



School of Civil and Environmental Engineering

Term 1, 2020

## CVEN3701 ENVIRONMENTAL FRAMEWORKS, LAW AND ECONOMICS

### COURSE DETAILS

Units of Credit	6
Contact hours	6 hours per week (2 x 3 hours)
Class	Tuesday, 9am – 12pm (lecture and workshop combined), Wednesday, 10am – 1pm (lecture and workshop combined). Please see table below for rooms
Course Coordinator and Lecturer	Dr Shengyang (Chris) Chen teaches environmental frameworks, email: <a href="mailto:s.chen@wrl.unsw.edu.au">s.chen@wrl.unsw.edu.au</a> , Room CE313
Additional Lecturers	Dr Gerry Bates (GB) teaches environmental law, email: <a href="mailto:gerrybates@bigpond.com">gerrybates@bigpond.com</a>  Amy Cheung (AC) teaches environmental economics, email: <a href="mailto:CVEN3701.AC@gmail.com">CVEN3701.AC@gmail.com</a>

### INFORMATION ABOUT THE COURSE

This course builds on the broad multidisciplinary introduction to sustainability provided in the ENGG1000 Engineering Design and Innovation projects, and the range of environmental material accounting, environmental risk assessment, and sustainability assessment tools introduced in CVEN1701 Environmental Principles and Systems. The course will introduce Environmental Impact Statements (EISs), Environmental Management Systems (EMSs) and corporate and regional environmental reporting, each of which uses the tools covered in CVEN1701. The course then goes on to cover environmental law and economics, which can be used to implement sustainable strategies for corporations and regions. The course provides background material for application in the following courses in Year 3 and 4:

- CVEN3502 Water and wastewater engineering
- CVEN3702 Solid wastes and contaminant transport
- CVEN4104 Sustainability in construction
- CVEN4701 Planning sustainable infrastructure

### HANDBOOK DESCRIPTION

This course builds on the introduction to environmental management in CVEN1701 and provides details of methods for Environmental Impact Statements (EIS) methods and the ISO14001 Environmental Management System (EMS) framework. It then provides an introduction for Engineers on environmental law in Australia and NSW, focusing on planning law, and pollution laws. Environmental economics methods to account for environmental impacts in monetary terms, and the use of market mechanisms to achieve preferred environmental outcomes is covered at a level suitable for engineers.

The URL of your course online handbook is:

<http://www.handbook.unsw.edu.au/undergraduate/courses/2020/CVEN3701.html>

## OBJECTIVES

The aim of this course is to enable students to undertake the preparation of EISs, EMSs and environmental reports, and to be able to have sufficient understanding of environmental law and economics to be able to work with professionals in these areas in order to implement sustainable strategies at corporate and regional levels.

The objectives of the course are to:

- know the standard formats for EISs, EMSs and environmental reports, and to be able to use environmental analytical tools to critically analyse these documents, and be able to manage their preparation.
- acquaint you with the fundamental principles of Australian environmental law; and to explain how these principles are applied to important areas of environmental management and regulation relevant to you in your studies and future career. The course assumes that participants have little or no background in the law, and so the course also provides some basic instruction about important legal concepts and structures. Although NSW is the 'default' jurisdiction for this course, the concepts and principles that are discussed are referable to all jurisdictions throughout Australia.
- introduce students in Engineering to the economic way of thinking about environmental issues. This section will begin with some elementary economic tools, and proceed to apply these tools to examine environmental issues. There is no attempt here to justify any particular economic method. If you like, it is a course in how to communicate with economists.

## TEACHING STRATEGIES

Lectures will provide an explanation of procedures to follow to prepare EISs and EMSs and to implement sustainability strategies in these documents by way of environmental law and economics. Examples will be given in these lectures. Students then need to learn these procedures by applying them to real world problems that they have some familiarity with, by way of assignments.

The course will not be run in distance mode, however, the lectures will be recorded and posted on Moodle. The lecture recordings are *not* a substitute for class attendance but may be useful for students who can't avoid missing a class, and for those who attend the class but want to rehear part of it to aid their understanding.

