

TRANSITIONAL ARRANGEMENTS: Bachelor of Science

The information provided below is intended to assist UNSW@ADFA students who commenced their UNSW@ADFA Bachelor of Science Degree prior to 2010.

Students should consult with their School Undergraduate/CDF Coordinator or Student Administrative Services if they have any concerns regarding their progression through their degree.

Bachelor of Science

School of Physical, Environmental and Mathematical Sciences

School of Engineering and Information Technology

School of Business

School of Humanities and Social Sciences

Award/s: 4410 – Bachelor of Science and Bachelor of Science (Honours) (BSc and BSc (Hons))

Duration: 3 years full-time or part-time equivalent plus an additional year for Honours.

UoC per semester: 24 UoC (full-time)

UoC for award: 144 UoC

Program Description:

The BSc is a three-year program at pass level and a four-year program at honours level. Science is the understanding of the physical universe (from sub-atomic particles and microbes through to the planet's environment and the origin of the universe itself), and human interactions with it. Just as important is the scientific process by which this understanding is gained. In turn, science is the foundation of the modern technologies that enhance the quality of lives and provide ever more sophisticated means of applying the scientific process. In addition, science is crucial in control of disease, biotechnology, new sustainable energy sources, information technology, and management of precious natural resources.

Honours students who are RAN midshipmen or RAAF officer cadets continue with their programs at UNSW@ADFA and complete their degrees at the end of the fourth year. Army officer cadets, however, 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 and those who are continuing with honours programs return to the Academy to complete their degree.

Program Objectives and Learning Outcomes:

The BSc degree rules allow students to include a mix of both Arts and Science courses.

The following Science discipline areas are available in the BSc and the BSc (Hons):

Chemistry

Computer Science

Geography



Information Systems
Mathematics
Oceanography
Operations Research
Physics

The following Arts discipline areas are available in the BSc:

Economics
English
Geography
History
Indonesian
Indonesian-Malay Studies
Information Systems
Management
Politics

Program Structure

The BSc is one of the most flexible programs available through UNSW@ADFA, allowing you to construct your degree in one of the following three options:

Option 1

Two Majors

Science major, plus Science major

Option 2

Major plus two Minors

Science major, plus Science minor, plus Science or Arts minor

Option 3

Two Majors plus a Minor

Science major, plus Arts major, plus Science minor

Academic Rules

Pass Degree

1 Faculty Regulations for Undergraduate Students

A student must comply with the Undergraduate Faculty Regulations for Undergraduate Students. In the event of a conflict, the rules for the Bachelor of Science take precedence over the Faculty Regulations for Undergraduate Students.

2 Degree Rules Dictionary

- 2.1 “Major” means an approved combination of 48 units of credit in the one discipline area, of which at least 36 units of credit are for upper-level courses.
- 2.2 “Minor” means an approved combination of 24 units of credit in the one discipline area, of which at least 12 units of credit are for upper-level courses.
- 2.3 “Level I” means courses at an introductory level, normally taken in Year 1.
- 2.4 “Upper level” means courses at Level II and Level III, normally taken in Years 2 or 3.
- 2.5 “Science discipline areas” means Chemistry, Computer Science, Geography, Information Systems, Mathematics, Oceanography, Operations Research, and Physics.
- 2.6 “Arts discipline areas” means Economics, English, Geography, Information Systems, History, Indonesian, Indonesian-Malay Studies, Management and Politics.
- 2.7 “Elective courses” means courses from any related discipline area as identified in Clauses 2.5 and 2.6 above.

3 Degree Requirements

- 3.1 A student must obtain, normally over three years of study, a minimum of 144 units of credit, including one of the following combinations (“1”, “2”, or “3”) –

Option 1) 96 units of credit for two majors from Science discipline areas; and –

- i. 24 units of credit for elective courses at Level I;
- ii. 12 units of credit for Directed Studies courses, ZBUS2801 Leadership and Management (**now ZGEN2801**) and ZHSS2002 Introduction to Strategic Studies (**now ZGEN2222**), or approved equivalents;
- iii. 12 units of credit for General Education courses, or approved equivalents, normally taken in the second and third year of study.

