

# Environmental Engineering Systems major

<b>Year and Campus:</b>	2016
<b>Coordinator:</b>	Dr Graham Moore
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<b>Overview:</b>	<p>Environmental engineers plan, design and manage interactions between the natural and built environments. This major provides you with the interdisciplinary skills necessary to succeed in this complex and exciting field. Given the critical link environmental engineers create between 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 biologists, ecologists, natural resource managers, community groups, farmers and other engineering disciplines, in order to establish sustainable and resilient human-environment systems.</p> <p><b>Careers and further study</b></p> <p>Students pursuing a career in Environmental Engineering will complete the Bachelor of Environments with a major in Environmental Engineering Systems, followed by the two-year Master of Engineering (Environmental). 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: <a href="http://www.eng.unimelb.edu.au">www.eng.unimelb.edu.au</a> (<a href="http://www.eng.unimelb.edu.au/">http://www.eng.unimelb.edu.au/</a>)</p> <p>Environmental engineering is a rapidly growing field and qualified environmental engineers are in high demand. Graduates specialise in land, water, energy or waste management; site contamination; river rehabilitation; soil erosion; renewable energy and other environmental issues. Graduates usually work with:</p> <ul style="list-style-type: none"> <li># Local and international engineering consulting firms</li> <li># Urban and rural water agencies</li> <li># Conservation and natural resources departments</li> <li># Environmental protection agencies</li> <li># Catchment management authorities</li> <li># Local, state and federal government</li> <li># Management consulting firms.</li> </ul>
<b>Learning Outcomes:</b>	<p>By the end of a three year Bachelor of Environments degree with an Environmental 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. For more information visit: <a href="http://www.benvs.unimelb.edu.au">www.benvs.unimelb.edu.au</a> (<a href="http://www.benvs.unimelb.edu.au/">http://www.benvs.unimelb.edu.au/</a>)</p>
<b>Structure &amp; Available Subjects:</b>	112.5 points (9 subjects) of Environmental Engineering Systems subjects.
<b>Majors/Minors/Specialisations</b>	<p>Course planning for an Environmental Engineering Systems major</p> <p>A major in Environmental Engineering Systems in the Bachelor of Environment consists of:</p> <ul style="list-style-type: none"> <li># 112.5 points (9 subjects) of Environmental Engineering Systems subjects;</li> <li># 37.5 points (3 subjects) of core first year subjects (Natural Environments, Reshaping Environments and Urban Environments);</li> <li># 12.5 points (1 subject) of first year subjects that are core to the major (Structural Environments);</li> <li># 25-37.5 points (2-3 subjects) of mathematics breadth subjects required for the major (see below under Required Level 1 breadth subjects).</li> </ul>

This is in addition to electives and breadth to make up the 300 points required for the degree. 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 Environmental Engineering Systems major aligns with the Study Plan Structure viewable on the Portal for students who commenced the Bachelor of Environments in 2013 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.

It is strongly recommended that students refer to the full description of this major.

The layout of this description is not necessarily in the order in which subjects are taken.

E.g. breadth subjects should be taken in a student's first year and the information on breadth is displayed at the end of this entry.

Students who commenced the Bachelor of Environments prior to 2013 should refer to the handbook entry for the year they commenced in conjunction with the 2013 handbook listings for Environments elective and Breadth subjects.

**Level 1 Core subjects - Bachelor of Environments (37.5 points)**

Core subjects that must be taken by all Bachelor of Environments students.

All of

Subject	Study Period Commencement:	Credit Points:
ENVS10001 Natural Environments	Semester 1, Semester 2	12.50
ENVS10002 Reshaping Environments	Semester 1, Semester 2	12.50
ENVS10007 Urban Environments	Semester 1, Semester 2	12.50

**Level 1 Environments Electives (37.5 points)**

Select three of the following subjects.

(N.B. ENVS10009 Structural Environments must be taken by students intending to undertake the Environmental Engineering Systems major.)

Subject	Study Period Commencement:	Credit Points:
ENVS10003 Constructing Environments	Semester 1, Semester 2	12.50
ENVS10004 Designing Environments	Semester 1, Semester 2	12.50
ENVS10005 Governing Environments	Semester 2	12.50
ENVS10006 Mapping Environments	Semester 1	12.50
ENVS10009 Structural Environments	Semester 2	12.50
ENVS10010 Owned Environments	Semester 1	12.50
ENVS10011 Productive Environments	Semester 2	12.50
ABPL10003 Visualising Environments	Semester 1, Semester 2	12.50

**Environmental Engineering Systems major - core subjects (87.5)**

All of

Subject	Study Period Commencement:	Credit Points:
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ENEN20002 Earth Processes for Engineering	Semester 2	12.50
ENGR20003 Engineering Materials	Semester 2	12.50
ENGR20004 Engineering Mechanics	Summer Term, Semester 1, Semester 2	12.50
MAST20029 Engineering Mathematics	Summer Term, Semester 1, 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

### **Environmental Engineering Systems major - Level 2 or Level 3 elective subjects (25 points)**

Selected from the following disciplines:

NB. A number of these subjects contributing to this major have prerequisites. Check the individual subject entry for more information. Where required, and subject to compliance with overall course rules, prerequisite subjects may be taken as breadth or as Environments elective subjects.

