend on both for their interest and for their validity on the firm correspondences with recognisable realities. The course will also examine the reasons for the popularity of the genre in the second half of the twentieth century.

AENG.2602 U English 2B

Full-year subject
Credit points 8
Hours per week 4 hours
Corequisite: English 2A

English 2B may be constructed by taking four options at second year level (two in each session of the same academic year) not attempted in English 2A.

AENG.3602 U English 3B

Full-year subject
Credit points 12
Hours per week 4 hours
Corequisite: English 3A

English 3B may be constructed by taking four options at third year level (two in each session of the same academic year) not attempted in either English 2A, 2B or English 3A.

ENGLISH HONOURS

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

Students normally enter the program at the beginning of the second full year of academic study, and will be expected to have completed 24 CP by the end of their first year of enrolment, with a pass in English 1 at Credit level or better. Rules governing the award of the degree of Bachelor of Arts with Honours are set out on p. 38 of this Handbook.

Honours students must include the following options in their second or third year programs: Middle English A, Old English A, Linguistics and Literary Criticism.

AENG.2690 U English2 Honours

Full-year subject
Credit points 8
Prerequisite: English 1, passed at Credit level or better.

The English 2 Honours program, consisting of English 2A and English 2H and carrying a value of 16 CP, will be made up of the following components:

Session 1.
AENG.2001 E-English 2A Core
Three 2/3 options chosen from the Schedule

Session 2.
AENG.2002 E-English 2A Core
Three 2/3 options chosen from the Schedule

In addition to work undertaken in the English Department, English 2 Honours students will be required to take one other approved subject to the value of 8 CP.

AENG.3690 U English 3 Honours

Full-year subject
Credit points 12
Prerequisite: English 2 Honours, passed at Credit level or better.

The English 3 Honours program, consisting of English 3A and English 3H and carrying a value of 24 CP, will be made up of the following components:

Session 1
AENG.3001 E—English 3A Core, together with an extra seminar in English Literature 1800–1900A.
Two 2/3 options chosen from the Schedule.

Session 2.
AENG.3002 E—English 3A Core, together with an extra seminar in English Literature 1800–1900B
Two 2/3 options chosen from the Schedule.

AENG.4690H English 4 (Honours) F/T
AENG.4691 H English 4 (Honours) P/T

Full-year subject
Prerequisite: English 3 Honours, passed at credit level or better.

- Discourse of some 12,500 words on a topic to be chosen by candidates in consultation with the Head of Department
- Literary Scholarship and Criticism.
- Special Studies.

AENG.4690 H English 4 (Honours) Australian Poetry Text and Counter Text

This course studies a selection of twentieth century Australian poetry with excursions into prose, both critical and imaginative. Discussion will focus on debates and conflicts raised by the readings in a variety of ways: *within* the work of particular writers, by their literary, critical or cultural contexts, by the challenges posed by the work of others across the century.

AENG.4690 H English 4 (Honours) Post 1950s British Novels

A study of very recent British novels, many of which have been written by migrants to Britain from former British colonies. Most of the novels chosen are set in modern London which, as the one time hub of empire, becomes the focus of questions about constructions of national, cultural and racial identity.

GENERAL STUDIES ENGLISH

The Department offers a range of English General Studies electives, each requiring 2 hours' contact a week for one session. No more than two General Studies electives will be available in any one academic year. The two electives offered in 1993 are English GS1 and English GS5.

N.B. Credit towards a degree will accrue from English General Studies electives only when two have been passed, giving 3 CP, or four, giving 6 CP.

AENG.0501 English GS1 **S2**

2 lectures a week.

Issues in Modern Australian Literature. A study of selected Australian texts, with special emphasis on their treatment of significant issues in contemporary Australian culture.

AENG.0502 U English GS2
(Not offered in 1993)

2 lectures a week.

Literature and Modern War. A study through selected texts of service men and women, and civilians, in several kinds of modern war.

AENG.0503 U English GS3 **S2**

(Not offered in 1993)

2 lectures a week

Science and the Literary Imagination. A study of the ways (through selected texts) in which scientific ideas have been represented in literature.

AENG.0504 U English GS4

(Not offered in 1993)

2 lectures a week

Australian Literature and Film. A comparative study of Australian texts and the films made from them.

AENG.0505 U English GS5 **S1**

American Literature.

A study of some significant American texts.

Department of Geography and Oceanography

Geography

Geography subjects are available for Arts and Science students. Therefore they contribute towards degrees of Bachelor of Arts, Bachelor of Arts with Honours, Bachelor of Science and Bachelor of Science with Honours. With respect to subject structure all major and sub-major sequences in Geography begin with Geography 1.

AGOC.1600 U Geography 1

Full-year subject
Credit points 6
Lectures 3 hours per week
Tutorials/practicals/local field excursions 4 hours per week

The basic aim of the course is to provide both continuing and non-continuing students in Geography with a general environmental science-geography background, an introduction to geographical methods of inquiry and an indication of the systematic and thematic specialisations within the discipline. An integrative approach to the understanding of physical, biological and human patterns and processes that take place at or near the surface of the earth is developed.

Geography 1 is divided into two parts. One part covers physical and biophysical aspects of the subject including natural environmental processes, landforms, soils, vegetation and cli

iate. The other part emphasises human aspects of the sub-
ict including the role of social, cultural,economic and political
ictors in shaping and changing settlement patterns and geo-
raphical distributions. Human-environment interactions are
onsidered throughout the course.

tudents are required to complete tutorial, test, essay and
ractical assignments. An examination will be held at the end
f each session. Several field classes in the Canberra region
ill be organised throughout the year. To obtain a pass in
ieography 1 all assessable components of the course must
e completed to a satisfactory level.

evel II Geography Subjects

GOC.2601 U Geography 2A

Full-year subject
Credit points 8
Lectures 2 hours per week
Tutorial/Practical/Field excursions 6 hours per week
Prerequisite: AGOC.1600 U

GOC.2602 U Geography 2B

Full-year subject
Credit points 8
Lectures 2 hours per week
Tutorial/Practical/Field excursions 6 hours per week
Prerequisite: AGOC.1600 U

GOC.2603 U Geography 2C

Full-year subject
Credit points 8
Lectures 2 hours per week
Tutorial/Practical/Field excursions 6 hours per week
Prerequisite: AGOC.1600 U

eography 2A will consist of two parts, a first session unit of
iogeography, and a second session choice of either
eomorphology, or Social Geography or Remote Sensing
pplications. Geography 2B will consist of two parts, a first
ession unit of Geography of Economic Activity, and a second
ession choice of either Geomorphology or Social Geography
· Remote Sensing Applications. Geography 2C will consist of
/o units, Remote Sensing Applications and Cartographic
ethods. Students enrolled in Geography 2C cannot include
e unit Remote Sensing Applications in either Geography 2A
· 2B. There will be two 5 day field schools, one for Geography
A and one for Geography 2B. It is important that students
nrolling in Level II Geography subjects indicate their choice
· units for both sessions at the time of enrolment.

tudents who intend to take more than 12CP of Level III
eography should take two Level II Geography Subjects.

yllabus Details for Level II Geography Units

GOC.2001 E Geomorphology S2

troduction to the principles of geomorphology. Drainage
asins and denudation systems. Weathering, hillslope hydrol-
gy, mass movement. Fluvial and aeolian processes and land-
rms.

AGOC.2002 E Social Geography S2

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.

AGOC.2003 E Cartographic Methods S1

Theoretical and practical aspects of field techniques, instrumentation and calculations used in the preparation and display of dimensional data bases for small and large scale cartography, with special reference to geographical and related applications.

AGOC.2004 E Biogeography S1

Introduction to the principles of biogeography. Energy flow and nutrient cycling in aquatic and terrestrial ecosystems. Plant community dynamics and recent ecological change. Contemporary environmental issues are highlighted.

AGOC.2006 E Remote Sensing Applications S2

An introduction to the principles and applications of remote sensing for the monitoring and management of earth resources with an emphasis on Australian examples. Particular attention will be given to satellite imagery and its linkage with geographic information systems.

AGOC.2007 E Geography of Economic Activity S1

This course examines how people's lives in both rural and urban locations are affected by changing economic and social circumstances. Components include the location of economic activity, the geography of economic restructuring and the interactions between people, economy and the environment. Broad issues are illustrated using specific case studies.

Level III Geography Subjects

AGOC.3601 U Geography 3A

Full-year subject
Credit points 12
Lectures 3 hours per week
Tutorials/Practical/Field excursions 6 hours per week
Prerequisite: Either Geography 2A or 2B

AGOC.3602 U Geography 3B

Full-year subject
Credit points 12
Lectures 3 hours per week
Tutorials/Practical/Field excursions 6 hours per week
Prerequisite: Either Geography 2A or 2B.
Corequisite: Geography 3A

AGOC.3603 U Geography 3C S1 or S2

Full-year subject
Credit points 8
Lectures: 2 hours per week
Tutorials/Practical/Field excursions: 4 hours per week
Prerequisite: Either Geography 2A or 2B
Corequisite: Geography 3A

Each subject involves a choice of session length units each of which represents a specialist field of study within Geography. All students enrolled in Level III Geography must do

Geography 3A, which comprises a choice of any 3 units, at least one of which must be taken in each session. Geography 3B comprises any 2 units not previously selected for Geography 3A. Geography 3C comprises any 2 units not previously selected for Geography 3A. Students enrolled in both Geography 3A and 3B must include the unit Geographic Research Methods. An honours student in Geography should enrol in both Geography 3A and 3B.

Field work may be required as part of each unit. All units may not be offered in any one year. It is important that students enrolling in Level III Geography subjects indicate their choice of units for both sessions at the time of enrolment.

Syllabus Details for Level III Geography Units

AGOC.3001 E Geographic Research Methods S1

An introduction to research methods in geography. Research frameworks in physical and human geography. Topic definition, theory and methodology. Practicalities of data collection and field work. Data analysis and interpretation. Reporting research findings. Applications of geographic research. The unit provides students with experience in designing a geographic research project.

AGOC.3002 E Geographic Information Analysis S1

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

AGOC.3003 E Geomorphological Systems S2

The movement of sediments and solutes in geomorphic systems. A study of the processes which control this movement and the landforms which result from it with particular emphasis on one or more of the following: fluvial, karst, arid slope or coastal systems.

AGOC.3004 E Ecological Systems S1

Analysis of vegetation in relation to environmental factors and community dynamics. Particular emphasis will be given to one or more of the following: mountain ecology, coastal ecology, arid zone ecology or tropical ecology.

AGOC.3005 E Population and Development S2

This course examines the major components of population growth—fertility, mortality and mobility—and how these affect processes of social-economic development. Case-studies are drawn primarily from Pacific and Southeast Asian Third World countries.

AGOC.3006 E Transport Geography

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

AGOC.3007 E Environmental Hazards S2

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

AGOC.3009 E Selected Special Topics S1

A unit based on specialist interest of staff and visitors may be presented in a given year.

For 1993: Cultural Geography.

The course examines the cultural foundations of landscape form and change in Australian urban and natural environments.

AGOC.3010 E Political Geography

An examination of the major socio-political forces shaping the geography of selected cities or regions and an assessment of the various theories underlying the analysis of urban or regional land use conflict.

AGOC.3011 E Resource Management

The course is concerned with the analysis, allocation and management of natural resources. The first part seeks to understand the characteristics of such resources; the second considers what is involved in their allocation; and the third considers their actual management. Case studies are examined in the final part of the course.

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.

AGOC.2690 U Geography 2 (Honours) F

Arts students may enter the program at the beginning of the second full year of academic study and will be expected to have completed 24 CP by the end of their first year of enrolment with a pass in Geography 1 at a good credit level or better. Geography 2 (Honours) students will be expected to enrol in both Geography 2A and Geography 2B which carries a value of 16 CP.

AGOC.3690 U Geography 3 (Honours) F

Arts students may enter the program at the beginning of the third full year of academic study and will be expected to have completed at least 48 CP by the end of their second year of enrolment with a pass in Geography 2A or 2B at a good credit level or better and have obtained 16 CP in level II Geography subjects or 8 CP in level II Geography and 8 CP in another appropriate field of study determined by the Head of Department. The Geography 3 (Honours) program will consist of Geography 3A and 3B and the unit Geographic Research Methods must be included in the program.

AGOC.3692 U Geography 3 (Combined Honours) F

In this program, course work is divided between the Department of Geography and Oceanography and another Department as approved by the Heads of the two departments concerned.

AGOC.4690 H Geography 4 (Honours) F/T
AGOC.4691 H Geography 4 (Honours) P/T

Full-year subject

To enrol in Geography 4 (Honours) students must satisfy the requirements for entry into either the degree of Bachelor of Arts with Honours or the degree of Bachelor of Science with Honours and must have completed at least 38 credit points in Geography at an overall level of credit or better.

:andidates for Honours in Geography are required to (a) pre-are a thesis of approximately 15,000 words in length; (b) ndertake coursework as prescribed by the department; (c) resent work-in-progress seminars; and (d) attend seminars elated to the applications of geographic research.

\GOC.4692 C Geography 4 (Combined Honours) F/T
\GOC.4693 C Geography 4 (Combined Honours) P/T

1 the Combined Honours program candidates are required to resent a thesis or research project on a topic that is con-erned with Geography and the interests of the other)epartment involved, the thesis or project being supervised nd examined by the two Departments conjointly. In addition, andidates are required to complete coursework as approved y the Head of Department.

)ceanography

)ceanography subjects are available for Science and Arts tudents and contribute towards the degrees of Bachelor of :ience, Bachelor of Science with Honours, Bachelor of Arts, nd Bachelor of Arts with Honours. Students undertake ceanography as a single subject, a major or a sub-major. The asic aim of Oceanography 1 is to provide students with a gen-ral introduction to the study of oceanography. Oceanography and 3 use physical and applied mathematical arguments to evelop an understanding of physical phenomena that take lace within the world's oceans. Students wishing to study)ceanography 2 require a pass in Mathematics 1 (AMAT 1600 l) as the course demands a basic understanding of algebraic ıanipulations and calculus. The emphasis in Oceanography and 3 is placed on physical oceanography but the course ıcludes components covering marine acoustics and optics nd marine chemistry.

.GOC.1700 Oceanography I

Full-year subject
Credit points 6
Lectures 3 hours per week
Laboratory 3 hours per week
Field exercises 7 days

ieneral properties of sea water, marine and submarine topog-ıphy, sea level variations, waves and tides, oceanic and tmospheric circulation, structure of the ocean floors, sedi-ıents, marine salvage, maritime law, ocean resources, bio-ıgical and chemical oceanography and remote sensing.

GOC.2700 U Oceanography 2

Full-year subject
Credit points 8
Lectures 3 hours per week
Laboratory/Tutorials 3 hours per week
Field 7 days
Prerequisites: Oceanography 1 (AGOC.1700 U) and Mathematics 1 (AMAT. 1600 U). Students wishing to take the marine chemistry component require Chemistry 1 (ACHM.1600 U).

hysical properties of the oceans and sea water, introduction ı ocean dynamics, physics of ocean circulation, theories of ırface gravity waves and tides. Students must also take either Marine Chemistry 2 or Marine Acoustics and Optics 2 (APHY.2006 E).

AGOC.3700 U Oceanography 3

Full-year subject
Credit points 12
Lectures 4 hours per week
Laboratory/Tutorials 4 hours per week
Field 9 days
Prerequisites: Oceanography 2 (AGOC.2700 U). Students wishing to take the marine chemistry component require Marine Chemistry 2 and those taking marine acoustics and optics require Marine Acoustics and Optics 2 (APHY.2006 E).

There are two parts to the subject. Part I deals with the oceanography of continental shelves, Australian regional oceanography, internal waves, ocean dynamics, mixing in the ocean, estuarine physics and time series analysis. Part II comprises either Marine Chemistry 3 or Marine Acoustics and Optics 3 (APHY.3011E) or Instrumentation and Measurement Techniques.

AGOC.4790 H Oceanography 4 (Honours) F/T
AGOC.4791 H Oceanography 4 (Honours) P/T

Full-year subject

Candidates for Honours in Oceanography must undertake an approved research project and prepare a thesis. Additional requirements will normally include lectures and examinations, attendance at oceanography research seminars, and the undertaking of a prescribed reading course.

AGOC.4792 C Oceanography 4 (Combined Honours) F/T
AGOC. 4793 C Oceanography 4 (Combined Honours) P/T

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

Department of History

The Pass Program

All major and sub-major sequences in History begin with History 1.

Students have maximum flexibility in completing major or sub-major sequences. They are able to select their own combinations of single-session subjects at Upper Level, provided only that they must complete Level II subjects to the value of 8 CP before proceeding to Level III subjects, and that subjects completed at Level II shall not be available as Level III options.

The Honours Program

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

Subject Descriptions

Level 1

AHIS.1600 U History 1
Modern European History

(Not offered in 1993)

AHIS.1601 U History 1: The Second World War

Full-year subject
Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: See Chapter 6.

This subject deals with the Second World War in Europe and Asia. While main military episodes of the war are considered, other topics such as the effects of war on society, mobilisation of economies for war, the experience of occupation and resistance, alliance diplomacy, and the aftermath of war will be considered.

Upper Level

Upper Level subjects in History are sessional and may be taken at either Level II or Level III of the BA degree structure. Such subjects will be worth 4 CP when taken at Level II, and 6 CP when taken at Level III. Level III students will be required to undertake additional reading and will be examined at a higher level. Students may not count the same subjects at both Level II and Level III.

AHIS.2602 U Modern American Foreign Policy S1

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U
Excluded: AHIS.3602 U

This subject examines the evolution of American foreign policy from the end of the Civil War to the present time. Special attention is given to the rise of American imperialism and American involvement in Asia, the Pacific, Latin America and Europe.

AHIS.2603 U Colonial Australia S1

Credit points 4

Lectures and tutorials 3 hours per week

Prerequisite: AHIS.1600 U. Excluded: AHIS.3603 U.

Australian history from the arrival of the first fleet to the federation of the six colonies. Special attention will be paid to the economic, social and technological context of pastoral expansion, urbanization and immigration, to the mental and physical challenges of the new environment, to the development of colonial science and the impact of Darwinism, and to the socio-economic basis of the federal movement.

AHIS.2604 U Modern Australia: Politics and Culture S2

Credit points 4

Lectures and tutorials 3 hours per week

Prerequisite: AHIS.1600 U *Excluded:* AHIS.3604 U

This subject explores the major themes in Australian political, cultural and economic history in the twentieth century. Topics will include relationships between external events and domestic politics, the changing political consequences of Federal-State financial arrangements, the significance of wars in the expansion of Commonwealth powers, the reforms of the Whitlam era, the changing roles of women in Australian society, and the role of the Australian film industry in the evolution of a distinctive Australian culture.

AHIS.2606 U From Democracy to Dictatorship: The German Experience 1918–1945 S2

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U
Note: Enrolment restrictions apply

This subject examines the collapse of the democratic structures erected in Weimar Germany and the eventual installation of a system of dictatorship based upon a one party state. The analysis will include a discussion of national character and historical legacies and the specific circumstances both national and international which created this situation.

AHIS.2609 U War and Society in Australia 1788–1988 S2

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U *Excluded:* AHIS.3609 U

This subject 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 subject is on substantive issues arising from involvement in Australia's wars in the twentieth century and the periods of peace between them. The subject will deal with the evolution of defence and military policy and its interaction with the political process; the nature and experience of Australia's alliances; 'home front' issues such as conscription, mobilisation, and the role of women in the forces and in war industry; and the evolution or otherwise of a distinctively Australian military ethos. Over and above this considerable attention will be given to campaign history. This may be justified both for its own sake, in that armies exist ultimately to fight, and for the examination of the experiences of ordinary Australian servicemen which it facilitates. While generally chronological in its approach, issues such as the role of the services under the Constitution and the related question of aid to the civil power will be dealt with thematically.

AHIS.2610 U Southeast Asia: Revolution, Nation and Society, 1870–1965 S2

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U

This course focuses upon the processes whereby the Indonesian state emerged from the period of Dutch high colonialism in the late 19th century and the first half of the 20th century, into fully fledged nationhood in the Sukarno era. At the same time other societies, two of significantly Malay origin were also moving towards independence. In the Philippines the transfer of colonial power from Spain to the United States presented its own problems as did the more intense economic exploitation of the Malay states and Singapore by the British complicated by strong racial tension. The French control of Indo-China became a central issue of Asian history until well into the 20th Century and Thailand continued to attempt to

alance traditionalism with the demands of rapid modernisa-
on. The explosive appearance of Japan in the region was one
f the elements which destroyed the old colonial structures
ut, as this course in comparative regional history will attempt
show, external intervention was not the most powerful
ecolonising factor in the creation of the four nations after
945.

HIS.2611 U Russian History **S1**

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U

his subject examines the transformation of Russian society
om the era of Peter the Great to 1917. It will show how, ulti-
ately, the costs of retaining its great power status proved to
e too great for the Russian state and will demonstrate how,
nder the impact of modernisation and 300 years of militari-
ation, Russia's society shattered, the autocracy ossified and
e economy could no longer fuel Russian expansion.

HIS.2612 U Soviet History **S2**

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U *Excluded:* AHIS.3612 U

ne subject begins with the revolutionary upheavals of 1905,
ebruary 1917 and November 1917. The role of the Civil War
s a formative experience, the New Economic Policy as an
ternative to the Stalinist economic model, Stalin's rise to
ower, and the impact of World War II will be examined in the
ght of recent 'revisionist' interpretations of both Western and
oviet post-*glasnost* historians. The challenges faced by post-
ar Soviet society—rising defence costs, economic rigidity,
olitical corruption, scarce consumer goods, defeat in
fghanistan—will be examined. The course will conclude with
discussion of why economic and political reform (*perestroika*
nd *glasnost)* under both Khrushchev and Gorbachev has
een so difficult to implement.

HIS.2615 U Social Change in East Asia: From the Twilight of Imperialism to Cold War, 1895–1975 **S1**

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U

his subject charts the social and political changes in Japan,
orea, and China from the first Sino-Japanese war (1894–95)
the end of the Vietnam war. Full consideration is given to the
der international climate in which these changes occurred.
ne first half of the subject concentrates on Japan's military
nd political expansion in Asia up to 1945. Themes explored
clude: the rise of radical nationalism; the development of
mmunism in China and and its role in ending the period of
le by warlords. The latter part of the subject examines the
se of demilitarised Japan as an economic power; the halting
tempts of South Korea to institute democracy whilst remain-
g technically at war with the North; and Mao Tse-tung's uni-
ation of China along socialist lines, followed by the
vastation of 'continuous revolution' in the 1960s.

HIS.2616 U Science and Technology in Australia **S2**

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U

This subject studies a number of the more important develop-
ments in both science and technology as Australia underwent
the process of 'industrial revolution' in the last two hundred
years. Australian science is examined within the framework of
Basalla's model for the diffusion of Western science, with par-
ticular reference to the natural sciences and the organisation
of science. Special attention will be paid to the following areas
of technology: innovation and invention in agriculture and the
pastoral industry; the energy system; water and irrigation;
manufacturing; food technology; land, sea and air transport
and communications; engineering construction; and defence
science and technology.

AHIS.2620 U The Sea and Seafarers: Maritime History from the 18th Century **S1**

Credit points 4
Lectures and tutorials 3 hours per week
Prerequisite: AHIS.1600 U *Excluded:* AHIS.3620 U

This subject attempts to introduce students to the major devel-
opments which have taken place in human exploitation of the
sea as a means of economic, social and cultural communica-
tion. After a brief review of early maritime technology, naval
architecture, navigation, exploration and naval-military
encounters, teaching and discussion concentrates on creating
a composite picture of the ways in which the maritime environ-
ment has influenced and been influenced by modern societies.

Level III

The syllabuses are the same as the Level II equivalents, but
involve additional reading and are examined at a higher level.

AHIS.3602 U Modern American Foreign Policy **S1**

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History
Excluded: AHIS.2602 U

AHIS.3603 U Colonial Australia **S1**

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History.
Excluded: AHIS.2603 U

AHIS.3604 U Modern Australia: Politics and Culture **S2**

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History
Excluded: AHIS.2604 U

AHIS.3605 U The Origins of Modern War **S1**

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite 14 credit points in History
Note: Enrolment restrictions apply

A study of warfare from the early 16th century to the eve of
World War 1, with some preliminary attention to ancient and
medieval warfare. The subject 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, prob-
lems of reform, and the influence of wider political, social and
economic factors.

AHIS.3606 U From Democracy to Dictatorship: The German Experience 1918–1945 S2

Credit points 6
Lectures and tutorials 3 hour per week
Prerequisite: 14 credit points in History
Excluded: AHIS.2606 U
Note: Enrolment restrictions apply

AHIS.3609 U War and Society in Australia 1788–1988 S2

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History.
Excluded: AHIS.2609 U

AHIS.3610 U Southeast Asia: Revolution, Nation and Society, 1870–1965 S2

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History
Excluded: AHIS.2610 U

AHIS.3611 U Russian History S1

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History.
Excluded: AHIS. 2611 U

AHIS.3612 U Soviet History S2

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History
Excluded: AHIS.2612 U

AHIS.3615 U Social Change in East Asia: From the Twilight of Imperialism to Cold War, 1895–1975 S1

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History.
Excluded: AHIS.2615 U

AHIS.3616 U Science and Technology in Australia S2

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History.
Excluded: AHIS.2616 U

AHIS.3620 U The Sea and Seafarers: Maritime History from the 18th Century S1

Credit points 6
Lectures and tutorials 3 hours per week
Prerequisite: 14 credit points in History.
Excluded: AHIS.2620 U

Additional 2nd/3rd year level options that may be offered in other years:

AHIS.2601 U/AHIS.3601 U—Revolts and Counter Insurgency in Southeast Asia
AHIS.2607 U/AHIS.3607 U—Mariners, Merchants and Missionaries: Maritime Empires of Southeast Asia from Earliest Times to 1850.
AHIS.2608 U/AHIS.3608 U—Pacific History: From European Contact to Fijian Coups
AHIS.2613 U/AHIS.3613 U—The American Civil War
AHIS.2614 U/AHIS.3614 U—East Asia: Between Tradition and Modernity
AHIS.2617 U/AHIS.3617 U—War, Society and the State, 1914–1945
AHIS.2618 U/AHIS.3618 U—America from Revolution to Civil War
AHIS.2619 U/AHIS.3619 U—The Fall and Rise of Europe: 1945 to the Present

The BA (Honours) in History

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

Level II:

AHIS.2690 U History 2 (Honours)

Seminars 2 hours per week
Prerequisite: AHIS.1600 U. *Corequisite:* 8 credit points in Level II History.

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

Level III:

AHIS.3690 U History 3 (Honours)

Seminars 2 hours per week per subject
Prerequisite: AHIS.2690 U plus 14 credit points in History. *Corequisite*: 24 credit points in Level III History.

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

AHIS.3692 U History 3 (Combined Honours)

In this program, course work is divided between the Department of History and another Department as approved by the Heads of the two departments concerned.

AHIS.4690 H History 4 (Honours) F/T
AHIS.4691 H History 4 (Honours) P/T

Prerequisite: AHIS.3690 U

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

AHIS.4692 C History 4 (Combined Honours) F/T
AHIS.4693 C History 4 (Combined Honours) P/T

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

HISTORY GS

The Department offers two General Studies subjects. Credit towards a degree will accrue only when both have been passed, giving 3 CP.

\HIS.0503 U History GS3
Japan in the Modern World **S2**

Lectures and tutorials 2 hours per week

\n overview of social, political, economic and military hanges in Japanese society from about 1800. Special mphasis is placed on Japan's relations with Asia and the Vest.

\HIS.0504 U History GS4
The American Civil War **S1**

Lectures and tutorials 2 hours per week

his course for science and engineering students pays atten- on to the causes of the American Civil War, the battles and ampaigns of the war, and its place in the history of the devel- pment of modern warfare.

)epartment of Mathematics

)utline of subject structures for the Arts and Science legrees

	HPW	*CPV*
a) *single subject*		
Mathematics 1	6	6
) *the sub-major*		
Mathematics 1	6	6
Mathematics 2A	8	8
		14
) *the single major*		
Mathematics 1	6	6
Mathematics 2A	8	8
Mathematics 3A	12	12
		26
d) *the major/sub-major combination*		
Mathematics 1	6	6
Mathematics 2A	8	8
Mathematics 2B	8	8
Mathematics 3A	12	12
Mathematics 3B	12	12
		46
e) *the Honours program*		
A fourth year honours program is offered for students who have completed a major at a sufficiently high standard		
) *the General Studies electives*		
Mathematics GS	2	3
Mathematics GS: Statistics in the Social Sciences	3	3

he following subjects are offered in the Arts and Science pro- rams:

.MAT.1600 U Mathematics 1 **F L4 ½ T1 ½ 6CP**

Students who have not completed HSC 3 unit Mathematics, r equivalent, are not recommended to undertake this course).

n introductory course covering topics in logic and sets; com- inatorics, probability and statistics; linear algebra, matrices; complex algebra, series and convergence; standard functions; differential and integral calculus; curve sketching; differential equations; vector algebra and calculus; elementary mechanics.

AMAT.0500 U Mathematics GS **F L/T2; 3CP**

This elective 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.)

AMAT.0501 U Mathematics GS: Statistics in the Social Sciences **F L/T3; 3CP**

Data summarising using data obtained from the students. Lying with statistics. Criticism of published newspaper and other reports. Sampling (including a mini-project to obtain real data which will be analysed during the course as the methods are developed). The Normal approximation. Inferences from data. Hypothesis testing. Dealing with proportions. Two sample problems. Goodness of fit test. Correlation and prediction. Time series models. Population models. Specific examples of the use of these methods will be given by academic and military staff with expertise in areas where statistics is used. (Only elementary mathematical ability will be assumed but students will be expected to take an active role and attend computing laboratory sessions).

AMAT.2601 U Mathematics 2A **F L4 T2; 8CP**
AMAT.2602 U Mathematics 2B **F L4 T2; 8CP**

Each of these subjects comprises four sessional units chosen with the approval of the Head of the Department from the following list. The units Core Mathematics 2 Parts I and II are compulsory. Mathematics 1 is a prerequisite for all units.

In 1993 the following six units will be offered.

Session 1	*Session 2*
Mathematical Modelling 2	Core Mathematics 2 (Part II)
Core Mathematics 2 (Part I)	
	Differential Equations 2
Statistics 2	Probability 2

Students wishing to do both Mathematics 2A and 2B should see the Head of Department who will arrange a special program.

AMAT.2001 E Discrete Mathematics 2 **L2 T1**
(Not offered in 1993)

Selection from the following topics:

Sets and relations: operations on sets, binary relations, functions. Symbolic logic: propositional and first-order logic, rules of inference, strategies of proof, Herbrand's theorem, resolution. Algebraic structures: introduction to groups, rings, fields, lattices, Boolean algebra and their applications in Computer Science.

AMAT.2002 E Differential Equations 2 **S2 L2 T1**

Properties and methods of solution of first and second order ordinary differential equations, with applications. Linear second order partial differential equations, separation of variables and Fourier series. Laplace Transform solution of linear differential equations.

AMAT.2003 E Classical Mechanics 2 L2 T1
(Not offered in 1993)

Prerequisite: Physics 1

Motion of a particle in three dimensions. Dynamics of systems of particles. Mechanics of rigid bodies. Rotational dynamics. Motions of rigid bodies in three dimensions. Lagrangian mechanics. Dynamics of oscillating systems.

AMAT.2004 E Probability 2 S2 L2 T1

Combinatorics. Set theoretic formulation of probability in discrete sample spaces. Conditional probability and independence. Random variables. Important discrete and continuous distributions. Multivariate distributions and transformations of variables. The weak law of large numbers. Random walk and gamblers ruin problems.

AMAT.2005 E Statistics 2 S1 L2 T1 ½

Presentation of data. Summary statistics, sampling. Estimation. Hypothesis testing. One and two-sample problems. Goodness-of-fit tests. Regression and correlation. The analysis of variance. Nonparametric statistics.

AMAT.2006 E Core Mathematics 2 (Part 1) S1 L2 T1

Matrices, eigenvalues, diagonalisation. Vector spaces, bases, orthogonal projections, least squares. Systems of linear differential equations. First-order partial differential equations. Laplace transforms.

AMAT.2007 E Core Mathematics 2 (Part II) S2 L2 T1

Prerequisite: Core Mathematics 2 (Part 1)

Multivariable calculus, vector operators, Taylor's theorem, maxima and minima. Orthogonal curvilinear coordinates. Multiple integration.

AMAT.2008 E Mathematical Modelling 2 S1 L2 T1

The formulation and use of mathematical models of various types. Illustrations chosen from population dynamics, fluid dynamics, Newtonian mechanics, traffic flow and other fields.

AMAT.3601 U Mathematics 3A F L6 T3; 12CP
AMAT.3602 U Mathematics 3B F L6 T3; 12CP
AMAT.3603 U Mathematics 3C S1 or S2 L6 T3; 6CP

Mathematics 2A is a prerequisite for third year mathematics subjects. Mathematics 3A and Mathematics 3B each comprise six sessional units, normally three in each session, and Mathematics 3C comprises three sessional units which can be taken in either session (or in both). Details of units are given below. Each third year subject may include one second year unit. In all cases, the choice of units is subject to the approval of the Head of the Department. Not all the units will be offered every year. The following units are planned for 1993 but the final selection will depend on sufficient student demand:

Session 1	*Session 2*
Differential Equations 3	Advanced Mathematical Techniques 3
Linear Models and Experimental Design 3	Case Studies in Statistics 3
Complex Analysis 3*	Generalized Linear Models 3
Continuum Mechanics 3	Incompressible and Viscous Fluid Dynamics 3
	Industrial Mathematics 3
	Projects 3†
Manpower Planning 3	Statistical Forecasting 3
Statistical Modelling 3	
Waves 3	Waveguide Theory 3

Notes

* This unit will use the lectures given to Engineering students in unit AMAT.3401 E Complex Analysis 3E.

† Students taking Projects 3 will be required to show good mathematical ability and/or particular motivation for this unit. Timetabling is flexible.

AMAT.3001 E Compressible Fluid Dynamics 3 L2 T1
(Not offered in 1993)

Prerequisite: Continuum Mechanics 3.

Thermodynamics of gas flow. Sound propagation. Supersonic flow and the Mach number. Irrotational flow. The method of characteristics and simple waves. Shock waves.

AMAT.3002 E Continuum Mechanics 3 S1 L2 T1

Prerequisites: Differential Equations 2, Classical Mechanics 2 or Physics 1.

Kinematics and dynamics of rigid and deformable continue. Common constitutive equations. Illustrations from the linear theory of elasticity.

AMAT.3003 E Differential Equations 3 S1 L2 T1

Prerequisite: Differential Equations 2.

Series solutions. Systems of differential equations. Special functions. Boundary value problems, partial differential equations and applications.

AMAT.3006 E Applied Probability 3 L2 T1
(Not offered in 1993)

Prerequisite: Probability 2.

Generating functions. Recurrent events and renewal theory. Markov chains and Markov processes with discrete states in continuous time. Queueing theory.

AMAT.3008 E Multivariate Statistics 3 L2 T1 ½
(Not offered in 1993)

Prerequisite: Linear Models and Experimental Design 3.

Multiple regression. Hotelling's T^2. Multivariate analysis of variance. Canonical correlation. Principal component analysis. Factor analysis. Use of statistical packages.

AMAT.3010 E Manpower Planning 3 S1 L2 T1

Prerequisite: Probability 2.

Discrete time models. Closed populations, limiting probabilities. Open populations. Controllability; attainable regions, recruitment and promotion strategies, maintainability.

Continuous time models. Length of service. Recruitment and wastage in systems of fixed and varying size. Systems with several grades.

AMAT.3011 E Numerical Fluid Dynamics 3 L2 T1
(Not offered in 1993)

Prerequisite: Continuum Mechanics 3.

Numerical solution of potential flow problems. Methods of solving the vorticity transport equation and the stream function equation. Boundary conditions. Pressure solution. Compressible flow computations.

AMAT.3012 E Advanced Differential Equations 3 **L2 T1**
Not offered in 1993)

Prerequisite: Differential Equations 3.

Selection from the following: Stability theory. Sturm-Liouville theory and orthogonal functions. Green's functions for ordinary differential equation problems. Canonical forms of partial differential equations. Boundary-value problems. Green's functions for partial differential equation problems. Applications.

AMAT.3013 E Incompressible and Viscous Fluid Dynamics 3 **S2 L2 T1**

Prerequisite: Continuum Mechanics 3.

Potential flow, elements of aerofoil theory. The vorticity equation. Exact solutions of the Navier-Stokes equations. Low Reynolds number flow. High Reynolds number flow and boundary-layer theory.

AMAT.3014 E Generalized Linear Models 3 **S2 L2 T1 ½**

Prerequisite: Linear Models and Experimental Design 3.

Multiway contingency tables. Log-linear models. Quantal response models. Generalized linear models: the GLIM statistical language and the interactively weighted least squares algorithm.

AMAT.3016 E Advanced Mathematical Techniques 3 **S2 L2 T1**

Prerequisite: Differential Equations 3.

Techniques dealing with mathematical problems not amenable to exact analytical solutions. Selection from the following: perturbation theory; bifurcation; asymptotics; calculus of variations; integral transforms; integral equations.

AMAT.3017 E Projectiles 3 **L2 T1**
Not offered in 1993)

Prerequisites: Differential Equations 2, Classical Mechanics 2 or Physics 1.

Gravity-only motion. Resisting medium motion. Basic equations of a trajectory and their numerical solution. Differential corrections. Coriolis forces. Wind effects. Spin and fin stabilization. Magnus effect. Lift and sideways forces. Projectiles in sport.

AMAT.3018 E Projects 3 **S2 L/T 3**

A short introduction to mathematical modelling; the skills required, possible strategies. Occasional lectures on particular problems with emphasis on the way in which the problems were translated into mathematical form. Practical experience in setting up and using mathematical models: students work alone or in small groups. Regular reports and conferences with project supervisors are required. At the conclusion each student must make a formal presentation and submit a written report.

AMAT.3019 E Special Topics 3 **L2 T1**
Not offered in 1993)

This unit is available for the presentation of a specialist topic by a visiting member of staff or for presenting a lecture course on a trial basis.

AMAT.3020 E Statistical Forecasting 3 **S2 L2 T1 ½**

Prerequisite: Statistics 2.

Stationary time series. Autocorrelation. Autoregressive and moving average processes. Frequency domain. Power spectrum. Estimation. Prediction and control.

AMAT.3021 E Waves 3 **S1 L2 T1**

Corequisite: Differential Equations 3.

An introduction to the mathematical theory of wave motion. Theory and physical intuition are developed using simple examples such as waves on strings. More complex systems are then examined, including sound waves and electromagnetic waves.

AMAT.3022 E Integral Equations 3 **L2 T1**
(Not offered in 1993)

Prerequisite: Differential Equations 2.

Classification of integral equations. Connection with differential equations. Convolution type, Fredholm, Volterra and Abel integral equations. Methods of successive approximations. Singular kernels. Hilbert space and linear operators. The resolvent.

AMAT.3023 E Integral Transforms and Asymptotics 3 **L2 T1**
(Not offered in 1993)

Prerequisite: Differential Equations 2.

Definition and properties of Integral Transforms (Fourier, Laplace, Melvin, Hankel). Application to differential equations linear systems and integral equations. Theory of asymptotic expansions and methods for obtaining them.

AMAT.3024 E Calculus of Variations 3 **L2 T1**
(Not offered in 1993)

Prerequisites: Differential Equations 2, Classical Mechanics 2 or Physics 1.

The Euler-Lagrange equations and applications. Lagrangian and Hamiltonian dynamics. Dirichlet's principle and Rayleigh-Ritz approximations.

AMAT.3025 E Waveguide Theory 3 **S2 L2 T1**

Prerequisite: Waves 3

Wave propagation phenomena, reflection, refraction and diffraction, and understanding of wave guiding mechanisms. Mathematical theories of guided wave propagation. Applications in areas such as optics, acoustics, electromagnetic waves, continuum mechanics.

AMAT.3026 E Complex Analysis 3 **S1 L2 T1**

Complex numbers. Analytic functions. Elementary functions and their mappings. Complex integrals, Cauchy's theorem and integral formula. Taylor's and Laurent's series. Residue theorem and evaluation of integrals.

AMAT.3027 E Industrial Mathematics 3 **S2 L2 T1**

Prerequisite: Differential Equations 2.

Illustration of the interaction between the mathematics community and industry using case studies. Emphasis is given to formulating simple models which may be analysed analytically to gain insight into the physical process involved. Examples

are based on the classical heat-diffusion equation with modifications to account for nonlinear diffusion, convection, spontaneous combustion and melting and freezing.

AMAT.3028 E Case Studies in Statistics 3 S2 L2 T1½

Prerequisite: Linear Models and Experimental Design 3

An introduction to the problems arising in real data analysis. Guidelines on understanding the problem, collecting the data, exploratory data analysis, formal data analysis, presentation of results. These will be illustrated via several case studies of problems arising in scientific, industrial, social and military applications.

AMAT.3029 E Modern Techniques in Data Analysis 3 L2 T1½

(Not offered in 1993)

Prerequisite: Statistics 2

A selection of topics from:

Graphical techniques in data analysis. Robust methods in regression; ridge regression, nonlinear regression. Diagnostic methods in regression, outliers, influence. Computer intensive methods; permutation tests, bootstrap, jackknife.

AMAT.3030 E Statistical Modelling 3 S1 L2 T1½

Prerequisite: Statistics 2

Statistical modelling using likelihoods; parameter estimation, properties of estimators, likelihood ratio test. A large proportion of the course will be devoted to developing models for a wide range of applied areas e.g. estimating wildlife populations, modelling choice behaviour, etc.

AMAT.3031 E Linear Models and Experimental Design 3 S1 L2 T1½

Prerequisite: Statistics 2

Quadratic forms. Estimation and hypothesis testing for the full rank case and less than full rank case. Multiple regression; diagnostic methods, transformations, weighted least squares. Randomized block designs, Latin squares, factoral designs. Crossed and nested designs. Random effects and mixed models.

AMAT.4690 H Mathematics 4 (Honours) F/T
AMAT.4691 H Mathematics 4 (Honours) P/T

Specialized study in selected topics, together with an approved project in the area in which the honours program is concentrated.

AMAT.4692 C Mathematics 4 (Combined Honours) F/T
AMAT.4693 C Mathematics 4 (Combined Honours) P/T

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

The following subjects are offered in the Engineering Program:

AMAT.1800 U Mathematics 1E F L4 T1

A first course in mathematical techniques, matrix algebra, vectors, complex numbers, differentiation, series, integration, differential equations.

Linear algebra; equation systems, determinants, Cramer's rule, Matrix algebra, notation, matrix types, matrix inversion, Vectors and elementary co-ordinated geometry; Cartesian and plane polar co-ordinates, parametric equations, curve sketching, Scalar and vector products, triple products, applications to geometry. Complex numbers; z-plane, de Moivre's theorem. Mathematical proof and notation; Order and inequalities. Introduction to number systems; mathematical induction. Relations and functions. Limits and continuity; an informal introduction. Differentiation; Properties of functions, Rolle's theorem and mean value theorems, slope and concavity of graphs. Stationary points and points of inflexion, local and absolute extreme, applications to curve sketching and problems. Series; Convergence, power series, evaluation of elementary functions. Taylor's series. Integration; the definite integral as a sum, properties of integrals, antiderivatives, fundamental theorem of calculus. Elementary functions, circular functions and inverses, logarithm and exponential functions, hyperbolic functions and inverses. Integration techniques; application of integrals; areas, centres of mass, moment of inertia. Improper integrals. Elementary differential equations and applications. Elementary probability theory and statistics.

AMAT.2800 U Mathematics 2E F L3 T1

Prerequisite: Mathematics 1E

Matrices, systems of linear equations. Vector spaces. Orthogonal projections and least squares. Eigenvalues. Diagonalization. Differential equations: first order, higher order linear; systems normal modes; Laplace transforms.

Multivariable calculus, maxima and minima. Integration. Vector field theory. Partial differential equations. Separation of variables. Fourier series.

AMAT.2801 U Engineering Mathematics 1E F L/T2

Prerequisite: Mathematics 1E

This subject comprises the two sessional units AMAT.3403 E Probability 3E and AMAT.3404 E Statistics 3E as described below.

AMAT.3800 U Mathematics 3E F L/T4

Prerequisite: Mathematics 2E

This subject comprises the following four sessional units.

AMAT.3401 E Complex Analysis 3E S1 L/T2

Revision of complex numbers, modules, argument, conjugate Euler's theorem, de Moivre's theorem, roots, solutions of polynomial equations. Functions, limits, continuity, differentiation analytic functions, Cauchy-Riemann conditions, solution of Laplace's and Poisson's equation by complex variable methods. Elementary functions, singular points, zeros, poles Complex line integrals. Cauchy's theorem, Integral formulae Series: convergence, power, Taylor, Laurent. Residue theorem, integrals with indentations, evaluation of real definite integrals by contour integration, principle of the argument Conformal mappings, elementary functions as mappings inverse mappings.

\MAT.3402 E Differential Equations 3E S2 L/T2

ieparation of variables for homogeneous and inhomogeeous partial differential equations, including Laplace, heat, /ave and Poisson equations in rectangular, cylindrical polar, pherical polar coordinates in one, two, or three space dimenions, steady or unsteady with sinusoidal item dependence. ieparation solutions involving Bessel and Legendre functions nd their properties. Boundary value problems; eigenvalues nd eigenfunctions. Fourier series. Laplace transforms pplied to partial differential equations.

\MAT.3403 E Probability 3E S1 L/T2

aws of probability, permutations and combinations. Random ariables: discrete and continuous, change of variables. :xpectations: moments. Chebyshev's theorem, generating inctions. Distributions: binomial, Poisson, hypergeometric, ormal, exponential, gamma and beta. Bivariate distributions; ums of random variables, central limit theorem. Simple ranom walk. Markov chains.

\MAT.3404 E Statistics 3E S2 L/T 2

'resentation of data, histograms. Sampling distributions. 'stimation; maximum likelihood, confidence intervals. lypothesis testing, quality control. Regression and correlaon. Goodness of fit. Non-parametric tests.

\MAT.3801 U Mathematics 3EE

. subject for students enrolled in a combined BSc/BE program omprising two units from the third year mathematics subject hosen with the approval of the Head of Department.