Option 2) 96 units of credit for one major from a Science discipline area, plus two minors, one of which must be from a Science discipline area; and -

- i. 12 units of credit for elective courses at Level I;
- ii. 12 units of credit for Directed Studies courses, ZBUS2801 Leadership and Management (**now ZGEN2801**) and ZHSS2002 Introduction to Strategic Studies (**now ZGEN2222**), or approved equivalents;
- iii. 12 units of credit for General Education courses, or approved equivalents, normally taken in the second and third year of study;

iv. 12 units of credit for elective courses at Upper Level.

Option 3) 120 units of credit for one major from a Science discipline area, one major from an Arts discipline area, and one minor from a Science discipline area; and -

- i. 12 units of credit for elective courses at Level I, chosen from a Science discipline area;
- ii. 12 units of credit for Directed Studies courses, ZBUS2801 Leadership and Management (now ZGEN2801) and ZHSS2002 Introduction to Strategic Studies (now ZGEN2222), or approved equivalents.

3.2 No more than 48 units of credit may be gained for Level I courses.

3.3 36 units of credit for Level I courses must be from Science discipline areas.

4 Special Rules

4.1 Students who complete a major or a minor in Management, which includes ZBUS1101 and ZBUS2302, must substitute 6 units of credit of upper-level elective courses for the ZBUS2801 Leadership and Management requirement.

4.2 Students who complete a major or a minor in Management, which includes ZBUS1101 but not ZBUS2302, are required to complete ZBUS2802. Such students cannot include ZBUS2801 or ZBUS2803 in their degree.

4.3 Students who include ZHSS2002 Introduction to Strategic Studies (now ZGEN2222) as part of a minor or major in either History or Politics are required to take 6 units of credit of upper-level elective courses in place of the Directed Studies requirement set out in rule 3.1 above.

Honours

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

5 Entry

To enrol for the award of the degree at Honours level in one or two specialisations, a student must –

1) complete the pass-degree program requirements;

or -

2) gain an approved award from elsewhere;

and -

3) have achieved at least a credit average (65) across the entire undergraduate program including a credit average over the Level III courses in a major sequence which is in the same discipline area as the proposed Honours program.

6 Degree Requirements

6.1 A student must obtain, normally over one year of study, a minimum of 48 units of credit in one or two areas of study approved by the Head of School.

7 Class of Honours

7.1 The Honours degree is awarded in three classes (Class 1, Class 2 in two Divisions, and Class 3).

Sample Programs:

The programs shown below are samples of those available under the rules for the BSc degree. They are intended to illustrate the operation of the degree rules, and to be a ready reference for degree structures, typical programs and the sorts of options available. Nothing in this section replaces or modifies any part of the degree rules. This section should be read in conjunction with the rules governing the award of the degrees of Bachelor of Science.

Note: In Level I course selections students will need to select some courses that are outside the discipline areas in which they build majors and minors. In the case of option 2 and 3 of Rule 3.1, students will have to choose Level II or Level III courses to the value of 12UoC outside their major and minor sequences. These courses have been designated as “Electives” for the purposes of the diagrams.

Option 1 – Bachelor of Science – Two majors from Science discipline areas

	Science Major <i>Chemistry</i>	Arts Major <i>Mathematics</i>	Electives <i>Physics & Econ</i>	General Education	Directed Studies	UoC
Yr 1	12 UoC	12 uoC	24 UoC			48
Yr 2	12 UoC	12 UoC		12 UoC	12 UoC	48
Yr 3	24 UoC	24 UoC				48
Total	48	48	24	12	12	144

Option 2 - Bachelor of Science - One major from a Science discipline area, plus two minors, one of which must be from a Science discipline area

	Science Major <i>Mathematics</i>	Science Minor <i>Oceanography</i>	Arts or Science Minor <i>Physics</i>	Electives <i>Politics</i>	General Edu	Directed Studies	UoC
Yr 1	12 UoC	12 uoC	12 uoC	12 UoC			48
Yr 2	12 UoC	12 UoC	12 UoC		6 UoC	6 UoC	48
Yr 3	24 UoC			12 UoC	6 UoC	6 UoC	48
Total	48	24	24	24	12	12	144