It is strongly recommended that students select two electives from the one discipline, as this will strengthen students' discipline knowledge within the major.

#### **Geomatics**

<b>Subject</b>	<b>Study Period Commencement:</b>	<b>Credit Points:</b>
GEOM20013 Applications of GIS	Semester 1	12.50
GEOM20015 Surveying and Mapping	Semester 2	12.50
GEOM30009 Imaging the Environment	Semester 1	12.50
GEOM30012 Integrated Spatial Systems	Semester 2	12.50
GEOM30013 Land Administration Systems	Semester 2	12.50
ENGR30002 Fluid Mechanics	Semester 1, Semester 2	12.50

#### **Biology**

<b>Subject</b>	<b>Study Period Commencement:</b>	<b>Credit Points:</b>
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

#### **Environmental Economics and Management**

<b>Subject</b>	<b>Study Period Commencement:</b>	<b>Credit Points:</b>
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 2016	12.50
ABPL20042 Residential Construction and Structures	Semester 1	12.50

### Chemistry

Subject	Study Period Commencement:	Credit Points:
CHEM20011 Environmental Chemistry	Semester 1	12.50

There is also one Level 1 subject that can also contribute to this major (i.e. as an elective in the major that counts as one of the 9 subjects)

Students interested in taking this subject should include the subject in the Free Points component of their study plan. It can take the place of another subject within the composition of this major but cannot be added to the major in the study plan. Students will need to ensure that they complete at least 62.5 points of Environments discipline subjects (which can include subjects within the major) at each of Level 2 and Level 3.

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

N.B. Students wishing to substitute either one or two Level 2 electives within this major for Level 3 electives, or one or two Level 3 electives within this major for Level 2 electives will be able to do so. An appropriate adjustment to the Level 2 and Level 3 Environments electives (below) can be made for individual students to ensure that within the Bachelor of Environments course the minimum points requirements for Environments discipline subjects are met (i.e. at least 62.5 points at Level 2 and at least 62.5 points at Level 3).

#### Level 3 Environments elective subject (12.5 points)

Select one x 12.5 point subject at Level 2 from the list of [Environments Discipline subjects](#) ([../view/current/%21B-ENVS-SPC%2B1000](#))

#### Level 2 or Level 3 Environments elective subjects (25 points)

Select two x 12.5 point subjects at Level 2 or Level 3 from the list of [Environments Discipline subjects](#) ([../view/current/%21B-ENVS-SPC%2B1000](#))

#### Breadth subjects

Bachelor of Environments students must complete between 50 and 75 credit points of subjects selected from those available as breadth for Bachelor of Environments students; with no more than 37.5 points at Level 1. For a complete listing of available subjects please click the 'Find breadth subjects' link on the [Handbook homepage](#) ([../](#)) and perform a search.

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.

#### Required Level 1 breadth subjects

Please note the following regarding the mathematics sequence of subjects that are essential to the Environmental Engineering Systems major (students must check the prerequisite requirements of subjects before enrolling to ensure it is appropriate and should consult a student advisor if they are unsure):

- # Students who have completed VCE Mathematical Methods Units 1 and 2 only, should enrol in MAST10012 Introduction to Mathematics, followed by MAST10005 Calculus 1, MAST10006 Calculus 2, and MAST10007 Linear Algebra. One of these subjects must contribute to the Free Points component of the B-ENVS as only 37.5 points at Level 1 can be included in the 50 point required breadth component.
- # Students who have completed VCE Mathematical Methods Units 3 and 4 with a study score of 25 or more should enrol in MAST10005 Calculus 1, MAST10006 Calculus 2, and MAST10007 Linear Algebra.

# Students who have completed VCE Specialist Maths Units 3 and 4 with a study score of 30 or more are not permitted to enrol in MAST10005 Calculus 1 but should enrol in MAST10006 Calculus 2, and MAST10007 Linear Algebra.

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

### **Breadth restrictions for Environmental Engineering Systems major students**

Students undertaking the Environmental 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 EARTH)
- # 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)

#### **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>)