)epartment of Physics

)utline of Courses

he Department of Physics offers subjects that contribute)wards the degrees of Bachelor of Science and Bachelor of cience with Honours. These subjects are also available in the egree of Bachelor of Arts.

rograms leading to the degree of Masters of Science and octor of Philosophy are also offered.

PHY.1600 U Physics 1 is a subject that is structured primar-/ to lead into the compulsory units of APHY.2601 U Physics A, and APHY.2602 U Physics 2B, but may also be considred as self contained for those Science and Arts candidates ho wish to major in other fields of study. AMAT.1600 U lathematics 1 is a corequisite.

. Pass Program—Arts and Science Degrees

ı) *Single Major* (MInimal)

			HPW	CPV
PHY.1600 U	Physics 1 (corequisite AMAT.1600 U Maths 1)	F	L3P3T1	6
PHY.2601 U	Physics 2A (corequisite AMAT.2601 U Maths 2A)	F	L4P4T1	8
	or			
PHY.2602 U	Physics 2B (corequisite AMAT.2601 U Matn 2A)	F	L4P4T1	8
PHY.3605 U	Physics 3A	F	L5P8	12
	or			
APHY.3606 U	Physics 3B (prerequisite APHY.2602 Physics 2B)	F	L5P8	12
	or			
*APHY.3607 U	Physics 3C (prerequisite APHY.2602 Physics 2B)	F	L6P10	15

***Note:** Certain B stream students must take the Special Elective Mechanics of Flight, of 3CP, but are precluded from taking Special Elective Meteorology A, of 3CP. They may make up these 3 credit points without exceeding the minimum 66CP by taking Physics 3C.

(b) An additional 6 credit points can be obtained over the 26 point minimal major by adding to the Program in (a) above the following subject.

APHY.3608 U	Physics 3D	F	L2P4	6

(c) *Sub Major* (Minimal)

APHY.1600 U	Physics 1 (corequisite AMAT.1600 U Maths 1)	F	L3P3TI	6
APHY.2601 U	Physics 2A (corequisite AMAT.2601 U Maths 2A)	F	L4P4T1	8
	or			
APHY.2602 U	Physics 2B (corequisite AMAT.2601 U Math 2A)	F	L4P4T1	8

2. Honours Year

APHY.4690 H Physics 4 F/T (prerequisite APHY.3601 U Physics 3A, or APHY.3602 U Physics 3B, or APHY.3603 U Physics 3C)
APHY.4691 H Physics 4 P/T
APHY.4692 C Physics 4 (Combined Honours) F/T
APHY.4693 C Physics 4 (Combined Honours) P/T

3. General Studies (GS) Elective (see p. 135)

APHY.0500 U	Physics for Society	F	2 hrs/week	3

4. Special Elective (SE) (See p. 135)

APHY.0501 U	Meteorology A	F	L1 ⅓ T ⅔	3

5. Engineering Degree

APHY.1800 U	Physics 1E (corequisite AMAT.1800 U Maths 1E)	F	L3T1,P48hrs 3hrs/week
APHY.1801 U	Physics 1CE (corequisite AMAT.1800 U Maths 1E)	F	L3TI,P36hrs
APHY.2801 U	Physics 2E (corequisite AMAT.2800 U Maths 2E)	F	L3T ¾ ,P60 hrs 3 hrs/week

Note: Individual Physics 2 and Physics 3 lecture units are available, subject to timetabling constraints, and prerequisite and corequisite constraints for Arts-Science students not undertaking a Physics single major or sub-major.

Subject Descriptions

APHY.1600 U Physics 1

Full year Subject
Credit Points 6
Lectures 3 hours per week

Tutorials 1 hour per week
Practicals 3 hours per week
Corequisite: Mathematics 1.

General Physics and Mechanics

Physical quantities, units, standards and measurements; dimensions and dimensional analysis; co-ordinate systems. Newton's law of motion, kinematics and dynamics. Momentum, energy, work and power. Rotational dynamics, moment of inertia, angular momentum. Newton's law of gravitation, Kepler's laws. Simple harmonic motion and resonance.

Wave Motion and Optics

Classification of waves, non-dispersive waves and the differential wave equation, harmonic waves, superposition, standing waves, beats, Doppler effect, Huygens' principle, reflection, refraction, lenses, interference, diffraction, resolving power of instruments.

Atomic and Nuclear Physics

Particle aspects of electromagnetic radiation: photoelectric effect, Compton effect, pair production. Wave aspects of particles: de Broglie waves, electron and x-ray diffraction, wave function and quantisation, wave-particle duality. Atomic structure: optical spectra, Bohr theory, atomic energy states, x-ray spectra. The nucleus: constituents, stability, binding energy, radioactivity, nuclear energy.

Physics of Deformable Bodies

Solids: elasticity and elastic module. Fluids: hydrostatics, including surface tension, and hydrodynamics applied to both ideal and real fluids.

Thermal Physics 1

Temperature, thermometry, thermal expansion, equations of state and phase changes. First law of thermodynamics, heat capacity and latent heat, calorimetry. Heat transfer processes: conduction, convection and radiation.

Electricity and Magnetism

Coulomb's law, calculations of electric fields and potentials. Gauss' law of electricity, capacitance, dielectric, multipoles. Conductors and electric currents. Ohm's law and origins of electrical resistance, electrical measurements, Kirchhoff's rules and circuit analysis of RL and RC circuits. Magnetic induction, motion of charges in electromagnetic fields. Ampère's law, Biot-Savart's law, Gauss' law of magnetism. Electromagnetic induction. Faraday's law, inductance. Displacement current, Maxwell's equations in integral form.

Level II Physics

A sub-major may be formed with either Physics 1 and Physics 2A *or* Physics 1 and Physics 2B.

Physics 2A is designed for students wishing to pursue a 'Contemporary Physics' stream. Physics 2B is designed for students wishing to pursue an 'Atmospheric Physics and Meteorology' stream.

Physics 2A and Physics 2B have the same prerequisites (Physics 1 & Mathematics 1), the same corequisite (Mathematics 2A) and the same practical component. A common core of four units guarantees that each subject provides a broad general foundation in physics. Unless otherwise indicated, all units consist of 18 lectures and 4 tutorials. With respect to the Mathematics 2A corequisite, students must take

AMAT.2006 E Core Mathematics 2 (Part I)
AMAT.2007 E Core Mathematics 2 (Part II)

and are strongly advised to take

AMAT.2002 E Differential Equations 2
AMAT.2008 E Mathematical Modelling 2

APHY.2601 U Physics 2A
Contemporary Physics Stream

Full-year subject
Credit points 8
Lectures 108 hours
Tutorials 24 hours
Practical 104 hours
Prerequisites: Physics 1, Mathematics 1
Corequisite: Mathematics 2A [Refer to advice above]
Number of units: six (6)

The six units assigned to the lecture/tutorial component of Physics 2A are as follows:

Session 1
APHY.2004 E Circuit Theory and Electronics
APHY.2008 E Quantum Physics 2
APHY.2010 E Optics 2

Session 2
APHY.2001 E Thermal Physics 2
APHY.2007 E Electromagnetism 2
APHY.2009 E Solid State Physics and its Applications 2

A satisfactory performance is required in **both** the lecture/tutorial component and the practical component.

APHY.2602 U Physics 2B
Atmospheric Physics and Meteorology Stream

Full-year subject
Credit points 8
Lectures 108 hours
Tutorials 25 hours
Practical 104 hours
Prerequisites: Physics 1, Mathematics 1
Corequisite: Mathematics 2A [Refer to advice above]
Number of units: seven (7)

The seven units assigned to the lecture/tutorial component of Physics 2B are as follows:

Session 1
APHY.2005 E *Physics of the Atmosphere 2
APHY.2008 E Quantum Physics 2
APHY.2010 E Optics 2
APHY.2011 E *Meteorology 2 (Part 1)

Session 2
APHY.2001 E Thermal Physics 2
APHY.2007 E Electromagnetism 2
APHY.2006 E *Marine Acoustics and Optics 2
APHY.2011 E *Meteorology 2 (Part 2)

Note: *These units consist of 12 lectures and 3 tutorials

A satisfactory performance is required in **both** the lecture/tutorial component **and** the practical component.

evel II Unit Descriptions

.PHY.2001 E Thermal Physics 2 S2

he unit deals with a study of the properties of systems at the *nacroscopic* level using the ideas of thermodynamics: ther-nodynamic variables, thermodynamic potentials, the law of nermodynamics, reversible and irreversible processes. The elevance of these ideas to areas such as electromagnetic adiation from heated bodies, magnetic systems, the emf's of ells, thermoelectricity and electricity production, thermody-amic cycles, heat pumps and the current need for energy onservation is discussed. To complement the above treat-nent, one aspect of the behaviour of matter at the microscopic nvel is presented via kinetic theory.

.PHY 2004 E Circuit Theory and Electronics S1

)C circuits: Circuit elements—basic properties; network nalysis rules—Kirchoff's rules, Maxwell's loop theorem, uperposition theorem; Norton and Thévenin equivalent cir-uits; maximum power transfer.

C circuits: Circuit elements—capacitors and inductors, asic properties; RMS and peak values; power factor; simple C circuits; complex variables and phasors; impedance; inte-rators and differentiators; RL,RC and RLC circuit analysis; esonance and bandwidth; maximum power transfer; complex aveforms—Fourier series; transient responses of simple cir-uits.

emiconductor Devices: Band theory of solids; intrinsic and xtrinsic semiconductors; the PN junction—diodes; basic iode circuits; the bipolar junction transistor; the field effect ansistor; simple transistor amplifiers.

perational Amplifiers: Positive and negative feedback; perational amplifiers—the ideal amplifier, inverting and non-nverting amplifiers; applications of operational amplifiers.

PHY.2005 E Physics of the Atmosphere 2 S1

he atmosphere: properties of dry and moist air, layers of the tmosphere defined by lapse rates, the hydrostatic equation, timetry.

nergy transfer: solar and terrestrial radiation; emission, osorption, scattering and reflection within the atmosphere, onduction, convection and advection.

tability: the 'parcel' model of stability, the adiabatic lapse ite: the aerological (F160) diagram, temperature inversions.

louds: cloud classification, cloud formation, cloud bases nd tops via the aerological diagram.

oncepts of weather and climate: time scales of changes, the fluence of the Earth's orbit and the inclination of its axis of tation, Milankovitch mechanisms.

PHY.2006 E Marine Acoustics and Optics 2 S2

his unit treats both theoretical and applied aspects of marine oustics and optics: acoustic transmission and attenuation in eawater, cavitation, sound speed profiles, refraction of sound, nderwater sound channels, sonar arrays and electronic steer-g, WPESS and sidescan sonar, the sonar equations, under-ater visibility and the blue window, use of lasers for nderwater communication and the mapping of coastal waters.

tudents who elect to take this unit as a component of the sub-ct AGOC.2700 U Oceanography 2 are provided with an addi-onal 9 lectures, 2 tutorials and a series of seven 3 hour ractical classes.

APHY.2007 E Electromagnetism 2 S2

The unit continues on from the concluding stages of the Electricity and Magnetism section in Physics 1 and Physics 1E. In addition, it is designed to bridge to the Physics 3 core unit 'Electromagnetism 3' and the Department of Electrical Engineering unit, 'Engineering Electromagnetics' in AELE.3800 U Electrical Engineering 3.

Vector fields: divergence, Stokes' theorems, Maxwell's equations in integral and differential forms for free space.

Electrostatics: electric field, electrostatic potential, Gauss' law, Poisson's and Laplace's equations, uniqueness, methods of images, dielectrics, polarisation, boundary condititions, applications to simple charge distributions, dipoles, capacitors.

Magnetostatics: magnetic field, vector potential, Ampère's circuital law, magnetic dipoles, magnetic materials, magnetisation, boundary conditions, applications to conductors, magnets, electromagnets.

Electromagnetic waves: Maxwell's equations for media, constitutive relations, energy density, Poynting vector, propagation of plane electromagnetic waves in free space, dielectric and conducting media, skin effect, radiation of electromagnetic waves.

APHY.2008 E Quantum Physics 2 S1

Wave-particle duality: interaction of photons with matter (revision), de Broglie matter waves, coexistence of wave and particle properties, wave packets, Heisenberg uncertainty principle.

Introduction to quantum mechanics: wave function and its interpretation, development of the Schrödinger wave equation, time independent wave equation, eigenfunctions, probability densities and normalisation, expectation values.

Application of the wave equation: Schrödinger recipe, infinite potential well, qualitative plots of bound-state wave functions, potential step E<V and E>V, potential barrier, example of barrier penetration.

One-electron atoms: wave equation, separation of variables, solution of the ϕ equation, solution of the ground state radial equation, wave functions, significance of the quantum numbers, electron probability distributions, selection rules.

Angular momenta and optical spectra: orbital magnetic dipole moment, Stern-Gerlach experiment and electron spin, spin angular momentum, spin-orbit interaction, total angular momentum, fine structure, optical spectra of alkali atoms, LS coupling, Zeeman effect—normal and anomalous, nuclear spin, hyperfine structure.

APHY.2009 E Solid State Physics and its Applications 2 S2

This unit is concerned with the modern theories describing the behaviour of matter in the solid state, particularly amorphous, single-crystal and polycrystalline materials. Special consideration will be given to those materials of interest to industry, such as the intrinsic semiconductors silicon and germanium, the III-V and II-VI semiconductor compounds, quartz, the transition metals and their alloys, polymers and ceramics.

Crystal structure: introduction to crystallography, crystal symmetry, influence of crystal symmetry on macroscopic physical variables, the study of materials by means of x-ray, electron and neutron beams, defects in crystal structures, alloys.

Electrical conductivity: propagation of waves in a periodic structure, band theory of solids, models describing the electrical conduction of insulators, metals and semiconductors, the operation of transistors.

Semiconductor devices: preparation of semiconductor crystals and their fabrication into semiconductor devices.

Fundamental properties of magnetic materials: diamagnetism, paramagnetism, ferro- and antiferromagnetism.

APHY.2010 E Optics 2 **S1**

A history of optics and light: ancient views, the corpuscular and wave theories, the acceptance of its dualistic nature and the partial resolution of this seemingly paradoxical situation.

The electromagnetic nature of light: Maxwell's equations in differential form leading to a wave equation and hence the possibility of electromagnetic waves, light as a form of electromagnetic waves, the transverse nature of electromagnetic waves and polarized light, lasers.

Geometrical optics: reflection and refraction at plane and curved interfaces, lenses and mirrors treated in the paraxial approximation by ray tracing methods and various analytical techniques, optical instruments including the human eye and the telescope, aberrations in optical systems, fibre optics.

Physical optics: the superposition principle and interference of light, Fresnel and Fraunhofer diffraction and Fourier optics. (The principles may be illustrated by reference to fields such as interferometry, spectroscopy and holography).

The depth of treatment in the above topics may be influenced by class interest.

APHY.2011 E Meteorology 2 **S1**

Wind: meteorologically significant forces, equations of motion, wind types, surface winds.

Global circulation patterns: the transfer of latent and sensible heat from the equator, the equatorial, mid-latitude and polar cells, the influence of ocean currents and large land masses, monsoons, high pressure and low pressure systems.

Airmass boundaries: polar, warm, cold and occluded fronts.

Local winds: land and sea breezes, anabatic and katabatic winds, foehn winds.

Precipitation: forms of precipitation, thunderstorms, tropical cyclones.

Level III Physics

Physics 3A is the continuation of the Contemporary Physics course stream commenced in Physics 2A.

Physics 3B is the continuation of the Atmospheric Physics/Meteorology course stream commenced in Physics 2B.

Physics 3C is an enhanced extension of the Atmospheric Physics/Meteorology course stream commenced in Physics 2B.

General Duties Air Force officer cadets are required to tak Mechanics of Flight (a Special Elective unit) often taken in con junction with Meteorology A (a Special Elective unit). Thos who undertake the Physics 2B and/or the Physics 3B subject are excluded from undertaking Meteorology A. Physics 3C ha consequently been designed to allow students who must tak Mechanics of Flight to gain additional 3 credit points whic would normally be gained by undertaking Meteorology A.

Physics 3D is designed to allow students who wish to spe cialise in Physics in their third year to gain 18 credit points i their third year of Physics or as a 6 credit point option for stu dents majoring in another discipline who have an appropriat background. Any Physics 3A, 3B core and optional units fc which the student has the appropriate prerequisite units an which have not been taken in the 3A or 3B subjects can b chosen for units in Physics 3D.

The student's final choice of units is arrived at in consultatio with the Head of Department who will elaborate on the un contents, and methods of assessment, and advise on the stu dent's preparedness to undertake his/her preferred course.

APHY.3605 U Physics 3A

Contemporary Physics stream

Credit points: 12
Prerequisites: Physics 2A or Physics 2B, Mathematics 2.
Average weekly contact hours: 5 lectures, 8 practical.

3 core and 4 optional units are to be selected from the list below. The core units Electromagnetism 3 and Quantur Mechanics 3 are compulsory.

APHY.3606 U Physics 3B

Atmospheric Physics/Meteorology stream

Credit points 12
Prerequisites: Physics 2B, Mathematics 2A
Average weekly contact hours: 5 lectures, 8 practical.

3 core and 4 optional units are to be selected from the lists belov The core units Meteorology 3 and Atmospheric Physics 3 ar compulsory, as is the unit Circuit Theory and Electronics 3.

APHY.3607 U Physics 3C

Credit points: 15
Prerequisites: Physics 2B, Mathematics 2A
Average weekly contact hours: 6 lectures, 10 practical.

3 core and 6 optional units are to be selected from the lists belov The core units Meteorology 3 and Atmospheric Physics 3 ar compulsory, as is the unit Circuit Theory and Electronics 3.

APHY.3608 U Physics 3D

Credit points 6
Prerequisites: Physics 2A or Physics 2B, Mathematics 2
Average weekly contact hours: 2 lectures, 4 practical

1 core and 2 optional units are to be selected from the lists belov

nits available for the Contemporary Physics and the Atmospheric Physics/Meteorology course streams are as follows:

Core units (26 lectures)

ontemporary Physics	**Atmospheric Physics/Meteorology**
lectromagnetism 3 (compulsory)(APHY.3001 E)	Meteorology 3 (compulsory)(APHY.~~3012~~ 3024 E)
uantum Mechanics 3 (compulsory)(APHY.3002 E)	Atmospheric Physics 3 (compulsory)(APHY.3025 E)
stronomy & Astrophysics 3 (APHY.3020 E)	Astronomy & Astrophysics 3 (APHY.3020 E)
olid State Physics 3 (APHY.3003 E)	Electromagnetism 3 (APHY.3001 E)
	Quantum Mechanics 3 (APHY.3002 E)

Optional units (13 lectures)

ontemporary Physics	**Atmospheric Physics/Meteorology**
	Circuit Theory & Electronics 3 (compulsory)(APHY.3029 E)
	Boundary Layer Physics (APHY.3026 E)
omputational Physics (APHY.3028 E)	Computational Physics (APHY.3028 E)
osmic Ray & High Energy Astrophysics (APHY.3021 E)	Cosmic Ray & High Energy Astrophysics (APHY.3021 E)
ata Analysis in Experimental Physics (APHY.3004 E)	Data Analysis in Experimental Physics (APHY.3004 E)
ectronics of Digital Systems (APHY.3006 E)	Electronics of Digital Systems (APHY.3006 E)
frared Physics (APHY.3009 E)	Infrared Physics (APHY.3009 E)
aser and Quantum Electronics (APHY.3010 E)	
arine Acoustics & Optics 3 (APHY.3011 E)	Marine Acoustics & Optics 3 (APHY.3011 E)
	Nonlinear Dynamics (APHY.3027 E)
uclear Physics (APHY.3013 E)	Nuclear Physics (APHY.3013 E)
article Physics (APHY.3014 E)	Particle Physics (APHY.3014 E)
asma Physics (APHY.3015 E)	Plasma Physics (APHY.3015 E)
pace Physics (APHY.3022 E)	Space Physics (APHY.3022 E)
atistical Mechanics 1 (APHY.3016 E)	Statistical Mechanics 1 (APHY.3016 E)
uperconductivity & Low Temperature Physics (APHY.3017 E)	
chniques for studying Advanced Materials (APHY.3023 E)	
ccasional elective	Occasional elective

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ore Unit Descriptions

PHY.3020 E Astronomy and Astrophysics

his course introduces the student to the wide variety of phe-omena observed in the astronomical universe with emphasis the theoretical interpretation of these in terms of basic ysical principles. Following an initial discussion of funda-ental astronomical concepts, the subject is divided into three ain sections: (a) stellar astronomy and astrophysics; (b) the ysics of the Milky Way Galaxy, and (c) external galaxies and smology. Individual topics covered within these sections ay change from year to year; however, the general outline is follows:

) Stellar astronomy and astrophysics. The physical proper-s of stars and their spectral classification; the chemical mposition of stars and the concept of stellar populations; ergy generation processes and the internal structure of ars; stellar evolution from star formation to stellar death, cluding the nature of white-dwarfs, supernovae, neutron ars and black holes.

) The physics of the Milky Way Galaxy. Physics of the inter-ellar medium; physical processes in nebulae; interpretation nebular spectra; Galactic structure, rotation and Oort's uations; the nature of the Galactic centre.

) External Galaxies and Cosmology. Galaxy classification; sters of galaxies, the virial theorem, dark matter and the ssing mass problem; the nature of active galaxies and asars; the cosmic distance scale; the big bang and the pansion of the Universe.

APHY.3025 E Atmospheric Physics 3

Atmosphere-radiation interaction. Radiation processes and the temperature profile; airglow; the ozone layer and ozone depletion; the greenhouse effect and global warming; albedo, feedback processes, effects of volcanic dust; the ionosphere, ionospheric communications.

Meteorological measurement techniques. In situ instrumentation; radiosondes; wind-finding balloons; meteorological radars (precipitation and clear air); acoustic and electromagnetic profilers; optical and satellite based systems; meteorological networks and data handling.

APHY.3001 Electromagnetism 3

Review and critique of development and use of Maxwell's equations. Use of Maxwell's equations for the electric and magnetic fields as the axiomatic basis for the theory of electromagnetism.

Potentials and gauges. Alternative forms of Maxwell's equations in terms of the scalar and vector potentials **A** and ø. Coulomb and Lorentz gauges.

Retarded potentials. Integral expressions for **A** and ø in terms of retarded times; application to Hertzian dipole radiator, **E** and **B** fields, outward energy flux, radiation resistance.

Plane wave solutions of the wave equation in free space. General monochromatic wave; sinusoidal waves; the Poynting vector and electromagnetic energy.

Fields in matter. Macroscopic vs microscopic theory; polarisation and magnetisation, electric and magnetic susceptibilities; Maxwell's equations in the potentials in matter; differential

equations for charge and current densities; the Poynting vector and electromagnetic energy in matter.

Propagation of plane waves in ideal dielectrics and absorbing media. The complex refractive index; comparison of conducting and insulating media, skin depth.

Boundary relations. Reflection and refraction at boundaries: Fresnel's equations, total internal reflection, evanescent wave, energy flow.

Guided waves. Metal coaxial and waveguide transmission lines; dielectric waveguides, optical fibres.

Antennae. Radiation resistance, directivity and gain, for Hertzian dipole and half-wave dipole, magnetic dipole.

APHY.3024 E Meteorology 3

The Foundations of Atmospheric Dynamics. Some basic concepts of Atmospheric Physics; fundamental kinematics of fluid flow.

The Equations of Atmospheric Motion. The equations of motion in inertial co-ordinates; meteorological equations of motion; applications.

The Theory of Atmospheric Motion. Models of the wind; vorticity and circulation; atmospheric energetics and turbulence (scaling arguments); atmospheric wave motion; scaling analysis of small and large scale flows; applications.

Applications. Forecasting; numerical meteorology; marine meteorology.

APHY.3002 E Quantum Mechanics

Inadequacy of classical physics. Electron and neutron diffraction and neutron interferometer experiments.

Historical introduction. Schrödinger and Heisenberg approaches: reformulation of laws of conservation of charge, energy, momentum and Newton's laws of motion.

One dimensional barrier problems. Kronig-Penney model of conduction in one dimensional crystal lattices, linear harmonic oscillator and its eigenfunctions.

Three dimensional problem. Particle moving in a central field of force; extension to explain the outer electron structure of hydrogen-like atoms, the periodic table of the elements; Pauli Exclusion Principle and the Dirac notation.

Time independent perturbation theory. Atomic and nuclear spectroscopy; concepts essential for the understanding of population inversions in laser physics and nuclear magnetic resonance and the influence that applied magnetic fields have on the degeneracy of energy levels.

APHY.3003 E Solid State Physics 3

This course demonstrates the concepts of reciprocal space and Bragg reflection to provide a common link between the theories of diffraction, lattice vibration and electronic bands. Where possible, the concepts are explored via a comparison of the relevant properties of silicon and gallium arsenide.

Symmetry and crystal structure. Categorisation of crystal structures via their symmetry properties, conventional nomenclature and usage of standard crystallographic source books, reciprocal space and the significance of reciprocal lattice points for Bragg reflection, alternative approaches to the construction of a reciprocal lattice.

Elastic waves and lattice vibrations. Stress, strain, contracted tensor notation and the stiffness matrix, influence of crystal symmetry, continuum and Bragg diffraction limits of lattice vibration propagation, dispersion curves for monatomic and polyatomic crystals, Einstein and Debye approximations, specific heat.

Introduction to electronic band theory. Diagrammatic representation of free electrons in real and reciprocal space, Bloch theorem, nearly free electron model, zone boundaries, energy gaps, dispersion curve, effective mass, intrinsic and doped semiconductors, solid state lasers.

Optional Unit Descriptions

APHY.3026 E Boundary Layer Physics

Atmospheric turbulence. Temporal and spectral characteristics; the energy cascade, the energy dissipation rate.

The terrestrial Boundary layer. The logarithmic wind profile dimensional analysis and scaling; turbulence generation by wind shear and convection; surface friction, heat transport momentum transport; the Surface Layer, the free convection zone, the well mixed zone; the entrainment zone.

Applications. Pollution transport; the marine boundary layer and sea state; agricultural and biometeorology.

APHY.3029 E Circuit Theory and Electronics

DC Circuits. Circuit elements—basic properties; network analysis rules—Kirchoff's rules, Maxwell's loop theorem Superposition theorem; Norton and Thévenin equivalent circuits; maximum power transfer.

AC Circuits. Circuit elements—capacitors and inductors, basic properties; RMS and peak values; power factor; simple AC circuits; complex variables and phasors; impedance; integrator and differentiators; RL, RC and RLC circuit analysis; resonance and bandwidth; maximum power transfer; complex waveforms—Fourier series; transient responses of simple circuits.

Semiconductor Devices. Band theory of solids; intrinsic and extrinsic semiconductors; the PN junction—diodes; basic diode circuits; the bipolar junction transistor; the field effect transistor; simple transistor amplifier.

Operational Amplifiers. Positive and negative feedback; operational amplifiers—the ideal amplifier, inverting and non inverting amplifiers; applications of operational amplifiers.

APHY.3028 E Computational Physics

This course deals with the computing techniques used in solving problems in Physics, with a significant part of it being directed to the analysis of experimental data and model fitting using software packages such as spreadsheets, Maple Mathematica and Mathcad. Topics will be selected from the following.

Polynomial Approximations. Approximating functions; interpolating polynomials; least-squares polynomials and linear fit; power series; divided-differences; Lagrange's interpolating polynomials; minimax polynomials.
Applications: Mössbauer data analysis.

Numerical Integration. Integration with equally spaced intervals; composite integration formulae; Romberg integration
Applications: Nuclear Magnetic Resonance broadline spectra

Ordinary differential equations. Euler's method and error propagation; Taylor series method; Runge-Kutter methods.

Applications: Harmonic oscillator states and energies; vibrating membrane graphics.

ıe *Discrete Fourier Transform.* Algorithms and applications; ınvolution and correlation; spectral analysis.

ᵖHY.3021 E Cosmic Ray and High Energy ɜtrophysics

ıe topic of High Energy Astrophysics is developed around ıservations made in Cosmic Ray Physics. Cosmic rays are latıvistic charged particles which account for a significant ıction of the energy density of the interstellar medium.

'eractions of high energy particles and photons with matter. ɜview; instrumental techniques for high energy astrophysics.

ɔserved properties. Cosmic rays in the terrestrial environ-ənt.

ɜductions. Linking of experimental observation data to the gin and acceleration of galactic and extragalactic cosmic /s, and ultimately to the high energy processes that take ıce in astrophysical objects.

ᵖHY.3004 E Data Analysis in Experimental Physics

ɔt offered in 1993)

ᵖHY.3006 E Electronics Of Digital Systems

ɔt offered in 1993)

ᵖHY.3009 E Infrared Physics

is course begins with a general introduction to radiation /s. A treatment is then given of the absorption, emission and nsmission of infrared radiation by various materials fol-ɹed by a discussion of sources and detectors of infrared liation. The rest of the course will then consist of topics ected under the following general headings:

ɾared molecular spectra and atmospheric transmission, sorption and emission.

'itary applications of infrared techniques (eg. weapon guid-ɔe, target and background signatures, reconnaissance, ɾared counter measures).

ɔhniques used in and results obtained from Infrared ɾonomy.

exible approach will be adopted in that choice of topics and ɔth of treatment may be influenced, within certain con-ɜints, by class interest.

HY.3010 E Laser and Quantum Electronics

ɜ- *or corequisite:* Quantum Mechanics (APHY.3002 E).

ɔoduction to lasers. Properties of laser light, types of laser.

ɜrmal radiation. Spectral distribution, Einstein coefficients

ɜorption of light. Complex susceptibility, absorption, disper-ɹ and refractive index, line width and damping; non-linear ɜorption.

ɔry-perot interferometer.

ɹciple of the laser. Negative temperature; pumping, two-, ıe-, and four-level systems, amplification, oscillation ɜshold.

ıadening. Homogeneous and inhomogeneous broadening; ɜ burning; relevance to laser operation.

ɜherent interaction. Interaction between a two-level atom l a coherent field, induced dipole moment, density matrix l equation of motion; optical Bloch vector; rotating wave ɾroximation; coherent transients.

APHY.3011 E Marine Acoustic and Optics 3

This unit builds on the level II unit of the same name. However, a brief revision of the necessary concepts will be provided at the commencement of each topic to be dealt with.

Acoustic beam. 3-D acoustic wave equation, spherical acoustic wave from a point source and a 'simple' source, acoustic radiation from a rigid piston transducer, near-range beam pattern and effects (cavitation, acoustic streaming, implications for a practical definition of the source level), far-range beam pattern expressed as a Fourier transform of the source strength profile, 'shading'.

Doppler SONAR. The Doppler frequency shift, acoustic Doppler current profiling, Fourier analysis of periodic and non-periodic functions of time; frequency spectrum of a tone burst; compromises regarding frequency and tone burst duration; visit to Physics Department's Doppler acoustic radar field station.

One further application of underwater acoustics to be considered will be nominated at the commencement of the unit (eg, ocean acoustic tomography, marine seismic surveying, . . .)

Underwater attenuation of electromagnetic radiation. Relationship between attenuation and dispersion, 'skin depth', implications for remote sensing of oceans (visible and infrared, microwaves), synthetic aperture radar, potential for underwater communication and non-acoustic detection of underwater objects.

APHY.3027 E Nonlinear Dynamics

Free oscillator—Damped oscillator (dissipative systems)—Forced oscillator.

Examples of dynamical systems. Compass, Rayleigh-Bernard convection Lorenz oscillator, Belousov-Zhabotinsky reaction.

Temporal chaos in dissipative systems.

Strange attractors.

Routes to chaos. Quasiperodicity, subharmonic cascade, intermittancy.

Debate

APHY.3013 E Nuclear Physics

Properties and models of the nucleus. Nuclear radius and its determination; nuclear mass and binding energy, semi-empirical mass formula; Fermi gas model; nucleon-nucleon interaction; shell model, predictions of the shell model; magnetic moments; collective model.

Nuclear processes. Alpha decay; nuclear reactions, excited states of nuclei; fission reactions; fusion reactions.

APHY.3014 E Particle Physics

Prerequisite: Quantum Mechanics (APHY.3002 E).

The starting point for this course is the middle nineteen-twenties when the fundamental entities of matter and field were thought to be the electron, proton and photon. A chronological overview is first presented of the subsequent key experimental and theoretical developments up to the present day. This overview is supplemented by films of activities at CERN. The lecture course then returns and revisits in far greater detail, both conceptual and mathematical, selected topics from the overview. These topics, usually amounting to about five in number, are selected from the following:

Dirac's relativistic theory of the electron.

Particle—antiparticle symmetry.

The Neutron. Discovery, significance, properties.

Yukawa theory of the Meson.

Accelerator developments. Discovery of the Strange particles.

Experimental evidence for the neutrino.

Parity non-conservation in the Weak Interaction and CPT Theorem.

Pion/Muon physics. Helicity.

Quark generations, SU(3) symmetry.

Electroweak theory including discovery of $W^{\pm}$ and Z^{0} bosons.

Standard model. Grand unified theories.

APHY.3015 E Plasma Physics

(Not offered in1993)

APHY.3022 E Space Physics

Structure of the interior of the Earth, the moon and selected planets, determined through seismology. Origin of the moon.

Planetary magnetism. Dipole and IGRF models of the Earth's magnetic field.

Structure of the planetary atmospheres. Thermal radiation balance of planetary atmospheres.

Celestial mechanics. Mathematical derivation of Kepler's Laws of planetary motion. Vis Viva equation. Lagrangian points. Orbital elements.

Structure and origin of comets, meteors and asteroids.

The interplanetary medium. The solar wind and the interplanetary magnetic field. Mathematical treatment of magnetic flux freezing.

APHY.3016 E Statistical Mechanics 1

Sharing of energy among particles; microstates and macrostates; thermodynamic degeneracy; most probable distribution; partition function; entropy and random disorder, thermodynamic functions and the partition function.

Independent localised systems. Boltzmann statistics; systems with only two quantum states; Einstein specific heat.

Independent non-localised systems. Bose-Einstein statistics; dilute limit; Fermi-Dirac statistics; perfect gas; photon gas; electron gas; classical limit.

APHY.3017 E Superconductivity and Low Temperature Physics

This course follows broadly the path outlined below.

Methods of producing low temperatures.

Measurement of low temperatures.

Properties of material at low temperatures. In addition to studying the properties of normal materials, the phenomena of superfluidity in liquid helium and of superconductivity in solid materials are considered.

APHY.3023 E Techniques for Studying Advanced Materials

Structure and composition of modern materials. Materials ranging from semiconductors, important to the electronic industry, to the composite fibres used in the aviation industry; studied by the interaction of waves with the atoms comprisin the materials: electromagnetic (X-rays) or particulate (elec trons or neutrons) waves; background theory of the scatterin of X-rays and electrons, use of diffraction patterns and image to analyse advanced materials.

Practical work, performed on a variety of materials of interes to the ADF, forms part of this unit.

APHY.4690 U Physics 4 (Honours) F/T
APHY.4691 H Physics 4 (Honours) P/T

This course is a dedicated Physics year wherein the studer undertakes a selection of four lecture units and undergoes a experimental or theoretical project culminating in a substanti thesis. The successful completion of this year at Honour Class I, or Class II Division I, qualifies the student, academ cally, for direct entry into the degree of Doctor of Philosoph

Entry to the honours program can be through the single majc or major/sub major programs. In the case of the 26 point mir imal major the student would be expected to have complete a further total of 26 credit points from Chemistry and/c Computer Science and/or Mathematics.

The standard of entry will typically be that the candidate pe forms (at least) at DISTINCTION level in PHYSICS 3A, c CREDIT level in PHYSICS 3A and MATHEMATICS 2A, c CREDIT level in PHYSICS 3B or PHYSICS 3C.

The lecture units, typically totalling four in number, will b drawn from:

(a) Solid State Physics 4 (APHY.4001 E)
(b) Astrophysics (APHY.4002 E)
(c) Microcomputers and Meteorology (APHY.4003 E)
(d) Experimental Magnetism (APHY.4004 E)
(e) Group Theory in Quantum Mechanics (APHY.4005 E)
(f) Statistical Mechanics 2 (APHY.4006 E) (prerequisit APHY.3016 E Statistical Mechanics 1).
(g) Nuclear Physics and Hyperfine Interactions (APHY.4007 E

APHY.4692 C Physics 4 (Combined Honours) F/T
APHY.4693 C Physics 4 (Combined Honours) P/T

In the Combined Honours program candidates are required t present a thesis or research project on a topic that is co cerned with Physics and the interests of the other Departme involved, the thesis or project being supervised and examine by the two Departments conjointly. In addition, candidates a required to complete course work as approved by the Head Department.

Physics in the Engineering Degree

The Department of Physics provides the compulsory subje APHY.1800 U Physics 1E to first year Electrical & Mechanic Engineers and APHY.1801 U Physics 1CE to first year Ci and Maritime Engineering students. The component lectu units are, in the main, very similar to those offered APHY.1600 U Physics 1 to Arts-Science students. There a some differences, notably in the units Properties of Matter ar Heat and Electricity and Magnetism, in order to allow for lil contributions from other first year units in the Engineerir degree and the different structuring between Years 1 and 2 the Engineering and Arts-Science degrees. The laborato component of APHY.1800 U Physics 1E is reduced by for percent with respect to that of APHY.1600 U Physics 1 a that of APHY.1801 U Physics 1CE is reduced to 36 hours.

PHY.1800 U Physics 1E

Lectures 81 hours
Tutorials 27 hours
Practical 48 hours (36 hours for Physics ICE)
Corequisite: Mathematics 1E

eneral Physics and Mechanics

ysical quantities, units, standards and measurements; nensions and dimensional analysis; co-ordinate systems.

ewton's laws of motion, kinematics and dynamics. omentum, energy, work and power. Rotational dynamics, oment of inertia, angular momentum. Newton's law of gravtion, Kepler's laws. Simple harmonic motion and resonance.

ave Motion and Optics

assification of waves, superposition, Doppler effect, resonce, Huygens' principle, electromagnetic waves, polarizan, reflection and diffraction. Resolving powers of truments.

omic and Nuclear Physics

rticle aspects of electromagnetic radiation: photoelectric ect, Compton effect, pair production. Wave aspects of pares: de Broglie waves, electron and x-ray diffraction, wave uction and quantisation, wave-particle duality. Atomic structe: optical spectra, Bohr theory, atomic energy states, x-ray ectra. The nucleus: constituents, stability, binding energy, lioactivity, nuclear energy.

operties of Matter and Heat

asticity. Hydrostatics, surface tension; hydrodynamics, rnoulli's equation. Temperature, thermometry. Thermal pansion, equations of state, phase changes, Kinetic theory gases. First law of thermodynamics, heat capacity, latent at. Heat transfer processes.

ectricity and Magnetism

ulomb's law, calculations of electric fields and potentials. uss' law, multipoles, conductors and electric currents. igins of electrical resistance, Ohm's law, electrical meements. Capacitance. Magnetic induction, motion of arges in electromagnetic fields. Ampère's law and Biotvart law. Constitutive Equations. Electromagnetic induction, raday's law, inductance. Displacement current, Maxwell's uations in integral form.

HY.1801 U Physics 1CE

Lectures 81 hours
Tutorials 27 hours
Practical 36 hours

cture component is identical to APHY.1800 U Physics 1E.

HY.2801 U Physics 2E

Lectures 84 hours
Tutorials 20 hours
Practical 60 hours
Corequisite: Mathematics 2E

cond Year Electrical Engineering Students must take the owing four units.

Electromagnetism 2E (APHY.2401 E)
Quantum Physics 2E (APHY.2402 E)
Solid State Physics and its Applications 2E (APHY.2403 E)
Optics 2E (APHY.2404 E)

A satisfactory performance is required in both the lecture/tutorial component and the practical component.

Department of Politics

The Department of Politics offers subjects designed to introduce students to the major ideas and issues of politics, both domestic and international. In the first year detailed attention is given to the workings of the Australian political system, to the political theory of Australian democracy, and to Australia's place in international politics.

Upper Level subjects deal with different systems of government in a wide range of countries, the relationships between states, and particular approaches and topics in the study of politics.

All major and sub-major sequences in Politics begin with Politics 1. In completing major or sub-major sequences students have maximum flexibility in selecting their own combination of single session subjects at Upper Level, provided only that they must complete Level II subjects to the value of 8 credit points before counting a subject as a Level III subject, and that subjects completed at Level II shall not be available as Level III options.

The Department of Politics also offers honours subjects beginning in second year which expand and develop the pass level subjects.

APOL.1600 U Politics 1

Full-year subject
Credit points 6
Lectures/tutorials 3 hours per week

An Introduction to Politics

This course introduces students to the study of politics by focusing on Australian politics at the national level. The course is in three parts. The first examines the major institutions and actors in the Australian political system, including the Constitution, the federal system, the Senate and the House of Representatives, executive government, the bureaucracy, the electoral system, political parties and interest and pressure groups. The second, theoretical, part explores issues such as the purpose and limits of government, and critically evaluates the democratic ideals of the Australian political system. The third part treats Australia in its international setting, as part of a world of states with different and sometimes conflicting interests. It looks, in particular, at Australia's relations with allies and near neighbours.

LEVEL II

Upper level subjects in Politics are sessional and may be taken at either Level II or Level III of the BA degree structure. Subjects are worth 4 credit points when taken at Level II, and 6 credit points when taken at Level III. If a subject is taken as a Level II subject, a student must have completed APOL.1600 U. If a subject is taken as a Level III subject, a student must have gained 14 credit points in Politics. Students taking a course as a Level III subject will be examined at a higher level than students taking a course as a Level II subject. Students may not count the same subjects at both Level II and Level III. The first subject number refers to Level II, the second subject number to Level III. Similarly, the first credit point number and prerequisite refers to Level II, the second in each case to Level III.

APOL.2601 U/3614 U Politics of Russia S1

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics.

The structure and working of the political system of Russia. The subject examines the background to and working through of the revolutions of 1917 and 1991. It examines such topics as the role of political leadership in a totalitarian system drawing examples from the years of Lenin, Stalin, Khrushchev, Brezhnev and the modern era. It also examines such other issues as the role of the Communist Party and other formal and informal groups, the role of the military, the ongoing significance of dissent and human rights, the relevance of law and the Constitution, and the political implications of Russia's domination of ethnic minorities. It traces the political forces at work in Russia up to the present day, and the prospects for ongoing reform.

APOL.2603 U/3615 U Politics of the USA S1

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

An examination of the American Constitution (with special emphasis on the separation of powers); the federal system, including the role of the state and local government; the Supreme Court; and executive-legislative relations. The subject also includes a study of the Congress and the Presidency, as well as the two political parties, presidential elections and the role of the Electoral College. Attention is also given to US foreign policy, with particular emphasis on the dispute about war powers under the Constitution.

APOL.2604 U/3618 U Politics of China S2

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

The structure and working of the political system of China. The subject examines the working through of China's revolution before and since the establishment of the People's Republic in 1949. The subject includes such topics as the role of the Communist Party, and other formal and informal political groups. It also examines such issues as political leadership in China, the role of the military, political dissent and opposition, the significance of Marxism-Leninism-Mao Zedong Thought, the tensions between capitalism and socialism, the importance of ethnic minorities, the growing importance of provincial politics, the politics of education and culture, China's irredenta, the prospects for change, and the values and interests involved in policy-making and social control.

APOL.2607 U/3608 U Special Study in Politics: The Politics of Canada S2

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

The political system of Canada, with special reference to federalism and the role of the states; the problems of regionalism and separatism; the economic and social welfare system; and relations with the United States. In addition to providing ar overview of the Canadian political system, the course will pre sent comparisons with the British and Australian political sys tems, particularly with regard to regionalism and party politics

APOL.2608 U/3617 U Understanding Revolutions S1

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

An examination of the nature of revolutions, their causes, thei consequences, and their justification. The first part of th course examines the distinguishing characteristics of revolu tions which makes them different from coups, revolts, an wars of independence. The second part of the course consid ers various explanations of why revolutions happen. The fina section examines the views of revolutionaries who have pu the case for revolution as a means of transferring politica power or of effecting social transformation. The case agains revolution will also be considered.

APOL.2609 U/3619 U A History of Socialism S

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

A study of the theory and practice of one of the modern world' major ideologies, from the French Revolution to the collapse c communism in Eastern Europe and Russia. Works by th major socialist thinkers, especially Karl Marx, will be examine for an understanding of their objections to capitalism, th strategies for change they recommend, and their visions c socialism. The activities of socialist parties will also be exam ined, including the division between those which advocate re olution and those which advocate reform. Particular attentio will be given to the ways in which the existence and problem of socialist states have affected socialist theories. The subjec ends with some alternative scenarios of the future of socialism

APOL.2610 U/3620 U The Collapse of Communism S

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

This subject is concerned with the circumstances under whic a seemingly robust sociopolitical order suddenly disinte grated. While the course involves detailed study of the recer politics of the former Eastern Bloc, its primary focus is on range of theoretical issues related to political domination regime legitimacy, and social mobilisation. These and othe concepts and theories are deployed to elucidate the nature c the forces which led to the collapse of 'real socialism'.

APOL.2611 U/3611 U The Politics of Australian Defenc Policy S

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

This subject uses different theoretical perspectives as well a a number of specific case studies to consider what shape Australia's defence thinking and policies, how decisions c

efence are reached, and assesses their impact on the ustralian economy and society. It begins by examining the ıltural, international and domestic political frameworks within hich policy is made, and evaluates how these influence and ɔnstrain Australia's defence agenda. It then looks at how ustralia's defence policies are formulated, covering: the prinpal institutions, the major actors and interest groups volved, the key decision making processes, and the allocaɔn of resources flowing from budgetary and other defence ɔlicies.

POL.2612 U/3612 U Parties, Voters and Public Opinion S1

Single session subject
Credit points 4/6
Lectures and tutorials 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

study of how individuals and groups act politically, the ıurses of their activities, and what implications their activities ıve for the democratic process. The course focuses on the le of parties and public opinion in shaping electoral ehaviour, and assesses the major theories and explanations at have been put forward to account for it. While the major cus of the subject is Australia, attention is also given to polital behaviour in other liberal democracies notably the United ates and Britain.

POL.2613 U/3613 U Electoral Systems S2

Single session subject
Credit points 4/6
Lectures and tutorials: 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

ı examination of electoral systems used throughout the mocratic world. The subject assesses the role of particular stems in shaping political institution and evaluate their pact on the democratic process. Countries given special ention include Australia, New Zealand, Canada, United ates, United Kingdom and Ireland. The subject also evalues electoral systems long used in Western Europe, as well those employed in the newly-emerging democracies in ıstern Europe.