The approaches to learning are:

Lectures	<ul style="list-style-type: none"><li>• Find out what you must learn</li><li>• Take notes on lecture slides provided to get a full set of reference notes for the course.</li><li>• Learn developing environmental laws and economic tools for use in environmental problems; many of these are not well documented in reference books.</li><li>• Participate in class discussions and work out example problems in class.</li><li>• Ask questions on how the content of lectures applies to assignment questions.</li></ul>
Workshops	<ul style="list-style-type: none"><li>• Work actively in small ad hoc groups on problems set in class.</li><li>• Be guided by demonstrators, discussion questions and additional reading.</li><li>• Participate and attempt all problems and discuss solutions with other students.</li><li>• Ask questions on how the content of lectures applies to assignment questions.</li></ul>

Private Study	<ul style="list-style-type: none"> <li>• Review lecture material, reference books, and resources on UNSW Moodle.</li> <li>• Work in groups on class assignments.</li> <li>• Reflect on class problems and assignments.</li> <li>• Download and work through additional readings provided and prepare for lectures.</li> <li>• Join Moodle discussions of problems.</li> <li>• Keep up with notices and find out marks via Moodle</li> </ul>
Assessments (quizzes, examinations, assignments, group discussions and presentations etc.)	<ul style="list-style-type: none"> <li>• Answer quiz questions in class.</li> <li>• Demonstrate your knowledge and skills in workshops and assignments.</li> <li>• Demonstrate ability to work effectively in a group by completing the group assignment.</li> <li>• Demonstrate higher understanding and problem solving on real world problems in hypothetical, but realistic problem settings in workshops.</li> <li>• Formative and summative assessment of knowledge and skills in single and group assignments. Students are encouraged to seek feedback from the lecturer and demonstrator(s) during preparation of assignments.</li> <li>• Exams are summative assessments on knowledge gained in the course, particularly as indicated by the ability to quickly undertake exercises set in the Workshop problems.</li> <li>• Do not copy sections from textbooks or websites, always use appropriate references for sourced material</li> </ul>

For each hour of contact it is expected that you will put in at least 1.5 hours of private study!

#### EXPECTED LEARNING OUTCOMES

This course is designed to address the learning outcomes below and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in the Appendix.

At the completion of the course, you should be able to:

Learning Outcome	EA Stage 1 Competencies
LO1. Describe the typical structure and format of an EIS, EMS and environmental report.	PE1.1, PE1.6, PE3.1
LO2. Be able to use environmental analytical tools to develop an EIS, EMS and environmental report for a project, an organisation and a region.	PE1.2, PE2.2, PE3.2, PE3.6
LO3. Be familiar with the laws that apply to environmental impacts of projects in NSW and Australia, and be able to brief and collaborate with environmental lawyers in the preparation of EISs, EMSs and environmental reports.	PE1.3, PE3.1, PE3.2
LO4. Be able to describe environmental economic analytical methods, and be able to critique their application in EISs, EMSs and environmental reports. Be able to brief an environmental economist to work with you in a multidisciplinary team to prepare EISs, EMSs and environmental reports for a range of projects, corporations and regions.	PE1.3, PE3.2, PE3.6