Option 3 - Bachelor of Science - One major from a Science discipline area, one major from an Arts discipline area, and one minor from a Science discipline area

	Science Major <i>Comp Sci</i>	Arts Major <i>Managment</i>	Science Minor <i>Ops Research</i>	Electives <i>Oceano</i>	Directed Studies	UoC
Yr 1	12 UoC	12 uoC	12 uoC	12 UoC		48
Yr 2	12 UoC	12 UoC	12 UoC		6 UoC	48
Yr 3	24 UoC	24 UoC			6 UoC	48
Total	48	48	24	12	12	144

Chemistry

School of Physical, Environmental and Mathematical Sciences

Chemistry is a foundation science of civilisation and is central to modern technology and medicine. It began with early studies of medicine and metallurgy in many parts of the world, including Africa, Asia and Europe, and developed into its modern form after the European Renaissance. Australians have won six Nobel prizes in sciences to date, including a Nobel Prize for Chemistry won by Sir John Comforth in 1975. One Nobel Prize was one for Physics and led to major advances in chemistry, biology and materials science (W.H. Bragg, W.L. Bragg, 1915). The other four were won in Medicine and contained substantial chemical components (Florey, 1945, MacFarlane Burnett, 1960, Eccles, 1963, and Doherty, 1996).

Chemistry is science at the molecular level. Chemical science underpins defence technology at every level from lasers and high-speed computers to food science and energetic materials. Ordnance and Engineering are particular areas where ADFA Chemistry majors have found employment. A Science or Arts degree built around Chemistry courses is a solid basis for pursuing a balanced and liberal education.

The chemistry of materials is taught at UNSW@ADFA in support of the BE and BTech programs for Engineering, Technology and Aviation students. The course Chemical and Biological Warfare: Defence and Disarmament is taught as part of the UNSW program of elective General Education courses for students of the Humanities and Social Sciences (BA), Engineering (BE) and Technology (BTech).

Chemistry is divided into several sub-fields. The School of PEMS has strengths in Physical and Theoretical Chemistry, Inorganic and Biological Chemistry. As well as teaching, academic staff carry out research in these fields. Fourth-year Honours and higher-degree-by-research (MSc, PhD) programs are available within a range of specified areas.

Plan Structure

Minor and Major

A Minor or Major sequence in Chemistry comprises two Level I courses

ZPEM1101	Chemistry 1A
ZPEM1102	Chemistry 1B

plus a Minor and a Major require 12UoC from the following Level II courses

ZPEM2102	Organic Chemistry 2
ZPEM2113	Inorganic Chemistry and Spectroscopy

plus a Major requires 24UoC from the following Level III courses

ZPEM3103	Physical Chemistry 3
ZPEM3106	Biological Chemistry
ZPEM3107	Explosives
ZPEM3121	Supramolecular Chemistry

Honours

Honours Chemistry is offered as part of the Degree of Bachelor of Science with Honours program. The course allows students to develop their own research program under the supervision of academic staff and to incorporate higher-level skills and a greater depth of scientific experience in their university studies. Such projects usually lead to new science and publication in scientific journals. Students nominate for selection through their respective Service in Semester 2 of third-year studies at the Academy. UNSW@ADFA requires high achievement in the Chemistry components of the normal pass degree, with a credit average or higher at Level III and an overall credit average or better for the BSc program.

Prospective honours students are invited to discuss projects with the Head of School and academic staff early in their third year.

Computer Science

School of Engineering and Information Technology

Computer Science is one of three disciplines of study offered in the field of Information Technology. The study of Computer Science is intimately linked with the study of the modern digital computer, its design, operational characteristics and control. Teaching is concentrated principally in the areas of algorithm specification, data structures, programming languages, operating systems, computer networks and artificial intelligence. The final year of the three-year program has a core concentration in software engineering, followed by project design and implementation. This third-year work is oriented strongly to Defence-related computing projects with direct Service input and guidance. Typical examples which have been undertaken include resource allocation studies for RAAF, system specification for the RAN Command Centre, war-gaming projects for Army, RAAF Staff College and for the ADF Warfare Centre.