POL.2614 U/3609 U Issues and Problems in Australian Foreign Policy S1

Single session subject
Credit points 4/6
Lectures and tutorials: 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

is subject examines developments in Australian foreign pol- to determine to what extent Australian policies are suited our regional environment and circumstances. Australia's ations with the Asia/Pacific region are analysed, along with ange of current issues in Australian foreign policy, including man rights, Antarctica, economic cooperation, aid and arms ntrol.

POL.2615 U/3607 U War in International Politics S2

Single session subject
Credit points 4/6
Lectures and tutorials: 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

is subject focuses on aspects of war in international politics: 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.

APOL.2616 U/3616 U The Military, Society and Politics in Indonesia S1

Single session subject
Credit points 4/6
Lectures and tutorials: 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

The Republic of Indonesia has been governed in a variety of ways. These include constitutional democracy, 'guided' democracy and the current method which is termed 'Panca Sila' democracy. The subject covers the colonial exploitation of the archipelago, the struggle for independence after World War Two, and civil-military relations in Indonesia. Western theories of civil-military relations and development theory, and the Indonesian concepts of power and democracy, are examined in detail. The unique concept of *dwi fungsi,* which is used by the Indonesian armed forces to justify a continuing role in domestic politics, is examined against the background of domestic dissent that continues in Indonesia.

APOL.2617 U/3621 U Introduction to Comparative Politics S1

Single session subject
Credit points 4/6
Lectures and tutorials: 3 hours per week
Prerequisite: APOL.1600 U/14 credit points in Politics

This subject focuses on the origins and workings of stable democratic regimes and canvasses the socioeconomic and sociopolitical dilemmas confronting such regimes worldwide. Particular attention is given to current and foreseeable transitions from authoritarian to democratic regimes in East/Southeast Asia and in Eastern Europe

Honours Subjects

Honours subjects begin at Level II. Entry at Level III is possible subject to certain conditions. All subjects are full year.

APOL.2690 U Politics 2 (Honours)

Full-Year Subject
Seminars 2 hours per week
Prerequisite: APOL.1600 U
Corequisite: 8 credit points in Level II Politics

A subject (to be determined) to be taken in addition to pass subjects chosen from the Upper Level Politics subjects.

APOL.3690 U Politics 3 (Honours)

Full-year subject
Seminars 2 hours per week
Prerequisite: 14 credit points in Politics
Corequisite: 24 credit points in Level III Politics.

A subject (to be determined) to be taken in addition to pass subjects chosen from the Upper Level Politics subjects.

APOL.3692 U Politics 3 (Combined Honours)

In this program, coursework is divided between the Department of Politics and another Department as approved by the Heads of the two departments concerned.

APOL.4690 H Politics 4 (Honours) F/T
APOL.4691 H Politics 4 (Honours) P/T

Full-year subject
Seminars 4 hours per week

Students will take four sessional units or two full year units in fields of study to be determined by the Head of Department.

In addition, candidates will complete a sub-thesis of approximately 15,000 words.

APOL.4692 C Politics 4 (Combined Honours) F/T
APOL.4693 C Politics 4 (Combined Honours) P/T

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

First Year Engineering Courses

First year non-Electrical Engineering students enrol in a course which is almost wholly common for all four streams of Aeronautical, Civil, Maritime and Mechanical Engineering. First year Electrical Engineering students enrol in a separate course, which has considerable commonality with the other engineering programs. More than half of the course is devoted to mathematics, physics and computer science, and the remainder to largely common engineering subjects.

Tables of subjects for the five streams are set out below:

Aeronautical Engineering

	Subjects	*Lecture Hours*	*Tutorial Hours*	*Practical Hours*	*Total Hours*
AMAT.1800 U	Mathematics 1E	108	27	zero	135
APHY.1800 U	Physics 1E	81	27	48	156
ACSC.1800 U	Computer Science 1E	54	zero	48	102
AMEC.1900 U	Aeronautical Engineering 1				
AMEC.1003 E	Engineering Materials for Aeronautical Engineers	39	zero	zero	39
AINT.1404 E	Engineering Drawing and Graphics	zero	zero	36	36
AINT.1401 E	Statics and Dynamics	54	27	12	93
~~AINT.1405 E~~	Workshop Practice (Mech/Aero Eng)	zero	zero	50	50
AMEC.1004 E	Introduction to Aero Space Design	14	zero	zero	14
AMEC.1005 E	Fundamentals of Flight	40	14	zero	54
Total	AMEC.1006E				675

Civil Engineering

	Subjects	*Lecture Hours*	*Tutorial Hours*	*Practical Hours*	*Total Hours*
ACHM.1800 U	Chemistry 1E	54	zero	zero	54
AMAT.1800 U	Mathematics 1E	108	27	zero	135
APHY.1801 U	Physics 1CE	81	27	36	144
ACSC.1800 U	Computer Science 1E	54	zero	48	102
ACMA.1800 U	Civil Engineering 1				
AINT.1404 E	Engineering Drawing and Graphics	zero	zero	36	36
AINT.1401 E	Statics and Dynamics	54	27	12	93
AELE.1001 E	Introduction to Electrical and Electronic Engineering	40	14	12	66
~~AINT.1405 E~~	Workshop Practice or (Civil/Maritime Eng)	zero	zero	50	50
ACMA.1001 E	Construction Camp				
ACMA.1002E					
Total					686

irst Year Engineering

lectrical Engineering

	Subjects	Lecture Hours	Tutorial Hours	Practical Hours	Total Hours
MAT.1800 U	Mathematics 1E	108	27	zero	135
PHY.1800 U	Physics 1E	81	27	48	156
CSC.1800 U	Computer Science 1E	54	zero	48	102
ELE.1800 U	Electrical Engineering 1				
ACHM.1401 E	Introduction to Engineering Materials for Electrical Engineering	39	zero	zero	39
AINT.1404 E	Engineering Drawing and Graphics	zero	zero	36	36
AELE.1002 E	Circuits & Systems 1	20	7	6	33
AELE.1003 E	Digital Systems 1	20	5	6	31
AELE.1004 E	Circuits & Systems 2	20	7	6	33
AELE.1005 E	Digital Systems 2	20	5	6	31
AELE.1006 E	Electronics 1	20	5	6	31
~~AINT.1405 E~~	Workshop Practice (Elec Eng)	zero	zero	50	50
tal AELE.1007E					677

ıritime Engineering

	Subjects	Lecture Hours	Tutorial Hours	Practical Hours	Total Hours
CHM.1800 U	Chemistry 1E	54	zero	zero	54
MAT.1800 U	Mathematics 1E	108	27	zero	135
PHY.1801 U	Physics 1CE	81	27	36	144
CSC.1800 U	Computer Science 1E	54	zero	48	102
CMA.1900 U	Maritime Engineering 1				
AINT.1404 E	Engineering Drawing and Graphics	zero	zero	36	36
AINT.1401 E	Statics and Dynamics	54	27	12	93
AELE.1001 E	Introduction to Electrical and Electronic Engineering	40	14	12	66
~~AINT.1405 E~~	Workshop Practice (Civil/Marine Eng)	zero	zero	50	50
al ACMA.1002 E					680

chanical Engineering

	Subjects	Lecture Hours	Tutorial Hours	Practical Hours	Total Hours
MAT.1800 U	Mathematics 1E	108	27	zero	135
PHY.1800 U	Physics 1E	81	27	48	156
CSC.1800 U	Computer Science 1E	54	zero	48	102
MEC.1800 U	Mechanical Engineering 1				
AMEC.1002 E	Introduction to Engineering Materials	39	zero	zero	39
AINT.1404 E	Engineering Drawing and Graphics	zero	zero	36	36
AINT.1401 E	Statics and Dynamics	54	27	12	93
AELE.1001 E	Introduction to Electrical and Electronic Engineering	40	14	12	66
~~AINT.1405 E~~	Workshop Practice (Mech/Aero Eng)	zero	zero	50	50
al AMEC.1006E					677

Description of First Year Subjects and Engineering Units

AMAT.1800 U Mathematics 1E

Lectures 108 hours
Tutorials 27 hours

A first course in mathematical techniques, matrix algebra, vectors, complex numbers, differentiation, series, integration, differential equations.

Linear algebra; equation systems, determinants, Cramer's rule; Matrix algebra, notation, matrix types, matrix inversion; Vectors and elementary coordinated geometry; Cartesian and plane polar coordinates, parametric equations, curve sketching. Scalar and vector products, triple products, applications to geometry. Complex numbers; z-plane, de Moivre's theorem. Mathematical proof and notation; Order and inequalities. Introduction to number systems; mathematical induction. Relations and functions. Limits and continuity; an informal introduction. Differentiation; Properties of functions, Rolle's theorem and mean value theorems, slope and concavity of graphs. Stationary points and points of inflexion, local and absolute extreme, applications to curve sketching and problems. Series; Convergence, power series, evaluation of elementary functions. Taylor's series. Integration; the definite integral as a sum, properties of integrals, antiderivatives, fundamental theorem of calculus. Elementary functions; circular functions and inverses, logarithm and exponential functions, hyperbolic functions and inverses. Integration techniques; application of integrals; areas, centres of mass, moment of inertia. Improper integrals. Elementary differential equations and applications. Elementary probability theory and applications.

ACSC.1800 U Computer Science 1E

Lectures 54 hours
Laboratory 48 hours

Problem solving methods and algorithm development: programs, flow charts, pseudocode, stepwise refinement, top down design, modularity. Pascal programming language: identifiers, variables, input/output, simple data types, assignment statement, expressions, operators, standard functions, procedures, block structure, local and global identifiers, scope, program control, Boolean variables and expressions, loops, user defined types. Elementary structures: arrays records, serial files, sets, searching and sorting methods, Numeric applications. FORTRAN programming language: application to numeric programming, use in Pascal programs. Introduction to computer systems: functional components, program execution, representation of information, binary arithmetic, fixed and floating point, signed numbers.

ACHM.1800 U Chemistry 1E

Lectures and demonstrations 54 hours

Introduction. Atoms, molecules, bonding and cohesion. Molecules and Matter. Concepts of Physical Chemistry. Chemistry of Materials.

There are no formal chemistry prerequisites for entry into Chemistry 1E. Students who have not studied chemistry in years 11 and 12 are advised that supplementary study may be needed for successful completion of the subject.

APHY.1800 U Physics 1E and APHY 1801 U Physics 1CE

Lectures 81 hours
Tutorials 27 hours
Practical 48 hours (36 hours for Physics 1CE)
Corequisite: AMAT.1800 U

General Physics and Mechanics

Physical quantities, units, standards and measurements dimensions and dimensional analysis; coordinate systems Newton's laws of motion, kinematics and dynamics Momentum, energy, work and power. Rotational dynamics moment of inertia, angular momentum. Newton's law of gravitation, Kepler's laws. Simple harmonic motion and resonance.

Wave Motion and Optics

Classification of waves, superposition, Doppler effect, resonance, Huygens' principle, electromagnetic waves, polarization, reflection, refraction and diffraction. Resolving powers o instruments.

Atomic and Nuclear Physics

Particle aspects of electromagnetic radiation: photoelectric effect, Compton effect, pair production. Wave aspects of particles: de Broglie waves, electron and x-ray diffraction, wave function and quantisation, wave-particle duality. Atomic structure: optical spectra. Bohr theory, atomic energy states, x-ray spectra. The nucleus: constituents, stability, binding energy radioactivity, nuclear energy.

Properties of Matter and Heat

Elasticity. Hydrostatics, surface tension; hydrodynamics Bernoulli's equation. Temperature, thermometry. Therma expansion, equations of state, phase changes. Kinetic theory of gases. First law of thermodynamics, heat capacity, laten heat. Heat transfer processes.

Electricity and Magnetism

Coulomb's law, calculations of electric fields and potentials Gauss' law, multipoles, conductors and electric currents Origins of electrical resistance, Ohm's law, electrical measurements. Capacitance. Magnetic induction, motion o charges in electro-magnetic fields. Ampère's law, Biot-Savar law. Constitutive Equations. Electro-magnetic induction Faraday's law, inductance. Displacement current, Maxwell's equations in integral form.

Engineering Units

AINT.1404 E Engineering Drawing & Graphics

Practical 36 hours

Basic principles and techniques in accordance with the Australian Engineering Drawing Handbook (AS CZ1) Auxiliary projection and oblique views. Curves of intersection and developments.

AMEC.1003 E Engineering Materials for Aeronautical Engineers

Lectures 39 hours

Emphasis will be given to aerospace materials in covering the following topics.

e structure of the atom. Forces between atoms. Spatial angements of atoms. The stages of aggregation. The crysline state. Polymeric materials, properties and applications. ect of imperfections in crystalline materials. Phase equilibin one and multicomponent systems. Materials in electric d magnetic fields.

AEC.1004 E Introduction to Aerospace Design

Lectures 14 hours

scriptive material on the following topics: The aircraft as a tal system. The basic parts of the aircraft and their nctions. The application of mechanical principles in termining the behaviour of an aircraft.

AEC.1005 E Fundamentals of Flight

Lectures 40 hours
Tutorials 14 hours

ndamentals: liquids and gases, viscosity. Aspects of air ws: boundary layers, pressure distributions, lift and drag, bulence, separation, vortices. Subsonic and supersonic ws: shock waves. Application to aircraft design and rformance.

ELE.1001 E Introduction to Electrical and Electronic Engineering

is unit consists of the combination of

AELE.1002 E Circuits & Systems 1
AELE.1004 E Circuits & Systems 2

AEC.1002 E Introduction to Engineering Materials

Lectures 39 hours

e structure of the atom. Forces between atoms, Spatial rangements of atoms. The states of aggregation. The ystalline state. Polymeric materials, properties and plications. Effect of imperfections in crystalline materials. ase equilibria in one and multicomponent systems. aterials in electric and magnetic fields.

CHM.1401 E Introduction to Engineering Materials for Electrical Engineering

Lectures and Demonstrations: 39 hours

introductory course on the materials of engineering for ectrical Engineering students presented from a chemical wpoint. Various topics will be discussed including: lymers; semiconductors; batteries and fuel cells; the relanship of electrochemical cells to corrosion and corrosion ntrol.

NT.1401 E Statics & Dynamics

Lectures 54 hours
Tutorials 27 hours
Laboratory 12 hours

atics of particles and rigid bodies under two and threenensional force systems. Application to trusses, frames and achines. Dry friction, wrapping friction. Distributed forces; ntre of gravity and centroid of geometric figures. Moments inertia. Internal forces in structural members: shear and nding moment diagrams. Principle of virtual work, applican to statics of machines. Cables and catenaries.

nematics and kinetic of the plane motion of a particle and a id body. Equations of motions; work, energy, impulse and omentum.

AELE.1002 E Circuits & Systems 1 **S1**

Lectures 20 hours
Tutorials 7 hours
Laboratory 6 hours

Electric and magnetic phenomena; DC circuit theory—Ohm's Law, Kirchhoff's voltage and current laws; simple DC circuits; the ideal operational amplifier (Op-Amp); comparison of the inverting and non-inverting configuration; examples of Op-Amp circuits; summing and subtracting amplifiers, differentiators and integrators; non-ideal performance of Op-Amps—finite open-loop gain and bandwidth, slew-rate, common mode rejection, input and output resistances, Op-Amp applications.

AELE.1003 E Digital Systems 1 **S1**

Lectures 20 hours
Tutorials 5 hours
Laboratory 6 hours

An Introduction to the analysis and design of digital logic circuits; Boolean algebra, combinational logic design, Karnaugh maps, sequential logic circuits, algorithmic state machine approach to the description of digital circuits, analysis of synchronous sequential circuits.

AELE.1004 E Circuits & Systems 2 **S2**

Lectures 20 hours
Tutorials 7 hours
Laboratory 6 hours

Simple AC circuits; analogue signals; impedance and admittance; frequency; phasors; measuring instruments (moving coil, DVM, CRO, etc.)

AELE.1005 E Digital Systems 2 **S2**

Lectures 20 hours
Tutorials 5 hours
Laboratory 6 hours

The design of synchronous sequential circuits, implementation using gates, flip flops and ROMs; Logic design using programmable logic arrays. An introduction to the architecture of computers; memories, the arithmetic logic unit, the control unit.

AELE.1006 E Electronics 1 **S2**

Lectures 20 hours
Tutorials 5 hours
Laboratory 6 hours

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.

AINT.1405 E Workshop Practice

Practical 50 hours

Instruction and practice in the use of hand and machine tools. The production of simple machine parts from drawings supplied. Electrical Engineering students will also undertake a course in high reliability precision soldering.

This will be done in Service Workshops during the May recess.

ACMA.1001 E Construction Camp

Practical 50 hours

Residential camp. Field demonstrations, exercises, site visits, introductory lectures.

This will be undertaken during the May recess.

Department of Civil and Maritime Engineering

Civil Engineering

Civil Engineering takes its name for the division of engineering in the Middle Ages between military and civilian works. The profession of civil engineering was recognized by the formation of the Institution of Civil Engineers (UK) in 1825. In the 19th-century, the broadening scope of engineering led to the division of civilian engineering into civil, mechanical and electrical, the further specializations (aeronautical, chemical, industrial, etc) have developed in the 20th century.

After contracting its sphere of interest over a long period of time, civil engineering is now broadening its scope with the recognition of the wider implications of its effects on modern society. Attention is given both to the interaction between civil engineering and other disciplines and to the effect of civil engineering works on the environment.

Present day civil engineering has maintained strong commonality with military engineering–the design and construction of facilities such as roads, bridges, aerodromes, buildings, earth structures, and the associated planning and management of projects.

The BE course in Civil Engineering in the University College is firmly based on mathematics, computer science, physical science, and the engineering approach to analysis and design. The major subdivisions of the course are: structures; materials of construction, including concrete and soils; the many aspects of water engineering; surveying; the construction of civil engineering works; transportation, and the science and practice of management and project management. Students are encouraged to develop resourceful and innovative attitudes throughout the course, especially in their final year project.

The course is based on subjects which are subdivided into teaching units. To pass a subject it is necessary to obtain a pass in aggregate, and to achieve an acceptable standard in each teaching unit. At the discretion of the Head of the Department, a student failing a unit may be required to repeat that unit.

The teaching units are multiples of sessional units consisting of twenty-seven contact hours, normally confined to the first or second half of an academic year. Thus a teaching unit of two sessional units consists of fifty-four contact hours, which may be spread over the whole academic year.

Elective units in third and final year will be selected in consu tation with the Head of the Department. The full range of ele tives may not be available in any one year.

Outline of Second and Later Year Courses and List of Teaching Units

Second Year Course

Subject			*Total Hou*
General Studies (see p.134)			5
AMAT.2800 U	Mathematics 2E		10
AMAT.2801 U	Engineering Mathematics 1E		
AMAT.3403 E	Probability 3E		2
AMAT.3404 E	Statistics 3E		2
ACSC.2801 U	Computer Science 2CE		
ACSC.2402 E	Numerical Analysis 2CE		5
ACMA.2800 U	Civil Engineering 2		
ACMA 2001 E	Concrete Technology 1	27	
ACMA.2002 E	Construction Technology	27	
ACMA.2003 E	Fluid Mechanics 1CE	54	
ACMA.2004 E	Engineering Geology 1	27	
ACMA.2005 E	Hydrology 1	27	
ACMA.2006 E	Soil Mechanics	40	
ACMA.2007 E	Surveying 1	54	
ACMA.2008 E	Materials 1CE	54	
ACMA.2009.E	Mechanics of Solids 1CE	54	
AECM.3401 E	Engineering Economics	27	
			39
			66
			24.5 hrs/w

Third Year Course

Subject			*Total Hou*
General Studies			5
ACMA.3800 U	Civil Engineering 3		
ACMA.3001 E	Structural Analysis 1	81	
ACMA.3002 E	Structural Design 1	54	
ACMA.3003 E	Surveying 2	27	
ACMA.3004 E	Survey Camp	27	
ACMA3005 E	Applied Probability and Statistics for Engineers	27	
ACMA.3006 E	Numerical Methods in Engineering	54	
ACMA.3007 E	Soil Engineering	81	
ACMA.3008 E	Free Surface Hydraulics	27	
ACMA.3009 E	Closed Conduit Hydraulics	27	
ACMA.3010 E	Coastal Engineering 1	27	
ACMA.3011 E	Water Resources	27	
ACSC.3401 E	Operations Research 3E	54	
	Technical Electives*	54	
			56
			62
			23 hrs/w

* To be chosen from list in Final Year Course.

nal Year Course

ıbject		*Total Hours*
CMA.4801 U	Civil Engineering: Project and Seminar	108
	or	
CMA.4802 U	Civil Engineering: Design and Seminar	108
CMA.4803 U	Practical Experience (Civil Engineering)	
CMA.4800 U	Civil Engineering 4	
ECM.3402 E	Theory of Management 27	
CMA.4001 E	Project Administration 27	
CMA.4002 E	Systems Engineering 27	
CMA.4003 E	Project Planning and Control 27	
CMA.4004 E	Structural Analysis 2 54	
CMA.4005 E	Structural Design 2 81	
CMA.4006 E	Transportation Engineering 81	
CMA.4007 E	Concrete Technology 2 27	
CMA.4008 E	Metals Engineering 1 27	
CMA.4009 E	Environmental Engineering 54	
	Technical Electives 54	
		486
		594
'erage contact hours per week		22

chnical Electives Total of 54 hours to be chosen from:

AMAT.3405 E	Manpower Planning 3CE	54
ACMA.4010 E	Finite Element Methods	27
ACMA.4014 E	Remote Sensing for Civil Engineers	27
ACMA.4015 E	Foundation Engineering	27
ACMA.4016 E	Structural Analysis 3	27
ACMA.4017 E	Surveying 3	27
ACMA.4018 E	Engineering Geology 2	54
ACMA.4019 E	Engineering Explosives	27
ACMA.4020 E	Program and Project Evaluation	27
ACMA.4021 E	Computer Tools for Engineering Management	27
	and/or	
	Approved units offered by Departments of Computer Science and Mathematics	54

ıbject Descriptions

MAT.2800 U Mathematics 2E

Lectures and Tutorials 108 hours

atrices, systems of linear equations. Vector spaces. thogonal projections and least squares. Eigenvalues, agonalization. Differential equations: first order; higher order ear; systems, normal modes; Laplace transforms.

ultivariable calculus, maxima and minima. Integration. ctor field theory.

rtial differential equations. Separation of variables. Fourier ries.

MAT.2801 U Engineering Mathematics 1E *Total 54 hours*

MAT.3403 E *Probability 3E* S1

ws of probability, permutations and combinations. Random riables, discrete and continuous, change of variables. Expectations; moments, Chebyshev's theorem, generating functions. Distributions; binomial, Poisson, hypergeometric, normal, exponential, gamma and beta. Bivariate distributions; sums of random variables, central limit theorem. Simple random walk. Markov chains.

AMAT.3404 E *Statistics 3E* S2

Presentation of data, histograms. Sampling distributions. Estimation; maximum likelihood, confidence intervals. Hypothesis testing; quality control. Regression and correlation. Goodness of fit. Non-parametric tests.

ACSC.2801 U Computer Science 2CE *Total 54 hours*

ACSC.2402 E *Numerical Analysis 2CE* S1

Prerequisite: Mathematics 1 or 1E and Computer Science 1 or 1E
Corequisite: Mathematics 2E

Computer calculations: Computer representation of numbers, floating point arithmetic, sources of errors, error propagation in computations, error analysis, numerical instability of algorithms. Numerical solution of non-linear equations: Bi-section method, simple iteration, Newton's method, method of false position, secant method, convergence criteria. Interpolation and approximation: Finite differences, interpolation formulae, nested multiplication, deflation of a polynomial, Lagrange interpolation polynomial, cubic spline interpolation, error analysis. Numerical integration and differentiation: Newton-Cotes integration formulae, composite formulae, Richardson extrapolation, Romberg integration, Gaussian quadrature, adaptive quadrature, error propagation in numerical integration, numerical differentiation. Numerical solution of ordinary differential equations: Taylor series methods, Euler and modified Euler method, Runge-Kutta methods, error analysis. Solution of linear simultaneous equations: Elimination methods, Gaussian elimination, matrix inversion, iterative methods, Jacobi method, Gauss-Seidel method, condition of a linear system, convergence criteria, error analysis. Mathematical software: Design criteria, efficiency considerations, mathematical software libraries.

ACMA.2800 U Civil Engineering 2 ***Total 391 hours***

ACMA.2001 E *Concrete Technology 1* *Total 27 hours*

Cement: Aggregates. Influence of components on both plastic and hardened concrete.

ACMA.2002 E *Construction Technology* *Total 27 hours*

Earthwork, concrete, steel, timber, masonry construction. Excavation. Foundation construction. Marine works. Construction safety. Site visits.

ACMA.2003 E *Fluid Mechanics 1CE* *Total 54 hours*

Fluid properties. Forces on fluid elements, systems and control volumes. Fluid statics and dynamics. Fluid momentum. Energy. Equations of motion. Potential flow. Laminar and turbulent flow. Boundary layers, lift and drag. Dimensional analysis. Models.

ACMA.2004 E *Engineering Geology 1* *Total 27 hours*

Geological time and structure of earth plate tectonics. Identification of minerals and rocks. Geological structure and mapping. Weathering and erosion processes. Landform evaluation.

ACMA.2005 E *Hydrology 1* *Total 27 hours*

Elements of meteorology: Hydrologic cycle; Measurement and analysis of precipitation and run off. Hydrographs.

ACMA.2006 E *Soil Mechanics* *Total 40 hours*

Formation of soils, composition, grading, texture, index tests, percentage test, compaction. Flow of water through saturated soils. Effective stress concept. Basic one dimensional consolidation analyses. Strength and deformation of saturated soils.

ACMA.2008 E *Materials 1CE* *Total 54 hours*

Materials science. Grain structure, effect of deformation, recrystallization, hot and cold working. Non-equilibrium relationships in multiphase materials, applications to heat treatment. Behaviour of materials in service: deformation, fatigue, fracture, wear, thermal stress, creep, corrosion, radiation damage. Effects of microstructure and macrostructure on properties. Fracture mechanics. Introduction to ceramic phases and properties. Welding: processes, metallurgy and weldability. Metal removal, surface finishing, joining.

ACMA.2009 E *Mechanics of Solids 1CE* *Total 54 hours*

Stress, strain in 2 and 3 dimensions: stress and strain transformations, principal stresses and strains, Mohr's Circles for stress and strain. Hooke's Law and Poisson's Ratio. Statistical determinacy and indeterminacy: temperature stresses, lack of fit, compound structures. Thin walled pressure vessels. Torsion of shafts of circular cross-section. Bending and shear stresses in symmetrical, asymmetrical and compound beams: deflection of beams. Euler buckling: axially and eccentrically loaded columns, non-uniform columns and beam columns. Principle of Virtual Work and Castigliano's Theorems.

ACMA.2010 E *Surveying 1* *Total 54 hours*

Elementary theory of errors. Levels and levelling. Electronic distance measurement. Theodolites and theodolite traversing. Contour and detail surveys. Satellite positioning. Hydrographic surveying.

AECM.3401 E *Engineering Economics* *Total 27 hours*

Basic concepts in management economics. Project evaluation techniques in private and public enterprise, introduction to management accounting.

ACMA.3800 U Civil Engineering 3 ***Total 567 hours***

ACMA.3001 E *Structural Analysis 1* *Total 81 hours*

Beam bending. Influence lines. The analysis of trusses. Moment area. Energy theorems. Slope deflection. Moment distribution. Cable structures. Suspension bridges. Force method of analysis. Displacement method of analysis. Grids. Laboratory sessions.

ACMA.3002 E *Structural Design 1* *Total 54 hours*

Types of loads on structures. Application of the SAA Loading Code, Parts 1,2. Design of steel, concrete, and timber structures. Design of connections in steel and concrete. Simple pre-stressed concrete design.

ACMA.3003 E *Surveying 2* *Total 27 hours*

Introduction to photogrammetry. Elements of hydrographic surveying. Map projections and computations on the Australian Map Grid.

ACMA.3004 E *Survey Camp* *Total 27 hour*

A one week field camp.

ACMA.3005 E *Applied Probability and Statistics of Engineers* *Total 27 hour*

Probabilistic, stochastic and deterministic design. Extrem value distributions. Monte Carlo simulation. Time series anal yses. Limit state design. Experimental design. Variability c materials.

ACMA.3006 E *Numerical Methods in Engineering* *Total 54 hour*

Errors. Non-linear and linear algebraic equations. Matrix alge bra. Numerical integration. Solution or ordinary and partial dif ferential equations. Time series analysis.

ACMA.3007 E *Soil Engineering* *Total 81 hour*

Effective stress concept. Saturated and unsaturated soils Drained and undrained conditions. Soil Strength. Laborator testing. Earth pressure theory. Retaining structures. Bearin capacity theory. Slope stability. Soil permeability and Darcy' law. Groundwater flow. Aquifer and well hydraulics. Seepag control. Consolidation theory. Settlement analysis. Site inves tigation and field testing.

ACMA.3008 E *Free Surface Hydraulics* *Total 27 hour*

Flow resistance and uniform flow in open channels. Specifi energy. Specific thrust. Channel transitions. Gradually varie flow in prismatic and natural waterways. Rapidly varied flow Flow measurement in open channels. Introduction to sedimen transport and the design of stable unlined channels.

ACMA.3009 E *Closed Conduit Hydraulics* *Total 27 hour*

Fluid resistance and the flow of real fluids in ducts. Pipe fittin energy losses. Flow measurement in pipes. Pipe systems Turbo machines. Turbo machine systems. Combined turb machine systems and pipe systems. Unsteady flow in pipes Rapidly varied flow in pipes. Cavitation.

ACMA.3010 E *Coastal Engineering 1* *Total 27 hour*

Wave theory. Wave transformation. Real wave trains. Wav hindcasting and forecasting. Tides. Nearshore currents Sediment transport. Coastal protection methods.

ACMA.3011 E *Water Resources* *Total 27 hour*

Surface water resources monitoring. Catchment yield an storage design. Storage and river routing. Ground wate Desalination. Hydro-Electric power. Catchment modelling.

ACSC.3401 E *Operations Research 3E*

Lectures/Tutorials 54 hours
Prerequisite: Mathematics 1E and Computer Science 1E

Introduction; process of operations research, model formula tion, mathematical techniques. Probability concepts; Bayes theorem, distributions, expectations. Decision analysis; trees choice criteria, utility. Linear programming; simplex procedure duality sensitivity, LP packages. Allocation models; trans portation, degeneracy, balancing, assignment. Game theory two person zero sum models, graphical algebraic and iterativ techniques. Dynamic programming; networks, resource allo cation, reliability. Networks; shortest path, minimal spannin tree, maximal flow. Project management CPM, resource allo cation, crashing, PERT.

CMA.4801 U Civil Engineering: Project and Seminar *Total 108 hours*

nalytical and/or experimental research study on topic elected by student relevant to Civil Engineering. Oral prentation.

CMA.4802 U Civil Engineering: Design and Seminar *Total 108 hours*

eries of minor design exercises and a major design to be elected from a number of possible civil engineering/military ngineering projects. Field investigations and laboratory studs may be involved.

CMA.4008 U Civil Engineering 4 *Total 544 hours*

ECM.3402 E *Theory of Management* *Total 27 hours*

he role of management in a technologically advanced soci-y. Human behaviour in the work situation; communication, fluence; decision-making. Models of organisations from atic structural notions to dynamic open systems. ngineering management, technical change and automation.

CMA.4001 E *Project Administration* *Total 27 hours*

rofessional ethics. Occupational health and safety. lanagement of a professional team. Management of project formation. Contract administration. Introduction to legal spects of professional practice. Arbitration.

CMA.4002 E *Systems Engineering* *Total 27 hours*

ystems approach to formulation and modelling of engineerg problems in design and construction. System optimisation. ecision analysis.

CMA.4003 E *Project Planning and Control* *Total 27 hours*

ıtroduction to construction planning; the construction indus-y, project management and competitive tendering. Site and ıcility layout. Equipment considerations on restricted sites. lodelling of construction operations. Practical application of anning techniques including computer applications; bar ıarts, line of balance, network methods, resource scheduling ıd cost control. Cyclic planning applications. CYCLONE, /ORK STUDY. Planning and control of specific engineering ɔerations, building, earthworks.

CMA.4004 E *Structural Analysis 2* *Total 54 hours*

urther topics in stiffness analysis, stability of bars in com-ression, plastic analysis, non-linear analysis. Dynamics. omputer applications. Approximate methods of analysis.

CMA.4005 E *Structural Design 2* *Total 81 hours*

eries of short sessions requiring feasibility studies and preminary designs of a range of civil engineering structures. A ıajor design on a selected topic to be completed.

CMA.4006 E *Transportation Engineering* *Total 81 hours*

ransport systems planning, design and evaluation. Traffic ngineering practice. Geometric design of roads and airfields. tructural design of unsealed, rigid and flexible road and airld pavements. Pavement maintenance and management.

CMA.4007 E *Concrete Technology 2* *Total 27 hours*

ariability of concrete. Concrete mix design procedures with and without additional cementitious materials. Multiphase theory of elastic behaviour. Deformation of concrete and its serviceability. Durability—physical and chemical deterioration. Nondestructive testing. Concrete for special purposes and modern developments in concrete technology.

ACMA.4008 E *Metals Engineering 1* *Total 27 hours*

Characteristics and types of modern steels, aluminium alloys and other metals used in building and construction. Fatigue and fracture. Fracture safe design. Fracture mechanics. Welding in structural engineering. Quality assurance testing and inspection. Corrosion protection systems. Codes and standards.

ACMA.4009 E *Environmental Engineering* *Total 54 hours*

Air pollution, water pollution, thermal pollution. Dispersion and diffusion. Radiation. Environmental impact statements. Biological and ecological systems. Environmental monitoring. Characteristics of water and waste water. Analysis of water and waste water. Waste water quality and quantity. Sewer hydraulics and design. Treatment and disposal processes.

Electives *Total 108 hours to be chosen*

AMAT.3405 E *Manpower Planning 3CE* *Total 54 hours*

Discrete time models. Closed populations, limiting probabilities. Open populations. Controllability; attainable regions, recruitment and promotion strategies, maintainability.

Continuous time models. Length of service. Recruitment and wastage in systems of fixed and varying size. Systems with several grades.

ACMA.4010 E *Finite Element Methods* *Total 27 hours*

Introduction to the finite element method. Application of finite element and finite difference techniques to the solution of problems in civil engineering.

ACMA.4014 E *Remote Sensing for Civil Engineers* *Total 27 hours*

Electromagnetic radiation, platforms, sensors, image analysis. Applications to regional planning, site surveys, feature recognition, topographic mapping and environmental monitoring.

ACMA.4015 E *Foundation Engineering* *Total 27 hours*

Foundations of structures: types, basis of selection, design and analysis. Treatment of foundation soils, consolidation and allowable settlement of foundations. Limit state design.

ACMA.4016 E *Structural Analysis 3* *Total 27 hours*

Introduction to theory of elasticity. Theory of thin plates. Experimental stress analysis. Use of package programs.

ACMA.4017 E *Surveying 3* *Total 27 hours*

Introduction to geodetic surveying and position fixing, using astro, inertial and satellite techniques. Survey adjustments by the method of least squares.

ACMA.4018 E *Engineering Geology 2* *Total 54 hours*

Structural geology applications in civil engineering. Weathering processes and their effects on strength, perme-

ability and durability. Engineering classification of rocks. Joint surveys and density contouring. Rock slope stability and mass movement. Strength, deformation and stress measurements. Water flow in rocks. Socketed piles in rocks. Tunnelling.

ACMA.4019 E *Engineering Explosives* *Total 27 hours*

Explosives, demolition theory. Blasting equipment and accessories. Initiation, electric, non-electric. Quarrying methods and design. Underwater techniques. Theory of shaped charges. Safety. Drilling and blasting. Specialised blasting techniques. Design of structures against blast.

ACMA.4020 E *Program and Project Evaluation* *Total 27 hours*

Logic framework; formative and summative evaluation; implementation analysis; economic and financial evaluation; cost effectiveness and cost utility analysis; tools and techniques for structured analysis.

ACMA.4021 E *Computer Tools for Engineering Management* *Total 27 hours*

Introduction to the use of a range of micro-computer based decision support tools in the context of engineering analysis, including spreadsheet, database, PERT/CPM, Monte Carlo modelling, analysis network, hyper-text and personal information management.

Approved units offered by Department of Mathematics *Total 27 hours*

Approved Units offered by Department of Computer Science *Total 27 hours*

Maritime Engineering*

The undergraduate course leading to BE (Maritime) was introduced by the Department of Civil and Maritime Engineering as one of the degree programs available to General List Midshipmen (Seaman, Supply, and Instructor branches) of the Royal Australian Navy. Students were first enrolled in 1988.

The Maritime Engineering course shares basic science, mathematics and computer science strands with the civil engineering programs.

The first year follows the core of courses common to civil, maritime, electrical and mechanical engineering. Year 2 of the maritime program is similar to the civil program except for the introduction of a major subject in oceanography. Third and fourth year programs progressively introduce stronger strands in fluid mechanics, coastal and off-shore engineering, metallic materials, maritime design, plus a number of technical electives specifically relevant to the technical training of maritime engineers. The Maritime Engineering course shares the strong project management and evaluation, planning and design with the Civil Engineering course.

* The future of this course is being reviewed

Outline of Second and Later Year Courses and List of Teaching Units

Second Year Course

Subject			*Total hours*
AMAT.2800 U	Mathematics 2E		108
AMAT.2801 U	Engineering Mathematics 1E		
AMAT.3403 E	Probability 3E	27	
AMAT.3404 E	Statistics 3E	27	
ACSC.2801 U	Computer Science 2CE		
ACSC.2402 E	Numerical Analysis 2CE	54	
AGOC.1700 U	Oceanography 1*		198
ACMA.2900 U	Maritime Engineering 2		
ACMA.2003 E	Fluid Mechanics 1CE	54	
ACMA.2009 E	Mechanics of Solids 1CE	54	
ACMA.2007 E	Surveying 1	54	
AELE.2401 E	Electronic Techniques	27	
ACMA.2008 E	Materials 1CE	54	243
			657
			24.3 hrs/wk

* 156 hours lectures and practical work plus allowance of 42 hours for field camp.

Third Year Course

Subject			*Total Hours*
General Studies			54
ACMA.3900 U	Maritime Engineering 3		
ACMA.2002 E	Construction Technology	27	
ACMA.3001 E	Structural Analysis 1	81	
ACMA.3002 E	Structural Design 1	54	
ACMA.3005 E	Applied Probability and Statistics for Engineers	27	
ACMA.3006 E	Numerical Methods in Engineering	54	
ACMA.3008 E	Free Surface Hydraulics	27	
ACMA.3009 E	Closed Conduit Hydraulics	27	
ACMA.3010 E	Coastal Engineering 1	27	
AMCA.3012 E	~~Hydrographic~~ Surveying	27	
ACMA.3013 E	Survey Camp ~~(Hydrographic)~~	27	
ACMA.3014 E	Applied Thermodynamics	27	
ACMA.3015 E	Coastal Engineering 2	27	
ACMA.4001 E	Project Administration	27	
AECM.3401 E	Engineering Economics	27	
ACSC.3401 E	Operations Research 3E	54	
	Elective*	27	
			567
			621
			23 hrs/wk

* Details of approved electives are given in the subject descriptions.

nal Year Course

ubject			*Total Hours*
eneral Studies			54
CMA.4902 U	Practical Experience* (Maritime Engineering)		
CMA.4901 U	Maritime Engineering: Project and Seminar		108
CMA.4900 U	Maritime Engineering 4		108
ompulsory Units:			
ACMA.4003 E	Project Planning and Control	27	
ACMA.4004 E	Structural Analysis 2	54	
ACMA.4008 E	Metals Engineering 1	27	
ACMA.4009 E	Environmental Engineering	54	
ACMA.4010 E	Finite Element Methods	27	
ACMA.4011 E	Design of Maritime Structures and Vessels	54	
ACMA.4012 E	Fluid Mechanics 2ME	54	
ACMA.4013 E	Metals Engineering 2	27	
AECM.3402 E	Theory of Management	27	
APHY.2405 E	Physics of the Atmosphere 2ME	27	
APHY.2406 E	Marine Acoustics and Optics 2ME	27	
'ectives: Total of 54 hours to be chosen from			
ACMA.4002 E	Systems Engineering	27	
ACMA.4016 E	Structural Analysis 3	27	
ACMA.4019 E	Engineering Explosives	27	
ACMA.4020 E	Program and Project Evaluation	27	
ACMA.4021 E	Computer Tools for Engineering Management	27	
ACMA.4022 E	Instrumentation	27	
ACMA.4023 E	Remote Sensing for Maritime Engineers	27	
AMAT.3405 E	Manpower Planning 3CE	54	
ıd/or			
ɔproved units offered by the ɐpartment of Mathematics and/or ɐpartment of Computer Science ɔecial Electives and/or ɔproved units offered by other stitutions in Maritime Engineering		54	459
			621
			23 hrs/wk

ɜee Rule 6 of BE Degree Rules.

IAT.2800 U Mathematics 2E

Lectures and Tutorials 108 hours

atrices, systems of linear equations. Vector spaces. rthogonal projections and least squares. Eigenvalues, agonalization. Differential equations: first order; higher order ear; systems, normal modes; Laplace transforms.

ultivariable calculus, maxima and minima. Integration. ctor field theory. Partial differential equations. Separation of riables. Fourier series.

AMAT.2801 U Engineering Mathematics 1E *Total 54 hours*

AMAT.3403 E *Probability 3E* S1

Laws of probability, permutation and combinations. Random variables, discrete and continuous, change of variables. Expectations; moments, Chebyshev's theorem, generating functions. Distributions; binomial, Poisson, hypergeometric, normal, exponential, gamma and beta. Bivariate distributions; sums of random variables, central limit theorem. Simple Random Walk. Markov chains.

AMAT.3404 E *Statistics 3E* S2

Presentation of data, histograms. Sampling distributions. Estimations; maximum likelihood, confidence intervals. Hypothesis testing; quality control. Regression and correlation. Goodness to fit. Non-parametric tests.

ACSC.2810 U Computer Science 2CE *Total 54 hours*

ACSC.2402 E *Numerical Analysis 2CE* S1

Prerequisites: Mathematics 1E and Computer Science 1E
Corequisite: Mathematics 2E

Computer calculations: computer representation of numbers, floating point arithmetic, sources of errors, error propagation in computations, error analysis, numerical instability of algorithms. Numerical solution of non-linear equations: bi-section methods, simple iteration, Newton's methods, method of false position, secant method, convergence criteria. Interpolation and approximation: finite differences, interpolation formulae, nested multiplication, deflation of a polynomial, Lagrange interpolation polynomial, cubic spline interpolation, error analysis. Numerical integration and differentiation: Newton-Cotes integration formulae, composite formulae, Richardson extrapolation, Romberg integration, Gaussian quadrature, adaptive quadrature, error propagation in numerical integration, numerical differentiation. Numerical solution of ordinary differential equations: Taylor series methods, Euler and modified Euler method, Runge-Kutta methods, error analysis. Solution of linear simultaneous equations: Elimination methods, Gaussian elimination, matrix inversion, iterative methods, Jacobi method, Gauss-Seidel method, condition of a linear system, convergence criteria, error analysis. Mathematical software: Design criteria, efficiency considerations, mathematical software libraries.

AGOC.1700 U Oceanography 1 *Total 198 hours*

Full year subject
Lectures 3 hours per week
Laboratory 3 hours per week
Field exercises **7** days

General properties of sea water, marine and submarine topography, sea level variations, waves and tides, oceanic and atmospheric circulation, structure of the ocean floors, sediments, marine salvage, maritime law and ocean resources.

ACMA.2900 U Maritime Engineering 2 *Total 243 hours*

ACMA.2003 E *Fluid Mechanics 1CE* *Total 54 hours*

Fluid properties. Forces on fluid elements, systems and control volumes. Fluid statics and dynamics. Fluid momentum. Energy. Equations of motion. Potential flow. Laminar and tur-

bulent flow. Boundary layers, lift and drag. Dimensional analysis. Models.

ACMA.2009 E *Mechanics of Solids 1CE* *Total 54 hours*

Stress, strain in 2 and 3 dimensions: stress and strain transformations, principal stresses and strains, Mohr's Circles for stress and strain. Hooke's Law and Poisson's Ratio. Statical determinacy and indeterminacy: temperature stresses, lack of fit, compound structures. Thin walled pressure vessels. Torsion of shafts of circular cross-section. Bending and shear stresses in symmetrical, asymmetrical and compound beams: deflection of beams. Euler buckling: axially and eccentrically loaded columns, non-uniform columns and beam columns. Principles of Virtual Work and Castigliano's Theorems.

ACMA.2010 E *Surveying 1* *Total 54 hours*

Elementary theory of errors. Levels and levelling. Electronic distance measurement. Theodolites, theodolite traversing. Contour and detail surveys. Satellite positioning. Hydrographic surveying.

AELE.2401 E *Electronic Techniques* *Total 27 hours*

Introduction; electronic aided measurement and control. Transducers with charge or current output; photoconductive devices, photomultipliers. Transducers with voltage output; thermocouples, photovoltaic devices, pH meters, piezoelectric transducers. Resistance transducers. Basic principles of digital electronics. Digital data acquisition systems; digital-to-analogue and analogue-to-digital converters, data acquisition using microprocessors.

ACMA.2008 E *Materials 1CE* *Total 54 hours*

Materials science. Grain structure, effect of deformation, recrystallization, hot and cold working. Non-equilibrium relationships in multiphase materials, applications to heat treatment. Behaviour of materials in service: deformation, fatigue, fracture, wear, thermal stress, creep, corrosion, radiation damage. Effects of microstructure and macrostructure on properties. Fracture mechanics. Introduction to ceramic phases and properties. Welding: processes, metallurgy and weldability. Metal removal, surface finishing, joining.

ACMA.3900 U Maritime Engineering 3 *Total 567 hours*

ACMA.2002 E *Construction Technology* Total 27 hours

Earthwork, concrete, steel, timber, masonry construction. Excavation. Foundation construction. Marine works. Construction safety. Site visits.