**COURSE PROGRAM T1 2020**

<b>Weeks &amp; Dates</b>	<b>Tuesdays lecture / workshop Room CivEng G1, 9am-12pm</b>	<b>Wednesdays lecture / workshop Room CivEng G1, 10am-1pm</b>
<b>Week 1</b> Tue 18 Feb Wed 19 Feb	<b>FRAMEWORKS</b> (Chris Chen / Lauren Bricknell) Course introduction & overview, Sustainable Development Principles, Introduction to Environmental Impact Assessment (EIA)	<b>FRAMEWORKS</b> (Chris Chen / Lauren Bricknell) Introduction to Environmental Impact Statements (EIS), Review of methods and tools from CVEN1701, Assignment 1 Briefing
<b>Week 2</b> Tue 25 Feb Wed 26 Feb	<b>LAW</b> (Gerry Bates) Part A: Fundamentals of the Australian legal system. Democracy in action; common law, legislation, state/federal responsibilities, property rights, relevant environmental legislation, Land and Environment Court of NSW	<b>LAW</b> (Gerry Bates) Part B: Environmental assessment of development. Applications for development consent; major projects and infrastructure; State EIA; Commonwealth EIA; protection of biodiversity
<b>Week 3</b> Tue 3 Mar Wed 4 Mar	<b>FRAMEWORKS</b> (Chris Chen / Lauren Bricknell) Preparation of Environmental Impact Statements (EIS)	<b>FRAMEWORKS</b> (Chris Chen / Lauren Bricknell) Environmental Management Systems (EMS), Sustainability reporting,
<b>Week 4</b> Tue 10 Mar Wed 11 Mar	<b>LAW</b> (Gerry Bates) Sustainable Development. Origins and meaning of SD; translation into law; practical applications of SD; holding governments accountable for sustainable decision-making	<b>LAW</b> (Gerry Bates) Part A: Pollution control; waste; contaminated sites; climate change
<b>Week 5</b> Tue 17 Mar Wed 18 Mar	<b>LAW</b> (Gerry Bates) Part B: Remedies for breaches of environmental laws. Administrative, civil and criminal remedies; challenging environmental decision-making.	<b>LAW</b> (Gerry Bates) Part A: Revision Part B: <b>Law Quiz (30%)</b> (open-book exam, 2 hours)
<b>Week 6</b>	<i>[Public holiday / Break week]</i>	
<b>Week 7</b> Tue 31 Mar Wed 1 Apr	<b>ECONOMICS</b> (Amy Cheung) Manage environmental issues with economics	<b>ECONOMICS</b> (Amy Cheung) Economic instruments for pollution control 1
<b>Week 8</b> Tue 7 Apr Wed 8 Apr	<b>ECONOMICS</b> (Amy Cheung) Economic instruments for pollution control 2	<b>ECONOMICS</b> (Amy Cheung) Global externalities and mitigation techniques 1

<b>Weeks &amp; Dates</b>	<b>Tuesdays lecture / workshop Room CivEng G1, 9am-12pm</b>	<b>Wednesdays lecture / workshop Room CivEng G1, 10am-1pm</b>
<b>Week 9</b> Tue 14 Apr Wed 15 Apr	<b>ECONOMICS</b> (Amy Cheung) Global externalities and mitigation techniques 2	<b>ECONOMICS</b> (Amy Cheung) Cost Benefit Analysis 1
<b>Week 10</b> Tue 21 Apr Wed 22 Apr	<b>ECONOMICS</b> (Amy Cheung) Cost Benefit Analysis 2	<b>ECONOMICS</b> (Amy Cheung) Cost Benefit Analysis 3, examination revision
Examination period: Sat 2 May – Fri 15 May	<b>Final exam (30%) (date to be announced)</b>	

## ASSESSMENTS

Details of each assessment component, the marks assigned to it, the criteria by which marks will be assigned, and the dates of submission are set out below.

<b>Assignment</b>	<b>Assignment Details (length)</b>	<b>Weighting</b>	<b>Learning Outcomes</b>	<b>Due Date</b> (Deadline for absolute fail)
Assignment 1 (group)	Critique of an EIS (8 pages)	20%	LO1, LO2	8pm Thu, 05 March 2020, Wk 3 (marks and feedback will be returned on Fri, 13 March 2020)
Quiz (individual)	Environmental Law (2 hours)	30%	LO3	Wed, 18 March 2020, Wk 5 (same day)
Assignment 2 (group)	Environmental Economics (3000-3500 words)	20%	LO4	9am Wed, 15 April 2020, Wk 9 (2 weeks later)
Exam (individual)	Frameworks and economics components only (2 hours)	30%	LO1, LO2, LO4	Exam period 2-15 May 2020 (same day)

**Students must submit their assignments as prescribed by each lecturer.** This may involve electronic submission via Turnitin on Moodle or by hard copy as requested by the lecturer. Please ensure all the details on the Assignment cover sheet provided on UNSW Moodle are included in your assignment.

**Penalties for late assignments apply!** Each lecturer will specify submission procedures and penalties for late assignments at the beginning of their component.

All requests for extensions and/or special consideration are to be submitted through the Special Consideration portal on MyUNSW (My Student Profile tab > My Student Services > Online Services > Special Consideration). See the following website for further information:

<https://student.unsw.edu.au/special-consideration>

**Rationale and Assessment Criteria for Assignment 1:** A written critique of a real Environmental Impact Statement (EIS) to demonstrate understanding of ecologically sustainable development (ESD) principles, techniques for environmental impact assessment (EIA) and environmental management systems (EMS). This is a group assignment.