Plan Structure

Minor and Major

A Minor or Major sequence in Computer Science comprises two Level I courses

ZITE1101	Introduction to Computer Science (now ZEIT1101)
ZITE1102	Programming Fundamentals (now ZEIT1102)

plus a Minor or Major requires 2 specified Level II courses in Computer Science

ZEIT2102	Computer Technology (previously ZITE2102)
ZEIT2103	Data Structures and Representation (previously ZITE2103)

plus a Major requires specified Level III courses

ZEIT3101	Computing Project – Computer Science (previously ZITE3101)
ZEIT3110	Software Engineering (previously ZITE3110)
ZEIT3113	Computer Languages and Algorithms (previously ZITE3113)

plus a Major requires 6UoC from the following electives

ZEIT2303	E Warrior (previously ZITE2303)
ZEIT2304	Web Sites and Multimedia (previously ZITE2304)
ZEIT2401	Quantitative Operations Research (previously ZITE2401)
ZEIT2403	Introduction to Operations Research (previously ZITE2403)
ZEIT3102	Cryptography (previously ZITE3102)
ZEIT3104	Electronic Commerce (previously ZITE3104)
ZEIT3108	Java Programming Applications (previously ZITE3108)
ZEIT3105	Human Computer Interaction (previously ZITE3105)
ZEIT3106	Interactive Computer Graphics (previously ZITE3106)
ZEIT3107	Multimedia and Virtual Environments (previously ZITE3107)
ZEIT3109	Knowledge Based Systems (previously ZITE3109)
ZEIT3111	Special Topic (3UoC) (previously ZITE3111)
ZEIT3114	Internetworking (previously ZITE3114)
ZEIT3115	Systems and Network Administration (previously ZITE3115)
ZEIT3116	XML Technologies (previously ZITE3116)
ZEIT3305	Special Topic 3 (previously ZITE3305)
ZEIT3404	Simulation (previously ZITE3404)

Computer Science and Information Systems Double Major

Students majoring in both Computer Science and Information Systems are not permitted to enrol in ZEIT3101 (previously ZITE3101). They will instead enrol in an additional Elective course (6UoC) from the above list.

Honours

Student wishing to take an Honours program in Computer Science need to take the full Computer Science major sequence as listed above. In their fourth year of study they undertake the following courses.

Full Time

ZEIT4103	Computer Science 4 (Honours) (48UoC – 24UoC a semester for one year) (previously ZITE4103)
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Part Time

ZEIT4104	Computer Science 4 (Honours) (48UoC – 12UoC a semester for two years) (previously ZITE4104)
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It is also possible to do a combined Honours program in Computer Science and another discipline. Students wishing to take such a combined Honours program need to take the full Computer Science major sequence as listed above. In their fourth year of study they undertake the following courses.

Full Time

ZEIT4101 Computer Science 4 (Combined Honours) (48UoC – 24UoC a semester for one year)
(previously ZITE4101)

Part Time

ZEIT4102 Computer Science 4 (Combined Honours) (48UoC – 12UoC a semester for two years)
(previously ZITE4102)

Students interested in taking an Honours program are advised to contact the School Office early in the year prior to the proposed Honours year.

Geography

School of Physical, Environmental and Mathematical Sciences

All Geography courses are available to both Arts and Science students. The School makes no distinction in curricula between students who are enrolled in the degrees of Bachelor of Arts and Bachelor of Science. Geography is the study of both the physical and human environments in which we live and the interactions between people and nature. Geography provides a bridge between the social and natural sciences. It provides students with the techniques to analyse our environment and society, including Geographic Information Systems and Remote Sensing.

Plan Structure

Level I Geography

In both Level I courses an integrative approach is developed to understanding environmental processes and human activities that take place on the surface of the earth.

Level II Geography

In Level II Geography, students can begin to specialise in one of the systematic branches of the discipline, either human or physical geography, or alternatively they can select a mix of courses from these two branches as well as geographical techniques (Remote Sensing) and area studies.

Potential honours students are encouraged to take more than 12UoC of Level II Geography.

Level III Geography

While there is no specified assumed knowledge for Level III Geography courses, it is generally expected that students will have completed some Level II Geography before enrolling in Level III. Students who have not done this should discuss their intended enrolment with the Head of School or relevant course convenor.