81

ACMA.3001 E *Structural Analysis 1* *Total ~~54~~ hours*

Beam bending. Influence lines. The analysis of trusses. Moment area. Energy theorems. Slope deflection. Moment distribution. Cable structures. Suspension bridges. Force method of analysis. Displacement method of analysis. Grids. Laboratory sessions.

54

ACMA.3002 E *Structural Design 1* *Total ~~81~~ hours*

Types of loads on structures. Applications of the SAA Loading Code, Parts 1 and 2. Design of steel, concrete and timber structures. Design of connections in steel and concrete. Simple prestressed concrete design.

ACMA.3005 E *Applied Probability and Statistics for Engineers* *Total 27 hours*

Probabilistic, stochastic and deterministic design. Extreme value distributions. Monte Carlo simulation. Time series analyses. Limit state design. Experimental design. Variability of materials.

ACMA.3006 E *Numerical Methods in Engineering* *Total 54 hours*

Errors. Non-linear and linear algebraic equations. Matrix algebra. Numerical integration. Solution of ordinary and partial differential equations. Time series analysis.

ACMA.3008 E *Free Surface Hydraulics* *Total 27 hours*

Flow resistance and uniform flow in open channels. Specific energy. Channel transitions. Gradually varied flow in prismatic and natural waterways. Rapidly varied flow. Flow measurement in open channels. Introduction to sediment transport and the design of stable unlined channels.

ACMA.3009 E *Closed Conduit Hydraulics* *Total 27 hours*

Fluid resistance and the flow of real fluids in ducts. Pipe fitting energy losses. Flow measurement in pipes. Pipe systems. Turbo machines. Turbo machine systems. Combined turbo machine systems and pipe systems. Unsteady flow in pipes. Rapidly varied flow in pipes. Cavitation.

ACMA.3010 E *Coastal Engineering 1* *Total 27 hours*

Wave theory. Wave transformation. Real wave trains. Wave hindcasting and forecasting. Tides. Nearshore currents. Sediment transport. Coastal protection methods.

ACMA.3012 E *Hydrographic Surveying* *Total 27 hours*

Introduction to hydrographic surveys. Echo sounding—theory and practice. Visual fixing by transets theodolite and sextant. Electronic position fixing; hyperbolic, range-range and satellite systems. Tidal streams and currents. Tidal datums. Sweeping and searching. Map projections.

ACMA.3013 E *Survey Camp (Hydrographic)* *Total 27 hours*

A one week camp involving series of hydrographic surveying exercises.

ACMA.3014 E *Applied Thermodynamics* *Total 27 hours*

Fundamental laws of thermodynamics. Thermal properties of gases and liquids. Air compressors, reciprocating internal combustion engines. Other types of heat engines. Refrigeration. Thermal circulation and air conditioning.

ACMA.3015 E *Coastal Engineering 2* *Total 27 hours*

Physical and numerical models. Wave data collection and analysis systems. Design parameters. Wave forces on structures. Breakwaters. Sacrificial sand buffers. Basin and moored ship resonance. Coastal inlets.

ACMA.4001 E *Project Administration* *Total 27 hours*

Legal aspects. Tortious liability of a professional engineer. Contract law and type of contracts. Birth of project. Site organisation. Industrial relations and construction safety. Contract documents. Project management. Arbitration.

AECM.3401 E *Engineering Economics* *Total 27 hours*

Basic concepts in management economics. Project evaluation techniques in private and public enterprise, introduction to management accounting.

CSC.3401 E *Operations Research 3E* *Total 54 hours*

Prerequisite: Mathematics 1E and Computer Science 1E

ıtroduction; process of operations research, model formula-ɔn, mathematical techniques. Probability concepts; Bayes' ıeorem, distributions, expectations. Decision analysis; trees, ıoice criteria, utility. Linear programming; simplex procedure, uality, sensitivity, LP packages. Allocation models; trans-ɔrtation, degeneracy, balancing, assignment. Game theory; vo person zero sum models, graphical, algebraic and itera-ve techniques. Dynamic programming; networks, resource llocation, reliability. Networks; shortest path, minimal span-ing tree, maximal flow. Project management. CPM, resource llocation, crashing, PERT.

CMA.4901 U Maritime Engineering: Project and Seminar *Total 108 hours*

nalytical and/or experimental research study on topic elected by student relevant to Maritime Engineering. Oral resentation.

CMA.4900 U Maritime Engineering 4 *Total 495 hours*

CMA.4010 E *Finite Element Methods* *Total 27 hours*

ıtroduction to the finite element method. Application of finite lement and finite difference techniques to the solution of roblems in Maritime Engineering.

CMA.4004 E *Structural Analysis 2* *Total 54 hours*

urther topics in stiffness analysis, stability of bars in com-ression, plastic analysis, non-linear analysis. Dynamics. omputer applications. Approximate methods of analysis.

CMA.4009 E *Environmental Engineering* *Total 54 hours*

ir pollution, water pollution, thermal pollution. Dispersion and ffusion. Radiation. Environmental impact statements. iological and ecological systems. Environmental monitoring. haracteristics of water and waste water. Analysis of water nd waste water. Waste water quality and quantity. Sewer ydraulics and design. Treatment processes.

CMA.4011 E *Design of Maritime Structures and Vessels* *Total 54 hours*

pecific maritime design projects to incorporate aspects of uid mechanics, coastal engineering, structural analysis and roject management. Briefing lectures include topics such as ıip forces on structures, wind forces, water current forces, uction drag, piled structures, ship hydrodynamics, principles f vessel design, offshore structures, finite element applica-ɔns and programs.

CMA.4012 E *Fluid Mechanics 2ME* *Total 54 hours*

eynold's transport theorem, angular momentum, fluid ele-ıent deformation, vorticity and circulation, Navier-Stokes quations, Reynold's equations, potential flow, flow around ɔdies and boundary layer, atmospheric boundary layer, ydraulic transients.

CMA.4003 E *Project Planning and Control* *Total 27 hours*

troduction to construction planning, the construction indus-y, project management and competitive tendering. Site and facilities layout, equipment considerations on restricted sites. Modelling of construction operations. Practical application of planning techniques including computer applications, bar charts, line of balance, network methods, resource scheduling and cost control. Cyclic planning applications, CYCLONE work study. Planning and control of specific engineering operations, building, earthworks.

ACMA.4008 E *Metals Engineering 1* *Total 27 hours*

Factors in design, materials selection and fabrication. Characteristics and types of modern steels, aluminium alloys and other metals used in building and construction. Fatigue and fracture. Fracture safe design and fracture mechanics. Welding in structural engineering. Quality assurance, testing and inspection. Corrosion protection systems.

ACMA.4013 E *Metals Engineering 2* *Total 27 hours*

Selection of metals, fabrication methods and treatment processes for specialised and high technology applications. Fracture Mechanics analysis and testing: applications to engineering case studies. Case studies of procedure and operator qualification for welding fabrication, quality assurance and quality control. Case studies of corrosion protection systems application in large engineering structures.

AECM.3402 E *Theory of Management* *Total 27 hours*

The role of management in a technologically advanced society. Human behaviour in the work situation: communication; influence; decision making. Models of organisations from static structural notions to dynamic open systems. Engineering management, technical change and automation.

APHY.2405 E *Physics of the Atmosphere 2ME* *Total 27 hours*

Excluded: APHY.0501 U

The atmosphere. Properties of dry and moist air. Layers of the atmosphere defined by lapse rates. The hydrostatic equation and altimetry.

Energy transfer. Solar and terrestrial radiation; emission, absorption, scattering and reflection within the atmosphere. Conduction, convection and advection.

Stability. The 'parcel' model of stability. The adiabatic lapse rate. The aerological (F160) diagram; interpretation of plotted aerological soundings. Temperature inversions.

Cloud. Clouds classification. Cloud formation. Cloud bases and tops via the aerological diagram.

Wind. Meteorologically significant forces. Equations of motion. Wind types. Surface winds.

APHY.2406 E *Marine Acoustics and Optics 2ME* *Total 27 hours*

This unit will include both theoretical and applied aspects of marine optics and acoustics; sonar equations, underwater sound channels, underwater visibility and the use of laser to map coastal waters.

Electives *Total of 81 hours to be chosen from*

ACMA.4022 E *Instrumentation* *Total 27 hours*

Measurement of physical quantities, transducers, measuring systems, recording and transmission of data.

ACMA.4016 E *Structural Analysis 3* *Total 27 hours*

Introduction to theory of elasticity. Theory of thin plates. Experimental stress analysis.

ACMA.4002 E *Systems Engineering* *Total 27 hours*

Queueing theory; arrival and servicing distributions, queue discipline, queueing models, single and multiple servers. Markov processes; state and transition properties, steady rate probabilities, first passage times, applications to decision rules and optimal maintenance simulation; random number generators, time and event methodology, simulation languages.

ACMA.4023 E *Remote Sensing for Maritime Engineers* *Total 27 hours*

Electromagnetic radiation, platforms, sensors, image analysis. Applications to regional planning, ocean properties, feature recognition, sea surface elevation mapping and environmental monitoring.

ACMA.4019 E *Engineering Explosives* *Total 27 hours*

Explosives, demolition theory. Blasting equipment and accessories. Initiation, electric, non-electric. Quarrying methods and design. Underwater techniques. Theory of shaped charges. Safety. Drilling and blasting. Specialised blasting techniques.

AMAT.3405 E *Manpower Planning 3CE* *Total 54 hours*

Prerequisite: Applied Probability 3 or equivalent

Discrete time models. Closed populations, limiting probabilities. Open populations. Controllability; attainable regions, recruitment and promotion strategies, maintainability.

Continuous time models. Length of service. Recruitment and wastage systems of fixed and varying size. Systems with several grades.

ACMA.4020 E *Program and Project Evaluation* *Total 27 hours*

Logic framework; formative and summative evaluation; implementation analysis; economic and financial evaluation; cost effectiveness and cost utility analysis; tools and techniques for structured analysis.

ACMA.4021 E *Computer Tools for Engineering Management* *Total 27 hours*

Introduction to the use of a range of micro-computer based decision support tools in the context of engineering analysis, including spreadsheet, database, PERT/CPM, Monte Carlo modelling, analysis network, hyper-text and personal information management.

Approved units offered by Department of Mathematics *Total 27 hours*

Approved units offered by Department of Computer Science *Total 27 hours*

Approved units offered by other institutions in Maritime Engineering *Total 54 hours*

Department of Electrical Engineering

Electrical Engineering is much the youngest of the three major, now traditional branches of engineering represented in the University College. It has its origin in the turning to practical use of the discoveries of Faraday, Ampere, Maxwell and a number of other eminent 19th century physicists. It has remained the most strongly science-oriented branch of engineering.

At first it had its major impact by providing the means for the generation, distribution and utilization of electric power However, while this remains an important sub-area of the whole subject, the last three decades particularly have seen a rapid and extensive diversification into the fields of computers and control as well as electronics and communications, and beyond them into such areas as biology, medicine and space technology. It is now true to say that there are very few areas of civilized activity which have remained untouched by the ideas and products of modern electrical engineering. The absorption of recent scientific development has been very rapid and has demanded a fully developed scientific outlook on the part of electrical engineers for a proper understanding of the problems involved. Many devices, scarcely more than laboratory prototypes a decade ago, are now in widespread use as fully engineered hardware.

The BE course in Electrical Engineering is built on a foundation of mathematics, computing science and physical science A small component of electrical engineering is introduced in the first year, with progressively larger components in second and third year. The final year is devoted exclusively to electrical and electronic subjects.

The electrical engineering component of the BE course is organised in sessional units. A sessional unit comprises two contact hours per week of lecture, tutorial and practical work given in a single session. To pass a subject it is necessary to obtain a pass in aggregate and to achieve an acceptable standard in each sessional unit. At the discretion of the Head of Department a student failing a unit may be required to repeat that unit.

Outline of Second and Later Year Courses and List of Sessional Units.

Second Year Course

	Unit Name	*Session*
AMAT.2800 U	Mathematics 2E	
ACSC.2802 U	Computer Science 2EE	
ACSC.2401 E	Numerical Analysis 2E	1
ACSC.2404 E	Data Structures 2EE	1
APHY.2801 U	Physics 2E	
APHY.2401 E	Electromagnetism 2E	2
APHY.2402 E	Quantum Physics 2E	1
APHY.2403 E	Solid State Physics and its Applications 2E	2
APHY.2404 E	Optics 2E	1
	General Studies elective	
AELE.2800 U	Electrical Engineering 2	

Students taking this subject will do all six sessional units listed below:

AELE.2001 E	Electronics 2	1
AELE.2002 E	Circuit Theory 1	1
AELE.2003 E	Digital Systems 3	1
AELE.2004 E	Electromechanics 1	2
AELE.2005 E	Circuit Theory 2	2

ELE.2006 E	Digital Electronics 1	2
ELE.2007 E	Computer Design	2
ELE.2008 E	Electronics Laboratory	2

hird Year Course

MAT.3800 U	Mathematics 3E	
AMAT.3401 E	Complex Analysis 3E	1
AMAT.3402 E	Differential Equations 3E	2
AMAT.3403 E	Probability 3E	1
AMAT.3404 E	Statistics 3E	2
	General Studies elective	
ELE.3800 U	Electrical Engineering 3	

tudents taking this subject will do all sixteen sessional units sted below

AELE.3013 E	Materials and Devices	1
AELE.3014 E	Control Theory 1	1
AELE.3015 E	Computer Design	1
AELE.3016 E	Power Electronics 1	1
AELE.3017 E	Communications 1	1
AELE.3018 E	Electromagnetics 1	1
AELE.3019 E	Optoelectronics 1	2
AELE.3020 E	Control Theory 2	2
AELE.3021 E	Microcomputer Interfacing 1	2
AELE.3022 E	Electromechanics 2	2
AELE.3023 E	Communications 2	2
AELE.3024 E	Electromagnetics 2	2
AECM.3401 E	Engineering Economics	2
AECM.3402 E	Theory of Management	1
ACSC.3401 E	Operations Research 3E (2 units)1 and	2

inal Year Course

ELE.4800 U	Electrical Engineering 4
ELE.4801 U	Electrical Engineering: Project, Thesis and Specialist Lectures
ELE.4802 U	Practical Experience (Electrical Engineering)†

each year a sub-set of the units listed below will be offered. tudents taking Electrical Engineering 4 will select twelve nits, subject to the approval of the Head of the Department, make a balanced course within their chosen streams. All udents will do a laboratory course, common to all streams, hich will count as four units.

	Unit Name
ELE.4008 E	Antennas
ELE.4011 E	Optical Wave Guides
ELE.4016 E	Digital Signal Processing
ELE.4018 E	Television Systems
ELE.4021 E	Computer Architecture
ELE.4022 E	Artificial Intelligence
ELE.4024 E	Speech Processing
ELE.4025 E	Simulation
ELE.4036 E	VLSI Design
ELE.4041 E	Radar Cross-Section Analysis
ELE.4043 E	Radar Signal Processing
ELE.4045 E	Software Engineering
ELE.4046 E	Image Processing
AELE.4049 E	Practical Work
AELE.4051 E	Remote Sensing
AELE.4052 E	Communications Systems
AELE.4053 E	Electronics 3
AELE.4054 E	Microwaves
AELE.4055 E	Microcomputer Interfacing 2
AELE.4056 E	Microcomputer Interfacing 3
AELE.4057 E	Lasers
AELE.4058 E	Data Networks 1
AELE.4059 E	Data Networks 2
AELE.4060 E	Optoelectronics 2
AELE.4061 E	Active and Digital Filter Synthesis
AELE.4062 E	Digital Electronics 2
AELE.4063 E	Electromechanics 3
AELE.4064 E	Electromechanics 4
AELE.4065 E	Variable Speed Drives 1
AELE.4066 E	Variable Speed Drives 2
AELE.4067 E	Digital Communications 1
AELE.4068 E	Power Systems 1
AELE.4069 E	Power Systems 2
AELE.4070 E	Power Electronics 2
AELE.4071 E	Control Theory 3
AELE.4072 E	Computer Control Theory
AELE.4073 E	Military Communications
AELE.4074 E	Stochastic Control Theory
AELE.4075 E	Adaptive Control Theory
AELE.4076 E	Guided Weapons Electronics
AELE.4077 E	Digital Communications 2
AELE.4078 E	Occasional Option 1
AELE.4079 E	Occasional Option 2
AELE.4081 E	Radar and Navigational Aids

† See Rule 6 of the BE Degree Rules

Subject Descriptions

AMAT.2800 U Mathematics 2E

Lectures and tutorials 4 hours per week

Matrices, systems of linear equations. Vector spaces. Orthogonal projections and least squares. Eigenvalues. Diagonalization. Differential equations; first order, higher order linear; systems, normal modes; Laplace transforms.

Multivariable calculus, maxima and minima. Integration. Vector field theory. Partial differential equations. Separation of variables. Fourier series.

ACSC.2802 U Computer Science 2EE

Prerequisites: Mathematics 1E and Computer Science 1E.
Corequisite: Mathematics 2E.

4 lectures and 3 laboratory/tutorial periods per week for the first session, consisting of the units Numerical Analysis 2E and Data Structures 2.

In addition, students must complete introductory material on the use of the UNIX environment as prescribed by the Department.

ACSC.2401 E *Numerical Analysis 2E* **S1**

Single session unit
Lectures/tutorials 3 hours per week
Prerequisites: Mathematics 1E and Computer Science 1E
Corequisite: Mathematics 2E

Computer calculations: Computer representation of numbers, floating point arithmetic, sources of errors, error propagation in computations, numerical instability of algorithms. Numerical solution of non-linear equations: Bisection method, simple iteration, Newton's method, method of false position, secant method, convergence criteria. Interpolation and approximation: Finite differences, interpolation formulae, nested multiplication, deflation of a polynomial, Lagrange interpolation polynomial, cubic spline interpolation. Numerical integration and differentiation: Newton-Cotes integration formulae, composite formulae, Richardson extrapolation, Romberg integration, Gaussian quadrature, adaptive quadrature, numerical differentiation. Numerical solution of ordinary differential equations: Taylor series methods, Euler and modified Euler method, Runge-Kutta methods. Solution of linear simultaneous equations: Elimination methods, Gaussian elimination, matrix inversion, iterative methods, Jacobi method, Gauss-Seidel method, condition of a linear system, convergence criteria. Use of mathematical software libraries.

ACSC.2404 E *Data Structures 2EE* **S1**

Single session unit
Lectures/Laboratory/Tutorials 4 hours per week
Prerequisite: Computer Science 1 or Computer Science 1E

Introduction to UNIX operating system use. Unlinked data structures: algorithms and storage mapping for records, variant records, arrays; fixed and variable length strings. Algorithms: complexity, O-notation, time-space tradeoff, analysis of some sorting algorithms. Linked structures and pointers: single linked lists, doubly linked lists, rings, stacks, queues, deques; application and implementation. Binary trees: ordered traversals, insertion and deletion, analysis, balanced trees, B-trees. Hashing: basic methods, collisions, analysis of performance. Programming theory and methodology: loop invariants, simple program development from pre- and post-conditions; macros and procedures; modularity, information hiding, data type abstraction, separate compilation. Recursion: comparison with iteration, use and abuse, elementary stack implementation of block structured language.

APHY.2801 U Physics 2E

Lectures *84 hours*
Tutorials 20 hours
Practical 60 hours
Corequisite: Mathematics 2E

A satisfactory performance is required in both the lecture/tutorial component and the practical component.

APHY.2401 E *Electromagnetism 2E* **S2**

Vector fields: divergence, Stokes' theorems, Maxwell's equations in integral and differential forms for free space.

Electrostatics: electric field, electrostatic potential, Gauss' law, Poisson's and Laplace's equations, uniqueness, method of images, dielectrics, polarisation, boundary conditions, applications to simple charge distributions, dipoles, capacitors.

Magnetostatics: magnetic field, vector potential, Ampère's circuital law, magnetic dipoles, magnetic materials, magnetisation, boundary conditions, applications to conductors, magnets, electromagnets.

Electromagnetic waves: Maxwell's equations for media, constitutive relations, energy density, Poynting vector, propagation of plane electromagnetic waves in free space, dielectric and conducting media, skin effect, reflection and refraction Fresnel equations, radiation of electromagnetic waves.

APHY.2402 E *Quantum Physics 2E* **S**

Wave-particle duality: interaction of photons with matter (revision), de Broglie matter waves, coexistence of wave and particle properties, wave packets, Heisenberg uncertainty principle.

Introduction to quantum mechanics: wave function and its interpretation, development of the Schrödinger wave equation, time independent wave equation, eigenfunctions, probability densities and normalisation, expectation values.

Application of the wave equation: Schrödinger recipe, infinite potential well, qualitative plots of bound-state wave functions potential step E<V and E>V, potential barrier, examples of barrier penetration.

One-electron atoms: wave equation, separation of variables solution of the ϕ equation, solution of the ground state radial equation, wave functions, significance of the quantum numbers, electron probability distributions, radiative transitions selection rules.

Angular momenta and optical spectra: orbital magnetic dipole moment, Stern-Gerlach experiment and electron spin, spin angular momentum, spin-orbit interaction, total angular momentum, fine structure, optical spectra of alkali atoms, LS coupling, Zeeman effect—normal and anomalous, nuclear spin, hyperfine structure.

Quantum devices and applications.

APHY.2403 E *Solid State Physics and its Applications 2E* **S2**

This unit is concerned with the modern theories describing the behaviour of matter in the solid state, particularly amorphous and polycrystalline materials. Special consideration will be given to those materials of interest to industry, such as the intrinsic semiconductors silicon and germanium, the III-V and II-VI semiconductor compounds, quartz, the transition metals and their alloys, polymers and ceramics.

Crystal structure: Introduction of crystallography, crystal symmetry, influence of crystal symmetry on macroscopic physical variables, the study of materials by means of x-ray, electron and neutron beams, defects in crystal structures, alloys.

Electrical conductivity: propagation of waves in a periodic structure, band theory of solids, models describing the electrical conduction of insulators, metals and semiconductors, the operation of transistors.

Semiconductor devices: preparation of semiconductor crystals and their fabrication into semiconductor devices.

Fundamental properties of magnetic materials: diamagnetism paramagnetism, ferro-and antiferromagnetism, devices which incorporate magnetic materials.

APHY.2404 E *Optics 2E* **S1**

A history of optics and light: ancient views, the corpuscular and wave theories, the acceptance of its dualistic nature and the partial resolution of this seemingly paradoxical situation

The electromagnetic nature of light: Maxwell's equations in differential form leading to a wave equation and hence the possibility of electromagnetic waves, light as a form o

ectromagnetic waves, the transverse nature of electromagtic waves and polarized light, lasers.

eometrical optics: reflection and refraction at plane and rved interfaces, lenses and mirrors treated in the paraxial proximation by ray tracing methods and various analytical chniques, optical instruments including the human eye and e telescope, aberrations in optical systems, fibre optics.

ysical optics: the superposition principle and interference of ht, Fresnel and Fraunhofer diffraction and Fourier optics he principles may be illustrated by reference to fields such interferometry, spectroscopy and holography).

ie depth of treatment in the above topics may be influenced class interest. Some topics of particular interest to engiers (e.g. lasers, fibre optics, Fourier optics) will be treated greater depth than in Physics 2 unit APHY.2010 E Optics 2.

ELE.2800 U Electrical Engineering 2

ELE.2001 E *Electronics 2* **S1**

Lectures and tutorials 21 hours
Laboratory 6 hours per week

sic construction and characteristics of field-effect transis-s (JFET and MOSFET); biasing circuits and Q-point selecn. Introduction to small signal models, analysis of small gnal amplifiers. Regulated power supplies.

ELE.2002 E *Circuit Theory 1* **S1**

Lectures and tutorials/laboratory 2 hours per week

epresentation of physical devices by circuit models; basic cuit elements and network variables; simple signal types; ear, time-invarient circuit analysis; first and second-order cuits; mechanical and similar 'real-world' analogies (dynam-s); classical solutions—initial conditions, linearity and superition; state equations; sinusoidal steady state; Thevenin's eorem; Norton's Theorem; simple networks—node analysis, esh analysis; matrix methods; coupled circuits, ideal transmer; impedance matching; controlled sources; computer nulation (e.g. SPICE).

ELE.2003 E *Digital Systems 3* **S1**

Lectures and tutorials/laboratory 2 hours per week

gital SSI, MSI and LSI building blocks—familiarity with standrd range and uses, including simple design; computer memy technology—historical-to-modern overview, including both ernal and external memory and storage; current memory in ore detail—RAM (SRAM vs DRAM, FIFO, CAM, VRAM), OM, PROM, EPROM, EEPROM; error detection/ correction cuits; extension of concept of memory to general logic rays—PLA, PAL, GAL; special uses of memory, e.g. bitapped display; microprocessors—historical overview (the 4, 16, 32, 64 bit evolution); parallel computer buses—handaking, control, data flow; serial data bus or LAN—collision evention, protocols; special-purpose chips—e.g. CCD cama chip, other digital-analogue (threshold detector, ADC/DAC).

ELE.2004 E *Electromechanics 1* **S2**

Tutorials and laboratory 2 hours per week

agnetic field and circuits; electrical, mechanical and magnetic eraction. Ideal and non-ideal transformer model. Principles energy conversion in linear and rotating magnetic devices ch as a.c. and d.c. machines. Steady state analysis of d.c. achines: topology equivalent circuit and characteristics.

AELE.2005 E *Circuit Theory 2* **S2**

Lectures/tutorials/laboratory 2 hours per week

Network topology; graphs, trees and links, loops, meshes and node pairs, duality; Laplace transform methods; complete solutions, partial fraction expansions, simple and multiple poles and zeros; transfer functions; Bode diagrams; Fourier series and transform, convolution; introduction to network synthesis.

AELE.2006 E *Digital Electronics 1* **S2**

Lectures/tutorials/laboratory 2 hours per week

Electronic circuit design and characteristics for various logic families including TTL, CMOS and ECL. Input and output circuit structures, speed and power properties. Electrical analysis of output contention on three-state buses. Full interpretation of IC data sheets including electrical properties for gates through to VLSI devices such as memories.

AELE.2007 E *Computer Design* **S2**

Lectures and tutorials 21 hours
Laboratory 6 hours

Computer organisation. Digital systems design including use of field programmable components and logic compilers. VLSI components for system design including microprocessor controllers and signal processing chip sets. Comparative architecture of CPUs viewed from CISC and RISC design philosophies. Introduction to machine-level programming, interrupt processing, and virtual-machines.

AELE.2008 E *Electronics Laboratory* **S2**

Tutorials and laboratory 27 hours

A practical course in the design and construction of electronic circuits. Several circuits to be designed based on schematics provided, constructed and tested. Circuits to include at least one analog and one digital circuit, and another interfacing the two. Introduction to the use of computer programs in circuit analysis. Technologies for construction of circuits, including printed circuit boards and wire-wrapping, soldering.

AMAT.3800 U Mathematics 3E

AMAT.3401 E *Complex Analysis 3E* **S1**

Lectures and tutorials 27 hours

Revision of complex numbers, modules, argument conjugate, Euler's theorem, de Moivre's theorem, roots, solutions of polynomial equations. Functions, limits, continuity, differentiation, analytic functions, Cauchy-Riemann conditions, solution of Laplace's and Poisson's equation by complex variable methods. Elementary functions, singular points, zeros, poles. Complex line integrals, Cauchy's theorem. Integral formulae. Series: convergence, power, Taylor, Laurent. Residue theorem, integrals with indentations, evaluation of real definite integrals by contour integration, principle of the argument. Conformal mappings, elementary functions as mappings, inverse mappings.

AMAT.3402 E *Differential Equations 3E* **S2**

Lectures and tutorials 27 hours

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 dimen-

sions, steady or unsteady with sinusoidal time dependence. Separation solutions, involving Bessel and Legendre functions and their properties. Boundary value problems; Eigenvalues and eigenfunctions. Fourier series. Laplace transform applied to partial differential equations.

AMAT.3403 E *Probability 3E* **S1**

Lectures and tutorials 27 hours

Laws of probability, permutations and combinations. Random variables: discrete and continuous, change of variables. Expectations: moments. Chebyshev's theorem, generating functions. Distributions: binomial, Poisson, hypergeometric, normal, exponential, gamma and beta. Bivariate distributions; sums of random variables, central limit theorem. Simple random walk. Markov chains.

AMAT.3404 E *Statistics 3E* **S2**

Lectures and tutorials 27 hours

Presentation of data, histograms. Sampling distributions. Estimation; maximum likelihood, confidence intervals. Hypothesis testing, quality control. Regression and correlation. Goodness of fit. Non-parametric tests.

AELE.3800 U Electrical Engineering 3

AELE.3013 E *Materials and Devices*

Lectures and tutorials 21 hours
Laboratory 6 hours

Semiconductors; band structure, Fermi energy, carrier transport, generation and recombination processes, Hall effect and its applications. Quantitative theory of PN junction devices; space-charge capacitance, diffusion capacitance, switching effects. The metal-semiconductor barrier, ohmic contacts. Characteristics and applications of varactor, tunnel and Schottky diodes. Theory of the BJT, Ebers-Moll equations, temperature, voltage and frequency limitation, switching effects, IC realization.

AELE.3014 E *Control Theory 1*

Lectures and tutorials 21 hours
Laboratory 6 hours

Introduction to frequency domain design of single-input/single-output control system. Stability and robustness conditions for Bode, Nyquist, Inverse Nyquist and NIchols Plots. Control System sensitivity: Bode's equal area and gain-phase relationships. Design of PID, lead, lag and lead-lag compensators. Design of two degree of freedom control systems. The Horowitz control system design method

AELE.3015 E *Computer Design*

Lectures and tutorial 15 hours
Laboratory 12 hours

Design of digital systems based on SSI, MSI, LSI, and PAL devices. CPU architecture based on the arithmetic unit (ALU) and the microprogrammed computer control unit (CCU). VLSI components for system design including microcontrollers, RALU's, and other microprogrammable IC building blocks. A lab-based design project for a CPU using an ALU and ROM-based, microprogrammed CCU.

AELE.3016 E *Power Electronics 1*

Lectures and tutorials 21 hours
Laboratory 6 hours

Introduction to devices; characteristics, protection and drive circuits. Relationship between devices and passive components; d.c./d.c. converters, controlled rectifiers and inverters

AELE.3017 E *Communications 1*

Lectures and tutorials 21 hours
Laboratory 6 hours

Representation of signals. Convolution, system impulse response and transfer function; correlation detection. Fourier series and Fourier transform. Transmission through linear systems. Noise in circuits and communications systems. Noise figure and noise temperature. Equivalent input noise temperature of two ports. Signal to noise ratio.

AELE.3018 E *Electromagnetics 1*

Lectures and tutorials 21 hours
Laboratory 6 hours

Plane Waves: as solutions of Maxwell's equations, in conducting media, reflection and refraction. Energy flow, the complex Poynting vector. Guided waves: non-uniform plane waves modes, TE and TM waves, rectangular waveguides, losses resonant cavities. Antennas: radiation pattern, directivity, gain impedance; the short dipole, aperture antennas, arrays.

AELE.3019 E *Optoelectronics 1*

Lectures and tutorials 21 hours
Laboratory 6 hours

The electromagnetic spectrum; wave and particle nature of light, Planck's black body radiation law. Detection processes in the visible and infra-red. Principles of operation and characteristics of photon detection devices, photoconductive cells PIN and avalanche photodiodes, phototransistors, photoemissive devices and pyroelectric detectors. Noise in photor detectors. Introduction to the technology of optical fibre systems, light sources, fibre characteristics, comparison of detectors for optical communication.

AELE.3020 E *Control Theory 2*

Lectures and tutorials 21 hours
Laboratory 6 hours

The concept of a system. State space and transfer functior models for linear time invariant systems. Feedback, open loop and closed loop systems. The solution to state equations. The stability of linear systems. The Routh Hurwitz stability criterion The root locus design method. The Nyquist stability criterion Nyquist and Bode plots.

AELE.3021 E *Microcomputer Interfacing 1*

Lectures and tutorials 6 hours
Laboratory 21 hours

Introduction to the organization of the Z80 microprocessor review of instruction set and assembly language concepts Input/output interfacing, the Intel 8255 Programmable Peripherals Interface (PPI). Interfacing of keyboards, displays ADCs and DACs. An introduction to interrupts.

.ELE.3022 E *Electromechanics 2*

Lectures and tutorials 21 hours
Laboratory 6 hours

quivalent circuit of a non-ideal single phase transformer. teady state analysis of the three phase induction machine: quivalent circuits and machine characteristics. Operational spects of a single phase induction machine. Steady state nalysis of synchronous machines: equivalent circuit and haracteristics. Introduction to: single phase series motor, rushless d.c. motor and stepping motor.

.ELE.3023 E *Communications 2*

Lectures and tutorials 21 hours
Laboratory 6 hours

mplitude modulation; double sideband and single sideband chniques. Vestigal sideband. Envelope and coherent detecon. Quadrature carrier multiplexing. Frequency translation nd multiplexing. Phase and frequency modulation. Single ne and multi-tone FM. Noise performance, FM threshold ffects and pre-emphasis. FM spectra., Narrow band FM.

ELE.3024 E *Electromagnetics 2*

Lectures and tutorials 21 hours
Laboratory 6 hours

ransmission lines: distributed circuits, travelling waves, landing waves, input impedance, terminations, surges, the mith Chart, impedance matching. Propagation in lines: freuency spectra, noise, phase and group velocity, attenuation. ptical transmission: the step-index fibre, the weak-guidance pproximation, the single-mode fibre, the parabolic profile, ultimode fibres, illumination, Gaussian beams. Unguided ropagation: propagation in free space, propagation in the resence of the earth, surface and space waves, earth curvare, diffraction, ducting. Fresnel zones, tropospheric scatterg, ionospheric propagation, atmosphere and rain effects.

ECM.3401 E *Engineering Economics*

Lectures and tutorials 27 hours

asic concepts in management economics. Project evaluation chniques in private and public enterprise, introduction to anagement accounting.

ECM.3402 E *Theory of Management*

Lectures and tutorials 27 hours

he role of management in a technologically advanced soci-y. Human behaviour in the work situation; communication; fluence; decision making. Models of organisations from atic structural notions to dynamic open systems. ngineering management, technical change and automation.

CSC.3401 E *Operations Research 3E*

Lectures and tutorials 54 hours
Prerequisite: Mathematics 1E and Computer Science 1E

troduction; process of operations research, model formulaon, mathematical techniques. Probability concepts; Bayes' eorem, distributions, expectations. Decision analysis; trees, oice criteria, utility. Linear programming; simplex procedure, ality, sensitivity, LP packages. Allocation models; transortation, degeneracy, balancing, assignment. Game theory; o person zero sum models, graphical, algebraic and iterae techniques. Dynamic programming; networks, resource location, reliability. Networks; shortest path, minimal spanning tree, maximal flow. Project management. CPM, resource allocation, crashing, PERT.

AELE.4800 U Electrical Engineering 4

AELE.4008 E *Antennas*

A review of antenna fundamentals and definitions; current element, radiation pattern, directivity and gain, reciprocity, impedance, polarisation. Dipoles, arrays, long-wire antennas. Aperture antennas; planar antennas, rectangular, circular, horn antennas, paraboloidal reflector antennas, slots, slot arrays. Receiving antennas; reciprocity, effective area, Friis transmission formula, noise, noise temperature.

AELE.4011 E *Optical Wave Guides*

Introduction to optical fibres, basic waveguide equations, wave and ray optics, the step-index fibre, the graded-index fibre, fabrication of optical fibres, fibre measurements, packaging of optical fibres, source coupling, splices and connectors, fibre systems.

AELE.4016 E *Digital Signal Processing*

Discrete time signals; relationship to continuous signals—sampling considerations. Nyquist frequency and Shannon's sampling theorem; spectral and time aliasing; relationship between integral and discrete Fourier transforms (DFT); fast Fourier (FFT) and current technology; spectral leakage; discrete convolution; circular convolution; filtering and convolution with DFT; overlap-block method of 'continuous' DFT filtering; z-transform and its relation to Laplace and Fourier transforms; realization of digital filters; simple lattice digital filter realizations; FIR filter design; IIR filter design; Butterworth and Chebyshev filter as an element in digital filter design; identification of signal as a means of digital filter design; adaptive filter design.

AELE.4018 E *Television Systems*

Physiological aspects of television, television standards, colour systems with particular reference to the PAL system. Television equipment; cameras, transmitters, receivers, video recorders. Information systems using the domestic television receiver: teletext, viewdata. Facsimile.

AELE.4021 E *Computer Architecture*

The design of digital systems using the latest VLSI building blocks and methods. Components include integer and floating point units, microcontrollers and ALU's, multipliers, multiplier-accumulators for digital signal processing, FIFO memories, CAMs, DRAMs, VRAMs, SRAMs, 32-bit processors which are tailored as general, RISC, DSP or graphics processors, PALS, gate arrays and custom devices.

AELE.4022 E *Artificial Intelligence*

Introduction to AI; history of AI development; Perception MACSYMA, PROSPECTOR; pattern recognition. Expert systems; building an expert system; languages-LIPS, PROLOG; inductive logic; ways of writing expert systems; the inference structure. Examples of expert systems; VLSI design. Inherent difficulties; non numerical computation. Heuristic methods; the operation of heuristic search methods; application to robotics. Pattern recognition; simple introduction; cluster analysis; factor analysis; discriminating function; linear and non-linear techniques; classification of patterns; examples in electronic diagnosis, remote computer fault diagnosis. Introduction to neural networks. Application of neural networks to artificial intelligence problems.

AELE.4024 E *Speech Processing*

Models for speech processing, digital representation of speech, homomorphic speech processing, linear predictive coding of speech, digital speech processing for man-machine communication by voice.

AELE.4025 E *Simulation*

Simulation as a methodology in the analysis of large scale systems. Importance of simulation. Comparison of simulation with mathematical analysis, advantages and disadvantages. Interpretation of simulation results. Accuracy and propensity indications. Elements of simulation techniques—simulation of simple deterministic systems described by a set of intego-differential equations and/or algebraic equations. Simulation of stochastic systems. Random number generation techniques. Monte Carlo simulation techniques. Simulation of queueing systems. Generation of probability functions. Application of simulation techniques. Examples include Forrester's industrial and world dynamic models. Computer network simulations.

AELE.4036 E *VLSI Design*

The need for semicustom and custom design chips—economics, speed, security. nMOS process. D.C. and A.C. characteristics of MOSFET. Logic design using MOSFET. Mead-Conway design rules for nMOS process. nMOS fabrication process. Aspects of system design involving MOSFET—speed-area tradeoff, regular design, PLA. Self-timed systems. Computer-aided design techniques. Application of design and diagnostic programs. cMOS process. Characteristics of cMOS transistors. Latch up. Simple cMOS circuit designs. cMOS fabrication process. cMOS design rules. Semicustom design vs full custom design. Gate arrays. Brief introduction to computer-aided design of VLSI circuits methodology.

AELE.4041 E *Radar Cross-Section Analysis*

Asymptotic methods: geometrical optics, geometrical theory of diffraction, diffraction by edges and convex surfaces, caustics. Moment methods: electric and magnetic field integral equations, linear spaces and basis functions, singularities, hybrid techniques.

AELE.4043 E *Radar Signal Processing*

Sources of uncertainty in radar: receiver, atmospheric and galactic noise, target scintillation and glint, clutter, propagation effects, fading, eclipsing, sidelobes, chaff. The radar equation: minimum detectable signal, system losses, coherent and incoherent integration of pulses. Spectra of noise and signals. Detection of radar signals in noise: matched-filter receiver, correlation detection, detection criteria, probability of detection, automatic detection, CFAR receiver. Digital processing of radar data, discrete Fourier transform, track-while-scan techniques. Extraction of information and waveform design: range and range-rate resolution, multiple target resolution, ambiguity diagram, optimum waveforms, pulse compression. Synthetic aperture radars: resolution, optimum array length, PRF selection. Phase coding techniques: periodic and random binary sequences, decoding, noise and clutter performance, ambiguity diagram, time-sidelobe suppression. Frequency coding techniques: generation and decoding, resolution properties, sidelobe reduction.

AELE.4045 E *Software Engineering*

The emphasis is on the practical application of software engineering techniques. The course is laboratory oriented using personal workstations such as the Macintosh II. High level language programming will be done with languages which support good software engineering methodologies (i.e. MODULA-2 or ADA). Real time and system oriented activities may be explored. A software project will comprise about half of the work for the course.

AELE.4046 E *Image Processing*

Continuous and discrete image characterization, two-dimensional digital signal processing; two-dimensional discrete Fourier tranforms (DFT) and fast Fourier transform (FFT); digital image capture and display; applications—remote sensing, medical, forensic, astronomical, digital television, film animation, scene synthesis for flight and other simulators; image enhancement; colour definition—physiological description of 3D colour space—hue, saturation, intensity—uniform colour space; geometric transformations (rotation, general warping, perspective projection); image restoration and reconstruction, image coding and data compression.

AELE.4049 E *Practical Work*

There will be a program of practical work common to all streams, equivalent in duration to four sessional units and spread uniformly throughout the year.

AELE.4051 E *Remote Sensing*

Planck's black body radiation law and its application to wavelength selection in remote imaging; high and low resolution optical sensors including multispectral line scanners and CCD push broom arrays; passive microwave and synthetic aperture radar sensor technology; reflectance and scattering characteristics of the earth's surface and cultural features; effect of the atmosphere on imaging; sources of image distortion, overview of past, present and future imaging systems including the Landsat, SPOT, NOAA and GMS optical satellite platforms, free flying satellite and space shuttle based radar and microwave sensors, sensor arrangements planned for the international Space Station; applications of remote sensing imaging technology to target detection, assessment of earth resources and atmospheric monitoring.

AELE.4052 E *Communications Systems*

Review of signal characteristics including bandwidth requirements of common data and message types in voice, picture and data transmission. Closed transmission media and their signal handling capabilities, including a review of dispersion and attenuation characteristics, and the determination of signal bandwidth. Systems to be considered will include open wire, coaxial cable and optical fibre channels. Open transmission systems and design considerations including microwave radio and link budget calculations, satellite communications systems, ULF, ELF and VLF transmission, cellular radio and net radio systems, troposcatter systems.

AELE.4053 E *Electronics 3*

Integrated circuit operational amplifiers, their design, characteristics (non ideal). Circuit design using op amps. Noise in components and systems. Oscillators, their voltage control phase locked loops. Power amplifiers.

AELE.4054 E *Microwaves*

Field theory of transmission lines, rectangular and circular wave guides, impedance, power flow, attenuation. Ferrite

media. Devices and components; directional coupler, matched terminators, tuners, wavemeters, filters, attenuators, circulators, isolators. Oscillators and amplifiers; klystrons, magnetrons, travelling wave tubes, solid state oscillators, parametric amplifiers. Stripline; directional couplers, hybrid rings, ferrite resonant cavities, stubs, phase shifters.

AELE.4055 E *Microcomputer Interfacing 2*

Bi-directional data transfer. The Zilog Z80 PIO; multilevel interupts, control mode. IEEE 488 and RS 232-C interface standards. Serial I/O using the Intel 8251 Programmable Communication Interface (PCI) and Zilog Serial Communications Controller (SCC). The design of a standalone microcomputer system.

AELE.4056 E *Microcomputer Interfacing 3*

An introduction to the control of equipment using a personal computer; hardware and software aspects of the Macintosh II computer, parallel and serial communications, interfacings ADCs and DACs, data acquisition and control tasks, designing simple I/O cards for the Macintosh II.

AELE.4057 E *Lasers*

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 common maser and laser systems. Laser applications involving beam directionality alignment, ranging, guidance systems. Applications involving laser power, spot size, power density, Q-switching techniques. Laser holography; type of holograms and their application for non-destructive testing and information storage.

AELE.4058 E *Data Networks 1*

Introduction to data networks, the ISO OSI reference model. Public networks, CCITT standards X.25 and X.21, private networks, local area networks, practical examples.

AELE.4059 E *Data Networks 2*

Design methodologies for data networks with special consideration given to topology, reliability, throughput, delay, routing, flow control, CSMA/CD based networks.

AELE.4060 E *Optoelectronics 2*

Formation and detection of optical images in the visible and infra-red; low light level imaging devices, light valves, image intensifiers. Principles of operation and construction of active and passive display devices; CRT, plasma, electroluminescent, vacuum fluorescent, liquid crystal. Addressing techniques, encoding and data organization, scanned displays, matrix displays, integrated electro-optic displays.

AELE.4061 E *Active and Digital Filter Synthesis*

Analog filter approximation theory, Butterworth, Chebyshev, Elliptic, and Bessel approximations. Implementation using opamps. Digital filter introduction, z-transforms. Bilinear transformation. Implementation of digital filter approximations. Adder network. Implementation of wave digital filters. Practical problems associated with digital filter implementations.

AELE.4062 E *Digital Electronics 2*

The overall design requirements of digital system including signal propagation, reflection and crosstalk. Printed circuit board design and methodology of circuit layout. Inter -board signal transmission problems and back plane design. Output commutation of flip-flop devices and metastability of memory devices. Design of large multi-megabyte dynamic memory cards for computer systems.

AELE.4063 E *Electromechanics 3*

Machines analysis based on state space representation. Application to a.c. machines; transient analysis.

AELE.4064 E *Electromechanics 4*

Analysis of synchronous generators for power generation; steady state, subtransient and transient models. Control of synchronous generators; solid state exciters and load frequency control.

AELE.4065 E *Variable Speed Drives 1*

Dynamic model of a.c. and d.c. machines, control strategies; fieldweakening and armature control (d.c. machines) and field-orientated control (a.c. machines). Microprocessor implementation of these strategies.

AELE.4066 E *Variable Speed Drives 2*

Special drive configurations: switched reluctance drives and permanent magnet brushless d.c. drives.

AELE.4067 E *Digital Communications 1*

Pulse-amplitude and pulse-time modulation. Pulse Code Modulation; methods of analogue to digital and digital to analogue conversion, uniform and non-uniform quantization, quantization noise, delta modulation. The channel; the memoryless channel, bandwidth, distortion, white and narrowband noise. Channel encoding; information and entropy, coding throughput. Digital transmission and reception; matched filter, decision theory. Baseband systems; intersymbol interference, equalization, performance, M-ary systems.

AELE.4068 E *Power Systems 1*

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.

AELE.4069 E *Power Systems 2*

Analysis of power systems; steady state and transient stability. Economic dispatch and unit commitment. Protection and reliability.