**Rationale and Assessment Criteria for the Law Quiz:** This is an individual quiz (open-book “mid-term exam”, 2 hours) worth 30% of the course mark and is designed to test students’ understanding of the fundamental principles of Australian environmental law and how these principles are applied to important areas of environmental management and regulation.

**Rationale and Assessment Criteria for Assignment 2:** A group assignment aimed at applying elementary economic methods and tools to an environmental problem and at determining whether decisions about environmental policy should be made on the basis of economic analysis.

**Date for marks returned** are two weeks after the due date for all assessments. All assignments will be marked on the basis of whether the student demonstrates an understanding of the material. The assignments are additionally assessed with respect to the depth of the analysis, the breadth of its consideration of the question at hand and the clarity of the way in which the answer is presented. The use of tables and diagrams is encouraged where appropriate. Please make sure you do not exceed the imposed word limits.

#### **Rationale and Assessment Criteria for Exam:**

Summative assessment on the frameworks and economics part of the course, related to course objectives and learning outcomes. The exam will be a **2-hour closed-book exam** (plus fifteen minutes reading time) during the normal exam period. **You are allowed to bring in one A4 sheet of paper with hand or typewritten notes, formulae, diagrams on both sides.** There will be three questions to be completed; one on environmental frameworks and two on economics. There will not be any law questions in the exam.

The questions will generally be similar to the exercises and questions discussed in workshops and lectures. There are no previous exam papers available.

The Exam date is set by Exams Branch, and is confirmed in about Week 8 of session. You can access the time and date of the exam via your MyUNSW. Do not make arrangements that will prevent you from doing the exam in the Exam Period, or after the exam date is set in Week 8, on the day of the exam.

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Final Examination is worth **30%** of the Final Mark if class work is included and **100%** if class work is not included. The class work is worth **70%** of the Final Mark if included. **A mark of at least 40% in the final examination is required before the class work (quiz and assignments) is included in the final mark.**

The final examination is compulsory. All students are expected to sit their final examination at the UNSW Kensington campus.

**Supplementary Examinations** for T1 2020 will be held on Monday 27<sup>th</sup> – Friday 31<sup>st</sup> May (inclusive). You are required to be available during all exam dates. Please do not to make any personal or travel arrangements during this period.

There will be workshop problems set and quick quizzes given in some workshops. You need to prepare for these prior to the workshop. They do not count directly to your final assessment mark, but are intended to give you formative assessment, and assist with preparation of the formal assignments and the end of session exam. Students who perform poorly in the quick quizzes and workshops are recommended to discuss progress with the lecturer during the term.

The Course coordinator reserves the right to adjust the final scores by scaling if agreed to by the Head of School.

## PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise are also liable to disciplinary action, including exclusion from enrolment.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The UNSW Students website provides further information on what constitutes Plagiarism at:

<https://student.unsw.edu.au/plagiarism>.

## LECTURERS

**Chris Chen** is a Research Associate in the Water Research Laboratory of School of Civil and Environmental Engineering at UNSW. He has expertise in hydrological and hydrodynamic modelling. His current research focusses on water dynamics in shallow wetlands under drying conditions where the future sustainability of the ecosystem is in question.

**Professor Gerry Bates** has been devising and teaching courses in environmental law for nearly 35 years. He is the author of *Environmental Law in Australia*, the standard text on the subject; and the founder and Editor in Chief of the *Australian Environmental and Planning Law Journal*. Dr Bates was formerly a 'stagiaire' or trainee of the European Union; and an independent green member of parliament in Tasmania for more than 9 years, returning to the law in 1996. He now works independently as a specialist in environmental law and policy. Professor Bates was a member of the Board of the NSW Environment Protection Authority for more than 12 years between 1998 -2010; and a Director of Kimbriki Environmental Enterprises, a regional waste recovery centre and landfill site on Sydney's Northern Beaches from 2005-2010. In 1994 he was honoured with the National Environmental Law Association's special award for "Outstanding Contribution to Environmental Law". In 2006 he was nominated for a Vice-Chancellor's Award for Excellence in Teaching at the Australian National University; and a Carrick Institute Citation for Outstanding Contributions to Student Learning. In 2015 he will be honoured by the Law Council of Australia, Planning and Environment Group, for his contribution to the field of environmental law.