Minor and Major

A Minor or Major sequence in Geography comprises two Level I courses

ZPEM1201 Geography 1A: Introduction to Global Change

ZPEM1202 Geography 1B: Contemporary Global Change

plus a Minor includes 12UoC from the following Level II and/or Level III Geography courses.

plus a Major includes 36UoC from the following Level II and/or Level III Geography courses.

ZHSS2227 Custom and Change in Melanesia

ZPEM2202 Ecological Biogeography

ZPEM2205 Rivers and Coasts

ZPEM2206 Remote Sensing: A Tool for Earth Observation

ZPEM2207 Social Geography

ZPEM2209 Development and Change

ZPEM3202 Cultural Geography

ZPEM3207 Making Decisions in Geography

ZPEM3208 Geographic Research Methods

ZPEM3209 Water Matters

ZPEM3203 Conservation Biogeography

ZPEM3204 Environmental Hazards

ZPEM3213 Resource Management

ZPEM3215 Transport Geography

ZPEM3216 This Sporting Life: Mapping Sports in Australia

ZPEM3222 Coastal Geomorphology

To complete a major in Geography, students must complete at least one Level II course that includes a residential field school (currently ZPEM2202 Ecological Biogeography or ZPEM2207 Social Geography) and a Level III Geography course that includes a residential field school (currently ZPEM3208 Geographic Research Methods).

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. The Honours program provides students with the opportunity to undertake a research project and to present their results in a thesis. Coursework in the form of seminars, lectures and assignments is also normally undertaken.

Information Systems

School of Engineering and Information Technology

Information Systems is one of three disciplines of study offered in the field of Information Technology. It can be studied as either an Arts or Science Discipline. The study of Information Systems concentrates on the application of computer systems to information processing and control. It is distinguished from Computer Science in that it accentuates the role of information in the service of management, and thus is interested in the analysis, design and implementation of systems rather than the computer itself. A “systems view” is taken throughout, where the organisational context for an information system is stressed. In the first two years the teaching is principally in the areas of information analysis and the mastery of the tools and techniques used to model systems and then implement them. The final year of the three-year program has a core concentration in software project lifecycle management.

This third-year work is oriented strongly to Defence-related computing projects with direct Service input and guidance. Typical examples which have been undertaken include the analysis of computing support requirements, the design and implementation of various data and graphical applications, and the construction of Web sites and virtual environments.

Plan Structure

Minor and Major

A Minor or Major sequence in Information Systems comprises two Level I courses

ZITE1301	Introduction to Information Systems (now ZEIT1301)
ZITE1302	Information Systems in Organisations (now ZEIT1302)

plus a Minor or Major require 2 specified Level II courses in Information Systems

ZEIT2301	Design of Information Systems (previously ZITE2301)
ZEIT3303	Capability Option Analysis (previously ZITE3303)

plus a Major requires three specified Level III courses

ZEIT3302	Software Project Management (previously ZITE3302)
ZEIT3303	Capability Option Analysis (previously ZITE3303)
ZEIT3304	Computing Project – Information Systems (previously ZITE3304)
ZEIT3306	Engineering a System (previously ZITE3306)

plus a Major requires one elective course from:

ZEIT2303	E Warrior (previously ZITE2303)
ZEIT2304	Web Sites and Multimedia (previously ZITE2304)
ZEIT2404	Strategic Decision Making (previously ZITE2404)
ZEIT3104	Electronic Commerce (previously ZITE3104)

Honours

Students wishing to take an Honours program in Information Systems need to take the full Information Systems major sequence as listed above. In their fourth year of study they undertake the following courses.

Full Time

ZEIT4303 Information Systems 4 (Honours) (48UoC – 24UoC a semester for one year) (previously ZITE4303)

Part Time

ZEIT4304 Information Systems 4 (Honours) (48UoC – 12UoC a semester for two years) (previously ZITE4304)

It is also possible to do a combined Honours program in Information Systems and another discipline. Students wishing to take such a combined Honours program need to take the full Information Systems major sequence as part of their undergraduate degree. In their fourth year of study they undertake the following courses.

Full Time

ZEIT4301 Information Systems 4 (Combined Honours) (48UoC – 24UoC a semester for one year) (previously ZITE4301)

Part Time

ZEIT4302 Information Systems 4 (Combined Honours) (48UoC – 12UoC a semester for two years) (previously ZITE4302)

Students interested in taking an Honours program are advised to contact the School Office early in the year prior to the proposed Honours year.

Mathematics

School of Physical, Environmental and Mathematical Sciences

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

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

Science, Engineering and Technology are based on mathematical thinking and use the language of mathematics. The Humanities, the Natural Sciences and the business world draw on the power of mathematics to predict, plan and understand natural and human affairs. As society becomes increasingly dependant on technology, mathematics is becoming more of an essential tool in our lives.

Plan Structure

The Level I courses build on high-school mathematics to give a broad introduction to the basic language and techniques of mathematics. Students who wish to major in other areas of Science are encouraged to take both Level I Mathematics courses, or at least the Level I Mathematics course ZPEM1301 Mathematics 1A. Taking Mathematics 1A, but not Mathematics 1B, will still allow students to complete a minor in Mathematics (see the structure for a minor below). The course ZPEM1302 Mathematics 1B is a prerequisite for some Level II and Level III Mathematics courses.

At Level II, ZPEM2302 Mathematical Tools in Science extends basic concepts introduced in ZPEM1301 Mathematics 1A, in particular ideas and techniques for representing and analysing data, and calculus of several variables. Case studies will illustrate how these mathematical tools are used in a wide range of disciplines including Geography, Chemistry, Physics and Oceanography. ZPEM2311 Mathematical Modelling builds on the basic concepts introduced in ZPEM1302 Mathematics 1B and looks at a variety of applications such as chemical reactions, sound, population growth and wave motion.

Level III courses delve into mathematical methods in greater depth and examine a variety of applications. Most of the courses taught are related, in some way, to the research that is currently undertaken by the staff members. Students are shown, first hand, the crucial role that mathematics plays in various areas of science, engineering and technology.

Minor and Major

A Minor sequence in Mathematics and Statistics comprises the Level I course

ZPEM1301	Mathematics 1A
ZPEM1302	Mathematics 1B*

Plus the Level II course

ZPEM2302	Mathematical Tools for Science
ZPEM2311	Mathematical Modelling
ZPEM3306	Waves and Fluids
ZPEM33nn	Advanced Tools for Scientists

A Major sequence in Mathematics and Statistics comprises the Level I courses

ZPEM1301	Mathematics 1A
ZPEM1302	Mathematics 1B*

plus the Level II courses

ZPEM2302	Mathematical Tools for Science
ZPEM2311	Mathematical Modelling*

plus 24UoC from the following Level III courses

ZPEM3301	Applications and Techniques in Mathematics
ZPEM3306	Waves and Fluids
ZPEM3311	Mathematical Methods for Differential Equations
ZPEM3320	Special Topic 3A

* ZPEM1302 Mathematics 1B is a prerequisite for ZPEM2311 Mathematical Modelling

Honours

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

Oceanography

School of Physical, Environmental and Mathematical Sciences

Viewed from space, the Earth is a blue planet with over 70% of its surface covered by water. Because of this, the oceans exert a major influence on the Earth's climate and shipping operations. The three-year major program covers key principles of oceanography and the related issues of meteorology and climate. It offers a comprehensive account of physical oceanography, including components that cover waves, currents, sonar, and remote sensing, and employs mathematical arguments to describe the physical phenomena that take place within the world's oceans. It provides all future ADF officers with a sound understanding of the influence of oceans and weather. Double Majors of Oceanography with either Physics or Mathematics cover the requirements for a position at RAN's METOC (Meteorology and Oceanography) office.

Plan Structure

The Level I course Introduction to Oceanography is designed as a general course suitable for those Science and Arts candidates majoring in other fields of study. It provides students with a broad introduction to the study of the oceans, including topics in ocean and atmosphere circulation, marine physics, chemistry, biology, ecology and geology. In addition, some of the Level II and Level III courses may be taken by students majoring in other fields of study provided that the School is satisfied that their background knowledge is appropriate.

Level I Mathematics (ZPEM1301 Mathematics 1A and ZPEM1302 Mathematics 1B or the equivalent in Engineering Mathematics courses) is currently the prerequisite for students enrolling in Level II and Level III Oceanography.

A special program of study designed to lead to a double major in Oceanography and Physics will automatically incorporate all of the courses that provide the mathematical tools for science (see below).

Minor and Major

A Minor or Major sequence in Oceanography comprises two Level I courses

ZPEM1402	Introduction to Oceanography
ZPEM1501	Mechanics, Waves and Thermodynamics

plus a Minor or Major requires the following Level II courses:

ZPEM2401	Australian Waters and their Dynamics
ZPEM2506	Space Weather and Meteorology

plus a Major requires the following Level III courses

ZPEM3222	Coastal Geomorphology
ZPEM3400	Special Program (Oceanography)
ZPEM3401	Ocean Circulation and Mixing
ZPEM3404	Ocean Waves and Modelling
ZPEM3524	Sonar Navigation and Guidance

Double Major in Oceanography and Physics

This special program comprises four Level I courses

ZPEM1301	Mathematics 1A
ZPEM1402	Introduction to Oceanography
ZPEM1501	Mechanics, Waves and Thermodynamics
ZPEM1502	Electromagnetism, Space and Matter

plus four Level II courses:

ZPEM2302	Mathematical Tools for Science
ZPEM2401	Australian Waters and their Dynamics
ZPEM2502	Waves and Electronic Materials
ZPEM2506	Space Weather and Meteorology

plus 48UoC from the following Level III courses

ZPEM33nn	Advanced Mathematical Tools for Scientists
ZPEM3306	Waves and Fluids
ZPEM3401	Ocean Circulation and Mixing
ZPEM3404	Ocean Waves and Modelling
ZPEM3501	Dynamics of Weather and Climate
ZPEM3502	Cosmology and Modern Astrophysics
ZPEM3503	Electromagnetic Waves and Advanced Materials
ZPEM3524	Sonar Navigation and Guidance
ZPEM3528	Thermodynamics and Nuclear Physics

Honours

Students with a special interest and aptitude in Oceanography are encouraged to apply for an Honours program. Combined Honours programs extending across two disciplines are also possible, with proposals considered on a case-by-case basis. The standard for entry to all programs is typically a credit average or better. All programs incorporate both coursework and a research project. In Combined Honours the research project is on a topic which incorporates both Oceanography and another discipline, and is jointly supervised and examined.

Operations Research

School of Engineering and Information Technology

Operations Research is one of three disciplines of study offered in the field of Information Technology. Applying mathematical models to the solution of problems encountered by individuals, groups and organisations became a science during World War II and is now known as Operations Research or Management Science.

The techniques developed were, after the war, modified and extended to be applicable in the civilian world, in areas such as banking, mining, the oil industry, transportation and many others. Today, the study of Operations Research and Management Science provides insight into decision making.

Plan Structure

Minor and Major

A Minor and Major sequence in Operations Research comprises two Level I courses

ZITE1101	Introduction to Computer Science (now ZITE1101)
ZITE1102	Programming Fundamentals (now ZITE1102)
ZITE1301	Introduction to Information Systems (now ZITE1301)
ZITE1302	Information Systems in Organisations (now ZITE1302)
ZPEM1301	Mathematics 1A
ZPEM1302	Mathematics 1B

plus a Minor requires 12UoC from the following Upper-Level courses

plus a Major requires 36UoC from the following Upper-Level courses

ZEIT2401	Quantitative Operations Research (previously ZITE2401)
ZEIT2403	Introduction to Operations Research (previously ZITE2403)
ZEIT2404	Strategic Decision Making (previously ZITE2404)
ZEIT2405	Problem Structuring Techniques (previously ZITE2405)
ZEIT3303	Capability Option Analysis (previously ZITE3303)
ZEIT3404	Simulation (previously ZITE3404)

Honours

An Honours program is not currently available in Operations Research.

Physics

School of Physical, Environmental and Mathematical Sciences

Physics is the systematic study of the basic properties of matter. Its scope ranges from elementary particles at one end of the size scale to galaxies, quasars and the universe itself at the other. It also encompasses some of the deepest scientific questions of the day and sustains a wealth of practical applications. The three-year major program covers key principles of physics and includes a comprehensive account of the physics of astronomy, meteorology and materials. It provides future ADF officers with the technical versatility and understanding necessary for them to employ and exploit the advanced technology at the core of modern defence systems and operations.

The Pass Program is constructed around four broad themes that between them span the field of physics:

- Space, Stars and the Universe
- Earth, Atmosphere and Oceans
- Remote Sensing and Surveillance
- Atoms, Matter and Modern Materials.

Threading through the Program, these themes provide a framework within which the student is introduced to the concepts of physics. In addition, they furnish practical examples and applications which reinforce and enhance understanding and display the value, utility and pervasive character of the principles of physics.

Plan Structure

Level I Physics is structured primarily to lead into Level II Physics. However ZPEM1501 Mechanics, Waves and Thermodynamics and ZPEM1502 Electromagnetism, Space and Matter are self-contained courses suitable for those Science and Arts candidates majoring in other fields of study. In addition, some of the Level II and Level III courses may be taken by students majoring in other fields of study provided that the School is satisfied that their background knowledge is appropriate.

Level I Mathematics (ZPEM1301 Mathematics 1A and ZPEM1302 Mathematics 1B or the equivalent in engineering mathematics courses) is currently a prerequisite for students enrolling in Level II and Level III Physics.

A special program of study designed to lead to a Double Major in Oceanography and Physics will automatically incorporate all of the courses that provide the mathematical tools for science (see below).

Minor and Major

A Minor or Major sequence in Physics comprises two Level I courses

ZPEM1501 Mechanics, Waves and Thermodynamics

ZPEM1502 Electromagnetism, Space and Matter

plus a Minor and a Major require the following Level II courses

ZPEM2502 Waves and Electronic Materials

ZPEM2506 Space Weather and Meteorology

plus a Major requires 24UoC from the following Level III courses

ZPEM3501 Atmospheric Dynamics (3UoC)

ZPEM3502 Cosmology and Modern Astrophysics (3UoC)

ZPEM3503 Electromagnetic Remote Sensing (3UoC)

ZPEM3504 Physics of Advanced Materials (3UoC)

ZPEM3521 Experimental Physics – Laboratory (3UoC)

ZPEM3522 Experimental Physics - Project (3UoC)

ZPEM3528 Thermodynamics and Propulsion (3UoC)

ZPEM3531 Nuclear Phenomena and the Environment (3UoC)

or 24UoC from the following Level III courses

ZPEM3501 Dynamics of Weather and Climate

ZPEM3502 Cosmology and Modern Astrophysics

ZPEM3503 Electromagnetic Waves and Advanced Materials

ZPEM3524 Sonar Navigation and Guidance

ZPEM3528 Thermodynamics and Nuclear Physics

Double Major in Physics and Oceanography

This special program comprises four Level I courses

ZPEM1301 Mathematics 1A

ZPEM1402 Introduction to Oceanography

ZPEM1501 Mechanics, Waves and Thermodynamics

ZPEM1502 Electromagnetism, Space and Matter

plus four Level II courses:

ZPEM2302 Mathematical Tools for Science

ZPEM2401 Australian Waters and their Dynamics

ZPEM2502 Waves and Electronic Materials

ZPEM2506 Space Weather and Meteorology

plus 48UoC from the following Level III courses

ZPEM33nn Advanced Mathematical Tools for Scientists

ZPEM3306 Waves and Fluids

ZPEM3401 Ocean Circulation and Mixing

ZPEM3404	Ocean Waves and Modelling
ZPEM3501	Dynamics of Weather and Climate
ZPEM3502	Cosmology and Modern Astrophysics
ZPEM3503	Electromagnetic Waves and Advanced Materials
ZPEM3524	Sonar Navigation and Guidance
ZPEM3528	Thermodynamics and Nuclear Physics

Honours

Students with a special interest and aptitude in Physics are encouraged to apply for an Honours program. Combined Honours programs extending across two disciplines are also possible, with proposals considered on a case-by-case basis. The standard for entry to all programs is typically a credit average or better. All programs incorporate both coursework and a research project. In Combined Honours the research project is on a topic which incorporates both Physics and another discipline, and is jointly supervised and examined.