AELE.4070 E *Power Electronics 2*

Converter topologies: three phase controlled rectifiers, a.c. controllers, current and voltage source inverters.

AELE.4071 E *Control Theory 3*

Revision of fundamental state space concepts for single-input-single-output systems. Multi-input-multi-output control systems in state-space representation and in transfer matrix representation. Controllability, observability and state-space decompositions. Relationship between state-space representation and transfer matrix representations. Decoupling as a method for designing controllers for a multivariable control system. Decoupling conditions. Relationship with system inverse. Design of controllers for multivariable systems using Rosenbrock's inverse Nyquist array method, and using the characteristic locus method. Model matching problems. Conditions for model matching.

AELE.4072 E *Computer Control Theory*

Computer as an element in a control loop. Different classes of computer control system, comparison of continuous and sampled data systems. Sampling and stability—sampling process, z-transform. Pulse transfer functions. Time domain analysis of a digital system. Closed-loop system response, steady-state computations. Stability of digital systems using Jury-Blanchard test and bilinear transformation. Bode plot, Nyquist plot. Digital controller design. Three term controller design. Dead-beat controller design. Practical examples.

AELE.4073 E *Military Communications*

Information theory and coding and statistical theory of detection. Comparison of military versus civilian communication systems with emphasis on consideration of reliability, graceful degradation, invulnerability, flexibility, security, capacity and quality.

AELE.4074 E *Stochastic Control Theory*

Introduction to Gauss-Markov model as a model for real-life uncertain systems. Gaussian noise as an approximation of real-life uncertainty. Formulation of linear-quadratic-Gaussian (LQG) problem. Solution of LQG problem. Kalman filtering as an estimation device. Design of controllers incorporating the Kalman filter, and/or reduced-order filter. Bellman's dynamic programming as a means to solving stochastic control problems; formulation and solution. Certainty-equivalence principle, and its applications.

AELE.4075 E *Adaptive Control Theory*

Introduction to adaptive control systems, the need for an adaptive control method. A simple gain adaptation as an example of adaptive control. Stability analysis using Lyapunov functions, construction of simple Lyapunov functions. Application of Lyapunov function in the design of adaptive controller for continuous time systems. Discrete time adaptive control, self-tuning controller design. Minimum variance and pole assignment design strategies. Robustness of adaptive controllers. Design issues.

AELE.4076 E *Guided Weapons Electronics*

Advantages and disadvantages of guided and unguided weapons. Missile guidance system, with consideration of guidance laws and sources of guidance information. Seekers covering both the acoustic and electromagnetic spectrum. Counter measures as used by and against missiles.

AELE.4077 E *Digital Communications 2*

Amplitude Shift Keying (ASK); spectrum, modulators and demodulators, performance, M-ary ASK. Frequency Shift Keying (FSK); spectrum, modulators and demodulators, performance, M-ary FSK. Phase Shift Keying (PSK); spectrum modulators and demodulators, performance, quadrature PSK (QPSK), M-ary PSK. Timing and synchronization, clock recovery. Design comparisons.

AELE.4078 E *Occasional Option 1*

The syllabus for this unit changes from one occasion to the next, allowing the presentation of a modern topic by a visiting academic of eminence or a special lecture course on a trial basis. Prerequisite units may be specified by the Head of Department.

AELE.4079 E *Occasional Option 2*

The syllabus for this unit changes from one occasion to the next, allowing the presentation of a modern topic by a visiting academic of eminence or a special lecture course on a trial basis. Prerequisite units may be specified by the Head of Department.

AELE.4081 E *Radar and Navigational Aids*

Fundamental radar concepts; pulse width, PRF and resolution considerations; ambiguities. The radar equation and the concept of radar cross section. CW and frequency modulated radar. Doppler effect, moving target indication (MTI) and pulse Doppler radar. Chirped radar systems and pulse compression. Side looking radar and imaging radar. Aperture synthesis and synthetic aperture radar. Over the horizon radar. Bistatic techniques and secondary radar. Radar system components and signal processing. Navigation aids. Distance and bearing indicators (NDB, DME, VOR and TACAN). Global systems (LORAN and OMEGA). Instrument and microwave landing systems. Satellite navigation systems.

AELE.4801 U Electrical Engineering: Project, Thesis and Specialist Lectures *196 hours*

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 Department. Where appropriate, these topics may be of a military nature. Group effort may be permitted in appropriate cases.

In each case a staff member will be nominated as a supervisor to provide guidance and general supervision during the project and preparation of the thesis. Evidence of sufficient progress may be required from time to time. The thesis, which typically will have a length of about 5000 words, is to be presented in the prescribed format not later than the first day of examinations. Students should arrange to have their theses typed. Arrangements will be made for theses of outstanding merit to be bound and deposited in the departmental library.

During the year students will be required to participate in a series of specialist lectures and seminars. Specialist lectures will normally take the form of attendance by students on six to ten occasions during the year at nominated meetings of the local professional societies. Shortly after the May recess and early in the third term each student will be required to lead a seminar on their project topic attended by other students taking this course and members of staff.

Department of Mechanical Engineering

The Mechanical Engineering degree course leads to the Bachelor of Engineering degree, and Pass and Honours classifications are determined at the conclusion of the course. The first two years of the course have been designed to meet the requirements not only of the Mechanical Engineering students but also of prospective students of Naval Architecture and Industrial Engineering who will transfer to the University's Kensington campus at the end of their second year. The third and final years of the course are specifically for the Mechanical Engineering students who remain at the University College.

Descriptions of the subjects which comprise the second and later years of the degree course are given below. Specialization in Mechanical Engineering begins in second year and increases as the degree course progresses. At the final year level, individual projects and a large number of elective subjects are offered permitting further specialization in particular areas although the full range of electives may not always be available. Up to four electives may be selected from subjects offered in other departments subject to the approval of the Heads of Departments concerned.

Course Revision

The second and later years of the Mechanical Engineering program have been revised and the new third year commenced in 1992. The new final year will commence in 1993. Students who successfully completed second year in 1990 will proceed on the old program.

Outline of Second and Later Year Courses and List of Teaching Units

Second Year Course

Subject	
AMAT.2800 U	Mathematics 2E
ACSC.2800 U	Computer Science 2E
ACSC.2401 E	Numerical Analysis 2E
ACSC.2403 E	Numerical Linear Algebra 2E
AMEC.2800 U	Mechanical Engineering 2
AMEC.2001 E	Thermodynamics 1
AMEC.2002 E	Dynamics of Mechanical Systems 1
AMEC.2003 E	Design 1
AMEC.2004 E	Fluid Mechanics 1
AMEC.2005 E	Mechanical Engineering Laboratory 1
AMEC.2006 E	Mechanics of Solids 1
AMEC.2007 E	Materials 1
AELE.2401 E	Electronic Techniques
AELE.2402 E	Electrical Machines

Third Year Course

Subject	
Two General Studies electives	
AMAT.3800 U	Mathematics 3E
AMAT.3401 E	Complex Analysis 3E
AMAT.3402 E	Differential Equations 3E
AMAT.3403 E	Probability 3E
AMAT.3404 E	Statistics 3E
AMEC.3800 U	Mechanical Engineering 3
AMEC.3005 E	Materials 2
AMEC.3008 E	Mechanical Engineering Laboratory 2
AMEC.3009 E	Thermodynamics 2
AMEC.3010 E	Dynamics of Mechanical Systems 2
AMEC.3011 E	Design 2
AMEC.3012 E	Mechanics of Solids 2
AMEC.3013 E	Fluid Mechanics 2
AMEC.3014 E	Instrumentation

Final Year Course

Subject	
AMEC.4802 U	Practical Experience (Mechanical Engineering)*
AMEC.4801 U	Mechanical Engineering: Project and Thesis
AMEC.4800 U	Mechanical Engineering 4
Compulsory units:	
AMEC.4001 E	Thermodynamics 3
AMEC.4032 E	Mechanical Engineering Laboratory 3
AMEC.4033 E	Fluid Mechanics 3
AMEC.4034 E	Mechanics of Solids 3
AMEC.4035 E	Dynamics of Mechanical Systems 3
AMEC.4036 E	Design 3
AECM.3401 E	Engineering Economics
AECM.3402 E	Theory of Management
ACSC.3401 E	Operations Research 3E
Elective units:	
Six to be selected from the following:	
AMEC.4006 E	Acoustic Noise
AMEC.4007 E	Advanced Design
AMEC.4008 E	Advanced Mechanisms
AMEC.4009 E	Applied Elasticity and Plasticity
AMEC.4010 E	Applied Optics
AMEC.4011 E	Approximate Methods for Partial Differential Equations
AMEC.4012 E	Boundary Layers and Separated Flows
AMEC.4013 E	Classical and Statistical Thermodynamics
AMEC.4014 E	Compressible Flow
AMEC.4015 E	Control Theory
AMEC.4016 E	Energy Studies
AMEC.4017 E	Impact Mechanics
AMEC.4018 E	Marine Engineering
AMEC.4019 E	Mechanics of Fracture
AMEC.4020 E	Naval Architecture
AMEC.4021 E	Random Vibrations and Signal Analysis
AMEC.4022 E	Rotor Dynamics
AMEC.4023 E	Thermal Performance and Energy Consumption in Buildings
AMEC.4024 E	Tribology
AMEC.4025 E	Turbomachinery
AMEC.4026 E	Occasional Elective
AMEC.4027 E	Fluid Power
AMEC.4028 E	Digital Control Using Microprocessors
AMEC.4029 E	Chaos and Non-linear Dynamics
AMEC.4030 E	Maintenance Management and Logistics Engineering
AMEC.4031 E	Analysis of Structural Vibration

* See Rule 6 of the BE Degree Rules.

Subject Descriptions

AMAT.2800 U Mathematics 2E

Lectures and tutorials 4 hours per week

Matrices, systems of linear equations. Vector spaces. Orthogonal projections and least squares. Eigenvalues. Diagonalization. Differential equations: first order, higher order linear; systems, normal modes; Laplace transforms.

Multivariable calculus, maxima and minima. Integration. Vector field theory.

Partial differential equations. Separation of variables. Fourier series.

ACSC.2800 U Computer Science 2E

ACSC.2401 E *Numerical Analysis 2E* **S1**

Lectures 27 hours; *Laboratory* 13 hours
Prerequisites: Mathematics 1E and Computer Science 1E
Corequisite: Mathematics 2E.

Computer calculations: Computer representation of numbers, floating point arithmetic, sources of errors, error propagation in computations, numerical instability of algorithms. Numerical solution of non-linear equations: Bisection method, simple iteration, Newton's method, method of false position, secant method, convergence criteria. Interpolation and approximation: Finite differences, interpolation formulae, nested multiplication, deflation of a polynomial, Lagrange interpolation polynomial, cubic spline interpolation. Numerical integration and differentiation: Newton-Cotes integration formulae, composite formulae, Richardson extrapolation, Romberg integration, Gaussian quadrature, adaptive quadrature, numerical differentiation. Numerical solution of ordinary differential equations: Taylor series methods, Euler and modified Euler method, Runge-Kutta methods. Solution of linear simultaneous equations: Elimination methods, Gaussian elimination, matrix inversion, iterative methods, Jacobi method, Gauss-Seidel method, condition of a linear system, convergence criteria. Use of mathematical software libraries.

ACSC.2403 E *Numerical Linear Algebra 2E* S2

Lectures 27 hours; *Laboratory* 13 Hours
Prerequisite: Numerical Analysis 2E
Corequisite: Mathematics 2E.

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

AMEC.2800 U Mechanical Engineering 2

AMEC.2001 E *Thermodynamics 1*

Lectures and tutorials 52 hours

Fundamental laws of thermodynamics. Thermodynamic properties of fluids. Reciprocating engines and compressors: cycle analysis, construction, performance. Vapour power cycles. Gas power cycles.

AMEC.2002 E *Dynamics of Mechanical Systems 1*

Lectures and tutorials 65 hours

Kinematics and kinetics of planar link mechanisms: methods of determining the velocity and acceleration of link members, intertial loads, crank-effort diagrams, fluctuation of energy and angular velocity, flywheels. Vibration of linear single degree of freedom systems: linearization, modelling of damping, free and forced response of undamped and damped systems, convolution integral, Laplace transform methods, transfer functions, numerical solutions. Vibration of linear two degree o freedom systems: free and forced vibrations of undampec systems, modes, principal coordinates, coupling, Rayleigh's principle, systems with damping.

AMEC.2003 E *Design 1*

Lectures and tutorials 78 hours

Introduction to design principles and the design process witt examples and emphasis on machine elements and the influ ence of manufacturing processes on design. Theories of fail ure including crack propagation theory and uniaxial fatigue design theory. Example topics include: screw threads, bolte connections, belt drives, clutches, braces, sliding bearings ball and roller bearings, springs, shafting, keys and couplings welding connections and structural design.

AMEC.2004 E Fluid Mechanics 1

Lectures and tutorials 67 hours

Physical properties of fluids, fluid statics. Kinematics of flui flow: continuity, stream function, potential function. Rotationa and irrotational motion: circulation, lift, Magnus effect; vortic ity, flow in a curved path, forced and free vortices. Eule Bernoulli and momentum equations; applications, includin propulsion. Laminar and turbulent flow. Reynolds numbe Dimensional analysis: dynamic similitude and modelling. Li and drag. Introduction to compressible flow.

AMEC.2005 E *Mechanical Engineering Laboratory 1*

Lectures and laboratory 54 hours

Fundamentals of experimental work; resolution, repeatabilit confidence, accuracy. Production of engineering report Engineering measurement tools. Basic application in flui mechanics, solid mechanics, thermodynamics, materials sc ence and dynamics.

AMEC.2006 E *Mechanics of Solids 1*

Lectures and tutorials 48 hours

Stress, strain in 2 and 3 dimensions: stress and strain trans formation, principal stresses and strains, Mohr's Circles fc stress and strain. Hooke's Law and Poisson's Ratio. Static determinacy and indeterminacy: temperature stresses, lack c fit, compound structures. Thin walled pressure vessel Torsion of shafts of circular cross-section. Bending and shea stresses in symmetrical, asymmetrical and compound beam deflection of beams, Euler buckling: axially and eccentricall loaded columns, non-uniform columns and beam column non-uniform columns and beam columns. Principle of Virtu Work and Castigliano's Theorems.

AMEC.2007 E *Materials 1*

Lectures and tutorials 42 hours

Materials science. Grain structure, effect of deformatio recrystallization, hot and cold working. Non-equilibrium rel tionships in multiphase materials, applications to heat trea ment. Behaviour of materials in service: deformation, fatigu fracture, wear, thermal stress, creep, corrosion, radiation dan age. Effects of microstructure and macrostructure on prope ties. Fracture mechanics. Introduction to ceramic phases ar properties. Welding: processes, metallurgy and weldabilit Metal removal, surface finishing, joining.

ELE.2401 E *Electronic Techniques*
Lectures and tutorials 27 hours

ıtroduction; electronic aided measurement and control. ransducers with charge or current output; photoconductive evices, photomultipliers. Transducers with voltage output; ıermocouples, photovoltaic devices, pH meters, piezoelectric ansducers. Basic principles of digital electronics. Resistance ansducers. Digital data acquisition systems; digital-to-ana-ɔgue and analogue-to-digital converters, data acquisition sing microprocessors.

ELE.2402 E *Electrical Machines*
Lectures and tutorials 27 hours

lagnetic fields and circuits; electrical, magnetic and mechan-:al interaction, transformers, generators and motors. A.C. ower systems; single- and three-phase, A.C. machines, syn-hronous and induction motors and generators, power trans-ıission. D.C. systems; commutation, D.C. motors and enerators, control of speed, torque and generated voltage. :ectification; regulated power supplies; inverters.

MAT.3800 U Mathematics 3E

MAT.3401 E *Complex Analysis 3E* **S1**
Lectures and tutorials 27 hours

evision of complex numbers, modulus, argument, conjugate, uler's theorem, de Moivre's theorem, roots, solutions of poly-ɔminal equations. Functions, limits, continuity, differentiation, nalytic functions, Cauchy-Riemann conditions, solution of aplace's and Poisson's equation by complex variable meth-ds. Elementary functions, singular points, zeros, poles. omplex line integrals, Cauchy's theorem. Integral formulae. eries: convergence, power, Taylor, Laurent. Residue ıeorem, integrals with indentations, evaluation of real definite ıtegrals by contour integration, principle of the argument. onformal mappings, elementary functions as mappings, verse mappings.

MAT.3402 E *Differential Equations 3E* **S2**
Lectures and tutorials 27 hours

eparation of variables for homogeneous and inhomoge-ɔous partial differential equations, including Laplace, heat, ave and Poisson equations in rectangular, cylindrical polar, ɔherical polar coordinates in one, two, or three space dimen-ons, steady or unsteady with sinusoidal time dependence. eparation solutions involving Bessel and Legendre functions ıd their properties. Boundary value problems; eigenvalues ıd eigenfunctions. Fourier series. Laplace transforms ɔplied to partial differential equations.

MAT.3403 E *Probability 3E* **S1**
Lectures and tutorials 27 hours

aws of probability, permutations and combinations. Random ariables: discrete and continuous, change of variables. xpectations: moments. Chebyshev's theorem, generating nctions. Distributions: binomial, Poisson, hypergeometric, ɔrmal, exponential, gamma and beta. Bivariate distributions; ms of random variables, central limit theorem. Simple ran-ɔm walk. Markov chains.

MAT.3404 E *Statistics 3E* **S2**
Lectures and tutorials 27 hours

resentation of data, histograms. Sampling distributions. stimation; maximum likelihood, confidence intervals. Hypothesis testing, quality control. Regression and correlation. Goodness of fit. Non-parametric tests.

AMEC.3800 U Mechanical Engineering 3
Lectures and tutorials/Practical 391 hours

AMEC.3005 E *Materials 2*
Lectures and tutorials 27 hours

Further studies of materials science. Ferrous and non-ferrous materials. Other important non-metallic materials. Crack analysis. Creep.

AMEC.3008 E *Mechanical Engineering Laboratory 2*
Lectures and tutorials 54 hours

Design of experiments. Advanced experiments in engineering. Experimental project.

AMEC.3009 E *Thermodynamics 2*
Lectures and tutorials 27 hours

Heat pump and refrigeration cycles. Combustion processes. Properties of mixtures. Air-conditioning.

AMEC.3010 E *Dynamics of Mechanical Systems 2*
Lectures and tutorials 81 hours

Systems: Modelling static and dynamic systems, lumped parameters, linear and non-linear, linearization, response of linear systems.

Dynamics: Vibration of multiple degree of freedom systems: discrete systems, matrix and state vector methods; distributed systems, whirling of shafts. Balancing of reciprocating masses.

Control Theory: System components, transfer functions. Open and closed loop systems. Time domain response, proportional, derivative and integral control. Frequency response methods, modification of system parameters, stability criteria. Root locus methods. Introduction to sampled-data systems. Introduction to analogue computers.

AMEC.3011 E *Design 2*
Lectures and tutorials 81 hours

Design loading determination, stress analysis and design of rotating and reciprocating machine assemblies and components with consideration of: combinations of stresses, uniaxial and mutliaxial fatigue failure, critical speeds, materials of manufacture and manufacturing methods; interchangeable manufacture, standardisation, unit and selective assembly, tolerance specification, conditions of fit, economics, probability, group analysis, inspection of workpieces and gauge design.

AMEC.3012 E *Mechanics of Solids 2*
Lectures and tutorials 81 hours

Equations of two-dimensional theory of elasticity. Introduction to numerical methods of stress and strain analysis. Topics from applied elasticity. Rotating variable thickness discs. Plate theory, sinusoidal loading, circular plates with symmetric loading. Elastic stability of struts, rings, tubes, beams and plates. Introduction to plasticity theory. Introduction to finite element stress analysis.

AMEC.3013 E *Fluid Mechanics 2*

Lectures and tutorials 27 hours

Laminar and turbulent pipe flow; losses in pipes and fittings, networks. Unsteady flow, surging, pressure waves including water hammer. Introduction to fluid devices. The Navier–Stokes Equations. Transition and flow separation. Jets and wakes. Boundary layer theory; momentum integral equation, solution by assumed profiles for laminar and turbulent boundary layers; skin friction, drag coefficient.

AMEC.3014 E *Instrumentation*

Lectures and tutorials 13 hours

Instrumentation systems and their applications.

AMEC.4801 U Mechanical Engineering: Project and Thesis

Tutorials and practical 216 hours

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.

AMEC.4800 U Mechanical Engineering 4

Lectures and tutorials/Practical 432 hours

AMEC.4001 E *Thermodynamics 3*

Lectures and tutorials 27 hours

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.

AMEC.4032 E *Mechanical Engineering Laboratory 3*

Laboratory 27 hours

Advanced experiments in engineering.

AMEC.4033 E *Fluid Mechanics 3*

Lectures and tutorials 27 hours

Internal flows, nozzles and diffusers. Cascade aerodynamics. Fluid mechanics of axial and centrifugal compressors, fans and pumps. Axial flow turbines—gas, steam and hydraulic. Performance calculations of turbomachines

AMEC.4034 E *Mechanics of Solids 3*

Lectures and tutorials 27 hours

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.

AMEC.4035 E *Dynamics of Mechanical Systems 3*

Lectures and tutorial 27 hours

Dynamics: vibrations in rods, beams and plates and rotating machinery. Random vibrations and modal testing.

Control theory: system accuracy and stability, design and compensation; process controllers and servomechanisms performance specification, controller selection, and settings and dynamic testing applications.

AMEC.4036 E *Design 3*

Lectures and tutorials 27 hours

The application of computer methods in the design of machinery involving static, reciprocating and rotating components including transmission gearing and pressure vessels; with selected topics in the analysis of stress deflection, vibration and fatigue, in the context of optimal design.

AECM.3401 E *Engineering Economics*

Lectures and tutorials 27 hours

Basic concepts in management economics. Project evaluation techniques in private and public enterprise. Introduction to management accounting.

AECM.3402 E *Theory of Management*

Lectures and tutorials 27 hours

The role of management in a technologically advanced society. Human behaviour in the work situation; communication influence; decision-making. Models of organizations from static structural notions to dynamic open systems Engineering management, technical change and automation

ACSC.3401 E *Operations Research 3E*

Lectures and tutorials 54 hours

Prerequisites: Mathematics 1E and Computer Science 1E

Introduction; process of operations research, model formulation, mathematical techniques. Probability concepts; Bayes theorem, distributions, expectations. Decision analysis; trees choice criteria, utility. Linear programming; simplex procedure duality, sensitivity, LP packages. Allocation models; transportation, degeneracy, balancing, assignment. Game theory two person zero sum models, graphical, algebraic and iterative techniques. Dynamic programming; networks, resource allocation, reliability. Networks; shortest path, minimal spanning tree, maximal flow. Project management. CPM, resource allocation, crashing, PERT.

Elective units

AMEC.4006 E *Acoustic Noise*

Lectures and tutorials 27 hours

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 method of control. Radiation of sound from vibrating machinery.

AMEC.4007 E *Advanced Design*

Lectures and tutorials 27 hours

Design philosophy and methodology: problem formulation problem analysis, solutions, evaluation, specification. Com

uter aided design and the use of software and data base for lesign analysis, evaluation and optimization. Design project.

AMEC.4008 E *Advanced Mechanisms*

Lectures and tutorials 27 hours

dvanced kinematics; velocity and acceleration analysis of omplex planar mechanisms. Inflection circle, Euler-Savary quations, Cubic of Stationary Curvature, Burmuster points. ynthesis. Introduction to analysis and synthesis of three imensional mechanisms.

AMEC.4009 E *Applied Elasticity and Plasticity*

Lectures and tutorials 27 hours

opics in applied elasticity and plasticity involving analytical nd numerical methods, selected from impact mechanics, nergy methods, finite difference and finite element techiques, fracture mechanics, plasticity problems including ending, torsion, pressure vessels and rotating discs, limit nalysis, forming processes, creep and shakedown.

AMEC.4010 E *Applied Optics*

Lectures and tutorials 27 hours

ight as electromagnetic radiation. Geometric and wavefront ptics. Polarisation. Interference and Coherence. Reconnaisance and image enhancement. Light sources. Nonestructive testing in fluids; visualization of density and temerature, velocimetry. Non-destructive testing in solids; phoelasticity, holography.

AMEC.4011 E *Approximate Methods for Partial Differential Equations*

Lectures and tutorials 27 hours

aplace's equation. Finite difference approximations and error stimations. Relaxation methods. Convection, stability. nplicit methods: Gaussian elimination, conjugate gradient ethod. Variational and Galerkin finite element methods. oundary integral methods.

AMEC.4012 E *Boundary Layers and Separated Flows*

Lectures and tutorials 27 hours

ynamics of viscous flow and Prandtl's boundary layer pproximation. Blasius and Falkner-Skan solutions and pproximate methods. Stability and transition. Tollmienchlichting and Taylor-Gortler instabilities. Turbulent boundy layers, jets and wakes. Recent theories of organised otion in turbulent flows. Boundary layer control for low drag nd high lift. Circulation control. Aerodynamic noise.

AMEC.4013 E *Classical and Statistical Thermodynamics*

Lectures and tutorials 27 hours

lassical theory: Maxwell's relations, determination of entropy nd enthalpy, change of phase, availability. Statistical thermonamics: probability, systems of independent particles, interal energy and specific heat, entropy.

AMEC.4014 E *Compressible Flow*

Lectures and tutorials 27 hours

troduction to one-dimensional flow. Waves in one-dimensional ctionless flow; waves in two-dimensional flows; supersonic ozzles and diffusers. Method of characteristics and two-dimenonal numerical methods. Small perturbation theory and linarised equations. Real gas flows: Introduction to hypersonic ows, rarefied and reactive gas dynamics. Measurements in mpressible flow.

AMEC.4015 E *Control Theory*

Lectures and tutorials 27 hours

Further studies in the analysis and design of control systems; correlation of frequency and transient responses, system identification, phase plane and state space analyses, nonlinear and discrete time systems, Liapunov stability analyses, optimal and adaptive systems. stochastic signal analysis. Computer modelling of control systems. Logic and computer control systems.

AMEC.4016 E *Energy Studies*

Lectures and tutorials 27 hours

Energy resources and economics. Energy availability and conversion. Direct conversion: thermoelectric engine, thermionic converter, magnetohydrodynamic engine, photo-voltaic effect and solar cell, fuel cell. Nuclear energy: fission and fusion.

AMEC.3017 E *Impact Mechanics*

Lectures and tutorials 27 hours

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.

AMEC.4018 E *Marine Engineering*

Lectures and tutorials 27 hours

Ship resistance and propulsion. Propellers, their design and performance. Ship manoeuvrability. Alternative propulsion systems and associated equipment.

AMEC.4019 E *Mechanics of Fracture*

Lectures and tutorials 27 hours

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.

AMEC.4020 E *Naval Architecture*

Lectures and tutorials 27 hours

Ship hydrodynamics and stability. Principles of ship design. Structural loading and response.

AMEC.4021 E *Random Vibrations and Signal Analysis*

Lectures and tutorials 27 hours

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.

AMEC.4022 E *Rotor Dynamics*

Lectures and tutorials 27 hours

Selected topics from: torsional vibrations, bending critical speeds, unbalance response, gyroscopic effects, influence of fluid film bearings, flow induced vibrations, heat flow induced vibrations, dynamics of cracked shafts, thermal effects, instability, balancing, condition monitoring.

AMEC.4023 E *Thermal Performance and Energy Consumption in Buildings*

Lectures and tutorials 27 hours

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.

AMEC.4024 E *Tribology*

Lectures and tutorials 27 hours

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.

AMEC.4025 E *Turbomachinery*

Lectures and tutorials 27 hours

Types of turbomachines; basic relations. Cascade aerodynamics; axial compressors, pumps and fans. Axial flow turbines. Centrifugal pumps, fans and compressors. Gas, steam and hydraulic turbines. Performance calculations of turbomachines.

AMEC.4026 E *Occasional Elective*

Lectures and tutorials 27 hours

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.

AMEC.4027 E *Fluid Power*

Lectures and tutorials 27 hours

Fluid power hydraulic systems: power transmission and circuitry, components and their operational characteristics, modelling of components including computer aided modelling, circuit design and component selection, electrical interfacing and control.

AMEC.4028 E *Digital Control using Microprocessors*

Lectures and tutorials 27 hours

The design and analysis of digital control systems with implementation using microprocessors. Discrete time signals. Z transform techniques. Methods of analysis and design. Digital control algorithms. Microprocessors and interfacing. Practical exercises using the 6502 microprocessor and peripherals.

AMEC.4029 E *Chaos and Non-linear Dynamics*

Lectures and tutorials 27 hours

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.

AMEC.4030 *Maintenance Management and Logistics Engineering*

Lectures and tutorials 27 hours

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.

AMEC.4031 *Analysis of Structural Vibration*

Lectures and tutorials 27 hours

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.

Aeronautical Engineering Program

The first year of the Aeronautical Engineering program has been amended in 1993, in preparation for a revision of the second year course in 1994, and the presentation of the third and fourth years of the program in 1994 and 1995 respectively.

The first year course is described on p.107, and is almost wholly common with the first year course for Mechanical Engineering.

Outline of Second Year Subjects:

AMAT.2800 U Mathematics 2E
AMEC.2900 U Aeronautical Engineering 2
- ACSC.2401 E Numerical Analysis 2E
- AMEC.2001 E Thermodynamics 1
- AMEC.2002 E Dynamics of Mechanical Systems 1
- AMEC.2003 E Design 1
- AMEC.2004 E Fluid Mechanics 1
- AMEC.2005 E Mechanical Engineering Laboratory 1
- AMEC.2006 E Mechanics of Solids 1
- AMEC.2007 E Materials 1
- AMEC.2008 E Aerospace Materials
- AELE.2401 E Electronic Techniques
- AELE.2402 E Electrical Machines

Except for Aerospace Materials, the subjects are common with those within the second year course in Mechanical Engineering.

AMEC.2008 E Aerospace Materials

Lectures 13 hours

Fabrication processes. Review of common aerospace materials—ferrous and non-ferrous alloys. Materials selection and specification.

ieneral Studies Electives

ıe general studies requirements for the BA and BSc degrees e specified in rules 6 and 7 of the degree rules. For the BE ıgree the general studies requirements are shown in ;hedules E2 and E3 for each of the degree streams (see ıapter 8).

ıble of General Studies Electives

ıe following list shows the General Studies electives offered ıd the degree courses in which they are available (A—Arts, —Science, E—Engineering).

:HM.0500 U	Chemistry and Society	A
ECM.0500 U	Economics GS	S,E
ELE.0500 U	Engineering GS	A
ENG.0501 U	English GS1	S,E
ENG.0502 U	English GS2	S,E
ENG.0503 U	English GS3	S,E
ENG.0504 U	English GS4	S,E
ENG.0505 U	English GS5	S,E
HIS.0501 U	History GS1	S,E
HIS.0502 U	History GS2	S,E
HIS.0503 U	History GS3	S,E
HIS.0504 U	History GS4	S,E
MAT.0500 U	Mathematics GS	A
MAT.0501 U	Mathematics GS: Statistics in the Social Sciences	A
PHY.0500 U	Physics for Society	A

ıstrictions on the Selection of Particular Electives

ıdents who have completed a 6 CP first year subject in the me discipline as any of the above electives may not obtain ıdit for the general studies elective if taken concurrently or bsequently.

all cases the general studies elective taken prior to the 6 CP el one subject in the same discipline may count towards the gree.

ıscriptions of Electives

:HM.0500 U Chemistry and Society

Full-year elective
Credit points 3
Lectures and tutorials 2 hours per week

sic vocabulary of chemistry: physical and chemical prop- ies of substances; symbols, formulas and equations; ılecular structure; carbon compounds; important industrial mpounds.

emistry in society: examination of societal issues such as foliants, explosives and propellants, food additives, fuels, netic engineering, heavy metals, medicinals, nuclear ergy and nuclear waste, toxic chemicals in warfare.

lancing benefits and risks: the nature of personal and soci- l risk; acceptance risk; the chemist's role in identifying, alysing and controlling the problems arising from the pro- ction and use of chemicals and chemical energy.

ECM.0500 U Economics GS

Full-year elective
Credit points 3
Lectures and tutorials 2 hours per week

This subject provides a broad-based treatment of essential concepts and major themes characterising contemporary economics at the micro- and macro-economic levels. It draws heavily on illustrative material from the Australian experience.

AELE.0500 U Engineering GS

Telecommunications: Principles, Systems and Policy

Full-year elective
Credit points 3
Lectures and tutorials 2 hours per week

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.

AENG.0501 U English GS1 **S2**

2 lectures per week.

Issues in Modern Australian Literature. A study of selected Australian texts, with special emphasis on their treatment of significant issues in contemporary Australian culture.

AENG.0502 U English GS2
(Not offered in 1993)

Literature and Modern War. A study, through selected texts, of the experiences of servicemen and women, and civilians, in several kinds of modern war.

AENG.0503 U English GS3
(Not offered in 1993)

Science and the Literary Imagination. A study of the ways (through selected texts) in which scientific ideas have been represented in literature.

AENG.0504 U English GS4
(Not offered in 1993)

Australian Literature and Film. A comparative study of Australian texts and the films made from them.

AENG.0505 U English GS5 **S1**

2 lectures per week

American Literature

A study of some significant American texts.

N.B. Credit towards a degree will accrue from English General Studies electives only when two have been passed, giving 3 CP, or four, giving 6 CP.

AHIS.0503 U History GS3 **S2**

Lectures and tutorials 2 hours per week

Japan in the Modern World

An overview of social, political, economic and military changes in Japanese society from about 1800. Special emphasis is placed on Japan's relations with Asia and the West.

AHIS.0504 U History GS4 **S1**

Lectures and tutorials 2 hours per week

The American Civil War

This course for science and engineering students pays attention to the causes of the American Civil War, the battles and campaigns of the war, and its place in the history of the development of modern warfare.

N.B. Students enrolling in History General Studies electives are required to take both History GS3 and History GS4 in the same year, and must pass both electives in order to accrue 3CP.

AMAT.0500 U Mathematics GS
(Not offered in 1993)

Full-year elective
Credit points 3
Lectures and tutorials 2 hours per week

This elective 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.)

AMAT.0501 U Mathematics GS: Statistics in the Social Sciences

Full-year elective
Credit points 3
Lectures and computing laboratories 3 hours per week

Data summarising using data obtained from the students. Lying with statistics. Criticism of published newspaper and other reports. Sampling (including a mini-project to obtain real data which will be analysed during the course as the methods are developed). The Normal approximation. Inferences from data. Hypothesis testing. Dealing with proportions. Two sample problems. Goodness of fit test. Correlation and prediction. Time series models. Population models. Specific examples of the use of these methods will be given by academic and military staff with expertise in areas where statistics is used. (Only elementary mathematical ability will be assumed but students will be expected to take an active role and attend computing laboratory sessions).

APHY.0500 U Physics for Society

Full-year elective
Credit points 3
Lectures and tutorials 2 hours per week

The elective is given in four parts:

(a) This introductory study includes discussions of the scientific method and the purpose of science. The validity and relevance to today's society of some of the physical theories developed up to the start of the 20th century are considered. These include: gravity, planetary motion and the solar system; Newtonian mechanics; special relativity; electricity and magnetism.

(b) An introduction to the concepts and techniques of astronomy with discussion on components of the solar system starts and stellar evolution, our galaxy and the universe together with special topics on the relevance of astronomy to mankind.

(c) Some theories of the 20th century and their applications will be developed. These include: Planck's quantum concept; wave properties of material particles; models of the atom; bonding and structure of matter. Examples of the physical principles will be drawn from: electron microscopy; lasers and holography; semiconductor devices.

(d) Peaceful and military applications of physics in some of the following areas: nuclear physics and radioactivity energy sources such as: nuclear fission and fusion plasma physics; solar energy. Other areas to be considered include: the earth's atmosphere; space research elementary particles.

Special Electives

AMEC.0500 U Mechanics of Flight

Full-year subject
Credit points 3
Lectures and demonstrations 2 hours per week

Prerequisites: HSC or equivalent in Physics and Mathematics

A special elective for both BA and BSc students, presented by the Department of Mechanical Engineering.

Fundamentals: liquids and gases, viscosity.
Aspects of air flows: boundary layers, pressure distributions lift and drag, turbulence, separation, vortices.
Subsonic and supersonic flows: shock waves.
Application to aircraft design and performance.

APHY.0501 U Meteorology A

Full-year subject
Credit points 3
Lectures and tutorials 2 hours per week

No mathematics or physics prerequisites

Measures, units, and notations. Nature, forms, and transformations of matter and energy. Kinetic theory. Force and inertia. The Sun/Earth system.

Meteorological elements. *In situ* and remote-sensing measurements. Climate statistics. Climatic variability and change

Systems. The atmosphere/Earth's-surface system: composition; interactions and exchanges between components Evolution of the atmosphere. Gaia hypothesis.

Forms of energy in the atmosphere/Earth's-surface system Energy fluxes. Radiation and its interactions. Energy balance Greenhouse effect. Global warming.

Fluid motions: circulation, convergence, vorticity. Atmospheric heat engine.

The seasons. Meridional energy fluxes. Global circulation.

Vertical structure of the atmosphere. Planetary boundary layer, ozone layer, ionosphere. Stability. Turbulence.

›rms and measures of atmospheric moisture. Dew and frost. ·oplet formation and growth. Clouds and precipitation.

›rces affecting air masses. Pressure contours, geostrophic ıw. The synoptic chart. Tropical cyclones, temperate depres-›ns, anticyclones, fronts. Thunderstorms. Small-scale circu-tions.

eather and climate influences on agriculture, industry, avia-›n and shipping, communications, military operations, habi-tion, comfort, and health. Natural disasters. Pollution.

CMA.0500 U Surveying

Taken over 2 years
Credit points 4
Total 135 hours

subject presented by the Department of Civil and Maritime ıgineering, made up of the following units:

ırveying 1 *54 hours*

ementary theory of errors. Simple surveying instruments, ıaining, chain surveying. Spirit levelling. Theodolites, eodolite traversing. Indirect methods of distance measure-ent. Tacheometry. Contour and detail surveys. Areas and ılumes. Reconnaissance survey methods.

ırveying 2 *27 hours*

troduction to photogrammetry. Elements of hydrographic rveying. Map projections and computations on the ıstralian Map Grid.

ırvey Camp *27 hours*

one-week field camp.

ırveying 3 *27 hours*

:roduction to geodetic surveying and field astronomy.

Asian Languages

The opportunity exists for 2nd and 3rd year students enrolled in the BA or BSc programs to study an Asian language (Chinese, Indonesian, Japanese). Students wishing to enrol in an Asian language will have to pass a Language Aptitude Test and obtain permission from the Commandant and the Rector.

Students may apply to enrol in Bahasa Indonesia at the Australian National University or in Japanese or Chinese at the University of Canberra. Successfully completed Asian language subjects will be counted as Arts subjects towards the BA and BSc degrees:

first-year sessional subjects	3 Credit Points each
second-year sessional subjects	4 Credit Points each
third-year sessional subjects	6 Credit Points each

Students intending to apply for enrolment in 1994 should contact Student Administration by September 1993.

3 cp can count
on degree

11. Graduate Study

Opportunities exist in the University College for study and research at postgraduate level leading to the award of the following degrees and diplomas of the University.

Research Degrees

Awarded for research and require the preparation and submission of a thesis embodying the results of an original investigation or design.

Degree	*Department*	*Course code*
PhD	All Departments of University College	1000–1990
MA(Honours)	Economics & Management	2271
	English	2281
	Geography and Oceanography	2301
	History	2321
	Mathematics	2340
	Politics	2401
ME	Civil and Maritime Engineering	2651
	Electrical Engineering	2663
	Mechanical Engineering	2691
MSc	Chemistry	2911
	Computer Science	2925
	Geography and Oceanography	2041
	Mathematics	2921
	Physics	2931

Program Identifiers for Research Degrees

Department	*Program Identifier*	*Research program*
Civil and Maritime Engineering	ACMA .9000 R	Civil and Maritime Engineering Research —Full time
	.9001 R	Civil and Maritime Engineering Research —Part time
Electrical Engineering	AELE .9000 R	Electrical Engineering Research—Full time
	.9001 R	Electrical Engineering Research—Part time
Mechanical Engineering	AMEC .9000 R	Mechanical Engineering Research—Full time
	.9001 R	Mechanical Engineering Research—Part time
Economics and Management	AECM .9000 R	Economics and Management Research —Full time
	.9001 R	Economics and Management Research —Part time
English	AENG .9000 R	English Research —Full time
	.9001 R	English Research —Part time
History	AHIS .9000 R	History Research —Full time
	.9001 R	History Research —Part time
Politics	APOL .9000 R	Politics Research —Full time
	.9001 R	Politics Research —Part time
Chemistry	ACHM .9000 R	Chemistry Research —Full time
	.9001 R	Chemistry Research —Part time
Computer Science	ACSC .9000 R	Computer Science Research—Full time
	.9001 R	Computer Science Research—Part time
Geography and Oceanography	AGOC .9000 R	Geography and Oceanography Research —Full time
	.9001 R	Geography and Oceanography Research —Part time
Mathematics	AMAT .9000 R	Mathematics Research —Full time
	.9001 R	Mathematics Research —Part time
Physics	APHY .9000 R	Physics Research —Full time
	.9001 R	Physics Research —Part time

For information on program identifiers see p. 144.

ormal Coursework Degrees and Diplomas

andidates in these courses are required to attend formal lec-ires and/or seminars and, where applicable, submit a project eport or sub-thesis. MA (Pass) degree students must com-ete a sub-thesis within the maximum period of candidature r the degree. Most courses are usually of two sessions dura-n full-time or four sessions duration for a part-time course. he Master of Management Economics is three sessions full-ne or six sessions part-time.

egree/Diploma	Course	Course code
A	Australian Studies (interdisciplinary)	8241
	English	8171
DefStudies	Interdisciplinary	9900
EngSc	Civil Engineering	8611
	Electrical Engineering	8505
InfSc	Information Science	8555
MgtEc	Management Economics	8390
rad Dip	Civil Engineering	5800
rad Dip	Electrical Engineering	5810
rad Dip	Technology Management	5900
rad Dip	Defence Studies	5910

egistration for higher degree and graduate diploma candi-ature is open to both civilian and defence force personnel.

ne conditions governing the award of higher degrees and aduate diplomas available at the University College are set t at the end of this chapter.

l formal coursework students should read carefully the infor-ation contained in Chapter 14.

oursework Masters Degrees

urse structures and requirements are set out below. For finitions and information key see p. 143.

laster of Arts Degree at Pass Level

A

241 Australian Studies

is course is available to continuing students only.

urse Structure and Requirements

ndidates for the award of the MA degree in Australian udies must complete over a period of at least two sessions l-time (maximum enrolment period four sessions) or four ssions part-time (maximum enrolment period six sessions), e of the following programs.

Four Sessional subjects and a sub-thesis

or

Six Sessional subjects.

In either case, there is a compulsory core seminar, (Australia since 1901), taken over two sessions. The electives from which seminars may be chosen are shown below.

No.	*Title*		*CCH*
Core Seminar			
AINT.8800 G	Australia Since 1901*	F	2
Electives			
AENG.8201 G	Australian Literature Since 1960	S1	2
AENG.8202 G	Australian Literary Movements and Controversies	S2	2
AENG.8207 G	Aboriginal Literatures and Themes—Unaipon to Recent Oral Testimony Material	—	
AENG.8212 G	Special Studies	S1	2
AHIS.8201 G	Australian Political History in the 20th Century	S2	2
AHIS.8202 G	Problems in the History of Australian Defence and Foreign Policy	S1	2
APOL.8201 G	Australian Foreign Policy: Contemporary Issues	S2	2
AINT.8100 G	Sub-Thesis (Australian Studies)*	F	

* For subject descriptions see 'Interdisciplinary Studies', p.156, and departmental listings in this section.

8171 English

Course Structure and Requirements

Candidates for the award of the MA degree in English at pass level must complete over a period of at least two sessions full-time (maximum enrolment period four sessions) or four sessions part-time (maximum enrolment period six sessions), one of the following programs.

1. Four Sessional subjects and a sub-thesis.

or

2. Six Sessional subjects.

It is expected that candidates who seek to complete the MA Pass degree in one year's full-time study will enrol in four sessional subjects and a sub-thesis.

No.	*Title*		*CCH*
Electives			
AENG.8100 G	Sub-Thesis (English)	F	
AENG.8201 G	Australian Literature since 1960	S1	2
AENG.8202 G	Australian Literary Movements and Controversies	S2	2
AENG.8203 G	Victorian Autobiographical Narratives	S1	2
AENG.8204 G	Twentieth Century Literary Theory	S1	2
AENG.8205 G	The Two Houres Traffique of Our Stage: Medieval and Renaissance Drama	—	2

No.	Title		CCH
AENG.8206 G	One Hundred Years of Women's Writing	—	2
AENG.8207 G	Aboriginal Literatures and Themes—Unaipon to Recent Oral Testimony Material	—	2
AENG.8208 G	One Hundred Years of Australian Women's Writing	—	2
AENG.8209 G	Australian War Literature of the Twentieth Century	S2	2
AENG.8210 G	Scholarship, Bibliography and Editing	S2	2
AENG.8211 G	Literary Modernism in Context: 1900–1920	—	2
AENG.8212 G	Special Studies	—	2

9900 Master of Defence Studies

MDefStudies

The Master of Defence Studies is a coursework degree. Provision is made in the degree rules for candidates to substitute a sub-thesis for some of the coursework, but most of the work undertaken for successful completion of the degree is associated with regular weekly attendance at seminars.

Entry Requirements

The course is normally open to graduates who have at least a major sequence in a discipline appropriate to the defence studies program which they wish to undertake. Admission is determined by the Higher Degree Committee of the University College.

Course Structure and Requirements

The Master of Defence Studies course requires candidates to complete over a period of at least two sessions full-time or four sessions part-time one of the two patterns of study listed below.

Either:

1. Complete coursework subjects to the value of 36 credit points chosen from the available options.

or

2. Complete four coursework subjects to the value of 24 credit points chosen from the available options and submit an approved sub-thesis of not more than 15,000 words or an equivalent research project on a topic deemed suitable by the Master of Defence Studies Standing Committee. Students must enrol in AINT.8101 G Sub-Thesis (Defence Studies).

At least 24 credit points are to be taken from the core subjects areas. In 1993 the core subjects areas are History and Politics.