**Amy Cheung** is a Senior Economist in the NSW government, specialising in economic appraisals and financial appraisals. Her doctoral thesis research was focused on developing a framework in economic theory to analyse the problem of salinity in Australia, and the use of possible market-based policies for its alleviation. Her other research interests include the economics of climate change, waste management, water trading and regulation.

## DATES TO NOTE

Refer to MyUNSW for Important Dates available at:

<https://student.unsw.edu.au/dates>

## ACADEMIC ADVICE

For information about:

- Notes on assessments and plagiarism,
- School policy on Supplementary exams,
- Special Considerations,
- Solutions to Problems,
- Year Managers and Grievance Officer of Teaching and Learning Committee, and
- CEVSOC.

Refer to Academic Advice on the School website available at:

<http://www.engineering.unsw.edu.au/civil-engineering/resources/academic-advice>

## DETAILS OF COURSE PROGRAM

### **Environmental frameworks component:**

- Course overview and briefing on frameworks assignment; a comprehensive review of environmental material accounting tools undertaken in CVEN1701; students who have not taken this first-year elective will be offered additional assistance.
- An outline of the required content and conventional methods for completing an EIS, with illustration from a case study EIS that will be used in the frameworks assignment.
- An outline of ISO14001 EMS, and credibility issues associated with undertaking an EMS.
- An outline of suggested contents of environmental reports for corporations and regions, with critical examination of case studies.

### **Environmental Law component:**

#### *Course Synopsis & Aims*

The law part of this Unit is designed to introduce to you, key principles of environmental law and policy that may be of use to you in your future careers as Environmental Engineers.

The course assumes that participants have little or no background in the law, and so the course also provides some basic instruction about important legal concepts and structures. Although NSW is the 'default' jurisdiction for this course, the concepts and principles that are discussed are referable to all jurisdictions throughout Australia. <sup>[SEP]</sup>

The content of the course concentrates upon those aspects of environmental law that you are most likely to come across in day to day practice as an engineer; requirements for gaining development consent; environmental assessment of projects and activities; pollution control, contaminated sites and waste; enforcement of environmental laws. But first we have to appreciate the nature of the Australian legal system and how it works.

### **Environmental economics component:**

- Economics and the environment – applying basic economic tools to environmental management.
- An economic view on “sustainable development”; Externalities, optimal pollution, cost benefit analysis and environmental valuation.



- Economic instrument of pollution control - “Internalising externalities”. Role of environmental regulation.
- Application of Cost-Benefit Analysis into environmental policy decisions.
- Global externalities: ozone, climate change. Concept of carbon trading.

## RELEVANT RESOURCES

### Moodle Discussion forum

Discussion and intra-group coordination can be done via a Discussions/HELP forum topic in Moodle for this course. The email discussion lists available in previous years are no longer accessible by students.

### Textbook

There is no required textbook. The following are recommendations:

#### Environmental Law:

The text recommended for this course is Bates, G *Environment Law in Australia*. (2016), 9th. Ed. LexisNexis. You can get regular updates to the content of this book on-line. Go to <https://campus.lexisnexis.com.au> select Register, and create an account.

Accessing the Law – [www.austlii.edu.au](http://www.austlii.edu.au)

#### Environmental Economics:

There is no required textbook. Students might wish to consult the following textbook in the library for further reading:

Perman, R., Yue, M., Common, M., Maddison, D., and McGilvray, J., 2012, *Natural Resource and Environmental Economics*, 4th edition, Pearson Education Limited, Essex.

An earlier edition of this textbook is available from the open reserve section at the UNSW library (S 333.7/381).

Additional Readings, standards and guideline documents will be provided throughout the lecture series on UNSW Moodle with each lecture.

## UNSW Moodle

A UNSW Moodle site has been established for the course, and it will be used to provide all information (lecture overheads, readings, exercises etc) for the course. There will not be any hard copy photocopies provided for the course. Assess this via the TELT Gateway at: <http://telt.unsw.edu.au/>.

## APPENDIX A: Engineers Australia (EA) Competencies

### Stage 1 Competencies for Professional Engineers

	<b>Program Intended Learning Outcomes</b>
<b>PE1: Knowledge and Skill Base</b>	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
<b>PE2: Engineering Application Ability</b>	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
<b>PE3: Professional and Personal Attributes</b>	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership