Engineering Systems

Year and Campus:	2015
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Overview:	Engineering involves the planning, design and construction of the built environment for the provision of essential services and infrastructure in a manner that respects and works with the natural and social environmental contexts in which it occurs. Engineers use their sophisticated understanding of these concepts to create solutions to improve quality of life. This major provides you with the interdisciplinary skills necessary to succeed in this complex and exciting field. Given the critical link engineers create between society, the built and natural environments, this major draws upon one of the key strengths of the Bachelor of Environments – its interdisciplinary approach to problem solving – to build your teamwork skills. You will learn how to work with a range of specialists, such as architects, biologists, ecologists, natural resource managers, planners, community groups, farmers and other engineering disciplines, in order to establish sustainable and resilient human-environment systems. This major is based on a strong ability in mathematics and science to learn how to develop predictive models of complex systems to allow design of engineered systems. **Careers and further study** Students pursuing a career in engineering will complete the Bachelor of Environments with a major in Engineering Systems, followed by the two-year Master of Engineering (Civil, Environmental or Structural). The five-year Bachelor-Master combination leads to professional accreditation by Engineers Australia, the Washington Accord and Eur-ACE, the European accreditation system for professional engineers. For more information on the Masters of Engineering and graduate careers, please visit the Melbourne School of Engineering web site: **www.eng.unimelb.edu.au (http://www.eng.unimelb.edu.au/)** ## Environmental engineering graduates specialize in land, water, energy or waste management; site contamination; river rehabilitation; soil erosion; renewable energy and other environmental issues. Civil and structural engineering graduates work in construction engineering, building structural design, transport and traffic, earthworks, hydraulic systems, and project management. Many graduate engineers also find demand for their strong analytic problem solving skills in a range of business and management careers. Graduates usually work with: ## # Local and international engineering consulting firms ## # Urban and rural water agencies ## # Conservation and natural resources departments ## # Environmental protection agencies ## # Catchment management authorities ## # Local, state and federal government agencies## # Management consulting firms # Public transport companies # Construction contracting companies
Learning Outcomes:	By the end of a three year Bachelor of Environments degree with an Engineering Systems major, students will have developed a deep understanding of the interaction between the built and natural environments, and problem solving skills with regard to ecologically sustainable development.
Structure & Available Subjects:	112.5 points of Engineering Systems subjects.

Majors/Minors/ Specialisations

Course planning for an Engineering Systems major

A major in Engineering Systems in the Bachelor of Environment consists of:

87.5 points of Engineering Systems Core subjects;
25 points of Major Elective subjects;

PLUS

In first year: 37.5 points of Level 1 Enabling & Environments elective subjects required for the major

Specific details of the Bachelor of Environments course structure can be found at:

https://handbook.unimelb.edu.au/view/current/B-ENVS (../../view/current/B-ENVS)

Subject Options:

The following description of the Engineering Systems major aligns with the Study Plan Structure viewable on the Portal for students who commenced the Bachelor of Environments in 2015 or later.

The components within the structure of this major have been designed to enforce the requirements of both this specific major and of the course overall, e.g. the requirement that at least 62.5 points of Environments discipline subjects (which can include subjects taken within the major) are taken at each of Level 2 and Level 3.

PRE-2015 STUDENTS: Students who commenced the Bachelor of Environments prior to 2015 should refer to the handbook entry for the year they commenced in conjunction with the 2015 handbook listings for Environments elective and Breadth subject listings. View 2014 Bachelor of Environments Handbook entry **here (../../view/2014/B-ENVS)**

Level 1 Environments & Enabling Electives (37.5 points)

In order to complete this major, enrol into the following first year subject as an Environment Elective:

Subject	Study Period Commencement:	Credit Points:
ENVS10009 Structural Environments	Semester 2	12.50

PLUS

based on your mathematics background, two subjects as an Enabling Subject:

Mathematics Background

VCE Mathematical Methods Units 1 and 2 only: Enrol in MAST10012 Introduction to Mathematics & MAST10005 Calculus 1. Then enrol into MAST10006 Calculus 2 and MAST10007 Linear Algebra as Breadth Subjects (see below)
VCE Mathematical Methods Units 3 and 4 with a study score of 25 or more: Enrol in MAST10005 Calculus 1 & MAST10006 Calculus 2. Then enrol into MAST10007 Linear Algebra as a Breadth Subject (see below)
VCE Specialist Maths Units 3 and 4 with a study score of 30 or more: Enrol in MAST10006 Calculus 2 & MAST10007 Linear Algebra.

IMPORTANT: This requirement may be taken as breadth.

Subject	Study Period Commencement:	Credit Points:
MAST10012 Introduction to Mathematics	Summer Term, Semester 1	12.50
MAST10005 Calculus 1	Semester 1, Semester 2	12.50
MAST10006 Calculus 2	Semester 1, Semester 2	12.50
MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50

Engineering Systems major - core subjects (87.5)

All of

Subject	Study Period Commencement:	Credit Points:
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50
ENGR20003 Engineering Materials	Semester 2	12.50
ENGR20004 Engineering Mechanics	Summer Term, Semester 1, Semester 2	12.50
ENEN20002 Earth Processes for Engineering	Semester 2	12.50
CVEN30008 Engineering Risk Analysis	Semester 1	12.50
CVEN30010 Systems Modelling and Design	Semester 2	12.50
ENGR30002 Fluid Mechanics	Semester 1, Semester 2	12.50

Major Electives & Environments Discipline subjects

Choose the total of

1. 25 points of Major elective subjects;
2. 37.5 points of Environments Discipline subjects

RULES:

Please note these rules when choosing the Major electives & Environments Discipline subjects below

1. Must complete 12.5 points level 2 subjects
2. Must complete 12.5 points level 3 subject**s**

Major Electives (25 points)

IMPORTANT:

1. It is strongly recommended that students select two electives from the one discipline, as this will strengthen students' discipline knowledge within the major.
2. Students wishing to apply for the Master of Engineering (Civil or Structural) MUST enrol into CVEN30009 Structural Theory and Design as a major elective.

Chemistry

Subject	Study Period Commencement:	Credit Points:
CHEM10004 Chemistry 2	Summer Term, Semester 2	12.50
CHEM20011 Environmental Chemistry	Semester 1	12.50

Biology

Subject	Study Period Commencement:	Credit Points:
ECOL20003 Ecology	Semester 2	12.50
GEOG20002 Understanding Global Landforms	Semester 1	12.50
HORT20027 Greening Landscapes	Semester 2	12.50
ATOC30005 Global Climates of the Past	Semester 1	12.50
ECOL30006 Ecology in Changing Environments	Semester 1	12.50

Infrastructure

Subject	Study Period Commencement:	Credit Points:

CVEN30009 Structural Theory and Design	Semester 2	12.50
ABPL30039 Construction Contract Administration	Semester 2	12.50

Spatial Systems

Subject	Study Period Commencement:	Credit Points:
GEOM20013 Applications of GIS	Semester 1	12.50
GEOM30009 Imaging the Environment	Semester 1	12.50
GEOM30012 Integrated Spatial Systems	Semester 2	12.50
GEOM20015 Surveying and Mapping	Semester 2	12.50
GEOM30013 Land Administration Systems	Semester 2	12.50

Environmental Economics and Management

Subject	Study Period Commencement:	Credit Points:
IBUS20002 Business in the Global Economy	Semester 2	12.50
MGMT20001 Organisational Behaviour	Semester 1, Semester 2	12.50
MGMT20007 Cross-Cultural Management and Teamwork	Not offered 2015	12.50
ABPL20042 Residential Construction and Structures	Semester 1	12.50

Environments Discipline subjects (37.5 points)

Select from this list: **Environments Discipline subjects (../../view/current/%21B-ENVS-SPC%2B1000)**

Breadth subjects and restrictions for Engineering Systems major students

The breadth requirements for the Bachelor of Environments include the restriction of some subjects as breadth options, depending on an individual student's choice of major. Subjects in the Handbook that are marked as available as breadth in the Bachelor of Environments may be subject to further restrictions, depending up which major a student is completing in that course. Detailed information on these **Restrictions for Breadth Options (../../view/CURRENT/%21B-ENVS-SPC%2B1001)** is available.

Students undertaking the Engineering Systems major are not permitted to take as breadth:

any Chemistry subjects (subject codes beginning CHEM)
any Civil Engineering subjects (subject codes beginning CVEN)
any Earth Science subjects (subject codes beginning ERTH)
any Engineering subjects (subject codes beginning ENGR)
any Geology subjects (subject codes beginning GEOL)
any Geomatics subjects (subject codes beginning GEOM)
any Mathematics and Statistics subjects (subject codes beginning MAST) - with the exception of MAST10006 Calculus 2 and MAST10007 Linear Algebra (and any required prerequisites for these subjects such as MAST10005 Calculus 1 and MAST10012 Introduction to Mathematics)
any Physics subjects (subject codes beginning PHYC)
any of the following Level 2 or Level 3 Construction subjects:

Subject	Study Period Commencement:	Credit Points:
ABPL20033 Construction Analysis	Semester 2	12.50
ABPL20036 Environmental Building Systems	Semester 1, Semester 2	12.50

	ABPL20041 The Construction Context	Semester 1	12.50
	ABPL30039 Construction Contract Administration	Semester 2	12.50
	ABPL30040 Measurement of Building Works	Semester 1	12.50
	ABPL30041 Construction Design	Semester 1	12.50
	ABPL30046 Structures and Construction Systems	Semester 1	12.50
	ABPL30055 Construction Management	Semester 1	12.50
	ABPL20042 Residential Construction and Structures	Semester 1	12.50
	ABPL20053 Concrete Structures and Construction	Semester 2	12.50

Notes:	For more information on this major and to view a sample course plan please visit: **http://edsc.unimelb.edu.au/sample-course-plans-bachelor-environments (http://edsc.unimelb.edu.au/sample-course-plans-bachelor-environments)**
Related Course(s):	Bachelor of Environments