Elective Subjects

Each of the subjects listed below—apart from the sub-thesis—involves a two or three hour seminar per week throughout the session, written work and an examination and is equivalent to 6 or 3 credit points. The sub-thesis is equivalent to 12 credit points.

No.	Title	Credits		CCH
AHIS.8202 G	Problems in the History of Australian Defence and Foreign Policy	6	S1	2
AHIS.8203 G	A History of Pre-Nuclear Strategic Thought	6	S2	2
AHIS.8205 G	The ASEAN States, the South West Pacific and Australia: Political and Defence Issues Since 1945	6	S2	2
AHIS.8207 G	Intelligence and National Security	6	S1	2
AHIS.8208 G	Land Warfare	6	S1	2
APOL.8201 G	Australian Foreign Policy: Contemporary Issues	6	S2	2
APOL.8205 G	Seapower and Australian Security	6	S1	2
APOL.8206 G	Changing Concepts of Security	6	S2	2
APOL.8207 G	The Gulf War: Domestic, Regional and International Dimensions	6	S2	2
APOL.8209 G	Australian Defence Since Vietnam: The Search for Self-Reliance	6	S2	2
APOL.8210 G	Armed Forces and Society	6	S1	2
APOL.8211 G	Northeast Asia: The Changing Regional Balance	6	S2	2
AGOC.8201 G	Strategic Geographical Issues in Australia's Neighbourhood	6	S2	2
AGOC.8202 G	Comparative Strategic Geography	6		2
AINT.8101 G	Sub-thesis (Defence Studies)	12	F	—

The following sessional subjects are also available to candidates with the appropriate undergraduate background.

No.	Title	Credits	CCH
Civil Engineering			
*ACMA.8801 G	New Materials and Technology	6	2
*ACMA.8802 G	Project Management: Planning (MDefS)	6	2
*ACMA.8803 G	Project Management: Administration (MDefS)	6	2
*ACMA.8804 G	Project Management: Operation and Control (MDefS)	6	2
*ACMA.8805 G	Project Management: Capital and Maintenance (MDefS)	6	2

).	Title	Credits		CCH
CMA.8806 G	Project Management: Logistics Modelling (MDefS)	6		3
CMA.8807 G	Applications of Systems Dynamics in Civil and Maritime Engineering	6		3
)mputer Science				
:SC.8201 G	Introduction to Computer and Information Systems	3	S1	3
:SC.8202 G	Management Science Techniques	3	S2	3
:SC.8209 G	Databases and Database Management	3	S1	3
:SC.8207 G	Knowledge Based Systems	3	S2	3
:onomics and Management				
:CM.8217 G	Foundations of Management: Organisational Planning and Development	3	S1	3
:CM.8218 G	Economic and Managerial Statistics	3	S2	3
:CM.8222 G	Human Resource Management	3	S2	3

vailability subject to staffing arrangements

aster of Engineering Science EngSc

i11 Civil Engineering

i05 Electrical Engineering

ndidates may qualify for the MEngSc degree by full-time idy over 2 academic sessions or part-time study over 4 ses- ns. The maximum periods of candidature are 4 and 8 ses- ns respectively. There are 2 sessions each year.

e degree may be obtained in either Civil Engineering or ctrical Engineering by a course of study predominantly in Department of Civil and Maritime Engineering or the partment of Electrical Engineering respectively.

e normal qualification for enrolment is an honours or supe- r pass bachelor degree from a four-year course in Civil or ctrical Engineering (as appropriate). An applicant who es not have the normal qualifications may be required to dertake a qualifying program, or to enrol initially in a aduate Diploma program. Some or all of the credits ained in these programs may be transferable on enrolment he MEngSc.

ndidates must complete a 36 credit program, consisting of credits of formal coursework, or 27 credits of formal course- rk and a 9 credit project, or 18 credits of formal coursework d an 18 credit project. Other programs may be approved in cial circumstances.

st postgraduate coursework subjects are presented as 3 rs of lectures per week for one session. Such subjects act 3 credits. Postgraduate subjects available from the partment of Civil and Maritime Engineering and the partment of Electrical Engineering are listed below. Not all be presented in any one year.

Up to 6 credits may be obtained from undergraduate subjects. Most undergraduate subjects are presented as 2 hours of lectures per week for one session. Such subjects attract 1½ credits. Undergraduate subjects available from the two departments are listed in the University College Handbook.

Credits may be obtained from appropriate work done in departments of the University College other than that in which the candidate is enrolled, or in other institutions of higher education. Candidates may request admission with advanced standing on the basis of work completed elsewhere before commencing the MEngSc program.

Provisions exist for transfer between the MEngSc and Graduate Diploma programs.

All programs are subject to the approval of the Head of the Department in which the candidate is enrolled.

Candidates are advised to study the Conditions for the Award of Higher Degrees.

Subjects available in the Department of Civil and Maritime Engineering

No.	*Title*	*Credits*
ACMA.8101 G	Research Project (9 credits)	9
ACMA.8102 G	Research Project (18 credits)	18
ACMA.8201 G	Foundation Engineering	3
ACMA.8202 G	Advanced Foundation Engineering	3
ACMA.8203 G	Soil Mechanics	3
ACMA.8204 G	Soil Dynamics	3
ACMA.8205 G	Site Investigations	3
ACMA.8206 G	Pavement Materials and Design	3
ACMA.8207 G	Geological Engineering	3
ACMA.8208 G	Basic Finite Elements	3
ACMA.8209 G	Applied Soil Mechanics	3
ACMA.8210 G	Finite Elements in Structural Analysis	3
ACMA.8211 G	Advanced Structural Analysis	3
ACMA.8212 G	Structural Engineering Materials 1 (Concrete Technology)	3
ACMA.8213 G	Reinforced Concrete	3
ACMA.8214 G	Prestressed Concrete	3
ACMA.8215 G	Structural Dynamics	3
ACMA.8216 G	Structural Engineering Materials 2 (Metals)	3
ACMA.8217 G	†Project Management—Planning	3
ACMA.8218 G	†Project Management—Administration	3
ACMA.8219 G	Project Management—Operation and Control	3
ACMA.8220 G	Project Management—Capital and Maintenance	3
ACMA.8221 G	†Project Management—Logistics Modelling	3
ACMA.8222 G	Project Management Special Elective 1	3
ACMA.8223 G	Project Management Special Elective 2	3
ACMA.8224 G	Project Management Special Elective 3	3
ACMA.8225 G	Project Management Special Elective 4	3
ACMA.8226 G	Coastal and Ocean Engineering	3
ACMA.8227 G	Civil Engineering Elective	3
ACMA.8228 G	Coastal and Seabed Dynamics	3
ACMA.8229 G	Traffic Engineering Practice	3
ACMA.8230 G	Traffic Engineering Practice: Special Elective	3
ACMA.8231 G	Occasional Elective 1	3
ACMA.8232 G	Occasional Elective 2	3
ACMA.8233 G	Occasional Elective 3	3
ACMA.8236 G	Applications of Systems Dynamics in Civil and Maritime Engineering	3

† In 1993 quotas will be applied to these subjects

Subjects available in the Department of Electrical Engineering

No.	*Title*	*Credits*
AELE.8201 G	Microwaves	3
AELE.8202 G	Antennas	3
AELE.8203 G	Optical Fibres	3
AELE.8204 G	Introduction to Digital Image Processing	3
AELE.8205 G	Digital Image Restoration	3
AELE.8206 G	Machine Vision	3
AELE.8207 G	Computer Generated Imaging	3
AELE.8208 G	Speech and Image Coding	3
AELE.8209 G	Advanced Computer Architecture	3
AELE.8210 G	Microcomputer System Design	3
AELE.8211 G	Digital Communications	3
AELE.8212 G	Advanced Digital Systems	3
AELE.8213 G	Advanced Digital Signal Processing Techniques	3
AELE.8214 G	Digital Signal Processing in Practice	3
AELE.8215 G	Advanced Circuit Theory	3
AELE.8216 G	Information Theory	3
AELE.8217 G	Time Series Analysis Techniques	3
AELE.8218 G	Advanced Control Systems	3
AELE.8219 G	Robotics	3
AELE.8220 G	Methods in Robust Control Theory	3
AELE.8221 G	Data Security	3
AELE.8222 G	Advanced Data Networks	3
AELE.8223 G	Advanced Very Large Scale Integration (VLSI) Techniques	3
AELE.8224 G	Advanced MOSFET Semiconductor Theory	3
AELE.8225 G	Advanced Power Systems	3
AELE.8226 G	Power System Protection	3
AELE.8227 G	Digital Electronics	3
AELE.8228 G	Advanced Digital Signal Processing	3
AELE.8229 G	Computer Pattern Recognition	3
AELE.8230 G	Spaceborne Imaging Technology	3
AELE.8231 G	Linear Systems	3
AELE.8232 G	Adaptive Control Systems	3
AELE.8233 G	Radar Cross-Section Analysis	3
AELE.8234 G	Radar	3
AELE.8235 G	Software Engineering	3
AELE.8236 G	Neural Networks	3
AELE.8237 G	Laser Fundamentals and Applications	3
AELE.8238 G	Adaptive Antenna Arrays	3
AELE.8239 G	Introduction to VSLI Systems	3
AELE.8240 G	Antenna Array Processing	3
AELE.8241 G	Interconnected Power System Dynamics	3
AELE.8242 G	Power Electronic Applications	3
AELE.8243 G	Broadband Antenna Arrays	3
AELE.8244 G	Expert Systems: A Practical Introduction	3
AELE.8245 G	Natural Language Processing	3
AELE.8246 G	Advanced Engineering Electromagnetics	3
AELE.8247 G	Electrical Engineering Elective	3
AELE.8248 G	Special Elective 1	3
AELE.8249 G	Special Elective 2	3
AELE.8250 G	Special Elective 3	3
AELE.8251 G	Special Elective 4	3
AELE.8252 G	Communications and Information Systems	3
AELE.8253 G	Surveillance, Target Acquisition and Guided Weapons	3
AELE.8101 G	Project Report (9 credits)	9
AELE.8102 G	Project Report (18 credits)	18

8555 Master of Information Scienc MInfSc

The Masters (Pass) degree in Information Science is a pr gram, sponsored by the Department of Computer Scienc that encompasses several Information Systems an Computer Science subjects designed to upgrade and furth expand both military and civilian students' expertise in thes areas.

To satisfy the MInfSc program it will be necessary for can dates to acquire 36 credit points. Candidates are able t choose one of the following course formats:

—6 subjects and a major project accredited with 18 cre points,

—9 subjects and a minor project accredited with 9 cre points, or

—12 subjects of coursework but no project.

Each subject, of three contact hours consisting of lecture seminars and tutorials per week, will contribute 3 credit poin towards the degree.

Some relevant Computer Science or Information Syster undergraduate subjects, provided they have not been take previously in a qualifying program, may contribute to the pr gram, subject to the approval of the Head of Department. Ea undergraduate subject will be accredited with 1.5 credit poin and a maximum of four undergraduate subjects may b included in the program.

Up to one third of the unit content of the MInfSc course m consist of units offered from other Masters programs, with th same creditation of 3 points per subject. Also academic wo relevant to the MInfSc degree completed in other institutio may, with the approval of the Head of Department, be accre ited, so long as it has not previously been accredited to a fo mal qualification.

Candidates may qualify for a Master of Information Scien Degree by full-time study over a minimum of one and a h years and a maximum of two and a half years, or, by part-tin study over a minimum of three and a maximum of four yea

Entry requirements

Applicants shall have been awarded an appropriate degree Bachelor with Honours which includes some Comput Science and/or Information Systems (or equivalent) uni from the University of New South Wales or a qualification co sidered equivalent from another university or tertiary instit tion, at a level acceptable to the Higher Degree Committee the University College. However, graduates with a good pa degree, which includes a substantial proportion of Comput Science and/or Information Systems related undergradua studies, from an approved tertiary institution, and who c

mit evidence that they have had a minimum of 2 years ctical working experience in computer and/or information tems related work may be admitted on the recommen- ion of the Head of Department and the Committee.

xceptional cases an applicant who submits evidence of h other academic and professional qualifications at least ivalent to an honours degree may be admitted to the pro- m on the recommendation of the Head of Department and Committee.

licants who are not eligible for direct admission will be uired to undertake a qualifying program of 15 credits of ropriate undergraduate/postgraduate subjects to be com- ed in a maximum of two sessions full-time or three ses- is part-time. Candidates undertaking the qualifying gram, may, if they successfully complete the first two sub- s at credit level or above, transfer directly into the Masters gram on the recommendation of the Head of Department the Committee. Candidates who do not complete the first subjects at credit level or above must successfully com- e all five subjects to complete the qualifying program. ididates, on entrance to the Masters program after com- ing the qualifying program, may transfer not more than 6 dit points associated with the subjects taken under the lifying program.

aster of Management Economics MgtEc

90 Economics and Management

primary objective of the MMgtEc is to offer a program ch meets the requirements of professional practice as ected in the broader concepts of public and private sector nagement. The degree is designed to familiarise students particular skills and techniques and also with the wider text in which those skills are applied.

ididates may qualify for the degree of Master of nagement Economics (MMgtEc) by studying full time for a imum of three sessions, or part time for a minimum of six sions. The degree may also be completed by two sessions ll time study and two sessions of part time study.

The degree requires successful completion of 12 subjects of three credit points each, or a total of 36 credit points CP).

Students are required to complete at least 8 of their 12 sub- ects from the list offered by the Department of Economics nd Management; up to four subjects may, with approval of the Head of Department, be selected from postgraduate fferings elsewhere in the University College or (by special rrangement) from suitable courses at other institutions.

All students are required to pass the following subjects:

AECM.8215 G Economics for Managers 1
AECM.8216 G Economics for Managers 2
AECM.8217 G Organisational Planning and Development
AECM.8218 G Economic and Managerial Statistics
and either
AECM.8220 G Accounting for Managers
or [in years in which this not offered]
AECM.8221 G Finance and Investment Appraisal

These should, as far as possible, be taken in the first year of study by both full time and part time students.

4. Depending on demand, the optional subjects will be offered in alternate years, which will allow most students access to most subjects.

5. All students are required to complete a specialisation of four or more subjects in one of the following areas:

(a) *Project Management and Logistics—*

AECM.8219 G Economic Foundations of Project Evaluation and Management;
AECM.8222 G Human Resource Management
AECM.8221 G Finance and Investment Appraisal
AECM.8223 G Acquisition and Contracting
AECM.8224 G Operations Management
ACSC.8201 G Introduction to Computer and Informations Systems
ACSC.8202 G Management Science Techniques
ACSC.8210 G Information Systems—Design, Operation and Control
AECM.8225 G Economic and Managerial Forecasting
AECM.8101 G Topics in Economics and Management 1
AECM.8102 G Topics in Economics and Management 2
AECM.8228 G Advanced Project Management
and/or
AECM.8227 G Logistics and Transport Management
AECM.8103 G Minor Thesis (6 CP)

Students may also enrol in a maximum of two subjects in project management offered in Civil Engineering with approval of Head of Department.

(b) *Management Information Systems—*

ACSC.8201 G Introduction to Computer and Information Systems
ACSC.8202 G Management Science Techniques
AECM.8225 G Economic and Managerial Forecasting
ACSC.8210 G Information Systems—Design, Operation and Control
ACSC.8217 G Computing Milieu
AECM.8103 G Minor Thesis (6 CP)

(c) *Management Economics—*

AECM.8101 G Topics in Economics and Management 1
AECM.8102 G Topics in Economics and Management 2
AECM.8226 G Economics of Regulation
AECM.8225 G Economic and Managerial Forecasting
ACSC.8202 G Management Science Techniques
AECM.8103 G Minor Thesis (6 CP)

6. With the approval of the Head of the Department of Economics and Management, students may be allowed to prepare a minor thesis as part of their degree programs. Such a thesis would be the equivalent of two subjects (6 CP) and be undertaken by enrolling in AECM.8103 G Minor Thesis.

7. With the approval of the Head of the Department of Economics and Management and the Head of the other Department involved, students may enrol in the following subjects:

ACSC.8201 G Introduction to Computer and Information Systems
ACSC.8202 G Management Science Techniques

ACSC.8210 G	Information Systems—Design, Operation and Control
ACSC.8215 G	Computing Milieu
ACMA.8217 G	Project Management: Planning
ACMA.8218 G	Project Management: Administration
ACMA.8219 G	Project Management: Operation and Control
ACMA.8220 G	Project Management: Capital and Maintenance

In summary, students are required to take twelve 3 CP sessional subjects of which six are compulsory, and at least four others form a specialisation in one of the designated areas.

Graduate Diplomas

Candidates may qualify for the award of Graduate Diploma by full-time study over 2 sessions or part-time study over 4 sessions. The maximum periods of candidature are 4 and 6 sessions respectively.

Candidates must complete a program of formal coursework totalling 24 credits.

The minimum qualification for enrolment is a pass-level three-year bachelor degree in an appropriate discipline.

In certain programs a candidate who has obtained 24 credits in the GradDip program may request transfer to an appropriate Masters program carrying 18 credits (not more than 6 having been obtained from undergraduate subjects/units). Requests should be made in writing to the relevant Head of Department.

5800 Graduate Diploma in Civil Engineering

5810 Graduate Diploma in Electrical Engineering

The diploma may be obtained in either Civil Engineering or Electrical Engineering by a course of study predominantly in the Department of Civil and Maritime Engineering or the Department of Electrical Engineering respectively.

An applicant who does not have the normal qualifications may be required to undertake a qualifying program. Some or all of the credits obtained in this program may be transferable on enrolment in the GradDip.

Most postgraduate coursework subjects are presented as 3 hours of lectures per week for one session. Postgraduate subjects available from the Department of Civil and Maritime Engineering and the Department of Electrical Engineering are listed on p. 140–141. Not all will be presented in any one year.

Up to 12 credits may be obtained from undergraduate subjects. Most undergraduate subjects are presented as 2 hours of lectures per week for one session. Such subjects attract 1½ credits. Undergraduate subjects available from the two departments are listed in the University College Handbook.

Credits may be obtained from appropriate work done in departments of the University College other than that in which the candidate is enrolled, or in other institutions of higher education. Candidates may request admission with advanced standing on the basis of work completed elsewhere before commencing the GradDip program.

Provisions exist for transfer between the Master of Engineering Science and GradDip programs.

All programs are subject to the approval of the Head of th Department in which the candidate is enrolled.

Candidates are advised to study the Conditions for the Awa of Higher Degrees.

5910 Graduate Diploma in Defence Studies

Candidates are required to complete 24 credit points from th subjects available in the Master of Defence Studies prograr

The maximum number of credits that may be taken in a sing Department is 18. At least 18 credits will be taken from a 'cor program (available in 1993 from History or Politics).

5900 Graduate Diploma in Technology Management

The postgraduate subjects from which credits may be gaine are those listed for the Master of Engineering Science (Proje Management Major), the Master of Information Science, ar the Master of Management Economics programs. Up to credits may be obtained from the Military Technology Electiv listed below. No more than 15 credits can be obtained from th offerings of any one department.

All programs require the approval of the Heads of the releva Departments.

No. 8802	*Title*
AINT.~~8201~~ G	Firepower
AINT.~~8202~~ G 8803	Vehicles and Mobility
AELE.8252 G	Communications & Information Systems
AELE.8253 G	Surveillances, Target Acquisition and Guided Weapons

* It should be noted that these subjects will each be taught as a 2 week full-time course.

Australian Technical Staff Officers' Course

Students undertaking this specialty within the Gradua Diploma in Technology Management will have addition course requirements as advised by the Course Coordinat

For subject descriptions, refer to the Interdisciplinary Studi section for AINT subjects (p156) and to Electrical Engineeri for AELE subjects (p150).

Graduate Study

Subject Descriptions

This section contains descriptions of the graduate subjec offered by University College. The subjects are in alphabetic Departmental order:

- Civil and Maritime Engineering
- Computer Science
- Economics and Management
- Electrical Engineering
- English
- Geography and Oceanography
- History
- Politics
- Interdisciplinary Subjects (University College)

ntification of Graduate Subjects and Units by Numbers

ubject is defined by the Academic Board of the University a unit of instruction approved by the University as being a :rete part of the requirements for a course offered by the versity'.

nit at University College is a component of a subject.

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

Each subject and unit has a unique subject identifier comprising an alphabetic prefix and a numeric suffix together with a separate alphabetic subject code.

The authority offering a subject or unit, normally a Department, is indicated by an alphabetic prefix before a decimal point.

The particular graduate subject or unit is identified by four digits after the decimal point. Subjects have a subject code 'G' and units a subject code 'S'.

Graduate subjects and units have an '8' as the first digit of the suffix to the subject identifier. Research degrees have been allocated program identifier and have a '9' as the first digit of the suffix and a code 'R'.

Each identifying number is allocated to one subject or one unit only. A number which has been used previously is not used for a new subject or unit.

: identifying alphabetic prefixes for each of the Depart-nts are set out below.

ACMA	Civil and Maritime Engineering
AELE	Electrical Engineering
AMEC	Mechanical Engineering (including Aeronautical Engineering)
AECM	Economics and Management
AENG	English
AHIS	History
APOL	Politics
ACHM	Chemistry
ACSC	Computer Science (including Information Systems)
AGOC	Geography and Oceanography
AMAT	Mathematics
APHY	Physics
AINT	University College (Interdisciplinary)

following subject codes identify graduate subjects and s:

G	Graduate subject
R	Research program
S	Graduate unit
P	Undergraduate unit taken at graduate level (subject to approval by Head of Department)

requisites and Corequisites

ɔe eligible to enrol in a particular subject in the University ege a student must meet any prerequisite and corequi-s which may be prescribed for it.

ırmation Key

following is the key to the information which may be plied about each subject:

S1 (Session 1), S2 (Session 2)

F (Session 1 *plus* Session 2, i.e. full year)

S1 *or* S2 (Session 1 *or* Session 2, i.e. choice of either session)

- SS (single session, but session not known at time of publication)
- CCH class contact hours
- L (Lecture, followed by hours per week)
- T (Laboratory/Tutorial, followed by hours per week)
- hpw (hours per week)
- C (Credit or Credit points).

Civil and Maritime Engineering

ACMA.8201 G Foundation Engineering (3 credits)

Technology of site investigation. Review of field and laboratory testing. Stability and conventional settlement analysis of isolated footings, combined footings and rafts. Allowable settlements. Design of isolated footings. Piling systems. Review of piling code. Structural analysis of rafts. Design of foundations on active soils. Case studies.

ACMA.8202 G Advanced Foundation Engineering (3 credits)

Analysis of piles and pile groups for land and offshore structures. Structure-foundation interaction. Modern developments in settlement analysis of isolated footings and rafts on clays and sands. Application of CPT data. Dewatering. Design of basement excavations. Underpinning. Raft-pile foundations.

ACMA.8203 G Soil Mechanics (3 credits)

Strength and stress-strain behaviour of saturated and unsaturated soils under static and repeated loading. Laboratory testing methods. Effective and total stress analyses. Selection of strength parameters. Field testing of strength, compressibility, permeability and rate parameters. Centrifuge testing. Variability of soil properties. Analysis of variability.

ACMA.8204 G Soil Dynamics (3 credits)

Fundamentals of vibrations. Transmission of vibrations in elastic continual, homogeneous and layered deposits. Laboratory testing of soil properties under dynamic loading. Liquefaction. Analysis and design of machine foundations subject to vertical, rocking, and torsional vibrations. Finite element analysis. Isolation of vibrations. Fundamentals of earthquake design. Application to foundation design in seismic regions.

ACMA.8205 G Site Investigations (3 credits)

Terrain and geomorphological engineering. Application of photogrammetric techniques. Recent developments in remote sensing. Mapping of features. Presentation of data. Drilling technology in soils and rocks. Types of samplers. Drilling mud. Offshore drilling and sampling. Field testing onshore and offshore, vane, CPT, SPT, camkometer, plate bearing. Geophysical techniques. Other techniques for soils and rocks. Field measurements of displacement, settlement, rotation, strain, force, pore pressure. Measurement of in-situ stresses in rocks. Groundwater studies. Field measurements of permeability in soils and rocks. Case studies.

ACMA.8206 G Pavement Materials and Design (3 credits)

Bitumens and bituminous concrete. Laboratory tests. Mix design. Fatigue, compressibility, creep. Application of bituminous materials in pavement maintenance and rehabilitation. Base course materials. Laboratory tests. Stabilisation techniques. Material properties. Unsealed roads, design, construction, maintenance management. Flexible pavements, design, construction, maintenance management. Concrete pavements, design, construction, maintenance management.

ACMA.8207 G Geological Engineering (3 credits)

Review of rock types, structural features, weathering processes, classifications. Joints. Field data. Presentation of data. Genetic classification of joints. Faults. General characteristics. Classifications. Reverse faults, thrust faults, overthrusts, normal faults, strike-up faults. Strength, deformation, permeability, weathering of rocks. Field and laboratory tests. Characteristic properties. Analysis of open-cut and underground. Rock anchors. Slope stability. Types of failures. Probabilistic analysis. Stabilisation techniques. Case studies of tunnels, dam sites, roads and railway investigations and design. Field and laboratory tutorials.

ACMA.8208 G Basic Finite Elements (3 credits)

Calculus of Variations, energy principles, global approximation methods. Solution of Laplace and Poisson's equations in one and two dimensions. Solution of two dimensional problems in solid mechanics. Numerical integration, isoparametric elements.

ACMA.8209 G Applied Soil Mechanics (3 credits)

Slope stability. Failure mechanisms on solid and rock slopes. Analyses of slope failures. Field instrumentation. Stabilisation of slopes. Case studies. Earth dams. Design and construction. Retaining structures. Analysis and design of gravity, gabion, crib, reinforced earth, sheet pile, coffer dams and miscellaneous systems. Numerical analysis of earth pressures. Soil and rock anchors.

ACMA.8210 G Finite Elements in Structural Analysis (3 credits)

Stiffness analysis of structures. Variational principles in solid mechanics. Application of finite elements for two and three dimensional stress analysis, plate bending and stability.

ACMA.8211 G Advanced Structural Analysis (3 credits)

Introduction to theory of elasticity, St. Venant torsion. Stress and strain in thin plates subjected to in-plane loading. Bending of thin plates. Stability of frames.

ACMA.8212 G Structural Engineering Materials 1 (Concrete Technology) (3 credits)

Microstructure, strength, deformation and durability of cement paste and concrete. Effects of chemical admixtures on cement paste and concrete properties. Thermodynamics of deformation. Constitutive relationships. Behaviour of concrete materials under sustained, repeated, dynamic, tensile and multiaxial loadings. Ferro-cement. Probabilistic and statistical aspects o concrete. Mix design to fulfil functional criteria.

ACMA.8213 G Reinforced Concrete (3 credits)

Methods of analysis and design of reinforced concrete mem bers for bending, compression, combined bending and com pression, shear and torsion. Analysis and design of flat slab and plates. Optimum design of reinforced concrete member and structures. Creep and shrinkage effects in concrete struc tures. Serviceability requirements.

ACMA.8214 G Prestressed Concrete (3 credits)

Analysis and design of prestressed concrete elements Design of statically indeterminate structures, composite struc tures. Deflections.

ACMA.8215 G Structural Dynamics (3 credits)

Analysis of lumped mass systems with various degrees c freedom. Vibration of beams, frames and plates. Free vibra tion. Dynamic response of multi degree-of-freedom systems Approximate methods of solutions. Finite element applica tions.

ACMA.8216 G Structural Engineering Materials 2 (Metals) (3 credits)

Metals as structural materials. Modern steels. Structural alu minium alloys. Brittle fracture. Fatigue. Corrosion and corro sion protection. Weldability of metals. Residual stresses an distortion. Weld quality. Non-destructive testing. Weld desigr Specifications.

ACMA.8217 G Project Management: Planning (3 credits)

Planning process. Feasibility studies. Environmental manage ment. Organization structure and theory. Planning of cycli operations. Programming and scheduling techniques Network analysis. Resource optimization. Quantity measure ment and labour constants. Planning and estimating tech niques. Multi-project scheduling. Manpower and financ planning.

ACMA.8218 G Project Management: Administration (3 credits)

Contract administration: legal aspects and project documer tation. Contract arrangements and forms of contract. Lega aspects: industrial law, law of contract and law of tor Specifications, bills of materials, types of estimates and meth ods of estimating. Tender procedure and tender evaluatio techniques. Contract supervision. Arbitration. Decision-mak ing techniques.

ACMA.8219 G Project Management: Operation and Control (3 credits)

Prerequisites: ACMA.8217 G and ACMA.8218 G

Role, duties and responsibilities of the project enginee Project organization. Site planning and layout. Project pro gramming and resource allocation. Contract and sub-cor tracting. Project finance, cost estimating and contro Manpower aspects, industrial relations. Project processing monitoring and control. Quality control and work measure ment. Project supervision.

MA.8220 G Project Management: Capital and Maintenance (3 credits)

ecasting and modelling techniques and applications. Life-le costing, Weibull analysis, age and block preventive lacement, Glasser's graphs, economic life of capital equip-nt. Capital replacement decisions, estimating reliability, anizational structure decisions, overhaul and repair. intainability, evaluation of component and system main-ability, system support and reliability. Institutional proce-es, annual estimates, FYDP. Inventory models, stock trol, cost models, risk management.

MA.8221 G Project Management: Logistics Modelling

holistic approach to analysis of logistics systems. Use of t systems methodology to specify key elements of logistics tems, and application of systems dynamics to produce ration of policy/decision model of the logistics system.

MA.8222 G Project Management: Special Elective 1 (3 credits)

cialised study of case studies in association with **MA.8217 G.**

MA.8223 G Project Management: Special Elective 2 (3 credits)

cialised study of case studies in association with **MA.8218 G.**

MA.8224 G Project Management: Special Elective 3 (3 credits)

cialised study of case studies in association with **MA.8219 G.**

MA.8225 G Project Management: Special Elective 4 (3 credits)

cialised study of case studies in association with **MA.8221 G.**

MA.8226 G Coastal and Ocean Engineering (3 credits)

ve theories, wave transformation, real wave trains, wave a collection and analysis, generation and decay of wind ves, wave hindcasting, operational and design wave esti-tion, tides and storm surges, wave induced sediment nsport (inshore and offshore regions), sensitivity of estuar- and coastal inlets to engineering works, wave forces on ictures, investigation and design of harbours and coastal l offshore projects, response of moored ships to wave on and design of mooring systems, numerical and physi- models in coastal and ocean engineering. Case studies. e: All topics will be discussed. Topics of specific interest be selected by students and an in-depth treatment will be sented.

MA.8227 G Civil Engineering Elective (3 credits)

occasional elective on a civil engineering topic, selected ording to the specific expertise and experience of visitors he Department of Civl and Maritime Engineering.

ACMA.8101 G Research Project (9 credits) F

A minor research project forming part of an on-going program in the Department or a project arising from the professional activities of the candidate.

ACMA.8102 G Research Project (18 credits) F

A major research project forming part of an on-going program in the Department or a project arising from the professional activities of the candidate.

ACMA.8228 G Coastal and Seabed Dynamics (3 credits)

Flow resistance in unidirectional flow, sediment properties, sediment transport in unidirectional flow, initiation of sediment movement and bed friction under oscillatory flows, longshore sediment transport, surf zone infragravity waves, coastal inlets, coral cays.

ACMA.8229 G Traffic Engineering Practice (3 credits)

Traffic analysis (existing and new methods and techniques); microcomputers in traffic design (development of traffic system models); transport and economics, environmental impacts and community involvement in transport planning.

ACMA.8230 G Traffic Engineering Practice: Special Elective (3 credits)

Specialised study of case studies in association with **ACMA.8229 G.**

ACMA.8231 G Occasional Elective 1 (3 credits)

An occasional elective given by a member of staff plus external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

ACMA.8232 G Occasional Elective 2 (3 credits)

An occasional elective given by a member of staff plus external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

ACMA.8233 G Occasional Elective 3 (3 credits)

An occasional elective given by a member of staff plus external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

ACMA.8236 G Applications of Systems Dynamics in Civil and Maritime Engineering (3 credits)

Systems Dynamics analyses a system in terms of state (level) and flux (rate) variables. A level represents, at every instant, the interaction of the fluxes having entered or left the system in the past. Fundamental to Systems Dynamics, therefore, are *feedback* and *change* over time. The subject will focus on application of Systems Dynamics to practical engineering planning, design, maintenance and management problems,

such as strategic planning of engineering facilities, environmental impact assessment, life-cycle costing, risk analysis and total quality management.

The following subjects are available in the MDefStudies course. Unless stated here the syllabus for each is the same as that shown for the MEngSc subject of the same name:

ACMA.8801 G New Materials and Technology (6 credits)

(Available to MDefStudies students only)

Introduction to high technology materials and techniques used in current generation military equipment. Metals and other materials for military application. Fabrication and repair technology.

ACMA.8802 G Project Management: Planning (6 credits)

ACMA.8803 G Project Management: Administration (6 credits)

ACMA.8804 G Project Management: Operation and Control (6 credits)

ACMA.8805 G Project Management: Capital and Maintenance (6 credits)

ACMA.8806 G Project Management: Logistics Modelling (6 credits)

ACMA.8807 G Applications of Systems Dynamics in Civil and Maritime Engineering (6 credits)

Computer Science

The following subjects can be selected for inclusion in a MInfSc program. Not all subjects may be available in any one year. However, should the demand be high for a specific subject in any year, then attempts will be made to make that subject available in that year.

ACSC.8201 G Introduction to Computer and Information Systems S1

This subject consists of five modules. The first module provides a brief exposure to the UNIX operating system. The second module addresses the recent developments in operating systems, and will cover areas such as hardware support for multi-programming, classification of operating systems, functions of an operating system, as well as the components of an operating system. The third module reviews the evolution of computer based information systems and will cover transaction processing systems, office automation systems, information reporting systems and decision support systems. The fourth module will discuss the present status of expert systems and artificial intelligence. The final module addresses the recent approaches in computer security and cryptography.

ACSC.8202 G Management Science Techniques S1

Examines the techniques of Management Science, emphasising their application and deployment in the analytical decision-making process. Topics included are decision theory and analysis, statistical analysis, game theory, linear and nonlinear programming, dynamic programming, inventory management, reliability and replacement strategies, search techniques, and stochastic processes. Forecasting and modelling techniques and applications. Evaluation o component and system maintainability, system support and reliability. Inventory models, stock control, cost models, risk management.

ACSC.8203 G Decision Support Systems S2

Addresses the principles and practice of decision support systems. Areas that will be addressed are the design, development and applications of decision support systems Conceptual framework, cognitive styles, evaluating and using Decision Support Systems (DSS), DSS architectures, data base management systems, model-base management systems, problem solving and decision-making tools, brainstorming, operations research tools, artificial intelligence techniques, dialogue generation and management software man-machine interfaces, adaptive design approach, knowledge acquisition, applications and case studies.

ACSC.8204 C Systems Programming S2

Systems programming based on the UNIX operating system and the C programming language. The UNIX environment text editing, hierarchical file system, protection and permissions, command features, pipes, filters, and tees, programming tools. Shells, shell programming, process hierarchy system management. C programming language, functions pointers, linked structures, hash addressed storage, binary trees. System interface, file access functions, input–output process spawning and control, signals and interrupts, process communication, interlanguage linking.

ACSC.8205 G C³I Systems—Design, Management, and Operation S

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.

ACSC.8206 G Data Networks S

Networks and their goals: applications of networks; data transmission; error correction and testing. Switching strategies for data communication: circuit switching, message switching and packet switching. Network architecture: layered architectures; a concept of a protocol; interworking. Terminal and computer networks. Wide area networks and local area networks Network standards: the ISO/OSI reference Model, SNA–IBM standard. The Physical Layer: the ISO requirements; mechan

l requirements; electrical requirements; terminal handling. e Data Link Layer: the ISO requirements; elementary data < protocols; sliding window protocols; examples. The twork Layer: the ISO requirements; virtual circuits and tagrams; routing; congestion; examples. The Transport yer: the ISO requirements; transport services; error detec- n and recovery; addressing; multiplexing; connection estab- nment, data transmission, connection release; erconnection of networks; examples. The Session Layer: ISO requirements; examples. The Presentation Layer: the) requirements; file transfer, virtual terminal protocol; secu- in computer networks; examples. The User Layer: the ISO uirements; distributed databases; distributed computation; twork and distributed operating systems; examples. Local ea networks. Technologies: topology, media, signalling hniques, transmission modes; examples. Access control: s access techniques, reservation techniques, ring access hniques; examples. Data link protocols: connection-less, nection-oriented; examples. Local area network stan- rds: IEEE 802 LAN, MAP. Networks: Ethernet, IBM ring. DN—data, voice, image transmission; intelligent networks.

SC.8207 G Knowledge Based Systems S2

eorem proving, resolution, Prolog. OPS-5. Inferencing, xact reasoning, knowledge representation, knowledge uisition, automatic rule indiction, consistency main- ance. Expert systems shells, knowledge engineering lan- ages. Support tools, knowledge base editors, explanation ilities. Meta-knowledge.

SC.8208 G Computer Security and Cryptography S1

oduction, description of problems in the protection of infor- tion. Classification of methods of protection. Mathematical thods, complexity theory, information theory, Encryption thods of information protection, classical ciphers, symmet- algorithms, assymmetric algorithms, DES, RSA. thentication methods, elementary methods of authenti- ion based on symmetric algorithms. Digital signatures, user hentication. Cryptographic techniques, block and stream hers, linear feedback shift registers, one-way ciphers and sswords, homomorphic techniques. Application of cryp- raphy in databases, models of databases, cryptographic thods which preserve database structure, tradeoff between gree of protection and efficiency, data processing of crypted data. The role of cryptography in computer network curity, key management, generation and storage of crypto- phic keys, cryptographic protocols. Trusted systems proaches. Tempest requirements.

SC.8209 G Databases and Database Management S1

oduces and concentrates on modern relational systems. ta analysis using the entity-relationship model. Relational ory. Principles of good database design: Functional depen- ncies; normal forms; multi-valued dependencies and 4NF; n dependencies and 5NF. Database languages: Relational ebra and SQL; Relational calculus, QUEL and QBE. formance considerations: File types and access mech- sms; hashing; indexes; B-trees. Query optimisation: uristic and cost estimation methods. Transactions and con- rency control: serializability and locking; deadlock detec- n and prevention; timestamping and optimistic methods. tabase recovery. Security and integrity. Distributed abases. Object orientation and databases.

ACSC.8210 G Information Systems—Design, Operation and Control S1

Types of information systems; management information systems, decision support systems, and knowledge based systems. Strategic planning; management control. Feasibility studies. Information systems initial design and detailed design. Use of information systems in organisations, overview of information systems functions. Systems theory. Information theory. Structuring systems. Software design, modularity, cohesion, coupling. Process design, data and transforms. Systems design methods (HIPO, SADT, PSL, SVD). Roles, duties and responsibilities of the systems manager. Site planning and layout. Project programming and resource allocation. Management and use of applications software, software development. Computer aided software engineering tasks. Manpower aspects. Project processing, monitoring and control. Project supervision.

ACSC.8211 G Computer Graphics S2

Modern topics in computer graphics: graphics hardware, output primitives, scan conversion, 2D and 3D modelling, perspective views of visible surfaces, interactive devices and modes, X windows, X-lib and toolkit, Postscript, colour perception and choice, rendering techniques.

ACSC.8212 G Operating Systems and Real Time Languages S1

Types of operating systems, real time operating systems. Management. Components of operating systems: process management, memory management, device management, file management. Real time operating system requirements. Process management, concurrent processes, communication between processes, synchronisation, scheduling, kernel of an operating system. Memory management; objectives, virtual memory, paging, segmentation. Input and output; design objectives, device handlers. File management; directories and file storage, operations on files. Resource allocation. Deadlocks, protection, reliability. Examples of real-time operating systems. Real-time languages, languages for discrete processes, languages for continuous processes. Examples of real-time languages.

ACSC.8213 G Software Engineering and ADA S2

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.

ACSC.8214 G Special Topic 1

ACSC.8215 G Special Topic 2

ACSC.8220 G Special Topic 3

ACSC.8221 G Special Topic 4

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

ACSC.8216 G Requirements Engineering S2

Gathering user requirement and knowledge acquisition. Preparing specifications. Information management, organisational analysis, software engineering. Logical design of modules, systems structure. Conventional and soft systems analysis. Planning process (SDLC, prototyping etc). Feasibility studies and computer support proposals. Capacity planning, measurement of capacity performance, software matrices. Evaluation of options and tenders.

ACSC.8217 G Computing Milieu S2

Provides a forum for the discussion of the social effects of computers, and to give a sampling of industrial, commercial and administrative applications. The associated practical work (small group discussions, essays and criticisms), is intended to give the student an opportunity to discuss pertinent social issues and to provide him/her with experience in literature searching and technical report writing. Topics will include literature searching, requirements for criticism and essay exercises, history of computers, economics of the industry, privacy, security, international issues, computers and employment.

ACSC.8218 G Computer Speech Processing S2

Introduces the fundamental concepts of computer speech processing: speech digitisation; sampling theorem; wideband speech coding; human speech production; fundamentals of phonetics; time-domain speech analysis; prosody; frequency-domain speech analysis; fundamentals of signal processing; homomorphic analysis; formant synthesis; fundamentals of speech perception; text-to-speech synthesis; linear-predictive coding; narrow-band speech coding; isolated-word recognition; pattern matching; hidden Markov models; artificial neural networks; speaker recognition; speech understanding systems.

ACSC.8219 G Document Processing Systems

Introduction and Historical Perspective—manuscript, block printing, typesetting, illustration, printing; Interactive Text Entry Programs—plain vanilla text editors, basic screen editors, development of macros for text editors, word processors, page layout programs; Modern Printing Technology—typesetting, illustration, printing; Structured Languages—TeX, LaTeX, Troff; Hybrid Languages; Markup Languages; Page Layout Languages; Design Aspects—typography, document design; Specialty Typesetting—mathematics, music, pictographic and script languages; Future Directions—on-line document design, storage technologies, data compression, document transmission.

ACSC.8222 G User Interface Construction S2

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

ACSC.8102 G MInfSc Major Project F

ACSC.8101 G MInfSc Minor Project F

Economics and Management

AECM.8101 G Topics in Economics and Management 1

Single session subject
Credit points 3
Prerequisite Permission of Head of Department

An occasional elective given by a member of staff on a topi of relevance to economics and management. Alternatively, literature search of a relevant topic and the preparation of research report or equivalent essays by the student.

AECM.8102 G Topics in Economics and Management 2

Single session subject
Credit points 3
Prerequisite Permission of Head of Department

An occasional elective given by a member of staff on a topi of relevance to economics and management. Alternatively, literature search of a relevant topic and the preparation of research report or equivalent essays by the student.

AECM.8103 G Minor Thesis (6 Credit Points)

The preparation and submission of a minor thesis as indicate in the Regulations for the MMgtEc degree.

AECM.8215 G Economics for Managers 1: Microeconomic Policy and Analysis S

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week

An introduction to microeconomics with special attention give to managerial applications. Topics covered include supply an demand behaviour, oligopoly and monopoly in the Australia context, industrial concentration, the implications of trans actions costs for managerial decision making, and the role c the Australian government in regulating the microeconomi environment.

AECM.8216 G Economics for Managers 2: Macroeconomic Analysis and Policy in an Open Economy S

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisite AECM.8215 G Economics for Managers 1

An introduction to macroeconomic analysis in an open ecor omy and macroeconomic policy and its implications for publi and private organisations. Monetary and fiscal policies an their impact on the domestic and foreign sectors of the ecor omy; the theoretical and practical analysis of the proper scop of government involvement in economic and social affairs; th effects of variations in macroeconomic analysis on the mar agerial environment in the public and private sectors.

ECM.8217 G Organisational Planning and Development **S2**

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week

his subject focuses on the theory and processes of organi-ational planning and development. It provides students with n understanding of how organisations plan, operate and hange. Students explore ways through which organisational anning and performance can be improved.

ECM.8218 G Economic and Managerial Statistics **S1**

Single session subject
Credit points 3
Lectures and laboratory 3 hours per week

his subject gives students a basic knowledge of statistical ethods as used in economics and management. The mphasis throughout is on the application of methods and nderstanding the results obtained. Students will also be intro-uced to basic computer packages.

ECM.8219 G Economic Foundations of Project Evaluation and Management **S1**

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisite: AECM.8216 G Economics for Managers 2

his subject explores the economic principles underlying pub-: projects and government involvement in the economy. ractical applications are used to elucidate the implications of ach principle for public sector management.

ECM.8220 G Accounting for Managers **S2**

Single session subject
Credit points 3
Lectures and practical sessions 4 hours per week

he aim of this unit is to discuss the key concepts of financial ccounting and management accounting; a description of the her major accounting specialisations; and a consideration of e relationship between accounting and other management sciplines.

ECM.8221 G Finance and Investment Appraisal **S2**

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisite: AECM.8218 G Economic and Managerial Statistics

troduction to investment evaluation techniques under con-tions of risk and uncertainty, both for public and private enter-ises. Topics covered include standard techniques such as scounted cash flow and cost benefit analysis and financial atement analysis; the capital asset pricing model; security valuation models; and corporate finance and financial insti-tions in Australia. Budgetary systems such as the Financial anagement Improvement Approach are also briefly dis-ıssed.

AECM.8222 G Human Resource Management **S1**

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisite: AECM.8217 G Organisational Planning and Development

This course examines the theory and practice of human resource management, including industrial relations. 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.

AECM.8223 G Acquisition and Contracting

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisite: AECM.8215 G Economics for Managers 1

Introduction to the institutional and legal framework of the acquisition process. Contracting, integrated logistics support, and systems design. The management and economics of the tendering process is also discussed, with the focus being on industrial marketing strategies and military procurement practices.

AECM.8224 G Operations Management

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisite: AECM.8215 G Economics for Managers1

Analysis of manufacturing, service and project operations. Products and processes. The management of production and distribution processes including planning and scheduling, capacity and material requirements, process control, inventory control, maintenance and reliability, quality assurance and cost control.

AECM.8225 G Economic and Managerial Forecasting

Single session subject
Credit points 3
Lectures and laboratory 3 hours per week
Prerequisite: AECM.8218 G Economic and Managerial Statistics

This subject is designed to familiarise students with the most effective way to use the different economic and managerial forecasting methods: judgmental, econometric (or causal), time-series (or extrapolative), and segmentation. Students will also learn how to combine these methods, the relative advantages and disadvantages of each of the forecasting methods, and ways of identifying the methods that are best in each situation. Particular attention will be focused on the application of the two major types of forecasting models—regression and time-series (particularly the Box–Jenkins ARIMA models)—with the help of computer packages.

AECM.8226 G Economics of Regulation

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisites: AECM.8215 G Economics for Managers 1 and AECM.8216 G Economics for Managers 2, or equivalent

This subject examines what government regulation of the economy at the microeconomic level can and does achieve in Australia. After an introduction to economic theories of the political process, the course examines a number of regulatory processes in detail and assesses their impact on economic efficiency. Regulatory regimes covered include minimum wage legislation, occupational health and safety legislation, zoning and land-use laws and financial market regulations controlling takeovers and insider trading. The final part of the course will contrast alternative approaches to regulating the transport and communications sectors in the context of the current trend towards deregulation and privatisation.

AECM.8227 G Logistics and Transport Management S1

Single session subject
Credit points 3
Lectures and tutorials 3 hours per week
Prerequisites: AECM.8216 G Economics for Managers 2; AECM.8218 G Economic and Managerial Statistics

Military logistics. Maintenance and reliability. Logistics functions. Integrated logistics support systems. Logistics management and corporate strategy. Techniques of logistics management. Location and transport requirements. Australian transportation systems. Pricing and costing of transport services. Appraisal of investments in transport infrastructure and facilities. Techniques of transport management. Defence considerations.

AECM.8228 G Advanced Project Management S2

Single session subject
Credit points 3
Seminars 3 hours per week
Prerequisite: AECM.8216 G Economics for Managers 2; AECM.8217 G Organisational Planning and Development

In this subject, students bring together project management techniques learned in other subjects throughout their Masters course. In addition to undertaking a thorough examination of research methodology, each student will prepare a substantial research paper on an individual project and present a discussion of the topic to other students.

Electrical Engineering

AELE.8201 G Microwaves

A selection of topics from: transmission lines, waveguides, striplines, resonators, filters, ferrite devices and other passive components; microwave diodes and transistors, up/down converters, frequency multipliers, phase shifters, detectors, magnetrons, klystrons, travelling wave tubes and other active components.

AELE.8202 G Antennas

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.

AELE.8203 G Optical Fibres

Waveguide equations, wave and ray optics; planar wave guides; step- and graded-index fibres; fibre couplers, splices connectors; fibre measurements; fibre fabrication.

AELE.8204 G Introduction to Digital Image Processing

General digital image processing concepts; image I/O devices; sampling theorem; enhancement; classification warping; storage/transmission.

AELE.8205 G Digital Image Restoration

2-D Fourier transforms—leakage, aliasing, interpolation; 2-D filtering convolution; Wiener filter; tomography; radio and optical astronomy; "clean", speckle restoration.

AELE.8206 G Machine Vision

Vision in humans; machine vision—segmentation, feature recognition, edge finding; 3-D world, shape-from-shading minimum curvature, stereopsis; examples.

AELE.8207 G Computer-Generated Imaging

Graphical animation; 3-D surface modelling; ray-tracing reflection model; artificial texture and terrain generation; simulators.

AELE.8208 G Speech and Image Coding

Models for speech processing, digital representation of speech, homomorphic speech processing, linear predictive coding of speech, digital speech processing for man-machine communication by voice. Continuous and discrete image characterization, discrete two-dimensional linear processing image enhancement and restoration, image analysis, image coding, techniques for image bandwidth reduction.

AELE.8209 G Advanced Computer Architecture

(This subject will be presented in collaboration with the Computer Sciences Laboratory, Research School of Physical Sciences, Australian National University).

The subject is an introduction to the architecture of parallel computers, the design and analysis of parallel algorithms, and various theoretical aspects of parallel computation. Topics which will be covered if time permits include: Motivation for parallel computation; Pipelined machines and vector processors; Array processors; Systolic arrays and instruction systolic arrays; connection networks; Hypercube machines; Various multiple-instruction multiple-data (MIMD) machines; Dataflow machines; Theoretical models of parallel computers Complexity results (including the class NS); Parallel algorithms for various problems; Languages for expressing parallelism.

AELE.8210 G Microcomputer System Design

Single and multi-level interrupts, bi-directional data transfer interfacing serial devices to microprocessors, the use of co processors for numerically intensive calculations, the use of high level languages for program development.

.ELE.8211 G Digital Communications

igital communication systems, digital modulation techniques ASK, APSK, OQPSK, PASK, FSK & MSK), line coding, qualization.

.ELE.8212 G Advanced Digital Systems

he State machine approach to digital design, computer archi-ecture, bit-slice design techniques, microprogramming, arallel processing techniques, the Transputer, Architectures or high speed and array processing.

.ELE.8213 G Advanced Digital Signal Processing Techniques

ast transform techniques, FFT, FWT, data and spectral win-ows; time and frequency transform techniques.

.ELE.8214 G Digital Signal Processing in Practice

peech processing techniques; speech recognition and syn-nesis; digital signal processor architecture, biomedical signal rocessing techniques; EEG, ECG and EMG signal process-ıg; fault detection in a vibrating structure; seismological sig-al processing; load forecasting in power systems.

.ELE.8215 G Advanced Circuit Theory

witched capacitor circuit theory; mathematical models, nalysis and design; computer-aided design of switched apacitor networks; application of switched capacitor circuits; lter design; flash A/D circuits.

.ELE.8216 G Information Theory

ıformation measure, entropy, mutual information; channel oding theorem; rate distortion theory, source coding tech-iques; data compression techniques; broadcast channels.

.ELE.8217 G Time-series Analysis Techniques

lassification of linear models. Autoregressive model, and utoregressive moving average model; parameter estimation echniques; structural estimation techniques; information cri-eria.

.ELE.8218 G Advanced Control Systems

ıtroduction to dynamical model representations; analysis of ontrol systems using coprime fractional representations; esign of observers; optimal control, H∞ optimal designs; ıodel reduction techniques.

.ELE.8219 G Robotics

lassification of robots; dynamical models of a manipulator rm; flexible and rigid arms analysis; control of a manipulator rm; design of adaptive controllers; sliding-mode controls.

.ELE.8220 G Methods in Robust Control Theory

ontrol of system with large parameter uncertainty. Lyapunov tability methods. Use of nonlinear control. High gain linear ontrollers. Use of observers for uncertain systems. Cheap ontrol and loop recovery techniques. High gain adaptive con-ol.

AELE.8221 G Data Security

Encryption and decryption techniques and related systems; one-time pad techniques; public key encryption and decryption techniques, signature authentication; RSA and MH techniques; cryptoanalysis.

AELE.8222 G Advanced Data Networks

Topological design of data networks; public data protocols, X.21, X.25, X.75, SNA protocols; ISDN concepts; ISDN protocols; design of ISDN systems; local area networks, Ethernet; design of a local area network; performances and measurements of a data network.

AELE.8223 G Advanced Very Large Scale Integration (VLSI) Techniques

VLSI design methodology; gate array vs custom-chip design; gate array design methodology; design of circuits using gate arrays; custom-chip design methodology; nMOS and cMOS design rules; latch-up and its solutions.

AELE.8224 G Advanced MOSFET Semiconductor Theory

MOSFET family, nMOS, cMOS, VMOS; analysis of an nMOS transistor; pinch through phenomenon; 2-dimensional and 3-dimensional solution of the potential distribution equation. Surface recombination; analysis of a cMOS transistor; latch-up problems; analysis of a VMOS transistor.

AELE.8225 G Advanced Power Systems

Theory and economic operation of large power systems. Performance, control, security, stability, analysis. Advanced digital computer techniques.

AELE.8226 G Power System Protection

Theory, construction and operation of devices and systems used in the protection of power networks and components.

AELE.8227 G Digital Electronics

A selection of topics from the following: bit-slice design; pipelined digital systems; microprogramming techniques; electrical properties of digital circuit interconnection; digital system design problems including flip-flop metastable states and output commutation; safe design using high speed logic families such as Advanced Schottky, FAST, Emitter-Coupled Logic; computer backplane bus design; designing with dynamic memories and other related topics.

AELE.8228 G Adaptive Digital Signal Processing

Advanced digital signal processing techniques including a selection of topics from Optimal filter design, Kalman Filters, estimation of signal model parameters and recursive estimation techniques. These techniques can be applied to such areas as image processing, speech processing and data communications.

AELE.8229 G Computer Pattern Recognition

The concepts of patterns in data, the definition of features and the need for feature selection. Linear and quadratic non-parametric discriminant analysis. Parametric statistical classification techniques including maximum likelihood methods. Unsupervised methods and clustering. Committee and piecewise linear methods. Applications in image interpretation, speech recognition and data reduction.

AELE.8230 G Spaceborne Imaging Technology

Planck's blackbody radiation law, atmospheric transmission and atmospheric windows. Wavelength ranges available for earth imaging and corresponding energy-matter interaction mechanisms. Detectors in the visible and reflective infrared regimes. Thermal detectors. Passive and active microwave sensing of earth surface features, including synthetic aperture radar methods. Spaceborne imaging systems including NOAA-AVHRR, Landsat MSS and TM, Spot HRV, SIR A,B,C and space station instrumentation.

AELE.8231 G Linear Systems

(This subject is presented in collaboration with the Department of Systems Engineering, Research School of Physical Sciences, Australian National University).

Introduction to linear systems, including: controllability, observability, state feedback, observers, transfer function realization, stability, matrix fractions, class of all stabilizing controllers.

AELE.8232 G Adaptive Control Systems

(This subject is presented in collaboration with the Department of Systems Engineering, Research School of Physical Sciences, Australian National University).

Topics in adaptive filtering and introduction to adaptive control; persistency of excitation, adaptive lattices, error systems, mismodelling and robustness, averaging, simultaneous identification and control; model reference adaptive control, adaptive controller stability.

AELE.8233 G Radar Cross-Section Analysis

A selection of topics from: incident, scattered and total fields; equivalence, reciprocity and reactance theorems; scalar, vector and diadic green's functions; modal methods; electric field, magnetic field and hybrid integral equations; method of moments for integral equation solution; singularity expansion methods; ray optics derived from Maxwell's equations; optics, physical optics and geometrical theory of diffraction; hybrid numerical-optics methods.

AELE.8234 G Radar

A review of radar concepts including: pulsewidth and PRF considerations, Doppler shift, ambiguities, the radar equation, the concept of radar cross-section, CW and FM radar, moving target indication, bistatic radar; a selection of modern developments from: chirp, pulse compression, matched filters, side-looking radar, aperture synthesis, synthetic aperture and imaging radars, SAR correlation and image formation, over-the-horizon radar, target identification.

AELE.8235 G Software Engineering

A selection of topics from the following: The software environment of real-time systems, concurrent programming techniques, particular study of Modula-2 or Ada, the low-level machine interface of high-level languages such as Modula-2 and Ada, modular design to east software transportability, object oriented programming techniques and other related topics. The Macintosh operating system and programming with its toolbox.

AELE.8236 G Neural Networks

Introduction to Neural Networks: Different types of Neural networks, Hopfield net, Hamming net, Carpenter Grossberg net, Hecht-Nielsen Counterpropagation net, Bidirectional A sociative Memory, Kohonen Feature map, Perceptro Training and classifications using neural network Applications of neural networks to signal processing, artifici intelligence.

AELE.8237 G Laser Fundamentals and Applications

Properties of electromagnetic radiation and its interaction wi matter. Laser materials, threshold conditions for oscillation Properties of laser light. Types of lasers and methods f measuring their characteristics. Q-switching, cavity dumpi and modelocking. Applications involving beam directionalit alignment; ranging, guidance systems. Applications involvi laser power. Holography, holographic interferometry, no destructive testing using holography. Laser safety, standar and practices.

AELE.8238 G Adaptive Antenna Arrays

A selection of topics from: Introduction to optimal array pr cessing, array signal representation, narrowband and broa band processor structures, element space and beamspa processing in time domain as well as in frequency domai adaptive algorithms, spatial spectral analysis.

AELE.8239 G Introduction to VLSI Systems

(This subject is presented in collaboration with the Comput Sciences Laboratory, Research School of Physical Science Australian National University).

This subject provides an introduction to integrated syster such as single-chip microprocessors. Topics covered inclu MOS devices and circuits, integrated system fabrication, da and control flow in systematic structures, implementation integrated system designs, examples of LSI systems and co trollers, system timing, highly concurrent architectures, a area-time tradeoffs. Students will be involved in a small nMC or cMOS design project.

AELE.8240 G Antenna Array Processing

A selection of topics from: Analysis of narrowband and broa band adaptive algorithms, error analysis and robust array pr cessing, broadband processors with robustness, bea forming in the presence of correlated arrivals, direction arrival estimation techniques.

AELE.8241 G Interconnected Power System Dynamic

Synchronous machine modelling, power flow equations, loa frequency control, voltage-VAR control, transient stabili solid-state exciters, eigen-value analysis and controller desi for damped interconnected power system operation.

AELE.8242 G Power Electronic Applications

Power electronic devices: SCR, GTO, TRIAC, bipolar trans tors, MOSFET, low power interface and protection networ Controlled rectifiers and switch-mode power supplies. Adju able speed drives; controlled rectifiers, choppers, inverte cyclo-converters and association control strategies. The u of field orientated control in variable speed drives. Switch reluctance drive analysis.

ELE.8243 G Broadband Antenna Arrays

selection of topics from: Narrowband and broadband signals r array processing, effect of bandwidth on the performance an array, array processing with tapped delay line structure, equency domain processing of broadband signals, relation-ip between time domain and frequency domain processing, oadband arrays with constraints, broadband arrays in the esence of correlated fields.

ELE.8244 G Expert Systems, A Practical Introduction

his subject considers some practical issues in the design and plementation of an expert system. Topics covered will clude knowledge representation methods, inference engine rategies, knowledge acquisition techniques and non-mono-nic reasoning.

ELE.8245 G Natural Language Processing

selection of topics from: Speech processing input, syntax alysis, non-deterministic and deterministic parsers, seman-analysis, ways of overcoming ambiguous meanings, prag-atics, discourse analysis, ways of understanding scourses.

ELE.8246 G Advanced Engineering Electromagnetics

selection from the following topics with applications to tennas, optics, waveguides, radar and microwave prop-gation: A review of time harmonic electromagnetic fields, the ave equation, construction of solutions from potentials, elec-magnetic theorems and principles, scattering, integral uations and the moment method, the geometrical theory of ffraction, Green's functions, perturbation and variational chniques.

ELE.8247 G Electrical Engineering Elective

n occasional elective on an electrical engineering topic, lected according to the specific expertise and experience of sitors to the Department of Electrical Engineering.

ELE.8248 G Special Elective 1

n occasional elective given by a member of staff or external cturers or visitors on a topic of immediate relevance. ternatively a literature review of the technology in a specific ea or a design project of appropriate intellectual and techni-l challenge may be undertaken.

ELE.8249 G Special Elective 2

n occasional elective given by a member of staff or external cturers or visitors on a topic of immediate relevance. ternatively a literature review of the technology in a specific ea or a design project of appropriate intellectual and techni-l challenge may be undertaken.

ELE.8250 G Special Elective 3

n occasional elective given by a member of staff or external cturers or visitors on a topic of immediate relevance. ternatively a literature review of the technology in a specific ea or a design project of appropriate intellectual and techni-l challenge may be undertaken.

AELE.8251 G Special Elective 4

An occasional elective given by a member of staff or external lecturers or visitors on a topic of immediate relevance. Alternatively a literature review of the technology in a specific area or a design project of appropriate intellectual and technical challenge may be undertaken.

AELE. 8252 G Communications and Information Systems

This subject will provide an overview of telecommunications services available both in military and civilian environments. Topics will include the information to be transmitted in a telecommunication system; telecommunications channels. Acts controlling the utilisation of the spectrum and international planning meetings (World Administrative Radio Conference, CCITT, CCIR, ITU etc).

Information systems, including storage, retrieval and management of information.

Students undertaking this subject will be expected to have a background in introductory trigonometry and the equivalent of senior high school to first year university physics.

AELE.8253 G Surveillance, Target Acquisition and Guided Weapons

This subject will provide a non-mathematical overview of the technologies available for surveillance and guided weapons systems. Topics will include the available electromagnetic spectrum; ranges of wavelength for surveillance; aircraft and spacecraft monitoring systems; civilian available data verses dedicated military technology; counter measures and counter-counter measures; control, communications and guidance issues in guided weapons system technology.

Students undertaking this subject will be expected to have a background in introductory trigonometry and the equivalent of senior high school to first year university physics.

AELE.8101 G Project Report (9 credit points)

Research project plus report in approved form.

AELE.8102 G Project Report (18 credit points)

Research project plus report in approved form.

English

AENG.8100 G Sub-thesis **F**

Students who choose to write a sub-thesis as part of their MA (Pass) program must submit the chosen topic for approval by the Head of Department. It is expected that the thesis will normally be c.15,000 words in length.

AENG.8201 G Australian Literature Since 1960 **S1 CCH2**

The subject examines a selection of texts in the novel, drama and poetry with the aim of determining major developments in Australian literature over the past twenty five years. Some attention is given to changing critical evaluation of texts as well as the critical views of writers.

AENG.8202 G Australian Literary Movements and Controversies S2 CCH2

This subject examines a number of Australia's most significant cultural/literary movements and controversies. Inevitably, questions of social and political importance will arise since many of this country's controversial creative writers have also been recognisable community figures. Literature was their way of relating to a wider world. Themes and controversies to be discussed include: republicanism/nationalism, Anzac, the land/environment, the Australian Legend, aboriginality, the Jindyworobaks, racism, anti-war sentiment and the public profile of arguably our most eminent writer, Patrick White.

AENG.8203 G Victorian Autobiographical Narratives S1 CCH2

A study of Victorian autobiographical narratives, both fictional and 'factual'. The selected texts were of major influence in their own time and continue to present challenges to modern critical thinking; some, like *Jane Eyre* and *The Mill on the Floss*, have enjoyed an extraordinary revival in the last two decades due to the increased interest in gender issues and the new challenges of contemporary literary theory. Autobiography, whether fictional or factual, is a more obviously problematic mode of writing than others and raises such issues as the presentation of self, the role of memory, the enabling/disabling function of language, the negotiation of the past and the treatment of time.

AENG.8204 G Twentieth Century Literary Theory S1 CCH2

This one semester subject deals with the most influential theories of the last hundred years: the theories of Aestheticism, of Henry James, D. H. Lawrence, T. S. Eliot, F. R. Leavis and his associates, American New Criticism, Structuralism, to the more recent developments: Deconstruction, the new Moralism, and Feminist and Marxist approaches.

AENG.8205 G The Two Houres Traffique of our Stage: Medieval and Renaissance Drama CCH2

(Not available in 1993)

The subject provides a critical analysis of the transition from the Medieval to the Renaissance notions of Time, Providence and Redemption as exemplified in dramatic practice from 1456–1642.

AENG.8206 G One Hundred Years of Women's Writing CCH2

(Not available in 1993)

This subject uses a wide-ranging selection of writing by women to study some of the worlds where women live, their problems as writers within the greater world and the perspectives they characteristically take.

AENG.8207 G Aboriginal Literatures and Themes—Unaipon to Recent Oral Testimony Material CCH2

(Not available in 1993)

This subject studies the emergence, and recent consolidation, of black literature (and themes) in this country. The attitude towards aboriginality of both black and white writers/speakers is compared and contrasted and the complex social and ideological differences obvious in the last decade receive particular emphasis.

AENG.8208 G One Hundred Years of Australian Women's Writing CCH

(Not available in 1993)

This subject uses a selection of writing by women in Australi to study life as they live and perceive it, and to consider the problems as writers in Australia.

AENG.8209 G Australian War Literature of the Twentieth Century S2 CCH

This subject discusses Australian literary responses to th major conflicts of the twentieth century. The contribution of wa literature to Australian cultural myths, and to notions c Australian identity receives particular attention.

AENG.8210 G Scholarship, Bibliography and Editing S2 CCH

An introduction to techniques and issues in research schola ship, particularly the theory and practice of scholarly editin

AENG.8211 G Literary Modernism in Context: 1900–1920 CCH

(Not available in 1993)

A close study of some modernist masterpieces by Jame Joyce, D. H. Lawrence and T. S. Eliot.

AENG.8212 G Special Studies CCH

(Not available in 1993)

Prerequisite for all M.A. Pass subjects: A major sequence i English in a BA pass degree from the University of New Sout Wales or equivalent.

Geography and Oceanography

AGOC.8801 G Coastal and Seabed Dynamics CCH

A consideration of the morphodynamics of beaches, heac lands, estuaries, and associated seabed and littoral sedimer assemblages.

AGOC.8201 G Strategic Geographical Issues in Australia's Neighbourhood CCH

The subject is concerned with the geographical infrastructur underlying strategic issues in the Australian neighbourhood. I addresses such matters as the pattern of continents, ocean and islands within Australia's strategic sphere; terrain forn and land cover—diversity and dynamics; natural environmen tal perturbations; implications of too much or too little wate human territoriality; parameters of survival in the Australia neighbourhood; the maritime realm; people and places i northern Australia; looking south—Antarctica and th Southern ocean; spatial cognition, information and images Both broad issues and specific cases will be discussed cover ing a range of geographical scales and diversity of geograph ical approaches.

GOC.8202 G Comparative Strategic Geography CCH2

his subject examines the principles of strategic geography nd compares and contrasts the geopolitical environment of ceania, a region of geographical spaciousness, with that of e Middle East, where geostrategic compression is often the verriding reality. Against this background the contemporary ructure of power in the two regions will be considered, cluding aspects of ethnic and communal balances within ates, inter-state relations and the penetration of external rces. Multi-communal entities with problematic futures char-cterize both regions, but in greatly differing geographical set-ngs. The course addresses the question: To what degree can cross-referencing of problems and prospects help us to a eeper general understanding of geopolitical competition ithin and between states?

listory

HIS.8201 G Australian Political History in the Twentieth Century S2 CCH2

nis Master of Arts subject is taught by seminars and assess-ent is a major essay and a seminar paper.

ne subject considers politico-historical events in Australia om the late 1890s which can be viewed as important histori-al turning points. The focus of the subject will be the analysis social and economic forces which produced these political anges in Australia. Examination is made of the role of group, olitical party and ethnic factors in shaping the politics of mod-n Australia. Attention is given to the related problems of the storical explanation of political events.

HIS.8202 G Problems in The History of Australian Defence and Foreign Policy S1 CCH2

ne subject examines the development of defence and foreign olicy in the pre-Federation era, Deakin's defence policy efore World War One, apprehension of Japan, the Singapore rategy, the formation of the Department of External Affairs, anges in defence and foreign policy during the Second 'orld War, Evatt and the United Nations, the formation of NZUS and SEATO, Australia's defence and political re-tionship with Britain and the United States, the policy of for-ard defence, the impact of the Guam doctrine and Britain's ithdrawal from East of Suez, and Australia's relationships ith regional nations. The subject concludes with the policies the Whitlam government, and may be complemented by the ession two subject on contemporary issues in Australian efence and foreign policy.

HIS.8203 G A History of Pre-Nuclear Strategic Thought S2 CCH2

ne subject examines the development of strategic thought om the late eighteenth century to the end of the Second 'orld War. There is an examination of the strategic eories of men such as Jomini, Clausewitz, Mahan, Corbett, oltke. Schlieffen, Fuller, Liddell Hart and Douhet. The theo-es are related to the practice of war and provide a basis for ession two subjects on strategy since 1945.

AHIS.8205 G The ASEAN States, the South West Pacific and Australia: Political and Defence Issues Since 1945 S2 CCH2

This subject examines recent and contemporary history in the regions contiguous to Australia that have been regarded as important for Australia's external defence since the Second world war: the ASEAN States and the South West Pacific Islands. Developments in these regions affecting Australian defence interests receive particular attention. Those 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 the end of the 1980s.

AHIS.8207 G Intelligence and National Security S1 CCH2

This subject studies the development and use of intelligence in questions of national security, particularly during the years of the Cold War. While emphasising the manner in which Australia has become involved in the international intelligence community and its contemporary role, the subject examines the development and use of intelligence in relation to the national security of such countries as the USA , UK, USSR, France and Israel. The subject is based on historical analysis, and focuses on questions relating to intelligence such as technology, accountability, alliances and governmental responsibility.

AHIS.8208 G Land Warfare S1 CCH2

This subject is intended to provide students with a heightened understanding of the development of land warfare in the period since 1945. The subject is historically based and thematically organised, and examines the theory and practice of counter-insurgency, limited war, mid-intensity conflict, logistics, and the application of technology to ground combat, before lifting the focus to encompass the relationship of ground forces to wider issues such as military-media relations, the growth of higher defence organisations, and the constraints of the laws of war and international agreements on freedom of operations.The subject is international in conception, but will focus on specifically Australian and regional concerns at various points.

Politics

APOL.8201 G Australian Foreign Policy: Contemporary Issues S2 CCH2

This subject examines contemporary problems in Australian foreign policy. It considers how well Australian foreign policy-makers have adapted to a changing regional and global environment. Australia's relations with the Asia/Pacific are examined, along with a range of issues in Australian foreign policy including regional security, human rights, economic issues, environment and Antarctica.

APOL.8205 G Seapower and Australian Security S1 CCH2

The objective of this subject is to develop an awareness of the importance of seapower in the defence of Australia and its national interests. The subject will explore the relationship

between Australia's maritime interests, its marine industries, national security and maritime strategy and will develop the concept of Australia as a maritime power. The subject will compromise 13 weekly seminars covering three main subject areas i.e. (1) will occupy the first four weeks of the subject. It will introduce the basic principles of maritime strategy and seapower and consider the evolution of Australian seapower over the last 90 years. (2) will occupy weeks 5–8 of the subject. It will address Australia's maritime interests, including the development of Australian marine industries, in the context that a nation's maritime power encompasses economic, industrial and human resources strengths as well as military power and (3) will occupy the last six meetings of the subject. It will look to the future of Australia as a maritime power, considering regional aspects and trends in the relevant technological, economic, legal and strategic factors.

APOL.8206 G Changing Concepts of Security S1 CCH2

This subject examines selected approaches and problems in the theory and practice of international politics with emphasis given to the concept of security and changing perceptions of its requirements. It includes consideration of the nature of the international system and the factors contributing to its transformation. Attention is given to issues such as the implications of a weak U.S. economy, economic interdependence, the growing desperation of the world's poor, environmental issues, immigration and refugees, and domestic crises that influence the external relations and security of states. It seeks in particular to arrive at an understanding of the idea of the New International Order said to be in prospect in the world after the Cold War.

APOL.8207 G The Gulf War: Domestic, Regional & International Dimensions S2 CCH2

This subject examines a number of issues related to the utility of force in resolving political problems which arose out of the Gulf War of 1991. It is divided into three sections. The first examines the domestic political processes of the major regional actors—Iraq, Kuwait, Saudi Arabia, Syria, Iran and Israel—and explores the roots of the particular local conflict from which the war developed. The second section explores the reasons for the concerted allied response, with attention to economic issues, to the principles embodied in the United Nations Charter, and to the opportunities for intervention supplied by the improvement of US-Soviet relations. The third section examines the diplomatic and military events between August 1990 and February 1991, and provides an opportunity for members of the class to reflect on what lessons if any might be learned from this episode.

APOL.8209 G Australian Defence Since Vietnam: The Search for Self-Reliance S2 CCH2

This subject examines critically how Australia's defence policies and structures have evolved since the end of the Vietnam War and whether and in what direction future changes can be expected to occur. Its principal concerns are: how well has Australia adjusted to its changed and still changing circumstances; what, if anything, is serving to impede Australia's latest attempts to institute a more independent and self-reliant defence posture; and is self-reliance in defence feasible or necessary anyway in the 1990s and beyond?

APOL.8210 G Armed Forces and Society S1 CCH2

This subject deals with the complex and manifold relationships between armed forces and the society of which they are part. It examines a range of issues and introduces students to concepts such as socialization, 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. The issues to be examined include: the nature of the military profession; military ethics; the education of officers; senior officer development; armed forces and civilian bureaucracy; political-military relations; aid to the civil power; public attitudes and the media; recruitment and retention; ethnic representation; women in the armed forces; questions of individual rights in the armed forces; the service family; and the impact of peacetime roles on the military ethos.

APOL.8211 G Northeast Asia: The Changing Regional Balance S2 CCH2

This subject analyses the changing nature of political and security relations amongst the countries of Northeast Asia in the post Cold War period. Attention is given to the impact of global changes on the regional balance, prospects for a nuclear and conventional arms race in the region, the role of diplomacy in changing regional alignments and implications of the region's economic dynamism. Central to the subject is an examination of the changing strategic objectives of the major powers of the region, including Russia, the United States, China and Japan and the influences that shape them. An assessment is also made of the extent to which the region manifests features of the so-called New World Order.

Interdisciplinary Studies

AINT.8100 G Sub-Thesis (Australian Studies) I

Students who choose to write a sub-thesis as part of their MA (Pass) program in Australian Studies must submit the chosen topic for approval by the Head of Department in the Department in which the sub-thesis will be supervised. It is expected that the sub-thesis will normally be approximately 15,000 words in length.

AINT.8101 G Sub-Thesis (Defence Studies) I

Students who choose to write a sub-thesis as part of their MDefStudies program must submit the chosen topic for approval by the Master of Defence Studies Standing Committee. It is expected that the sub-thesis will be approximately 15,000 words in length.

8802

AINT.~~8201~~ G Firepower (Military Technology Subject)

Explosives and propellants, armour materials, warhead design, penetration of armour, ballistics, gun design, gun fire control, light weapons.

8803

AINT.8202 G Vehicles and Mobility (Military Technology Subject)

Vehicle mechanics and propulsion, handling, fuels, terramechanics, fighting vehicle design, logistic vehicles, bridging, mines and counter mobility, reliability, helicopters.

NT.8800 G Australia Since 1901 F CCH2

iis subject draws upon the resources of five departments conomics and Management, English, Geography and ceanography, History and Politics) to provide an interdisci-nary core for the whole program. It spans two sessions, is andatory for completion of the degree and represents two of e six subjects which must be successfully completed to qual- for the degree.

ie subject matter is the social, political and economic expe-nce of Australia in the 20th century. The framing of the con-tution, subsequent changes, and the literary response to it ms one theme in Session 1; the history and literature of the o World Wars another; and analysis of the economic and cial forces underlying the development of Australia until and cluding WWII provides the basis for a series of contributions im the Departments of Economics and Management and story.

In Session 2, the focus shifts to the post-war period. The Department of History offers contributions on social and political change in this period, providing a perspective on analyses of changing voting patterns, the place of Aboriginals and of the armed forces in 20th century Australia, and of economic policies under Menzies and Whitlam. The English Department discusses literary reflection on post-war Australian society and Economics and Management takes a forward-looking view at prospects until the year 2000.

While a number of departments is involved, coherence has been given to the seminar by having it focus on historically related topics which, also comprise mutually reinforcing themes.

Graduate Study

Conditions for the Award of Higher Degrees

The conditions governing the award of higher degrees available in the University College are set out below. Where the conditions apply generally in the University, reference to a faculty implies the University College.

Doctor of Philosophy (PhD)

1. The degree of Doctor of Philosophy may be awarded by the Council on the recommendation of the Higher Degree Committee of the University College (hereinafter referred to as the Committee) to a candidate who has made an original and significant contribution to knowledge.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor with Honours from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment as a candidate for the degree.

Enrolment

3. (1) An application to enrol as a candidate for the degree shall be lodged with the College Secretary at least one calendar month before the commencement of the session in which enrolment is to begin.

(2) In every case before making the offer of a place the Committee shall be satisfied that agreement has been reached between the Department 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 Bill of Rights for postgraduate research students.

(3) An approved candidate shall be enrolled either on a full-time or part-time basis.

(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 or supervisors 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.

hesis

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 College Secretary 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 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) Five copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the five 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.

xamination

6. (1) There shall be not fewer than three examiners of the thesis, appointed by the Committee, at least two of whom shall be external to the University.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the thesis and shall recommend to the Committee 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 Department.

(c) the thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the higher degree Committee, the thesis would merit the award of the degree.

(d) the thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) the thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance in the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the same thesis and submit to further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(4) The Committee shall, after consideration of the examiners' reports and the results of any further work, 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.

ees

7. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Arts at Honours Level (MA(Hons))

1. The degree of Master of Arts at Honours level may be awarded by the Council on the recommendation of the Higher Degree Committee of the University College (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation. The degree shall be awarded either with the grade of Honours Class 1 or with the grade of Honours Class 2. A candidate for the award of the degree at Honours level shall not be awarded the degree at Pass level.

Qualifications

2. (1) A candidate for the degree shall have been awarded at a standard not below Honours Class 2 an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the College Secretary at least one calendar month before commencement of the session in which enrolment is to begin.

(2) In every case, before making the offer of a place the Committee shall be satisfied that initial agreement has been reached between the Department 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 part-time student.

(4) A full-time candidate will present the thesis for examination no earlier than 1½ 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 Department 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 Department in accordance with the procedures established within the Department 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 College Secretary 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) Four copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the four copies of the thesis submitted for examination and is free to allow 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.

xamination

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 Department;* or

(c) The thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the Higher Degree Committee, the thesis would merit the award of the degree.

(d) The thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) The thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance in the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the same thesis and submit 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.

ees

7. A candidate shall pay such fees as may be determined from time to time by Council.

* Or in the case of an interdisciplinary program the Rector of the University College.

aster of Engineering IE) and Master of cience (MSc)

1. The degree of Master of Engineering or Master of Science by research may be awarded by the Council on the recommendation of the Higher Degree Committee of the University College (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation.

ualifications

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 College Secretary at least one calendar month before the commencement of the session in which enrolment is to begin.

(2) In every case, before making the offer of a place the Committee shall be satisfied that initial agreement has been reached between the Department 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 part-time student.

(4) A full-time candidate will present the thesis for examination no earlier than 1½ 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 Department 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 Department in accordance with the procedures established within the Department 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 College Secretary 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) Four copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

(6) It shall be understood that the University retains the four copies of the thesis submitted for examination and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

ɛamination

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 Department.

(c) The thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the Higher Degree Committee, the thesis would merit the award of the degree.

(d) The thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) The thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance in the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the same thesis and submit to further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(4) The Committee shall, after consideration of the examiners' reports and the results of any further examination, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate not be awarded the degree the Committee shall determine whether or not the candidate be permitted to resubmit the thesis after a further period of study and/or research.

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7. A candidate shall pay such fees as may be determined from time to time by the Council.

ɜster of Arts at Pass ˈvel (MA)

1. The degree of Master of Arts at Pass Level may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

ıalifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe before permitting enrolment.

rolment and ɔgression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall normally be lodged with the College Secretary at least two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) A candidate for the degree shall be required to undertake such formal subjects and, except in exceptional circumstances, pass at the first attempt such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

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A candidate shall pay such fees as may be determined from time to time by the Council.

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Master of Defence Studies (MDefStudies)

1. The degree of Master of Defence Studies at Pass level may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. A candidate for the degree shall have been awarded

(1) an appropriate degree 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 Higher Degree Committee of the University College (hereinafter referred to as the Committee); or

(2) a degree of Bachelor at pass level from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution which includes a major in a relevant field of study with results at credit level or better in two final year sessional subjects (or equivalent); in addition candidates must be graduates of at least three years standing or have a minimum of three years full-time work experience;

(3) in exceptional cases persons with other academic and/or professional qualifications and extensive work experience of a relevant nature may be permitted to enrol for the degree; such applicants will normally be required to complete a qualifying program.

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 College Secretary at least two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) The program of advanced study shall total a minimum of 36 credit points. The maximum number of credit points for coursework subjects that may be taken in a single Department is 24.

(3) A student shall be permitted to continue in the degree after failure in one subject (not including a sub-thesis). In the event of another failure or failure in a sub-thesis a student shall not be permitted to continue in the degree unless circumstances justifying continuation can be demonstrated to the Higher Degree Committee of the University College.

(4) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(5) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Managemen Economics (MMgtEc)

1. The degree of Master of Management Economics at Pass level may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the College Secretary at least two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) A student shall be permitted to continue in the degree after failure in one subject (not including a sub-thesis). In the event of another failure or failure in a sub-thesis a student shall not be

permitted to continue in the degree unless circumstances justifying continuation can be demonstrated to the Higher Degree Committee of the University College.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of three academic sessions from the date of enrolment in the case of a full-time candidate or six sessions in the case of a part-time candidate. The maximum period of candidature shall be five academic sessions from the date of enrolment for a full-time candidate and eight sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

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4. A candidate shall pay such fees as may be determined from time to time by the Council.

aster of Engineering :ience (M EngSc)

aster of Information :ience (MInfSc)

1. The degree of Master of Engineering Science or Master of Information Science may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

ıalifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

ırolment and ogression

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 College Secretary two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) A candidate for the degree shall:

(a) undertake such formal subjects and pass such assessment as prescribed, or

(b) demonstrate ability to undertake research by the submission of a thesis embodying the results of an original investigation on an approved topic, or

(c) undertake an approved combination of the above in which case the thesis component shall be referred to as a project report.

(3) The program of advanced study shall total a minimum of 36 credits. The number of credits allocated for each subject shall be determined by the Committee on the recommendation of the appropriate Head of Department. A 9 credit project report shall be submitted for examination in accordance with the requirements of the appropriate Head of Department and shall be assessed as a formal subject .

(4) A candidate's proposed program shall be approved by the appropriate Head of Department prior to enrolment. For the purposes of this requirement the appropriate Head of Department shall normally be the Head of Department providing supervision of the project report or, if there is no project report, the major field of study.

(5) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate. A Head of Department may specify that a candidate shall be required to pass at the first attempt all examinations prescribed by the Committee.

(6) No candidate shall be awarded the degree of Master of Engineering Science until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and eight sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

(7) No candidate shall be awarded the degree of Master of Information Science until lapse of three academic sessions from the date of enrolment in the case of a full-time candidate, or six sessions in the case of a part-time candidate. The maximum period of candidature shall be five academic sessions from the date of enrolment for a full-time candidate and eight sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

In special cases candidates may complete the program in two sessions subject to the approval of the course authority.

18 Credit Project Report

4. (1) A candidate who undertakes an 18 credit project shall carry out the work on an approved topic under the direction of a supervisor appointed from the full-time academic members of the University College staff.

(2) The candidate shall give in writing to the College Secretary two-months' notice of intention to submit a project report.

(3) The project report 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 project.

(5) Four copies of the project report shall be presented in a form which complies with the requirements of the University for the preparation and submission of project reports and theses for higher degrees.

(6) It shall be understood that the University retains the four copies of the project report submitted for examination and is free to allow the project report to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968, the University may issue the project report in whole or in part, in microfilm or other copying medium.

Examination of 18 Credit Project Report

5. (1) There shall be no fewer than two examiners of the project report, appointed by the Academic Board of the University on the recommendation of 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 project report and shall recommend to the Committee that:

(a) the project report be noted as satisfactory; or

(b) the project report be noted as satisfactory subject to minor corrections being made to the satisfaction of the Head of Department; or

(c) the project report be noted as unsatisfactory but that the candidate be permitted to resubmit it in a revised form after a further period of study and/or research; or

(d) the project report be noted as unsatisfactory and that the candidate be not permitted to resubmit it.

(3) The Committee shall, after considering the examiners' reports and the candidates' results of assessment in the prescribed formal subjects, recommend whether or not the candidate may be awarded the degree. If it is decided that the project report is unsatisfactory the Committee shall determine whether or not the candidate may resubmit it after a further period of study and/or or research.

Fees

6. A candidate shall pay such fees as may be determined from time to time by the Council.

Graduate Diploma Rules

1. A Graduate Diploma may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

2. (1) A candidate for the diploma shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the University College (hereinafter referred to as the Committee).

(2) An applicant who has obtained suitable credits in the equivalent Master's or Master's Qualifying program of the University College but has not taken out the Master's degree will be given advanced standing as if those credits had been obtained while enrolled in the Graduate Diploma program.

(3) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the diploma.

(4) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

3. (1) An application to enrol as a candidate for the diploma shall be made on the prescribed form which shall be lodged with the College Secretary at least two calendar months before the commencement of the session in which enrolment is to begin or, where applicable, by the advertised date.

(2) A candidate for the diploma shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The program of advanced study shall total a minimum of 24 credits. The number of credits allocated for each subject shall be determined by the Committee on the recommendation of the Head of Department.

(4) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

In the case of Defence Studies, candidates shall be be permitted to continue after failure in one subject. In the event of a further failure a candidate will be excluded unless circumstances justifying continuation can be demonstrated to the Committee.

(5) No candidate shall be awarded the diploma until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period to candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

4. A candidate shall pay such fees as may be determined from time to time by the Council.

LENGTH OF THESES

The length of a doctoral thesis normally should not exceed 100,000 words of text and that of a masters research thesis 75,000 words.

PREPARATION AND SUBMISSION OF PROJECT REPORTS AND THESES FOR HIGHER DEGREES

1. (1) Every candidate for the degree of Master or Doctor in which a *report* on a project or a *thesis* is required shall submit the required copies of the project report or thesis in accordance with the Schedule below.

(2) All copies shall contain:

(a) a short abstract comprising no more than 350 words. The abstract shall indicate:

—the problem investigated;

—the procedures followed;

—the general results obtained;

—the major conclusions reached;

but shall not contain any illustrative matter, such as tables, graphs or charts.

(b) the following statement signed by the candidate:

'I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of a university or other institute of higher learning, except where due acknowledgement is made in the text of the thesis.'

(c) 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).

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.

(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 project, report or thesis submitted to the College Secretary is for deposit in the University Library. The Library deposit copy shall be presented in a permanent and legible form in original typescript, printed copy, laser printed copy, computer printed copy of letter quality using a new carbon ribbon or good photocopy of one of these. Faded, dirty or faint copies are not acceptable.

(2) The copies shall be bound in accordance with (3) below to allow their transmission to examiners without the possibility of their disarrangement.

(3) Prior to the award of the degree the candidate shall ensure that the Library deposit copy is bound in boards, covered with buckram. The bound volume shall be lettered on the spine as follows:

(a) At the bottom and across—UNSW, or if the volume is too thin for this— $\frac{\text{U}}{\text{NSW}}$

(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 Academic Administration.

Schedule

1. Degrees and course codes for which candidates are required to submit 5 copies of a thesis to the College Secretary:

Doctor of Philosophy	1000–1990

2. Degrees and course codes for which candidates are required to submit 4 copies of a thesis or project report to the College Secretary:

Master of Arts at honours level—by thesis	2271–2401
Master of Engineering Science—by 18 credit project	8500–8640
Master of Information Science—by 18 credit project	8555
Master of Science—by thesis	2041–2931
Master of Engineering —by thesis	2651–2691

3. Degrees and course codes for which candidates may be required to submit 2 copies of a project report or sub-thesis to the Head of Department:

Master of Arts	8170–8241
Master of Defence Studies	9900
Master of Engineering Science—by 9 credit project	8500–8640
Master of Information Science—by 9 credit project	8555

Note: This schedule may be varied from time to time as the University adds new courses, deletes old ones or amends the conditions of existing degrees.

licy with respect to Use of Higher gree Project Reports d 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 reports or theses may be put, they are required to complete a declaration (obtainable from the Academic Administration) which would **1.** grant the University Librarian permission to publish or to authorize the publication of the project report or thesis (Form 1); **2.** withhold the right of the University Librarian to publish the project report or thesis (Form 2); or **3.** allow the University Librarian to publish the project report or thesis under certain conditions (Form 3).

12. Academic Prizes

Undergraduate University College Prizes

The following table summarizes the undergraduate prizes awarded by the University College. In addition to the Boards of Studi prizes and the privately endowed prizes listed below, each of the academic departments may award prizes for outstanding pe formance by undergraduate students.

Information regarding the establishment of new prizes may be obtained from the Deputy College Secretary (Academic).

Name of Prize/Donor	*Value $*	*Awarded for*
Board of Studies in Humanities and Social Sciences Prize	$100.00	The most distinguished performance by an officer cadet in the first year of the Bachelor of Arts course.
Board of Studies in Humanities and Social Sciences Prize	$100.00	The most distinguished performance by an officer cadet in the second year of the Bachelor of Arts course.
Board of Studies in Humanities and Social Sciences Prize	$100.00	The most distinguished performance by an officer cadet in the third year of the Bachelor of Arts course.
Board of Studies in Science Prize	$100.00	The most distinguished performance by an officer cadet in the first year of the Bachelor of Science course.
Board of Studies in Science Prize	$100.00	The most distinguished performance by an officer cadet in the second year of the Bachelor of Science course.
Board of Studies in Science Prize	$100.00	The most distinguished performance by an officer cadet in the third year of the Bachelor of Science course.
Board of Studies in Engineering Prize	$100.00	The most distinguished performance by an officer cadet in the first year of the Bachelor of Engineering course.
Board of Studies in Engineering Prize	$100.00	The most distinguished performance by an officer cadet in the second year of the Bachelor of Engineering course.
Board of Studies in Engineering Prize	$100.00	The most distinguished performance by an officer cadet in the third year of the Bachelor of Engineering course.
The Science Prize (British Aerospace Australia)	$100.00	The most distinguished performance by an officer cadet in the three years of the Bachelor of Science course.
The A. H. Corbett Prize (Institution of Engineers ACT Branch)	$200.00 and Bronze Medal	The top graduate in engineering
The ACT Housing Trust Prize	$300	The best essay, project or thesis related to ACT public housing by a student in the Bachelor of Arts, Bachelor of Science or Bachelor of Engineering course.
Aeronautical Engineering		
The Royal Aeronautical Society Canberra Prize	$100.00 and Perpetual Trophy	Distinguished performance in second year Aeronautical Engineering.
Chemistry		
Royal Australian Chemical Institute Prize	$50.00	Outstanding performance in first and second year Chemistry studies.
Civil Engineering		
The Wing Commander John Yeaman Prize (Dr J. Yeaman)	$250.00 and Silver Medal	The best performance in the teaching unit Transportation Engineering in ACMA.3800 U Civil Engineering 3.
The AISC Steel Design Prize	$200.00	The best performance in the steel design component of t teaching unit ACMA.3002 E Structural Design 1 ACMA.3800 U Civil Engineering 3
Computer Science		
The Second Year Computer Science Prize (Ansett)	Books to the value of $100.00	The best performance by an officer cadet in second year Computer Science.
The Second Year Information Systems Prize (Australian Computer Society)	$100.00	The best performance in Information Systems 2.
The Computer Science Project Prize (Aspect Computing)	$1000	The most outstanding project submitted for ACSC.3025 E Computer Science Project 3.
The Information Systems Project Prize (Aspect Computing)	$1000	The most outstanding project submitted for ACSC.3011 E Information Systems Project 3.

ıme of Prize/Donor	Value $	Awarded for
ɛctrical Engineering		
e Rockwell Electronics Award	$170.00 and a plaque	The best performance by an officer cadet in Electrical Engineering 1.
e Institution of Engineers, Australia ıllege of Electrical Engineers' Prize	$300.00 and framed certificate	The best overall performance in third year studies in Electrical Engineering
e Siemens–Plessey Award in ɛctrical Engineering ɔmmunications and Electronics)	$250.00	The best overall performance in all four years of the electrical engineering program by a student undertaking a speciality in communications and/or electronics.
e Institution of Radio and ɛctronic Engineers Australia anberra Division) Prize	$200.00 and one year's membership of the Institution	The best performance in laboratory work and thesis by a final year electrical engineering student.
e IEE Prize (Institution of ɛctrical Engineers)	£75	The best performance in fourth year options including power, power electronics and machines.
glish		
e E. R. Bryan Prize	$70.00	Distinguished performance by a first year officer cadet in English 1.
e Professor Grahame Johnston ze	Books to the value of $100.00	The best performance in Australian Literature.
e Barry Andrews Shakespeare ze	$100.00	The best performance in Shakespeare and/or renaissance drama studies.
e Dorothy Green Prize	$200.00	The best essay by an undergraduate student on Australian Literature.
ıtory		
e L. C. F. Turner Prize	$100.00	Outstanding performance in History.
thematics		
e R. J. A. Barnard Memorial ze	$100.00	Outstanding performance by an officer cadet in three years of Mathematics.
eanography		
e Alan Carter Prize	Books, Atlas or Chart to the value of $100.00	The best performance by a first year student in Oceanography 1.
ysics		
e Sir Leslie Martin Prize	$100.00	Distinguished performance by a first year officer cadet in first year Physics.
e Australian Institute of Physics ze (ACT Branch)	$100.00 and one year's membership of the Institute	Distinguished performance in second year Physics.

raduate University College Prizes

ne of Prize/Donor	Value $	Awarded for
Australian Institute of Project nagement Prize	Medal and one year's membership of the Institute	Excellence and a significant contribution to the advancement of project management by a student completing the Master of Engineering Science, Master of Defence Studies, or PhD in the University College.
Defence Studies Prize tro Fedorczenko Legacy)	Books to the value of $200.00	The most outstanding academic record of a student completing the Master of Defence Studies course.
Ria de Groot Prize	$150.00	The best female postgraduate student graduating from the University College.
Royal Aeronautical Society ıberra Graduate Prize	$150.00 and medal	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.

13. Calendar for 1993

Week beginning	*Week No.*	
4 January	1	Leave
11	2	
18	3	
25 January	4	
1 February	5	Military Training
8	6	
15	7	
22	8	
1 March	9	
8	10	
15	11	
22	12	Session 1
29	13	(14 weeks: 8 March to 25 June)
5 April	14	
12	15	
19	16	
26	17	
3 May	18	
10	19	May recess: career development and field trips
17	20	
24	21	
31	22	
7 June	23	
14	24	
21	25	
28	26	Mid-year examinations
5 July	27	
12	28	Mid-year leave
19	29	

eek beginning	*Week No.*	
	30	
August	31	Session 2
	32	(13 weeks: 26 July to 29 October)
	33	
	34	
	35	
September	36	
	37	
	38	
	39	Session 2 study recess
October	40	
	41	
	42	
	43	
November	44	
	45	Study and annual examinations
	46	
	47	Military training
	48	
December	49	
	50	Graduation week
	51	Leave
	52	

Dates to Note in 1993

		Meetings of College Committees (Tentative dates)	
January			
18	Academy Year begins		
26	Australia Day		
February			
		5	Academic Board Executive and Higher Degree Committees
11–13	Academic orientation and enrolment for all 1st year undergraduate students		
15–16 (17)	Enrolment and re-enrolment of postgraduate students		
March			
1– 3	Re-enrolment of continuing undergraduate students		
8	**Session 1 begins**		
		5	Academic Board and Higher Degree Committees
		10	Engineering Board of Studies
		17	Science Board of Studies
15	Canberra Day—Public Holiday	24	Humanities and Social Sciences Board of Studies
29	Last day for students to enrol in whole year or Session 1 subjects/units		
31	HECS census date		
April			
		2	Academic Board Executive and Higher Degree Committees
9	Good Friday—Public Holiday		
12	Easter Monday—Public Holiday		
23	Last day for students to discontinue without failure Session 1 subjects/units		
25 (26)	Anzac Day—Public Holiday		
30	Publication of provisional timetable for mid-year examinations		
May			
7	Last day for students to advise of examination clashes.	7	Academic Board Executive and Higher Degree Committees
8–23	May recess	26	Humanities and Social Sciences Board of Studies
24 (24)	Publication of final timetable for mid-year examinations		
June			
14	Queen's Birthday—Public Holiday	2	Science Board of Studies
25	**Session 1 ends**	4	Academic Board and Higher Degree Committees
28	Mid-year examination period begins	9	Engineering Board of Studies
July			
		2	Academic Board Executive and Higher Degree Committees
10	Examination periods ends (yrs 1–3)	22	Assessment Committees
14	Examination period ends (yr 4 and PG)	28	Humanities and Social Sciences Board of Studies
11–25	Mid-year leave		
26	**Session 2 begins**		

tes to Note

es to Note in 1993

		Meetings of College Committees (Tentative dates)	
gust			
Last day for students to discontinue without failure subjects/units which extend over the whole academic year		4	Science Board of Studies
		11	Engineering Board of Studies
		13	Academic Board Executive and Higher Degree
Last day for students to enrol in Session 2 subjects/units		2	Committees
HECS census date			
ptember			
		3	Academic Board and Higher Degree Committees
		8	Science Board of Studies
Last day for students to discontinue without failure session 2 subjects/units		15	Engineering Board of Studies
		22	Humanities and Social Sciences Board of Studies
Publication of provisional examination timetable			
Session 2 study recess begins			
tober			
Eight Hour Day—Public Holiday			
Session 2 study recess ends			
Last day for students to advise of examination timetable clashes	24 Sept		
Publication of final timetable for the annual examinations		8	Academic Board Executive and Higher Degree Committees
Session 2 ends			
vember			
Study and examination period begins		12	Academic Board and Higher Degree Committees
Remembrance Day			
Study and examination period ends			
cember			
Assessment results displayed on noticeboards		2	Assessment Committees
Assessment results mailed to students		3	Assessment Committees
Degree conferring ceremonies			
Graduation Parade			
Academy Year ends			

BLIC HOLIDAY COMPENSATION:

nday 15 March (Canberra Day)	Monday lost
lay 9 April (Good Friday)	Friday lost
nday 12 April (Easter Monday)	Monday timetable on Tuesday 13 April
nday 26 April (Anzac Day)	Monday timetable on Wednesday 28 April
nday 14 June (Queen's Birthday)	Monday timetable on Thursday 17 June
nday 4 October (NSW Labour Day)	Monday ~~lost~~ timetable on Tuesday 5 October

14. Timetables

Arts and Science Courses

Arts and Science students must select their programs to meet the requirements of the degree rules given in Chapter 8 and to be generally on the lines of the sample programs illustrated in Chapter 9. A student's program for any year must also be compatible with a timetable of subjects published in this Chapter.

Students should read the subject descriptions given in Chapter 10 for their chosen subjects and note the commitments for lectures, tutorials, laboratory and field work. Where a subject offers a choice of units, they should select those they wish to take, while noting corequisites and prerequisites.

For the purpose of the timetable, all the subjects offered in the Arts and Science courses are grouped in five blocks, designated A, B, C, D and E. There are 45 periods in each teaching week and one of the letters is assigned to each of them:

Period No.	1	2	3	4	5	6	7	8	9
Monday	A	E	D	C	B	A	A	A	A
Tuesday	B	A	E	D	C	B	B	B	B
Wednesday	C	B	A	E	D	C	C	C	C
Thursday	D	C	B	A	E	D	D	D	D
Friday	E	D	C	B	A	E	E	E	E

The subjects grouped in block A are scheduled in some of the periods marked A, subjects grouped in block B are scheduled in some of the periods marked B, and so on. The scheduled periods include lectures and in some cases may include tutorials and laboratory classes (although generally the Departments arrange their own timetables of tutorials and laboratory classes).

Students must choose their subjects for the year from up to four of the blocks; the remaining block will be reserved for periods of military training and English Communication. When making their selections, students should note the following:

1. When a Level II or Level III subject is selected, it is generally not possible to take another subject from the same block.
2. A choice of units must be made when this is indicated in a subject description in Chapter 10.
3. Where a subject is grouped in two different blocks, either block may be selected. The choice of block may be influenced by the units of the subject offered in each block. It may be possible to choose units from both blocks.
4. The laboratory periods for a particular subject need not be taken in the same block as the lectures in that subject. Laboratory periods and tutorials must be chosen so that they do not clash with classes for other subjects selected.
5. If possible one of periods 4, 5 and 6 each day should be kept free for a lunch break.

The timetable of subjects grouped into the five blocks is given at the end of this chapter.

The locations of all lectures, tutorials and laboratory classes will be posted on the South Lecture Block notice board.

Session 1 and whole year subjects—Friday 3 March 1993
Session 2 and whole year subjects—Friday 18 July 1993

Honours students at all levels should consult the relevant departments for times of honours classes.

Engineering Courses

For each of the Engineering streams, the programs for the first three years are prescribed, but there is a choice of General Studies electives in the second and third years. Some elective units are available in the fourth year.

Military Training Program

All officer cadets are required to undertake a maximum of six (6) periods per week military training, which includes an average of one hour per week of English Communication. It will be necessary when planning your personal timetable to nominate a block for this purpose. A detailed military training program will be available to officer cadets before the commencement of the academic year.

Period 9 Thursdays is allocated for sport training.

ersonal Timetables

ere is a blank timetable frame on the last page of this hand-ok. Students are strongly advised to use the blank to record ir own personal timetables. The personal timetable will rve not only as a reminder but also as a check against ishes, especially tutorial clashes.

y student who finds difficulty in selecting subjects or in mak-up a personal timetable is invited to seek assistance from nember of the College Secretary's staff.

Period Times

Times for periods are as follows:

Mondays		*Tuesdays–Fridays*	
Period		Period	
1	9.00– 9.50 am	1	8.00– 8.50 am
2	10.10–11.00 am	2	9.00– 9.50 am
3	11.10–12.00 md	3	10.10–11.00 am
4	12.10– 1.00 pm	4	11.10–12.00 md
5	1.10– 2.00 pm	5	12.10– 1.00 pm
6	2.10– 3.00 pm	6	1.10– 2.00 pm
7	3.10– 4.00 pm	7	2.10– 3.00 pm
8	4.10– 5.00 pm	8	3.10– 4.00 pm
9	5.10– 6.00 pm	9	4.10– 5.00 pm

imetable of Arts and Science Subjects for 1993

.OCK A

eld of Study	*Subject/Level/Unit*		*Session†*	*M*	*T*	*W*	*Th*	*F*
athematics	Mathematics 1		F	1	2	3	4	5
emistry	Chemistry 2A		F	1	2	3	4	
glish	2A	English Renaissance Literature (Core)	1	6				
		Australian Literature (Core)	2	6				
	English 2/3 Options							
		Middle English A	1	1		3		
		Old English A	2	1		3		
		C 19 American Literature	1	1		3		
		C20 American Literature	2	1		3		
		Literature of the Great War	1	7			4	
		Linguistics & Literary Criticism	2	7			4	
		After Modernism	1		2			5
		Mythopoeic Literature	2		2			5
ography	2C	Cartographic Methods	1		2		4	5
	2A/B/C	Remote Sensing Applications	2		2		4	
athematics	2A/B	Statistics 2	1	6,7γ		3	4	
		Probability 2	2	6t		3	4	
onomics and anagement	3	Industrial Economics	1	1	2	3		
		Quantative Analysis	2	6,7,8				
		Finance	1	6			4	5
		Human Resource Management	2	6			4	5
eanography	3	*	F	1	2	3	4	5
ysics	3B/C‡	*	F	1	2	3	4	5
		Meteorology 3	1		2		4	
		Atmospheric Physics 3	2		2		4	
litics	2/3	Politics of Australian Defence Policy	1	1		3		
		Understanding Revolutions	1	6			4	
		Issues and Problems in Australian Foreign Policy	1	6	2		5	
		Parties, Voters and Public Opinion	2	6			4	
		Collapse of Communism	2		2			5
		War in International Politics	2	1		3		

tes: * indicates a choice of units.
† F indicates full-year subject.
‡ See Department for special considerations and optional units timetable.
t indicates at least one tutorial at this time.
γ indicates at least one computing laboratory session at this time.

BLOCK B

Field of Study	*Subject/Level/Unit*	*Session†*	*M*	*T*	*W*	*Th*
Economics and Management	Economics and Management 1	F	5	6	2	
Geography	Geography 1	F		1		3
Oceanography	Oceanography 1	F		1		3
Economics and Management	Economics 2	F		6	2	
	Intro to Corp & Govt. Accg	1	5	1		3
	Quantitative Methods	2	5	1		3
Mathematics	2A/B Core Mathematics 2 (Part I)	1	5	6	2t	
	Mathematical Modelling 2	1		1		3
	Core Mathematics 2 (Part II)	2	5	6	2t	
	Differential Equations 2	2		1		3
History	2/3 Maritime History	1	5		2	
	Modern American Foreign Policy	1		6		3
	Origins of Modern War	1	5	1		
	Southeast Asia: 1870–1965	2	5		2	
	Democracy to Dictatorship	2		6		3
	Social Change in East Asia	1		7		
Chemistry	Chemistry 3B/3C	F	5	1	2	3
Computer Science	3A/B Applied Stochastic Processes 3	1			2	
	Data Networks 3	1		1		3
	Artificial Intelligence 3	2		1		3
	Optimal System Control 3	2			2	
	Simulation 3	2	5	6		
	Information Systems 3	F	5	1,6	2	3
English	English GS1 and 5	F	5		2	
Politics	Politics 1 (Repeat lectures)	F	5		2	

t indicates at least one tutorial at this time

BLOCK C

Field of Study	*Subject/Level/Unit*	*Session†*	*M*	*T*	*W*	*Th*
History	History 1	F		5		2
Physics	Physics 1	F	4		1	
Economics and Management	International Trade	1	4		6,7	
	Foundations of Management	2		5	6	2
Geography	2A Geomorphology	2		5		2
	2B Social Geography	2			1	
	2A/B Biogeography	1		5		2
	Geography of Economic Activity	1			1	
Physics	2A/B Circuit Theory and Electronics	1	4			
	Quantum Physics 2	1			1	
	Thermal Physics 2	2	4			
	Optics 2	1		5		2
	Electromagnetism 2	2			1	
	Solid State Physics and its Applications 2	2		5		2
	Meteorology 2 (Part 1)	1	4			
	Meteorology 2 (Part 2)	2		5		2
	Physics of the Atmosphere 2	1	4			
	Marine Acoustics and Optics 2	2		5		2
Chemistry	Chemistry 3A	F	4	5	1	2
Computer Science	3A/B Comparative Programming Languages 3	1	4			2
	Operating Systems 3	1		5	6	
	Software Engineering 3	1			1	
	Compiler Design 3	2			1	
	Computer Graphics 3	2		5	6	
	Cryptography and Computer Security 3	2	4			2

metables

Eng 3A Core

nglish	English 2/3 Options			4		6	
	Victorian Fiction	1		5		2	
	Literature & Society in England in the 1930s	2		5		2	
	C19 Australian Literature	1			1		3
	Modern Drama	2			1		3
	Literature & Society 1900–1920	1	4		6		
	C20 Australian Literature	2	4		6		
athematics	Mathematics GS: Statistics in the Social Sciences	F	4		6,7		
	3A/B/C Complex Analysis 3	1		5		2	
nemistry	Chemistry and Society	F			1		3

LOCK D

eld of Study	*Subject/Level/Unit*	*Session†*	*M*	*T*	*W*	*Th*	*F*
mputer Science	Computer Science 1	F		4		1	2
	Information Systems 1	F		4		1	2
litics	Politics 1	F	3		5		
nemistry	Chemistry 2A (repeat lectures)	F	3	4	5	1	
mputer Science	2A/B Introductory Operations Research 2	1		4			2
	Numerical Analysis 2	1	3			1	
	Applied Operations Research 2	2		4			2
	Numerical Linear Algebra 2	2	3			1	
	Information Systems 2	F	3	4	5		2
eanography	Oceanography 2	F	3	4	5	1	
ysics	2A/B Circuit Theory and Electronics	1				1	
	Thermal Physics 2	2				1	
	Meteorology 2 (Part 1)	1				1	
	Physics of the Atmosphere 2	1				1	
	Marine Acoustics and Optics 2 (Oc 2 and ME 4)	2	3	4	5		
story	2/3 Science and Technology in Australia	2			5		2
	Russian History	1		4		7	
	Colonial Australia	1			5		2
	~~Soviet History~~	~~2~~		~~4~~		~~7~~	
	War and Society in Australia	2	3			6	
	Modern Australia: Politics and Culture	2	3			6	
ography	3A/B/C	F	3	4	5	1,6	2
athematics†	3A/B/C Case Studies in Statistics 3	2	3			6,7	
	Incompressible and Viscous Fluid Dynamics 3	2	3		5	6	
	Differential Equations 3	1				8,9	2
	Continuum Mechanics 3	1	3		5	6	
	Statistical Modelling 3	1	3		5	6	
	Waves 3	1		4		1,7	
	Waveguide Theory 3	2		4		1,7	
chanics of Flight	Mechanics of Flight	F	3			1	
teorology A	Meteorology A	F			5		2
ysics	Physics for Society	F		4		6	

Some units may not be offered. See Department for details.

BLOCK E

Field of Study	*Subject/Level/Unit*	*Session†*	*M*	*T*	*W*	*Th*	
Chemistry†	Chemistry 1	F	2	3		5	
English†	English 1	F	2		4		
Computer Science	2A/B Knowledge Programming 2	1	2			5	
	Data Structures 2	1		3			
	Computer Architecture 2	2		3			
	Data Abstraction 2	2			4		
	Operating Systems 2	2	2			5	
Politics	2/3 Military, Society & Politics in Indonesia	1	2			5	
	Politics of Russia	1			4		
	Introduction to Comparative Politics	1		3			
	Politics of USA	1		3			
	History of Socialism	2		3			
	Electoral Systems	2		3			
	Politics of China	2	2			5	
	Politics of Canada (Special Study in Politics)	2			4		
Economics and Management	3 Labour Economics & Industrial Relations	1		3		5	
	Advanced Economic Theory & Policy	1	2		4		
	International Economic Theory & Policy	2	2		4		
	Capitalism, Socialism & Economic Growth	2		3		5	
	Logistics	1	2		4		
	Accounting Information for Managers used	2 new	2		4		
Geography	3 *	F	2	3	4		
Mathematics	3A/B/C Linear Models and Experimental Design 3	1		3			6,
	Generalized Linear Models 3	2		3			6,
	Manpower Planning	1	2		4		
	Advanced Mathematical Techniques 3	2				5	1,
	Statistical Forecasting	2	2		4		
	Industrial Mathematics 3	2	2		4		
Physics	3A/B/C/D‡ Astronomy & Astrophysics	1		3		5	
	Quantum Mechanics	1	2		4		
	Electromagnetism 3	2		3		5	
	Solid State Physics	1 ~~2~~	2		4		
History	History GS4	1					6,
	History GS3	2					6,
Economics	Economics GS	F	2		4		

* See Department for details.
† Students wishing to undertake both these subjects should contact the Departments.
‡ See Department for special considerations and optional units timetable.

Engineering GS 3 5

Engineering timetables for 1993

Aeronautical

	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10	5.10
MONDAY	AMAT.1800 AMAT.2800	AINT.1401/-- ACSC.2401 (T)/-- AECM.0500	AMEC.1005 ACSC.2401/2403	APHY.1800 **LUNCH**	**LUNCH** AMAT.2800(T)		MILITARY	MILITARY	MILITARY

	8.00	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10
TUESDAY	AINT.1404	AMAT.1800 AMAT.2800	AINT.1401 AMEC.2007	ACSC.1800 AMEC.2006	**LUNCH** AELE.2402/2401 AMAT.3401/3402	**LUNCH**			
WEDNESDAY	APHY.1800		AMAT.1800	AINT.1401 AECM.0500	**LUNCH** **LUNCH**		MILITARY	MILITARY	MILITARY
THURSDAY	AMEC.1005 ACSC.2401/--	AELE.2402/2401	ACSC.2401 (T)'/--	AMAT.1800 AMAT.2800	**LUNCH** **LUNCH**	AMAT.2800(T)			SPORT
FRIDAY	AINT.1401/-- AMEC.2007	ACSC.1800 AMEC.2006	APHY.1800	ACSC.2401 (T)'/--	**LUNCH** **LUNCH**				

	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10	5.10
MONDAY	AMAT.1800 AMAT.2800	AINT.1401/-- AECM.0500 AECM.0500	AELE.1001 ACSC.2402/--	APHY.1801 **LUNCH**	**LUNCH** APOL+AENG GS **LUNCH** **LUNCH**				

	8.00	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10
TUESDAY	AINT.1404	AMAT.1800 AMAT.2800	AINT.1401 ACMA.2008	ACSC.1800 ACMA.2009 ACSC.3401	**LUNCH** **LUNCH** **LUNCH** **LUNCH**		MILITARY	MILITARY	MILITARY
WEDNESDAY	APHY.1801 AMAT.3403/3404	AELE.1001 APOL+AENG GS	AMAT.1800	AINT.1401 AECM.0500 AECM.0500	**LUNCH** **LUNCH** **LUNCH** **LUNCH**		 MILITARY	ACSC.2402(L)/-- MILITARY	ACSC.2402(L)/-- MILITARY
THURSDAY	ACHM.1800 ACSC.2402/--		AELE.1001	AMAT.1800 AMAT.2800	**LUNCH** **LUNCH** **LUNCH** **LUNCH**	 MILITARY MILITARY	 MILITARY MILITARY	 MILITARY MILITARY	 SPORT
FRIDAY	AINT.1401/-- ACMA.2008	ACSC.1800 ACMA.2009	APHY.1801 AMAT.3403/3404 ACSC.3401	ACHM.1800	**LUNCH** **LUNCH** **LUNCH**	 AMAT.2800(T) **LUNCH**	 AHIS.0501/0502	 --/AECM.3401 AHIS.0501/0502 AECM.3402/--	 AECM.3401 AECM.3402

Electrical

	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10	5.10
MONDAY	AMAT.1800 AMAT.2800	AECM.0500	AELE.1002/1004- ACSC.2401/--	APHY.1800 **LUNCH** **LUNCH**	**LUNCH** APOL+AENG GS APOL+AENG GS **LUNCH**		APHY.2800(L) MILITARY	APHY.2800(L) MILITARY	APHY.2800(L) MILITARY

	8.00	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10
TUESDAY	AINT.1404	AMAT.1800 AMAT.2800	ACSC.2404/2405	ACSC.1800 ACSC.3401	**LUNCH** APHY.2800 AMAT.3401/3402 **LUNCH**	**LUNCH** **LUNCH**	MILITARY APHY.2800 (L)	MILITARY APHY.2800(L)	MILITARY APHY.2800(L)
WEDNESDAY	APHY.1800 APHY.2801 AMAT.3403/3404	AELE.1002/1004 APOL+AENG GS ACSC.2401(T)/-- APOL+AENG GS	AMAT.1800	AECM.0500 ACSC.2401(T)/--	**LUNCH** **LUNCH** **LUNCH** **LUNCH**	ACSC.2404/5(L) AMAT.2800(T)	ACSC.2404/5(L) MILITARY MILITARY	ACSC.2404/5(L) MILITARY MILITARY	ACSC.2404/5(L) MILITARY MILITARY
THURSDAY	ACSC.2401/--	ACHM.1401/-- APHY.2801 AMAT.3401/3402	AELE.1002/1004	AMAT.1600 AMAT.2800(T)	**LUNCH** **LUNCH** **LUNCH** **LUNCH**	MILITARY AELE.2800(L) MILITARY	MILITARY AELE.2800(L) MILITARY	MILITARY AELE.2800(L) MILITARY	SPORT
FRIDAY	ACHM.1401 ACSC.2404/2405	ACSC.1800 ACSC.3401	APHY.1800 APHY.2801 AMAT.3403/3404	ACHM.1401	**LUNCH** **LUNCH** **LUNCH** **LUNCH**	AMAT.2800(T) ACSC.2404/5(L) AHIS.0501/0502	AELE.2800(L) ACSC.2404/5(L) AHIS.0501/0502	AELE.2800(L) ACSC.2404/5(L) AECM.3402/3401	AELE.2800(L) ACSC.2404/5(L) AECM.3402/3401

	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10	5.10
MONDAY	AMAT.1800	AINT.1401/--	AELE.1001	APHY.1801	**LUNCH**				
	AMAT.2800		ACSC.2402/--		**LUNCH**	AGOC.1700(L)	AGOC.1700(L)	AGOC.1700(L)	
		AECM.0500			**LUNCH**				
		AECM.0500	--/APHY.2406	**LUNCH**	APOL+AENG GS				

	8.00	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10
TUESDAY	AINT.1404	AMAT.1800	AINT.1401	ACSC.1800	**LUNCH**				
	AGOC.1700	AMAT.2800	ACMA.2008	ACMA.2009	--AELE.2401	**LUNCH**	MILITARY	MILITARY	MILITARY
				ACSC.3401	**LUNCH**				
				--/APHY.2406	**LUNCH**				
WEDNESDAY	APHY.1801	AELE.1001	AMAT.1800	AINT.1401	**LUNCH**				
	AMAT.3403/3404				**LUNCH**			ACSC.2402(L)/--	ACSC.2402(L)/--
				AECM.0500	**LUNCH**		MILITARY	MILITARY	MILITARY
		APOL+AENG GS		AECM.0500	**LUNCH**				
THURSDAY	ACHM.1800		AELE.1001	AMAT.1800	**LUNCH**				
	ACSC.2402/--	--/AELE.2401	AGOC.1700	AMAT.2800	**LUNCH**	MILITARY	MILITARY	MILITARY	
					LUNCH	MILITARY	MILITARY	MILITARY	SPORT
	--/APHY.2405				**LUNCH**				
FRIDAY	AINT.1401/--	ACSC.1800	APHY.1801	ACHM.1800	**LUNCH**				
	ACMA.2008	ACMA.2009	AMAT.3403/3404	AGOC.1700	**LUNCH**	AMAT.2800(T)			
		ACSC.3401			**LUNCH**	AHIS.0501/0502	AHIS.0501/0502	--/AECM.3401	AECM.3401
		--/APHY.2405			**LUNCH**			AECM.3402/--	AECM.3402

Mechanical

	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10	5.10
MONDAY	AMAT.1800 AMAT.2800	AINT.1401/-- AECM.0500	AELE.1001- ACSC.2401/2403	APHY.1800 **LUNCH** **LUNCH**	**LUNCH** AMAT.2800(T) APOL+AENG GS **LUNCH**		MILITARY	MILITARY	MILITARY

	8.00	9.00	10.10	11.10	12.10	1.10	2.10	3.10	4.10
TUESDAY	AINT.1404	AMAT.1800 AMAT.2800	AINT.1401 AMEC.2007	ACSC.1800 AMEC.2006 ACSC.3401	**LUNCH** AELE.2402/2401 AMAT.3401/3402 **LUNCH**	**LUNCH** **LUNCH**			
WEDNESDAY	APHY.1800 AMAT.3403/3404	AELE.1001 APOL.1600 AENG.0505/1	AMAT.1800	AINT.1401 AECM.0500	**LUNCH** **LUNCH** **LUNCH** **LUNCH**		MILITARY MILITARY	MILITARY MILITARY	MILITARY MILITARY
THURSDAY	ACSC.2401/2403	AELE.2402/2401 AMAT.3401/3402	AELE.1001	AMAT.1800 AMAT.2800	**LUNCH** **LUNCH** **LUNCH** **LUNCH**	AMAT.2800(T) MILITARY	MILITARY	MILITARY	SPORT
FRIDAY	AINT.1401/-- AMEC.2007	ACSC.1800 AMEC.2006 ACSC.3401	APHY.1800 AMAT.3403/3404	ACSC.2401/2403(T)	**LUNCH** **LUNCH** **LUNCH** **LUNCH**	AHIS.0501/0502	AHIS.0501/0502	AECM.3402/3401	AECM.3402/3401

15. 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

It is University policy to promote equal opportunity in education (refer to EOE Policy Statement, University of New South Wales **Calendar**)

Enrolment in the University

On their entry to the Academy officer cadets must enrol formally as undergraduate students in the University College of the University of New South Wales. Acceptance as a member of the University for *all* students implies an undertaking on the part of each student to observe the regulations, by-laws and other requirements of the University in accordance with the declaration he or she signs at the time of enrolment. Such regulations, etc, are published in the current **Calendar** of the University of New South Wales.

First year students are required to attend an enrolment session before the academic year begins, at a place and time to be advised.

Before entering the second and later years students will be required to complete and return re-enrolment forms to Student Administration. Enrolment information for all students at the University College is kept on the University's student data base. Any enquiries about enrolment should be directed to Student Administration.

New and re-enrolling postgraduate students will be advised in January of each year of the enrolment details.

Change of Course

New first year students enter the Academy on the unde standing that they will take up the places allotted to them i particular courses of study. In exceptional circumstances student may be permitted to enrol in a different course, prc vided there is a vacancy and provided he or she is apprc priately qualified.

It may be possible for a student to transfer from one course t another at the end of the first year provided that he or she i appropriately qualified. A student permitted to transfer wi either re-enrol as a first year student in the new course or enr as a second year student but with a restricted choice c program.

Students seeking to change course should consult the Divisional Officer in the first instance. Changes of course ar not permitted after 31 March.

Variations in Enrolment (including Withdrawal)

All undergraduate and postgraduate students wishing to var the programs for which they have enrolled must make appl cation on the form available from Student Administration.

Applications to withdraw from subjects may be submitted a any stage of the academic year, but applications lodged wit Student Administration after the following dates will result i the applicants being regarded as failing the subjects cor cerned, except in special circumstances:

- for single session subjects, the end of the seventh week c the Session.
- for whole year subjects, the end of the third week c Session 2.

(See Chaper 13 for the actual dates in the current year).

A student who withdraws from a teaching unit of an enginee ing subject after the middle of the session for a single sessio unit or after the beginning of Session 2 for a whole year un will usually be regarded as having failed in that unit.

)plications to withdraw from units must be made in writing to
e relevant Head of Department at least a week before the
adline in either case.

)plications for enrolment in additional subjects must be sub-
tted to Student Administration by the end of March for whole
ar and Session 1 subjects and by the end of the first week
August for Session 2 subjects. (See Chapter 12 for the
tual dates in the current year).

udents who withdraw from their courses for any reason are
quired to notify Student Administration in writing. A student
10 withdraws without giving such notification may be
garded as failing all subjects in which he or she is enrolled,
d also risks infringing the University's re-enrolment rules.

ich application for a variation in enrolment received before
e end of Week 7 of each Session will be acknowledged by
e University in the *Confirmation of Enrolment Program*
tice.

student's program of study must be compatible with the pub-
ned timetable of classes. The onus is on the student to
orm Student Administration if there is any incompatibility.

s emphasized that failure to attend for any assessment pro-
dure or to lodge any material stipulated as part of an assess-
ent procedure, in any subject in which a student is enrolled
l be regarded as failure in that assessment procedure
less written approval to withdraw from the subject without
lure has been obtained from the University.

ttendance at Classes

udents are expected to be regular and punctual in atten-
nce at all classes in the courses and subjects in which they
e enrolled.

hrough illness or other unavoidable cause a student is pre-
nted from attending classes for an extended period or is
herwise unable to meet the course requirements, he or she
y be excused by the Deputy College Secretary (Academic)
not attending classes for a period of up to one month.
planations of absences or requests for permission to be
sent for such causes must be made in writing to the Deputy
llege Secretary (Academic) and, when appropriate, accom-
nied by a medical certificate. If the period of absence
ludes an examination or other form of assessment, this
ould be stated in the student's application.

e onus is upon the student to advise the relevant member
staff of unavoidable absences from classes.

certain circumstances, a student who is repeating a sub-
t may be exempted from attending some classes in that
)ject.

students attend less than eighty per cent of their possible
sses they may be refused final assessment.

xaminations

e annual examinations in the University College are held in
tober–November. Mid-year examinations are held for most
)jects in June–July.

A provisional timetable indicating the dates and times of examinations is issued well in advance of each examination period and will be posted on the notice-board in the foyer of the South Lecture Block. Students are advised to study the provisional timetable, and they must notify Student Administration immediately of any clashes in their examination programs.

The final timetable indicating the dates, times, locations and authorised aids is published approximately two–three weeks before the examination period begins. Copies will be available in the Library and at the Student Enquiry Counter. Instructions to Candidates are issued with the final timetable. All students are expected to read the instructions before the examinations begin, and to observe them.

Misreading the timetable is not an acceptable excuse for a student who fails to attend an examination.

In the assessment of student's progress, consideration is given to work in laboratory and class exercises and to any term or other tests given during the year, as well as to performance in written examinations.

Use of Computers and Electronic Calculators in Examinations

The use of computers or electronic calculators may be permitted in examinations conducted within the University. Computers and electronic calculators which are authorised by the University for this purpose MUST be *hand-held, internally powered and silent.* Computers are distinguished from electronic calculators for this purpose by the existence of a full alphabetic keyboard. Computers will not be permitted in examinations for which an electronic calculator has been specified. When an electronic calculator is permitted in an examination, any programmable memory on it must be cleared prior to entering an examination room.

The University does not provide computers or electronic calculators of any kind described in this rule for use in examinations although some departments 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, 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 shall not be admitted to an examination after thirty minutes from the time of commencement of the examination.

5. Candidates shall not be permitted to leave the examination room before the expiry of thirty minutes from the time the examination commences.
6. 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.
7. 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.
8. All answers must be in English unless otherwise stated. Foreign students who have the written approval of the College Secretary may use standard linguistic dictionaries.
9. Smoking is not permitted during the course of examinations.
10. A candidate who commits any infringement of the rules governing examinations is liable to disqualification at the particular examination, to immediate expulsion from the examination room and to such further penalty as may be determined in accordance with the By-laws.

Academic Misconduct

Students are reminded that the University regards academic misconduct as a very serious matter. Students found guilty of academic misconduct are usually excluded from the University for two years. Because of the circumstances in individual cases the period of exclusion can range from one session to permanent exclusion from the University.

The following are some of the actions which have resulted in students being found guilty of academic misconduct in recent years: use of unauthorised aids in an examination, submitting work for assessment knowing it to be the work of another person; improperly obtaining prior knowledge of an examination paper and using that knowledge in the examination; failing to acknowledge the source of material in an assignment.

Examination Results

The results of formal examinations are published by Student Administration in July and in early December, and posted on notice-boards in the University College. Students also receive individual notifications of their results from the University.

Passes in subjects are graded as follows:

High Distinction	an outstanding performance
Distinction	a superior performance
Credit	a good performance
Pass	an acceptable level of performance
Satisfactory	satisfactory completion of a subject for which graded passes are not available
Pass Conceded	may be granted provided that a stu dent's overall performance is consic ered to warrant such a concession; will allow progression to another sut ject for which the first is a prerequisite
Pass Terminating	may be granted provided a student' overall performance is considered t warrant such a concession; it does nc allow progression to another subject fc which the first is a prerequisite.

Review of a Result

A student may make application in writing to the Deput College Secretary (Academic) for the review of a result. Th application must be submitted not later than fifteen workin days after the date of issue of the *Notification of Result* *Assessment* form.

In reviewing a result, the subject authority will ensure that a components of the assessment have been assessed and mark assigned. The review is not a detailed reassessment a student's standard of knowledge and understanding of, an skills in, the subject. It is rather a search for arithmetic error i arriving at the composite mark and for gross and obvious erro in assignment of marks in components of the final composit mark.

Special Consideration

Any students who believe that their performance in a subjec either during session or in an examination, has been adverse affected by sickness or any other reason should infor Student Administration and ask for special consideration in th determination of their standing.

Such requests should be made in writing as soon as pract cable after the occurrence and in any event no more tha seven days after the final examination in a subject.

When submitting a request for special consideration a stu dent should provide a medical certificate or other appropriat evidence to support it.

Further Assessment

Deferred examinations are not granted in the Universi College.

In special circumstances, such as medical or compassiona grounds, a student may be granted further assessment in subject.

Further assessment may be given by a subject authority at h or her discretion at any time before the meeting of the releva assessment committee. Further assessment in a subject ma also be awarded to a student by the Assessment Committe

such cases the students will be notified to contact the bject authorities concerned, and they should do so at the rliest opportunity.

udents awarded further assessment by the Assessment mmittee for Session or 2 whole year subjects will normally given a minimum of four weeks' notice of the deadline for ch assessment. All such assessment must be finalised fore the commencement of the following academic year.

estrictions upon Re-enrolling

e University's rules governing re-enrolment require stu-nts who have records of failure to show cause why they ould be permitted to re-enrol.

peated Failure Rule

Students shall be required to show cause why they should be allowed to repeat a subject which they have failed more than once. Where the subject is prescribed as part of the course they shall also be required to show cause why they should be allowed to continue that course.

neral Rule

(1) Students shall be required to show cause why they should be allowed to repeat a subject they have failed if the relevant Assessment Committee so decides on the basis of previous failures in that subject or in a related subject. Where the subject is prescribed as part of the course they shall also be required to show cause why they should be allowed to continue that course.

(2) Students shall be required to show cause why they should be allowed to continue their course if the relevant Assessment Committee so decides on the basis of their academic record.

e Session–Unit System

(1) Students who infringe the provisions of Rule 2 at the end of Session 1 of any year will be allowed to repeat the subject(s) (if offered) and/or continue the course in Session 2 of that year, subject to the rules of progression in the course.

(2) Such students will be required to show cause at the end of the year, except that students who infringe Rule 2 at the end of Session 1, and repeat the subjects in question in Session 2, and pass them, will not be required to show cause on account of any such subjects.

emption from Rules by Faculties

(1) An Assessment Committee may, in special circumstances, exempt students from some or all of the provisions of Rule 2.

(2) Such students will not be required to show cause under such provisions and will be notified accordingly by the Deputy College Secretary (Academic).

Showing Cause

5. (1) Students wishing to show cause must apply for special permission to re-enrol. Application should be made on the form available from Student Administration and must be lodged with the Deputy College Secretary (Academic) by the date specified.

   (2) Each application shall be considered by the Admissions and Re-enrolment Committee of the University College which shall determine whether the cause shown is adequate to justify the granting of permission to re-enrol.

Appeal

6. (1) Students who are excluded by the Admissions and Re-enrolment Committee from a course and/or subjects under the provisions of the Rules may appeal to the Re-enrolment Appeal Committee of the University's Academic Board. The decision of the Committee shall be final.

   (2) The appeal must be lodged with the Deputy College Secretary (Academic) within fourteen days of the date of notification of exclusion; in special circumstances a late appeal may be accepted at the discretion of the Chair of the Re-enrolment Appeal Committee. In lodging such an appeal with the Deputy College Secretary (Academic) students should provide a complete statement of all grounds on which the appeal is based.

   (3) The Re-enrolment Appeal Committee shall determine appeals after consideration of each appellant's academic record, application for special permission to re-enrol, and stated grounds of appeal. Students may elect to appear before the Committee and/or be represented.

Exclusion

7. (1) Students who are required to show cause under the provisions of Rule 3 and either do not attempt to show cause or do not receive special permission to re-enrol from the Admissions and Re-enrolment Committee (or the Re-enrolment Appeal Committee on appeal) shall be excluded, for a period not in excess of two years, from re-enrolling in the subjects and courses on account of which they were required to show cause. Where the subjects failed are prescribed as part of any other course (or courses) they shall not be allowed to enrol in any such course.

   (2) Students required to show cause under the provisions of Rule 2 who either do not attempt to show cause or do not receive special permission to re-enrol from the Admissions and Re-enrolment Committee (or the Re-enrolment Appeal Committee on appeal) shall be excluded, for a period not in excess of two years, from re-enrolling in any subject they have failed twice. Where the subjects failed are prescribed as part of a course they shall also be excluded from that course. Where the subjects failed are prescribed as part of any other course (or courses) they shall not be allowed to enrol in any such course.

Student Records

Academic records of students in the University College are kept on the University's student data base. Students may obtain transcripts of their own records on application to Student Administration.

Change of Address

A student must give notice of any change of postal address to Student Administration, on the form obtainable from the Student Enquiry counter, Administration Building.

All communications from the University will be addressed to students at their Session address at the University College, except in the case of results of assessment if any students have requested them to be sent to vacation addresses.

Notice-boards

From time to time academic departments post notices which inform students about assignments, tests, tutorial groups, seminars, etc. Students are expected to be acquainted with the notices that concern them.

Admission to Degree

The University College Conferring of Degrees Ceremonies are held each year in December.

Students whose current program of study will enable them to complete all requirements for the degree should lodge with Student Administration the form Application for Admission to Degree by the second Friday in October. Forms are available from the Student Enquiry counter on the first floor of th Administration Building.

Students who have indicated on their enrolment form that the are potential graduands are forwarded an application forn with their *Confirmation of Enrolment Program* in Septembe Students who do not complete an application form will no graduate.

Details concerning the Conferring of Degrees Ceremonies wi be forwarded to all potential graduands in November.

Students enrolled in an Arts honours course who decide not t proceed to an honours year should apply to take out th degree at pass level, and advise Student Administration i writing before the end of the annual examination period.

Academic Dress

Information about the University College's academic dres requirements are available from the Deputy College Secrera (Academic).

Advice

Students seeking advice on any matters are invited to contac one of the Student Counsellors.

Students who wish to discuss their courses and related mat ters are welcome to call on a member of the Colleg Secretary's staff.

ıdex

PERSONAL TIMETABLE

PERIOD	1	2	3	4	5	6	7	8	9
MONDAY									
TUESDAY									
WEDNESDAY									
THURSDAY									SPORT
FRIDAY									

UNIVERSITY COLLEGE
UNIVERSITY OF NEW SOUTH WALES

IMPORTANT NOTICE

CHANGES TO DATES TO NOTE IN 1993

Please note the following changes to the dates on Pages 175-176 of the 1993 University College Handbook.

Dates to Note in 1993

		Meetings of College Committees (Tentative dates)
January		
18	Academy Year begins	
26	Australia Day	
February		
		5 Academic Board Executive and Higher Degree Committees
11–13	Academic orientation and enrolment for all 1st year undergraduate students	
* 15–~~16~~ 17	Enrolment and re-enrolment of postgraduate students	
March		
1– 3	Re-enrolment of continuing undergraduate students	
8	**Session 1 begins**	
		5 Academic Board and Higher Degree Committees
		10 Engineering Board of Studies
		17 Science Board of Studies
15	Canberra Day—Public Holiday	24 Humanities and Social Sciences Board of Studies
29	Last day for students to enrol in whole year or Session 1 subjects/units	
31	HECS census date	
April		
		2 Academic Board Executive and Higher Degree Committees
9	Good Friday—Public Holiday	
12	Easter Monday—Public Holiday	
23	Last day for students to discontinue without failure Session 1 subjects/units	
* 26 ~~25~~	Anzac Day—Public Holiday	
30	Publication of provisional timetable for mid-year examinations	
May		
7	Last day for students to advise of examination clashes.	7 Academic Board Executive and Higher Degree Committees
8–23	May recess	26 Humanities and Social Sciences Board of Studies
* 24 ~~21~~	Publication of final timetable for mid-year examinations	
June		
14	Queen's Birthday—Public Holiday	2 Science Board of Studies
25	**Session 1 ends**	4 Academic Board and Higher Degree Committees
28	Mid-year examination period begins	9 Engineering Board of Studies
July		
		2 Academic Board Executive and Higher Degree Committees
10	Examination periods ends (yrs 1–3)	22 Assessment Committees
14	Examination period ends (yr 4 and PG)	28 Humanities and Social Sciences Board of Studies
11–25	Mid-year leave	
26	**Session 2 begins**	

Dates to Note

Dates to Note in 1993

		Meetings of College Committees (Tentative dates)
August		
6	Last day for students to discontinue without failure subjects/units which extend over the whole academic year	4 Science Board of Studies 11 Engineering Board of Studies 13 Academic Board Executive and Higher Degree Committees
* 6	Last day for students to enrol in Session 2 subjects/units	
31	HECS census date	
September		
		3 Academic Board and Higher Degree Committees 8 Science Board of Studies
10	Last day for students to discontinue without failure session 2 subjects/units	15 Engineering Board of Studies 22 Humanities and Social Sciences Board of Studies
17	Publication of provisional examination timetable	
25	Session 2 study recess begins	
October		
4	Eight Hour Day—Public Holiday	
5	Session 2 study recess ends	
24 Sept * ~~7~~	Last day for students to advise of examination timetable clashes	
5	Publication of final timetable for the annual examinations	8 Academic Board Executive and Higher Degree Committees
* 29 ~~23~~	Session 2 ends	
November		
1	Study and examination period begins	12 Academic Board and Higher Degree Committees
11	Remembrance Day	
19	Study and examination period ends	
December		
8	Assessment results displayed on noticeboards	2 Assessment Committees
9	Assessment results mailed to students	3 Assessment Committees
15	Degree conferring ceremonies	
16	Graduation Parade	
* 21 ~~17~~	Academy Year ends	

PUBLIC HOLIDAY COMPENSATION:

Monday 15 March (Canberra Day)	Monday lost
Friday 9 April (Good Friday)	Friday lost
Monday 12 April (Easter Monday)	Monday timetable on Tuesday 13 April
Monday 26 April (Anzac Day)	Monday timetable on Wednesday 28 April
Monday 14 June (Queen's Birthday)	Monday timetable on Thursday 17 June
* Monday 4 October (NSW Labour Day)	Monday ~~lost~~ timetable on Tuesday 5 October