



# ENVS201

## Introduction to Environmental Economics

S1 External 2019

*Dept of Environmental Sciences*

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#### Disclaimer

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## General Information

Unit convenor and teaching staff

Instructor

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office #517, 12 Wally's Walk (E7A)

By appointment

Credit points

3

Prerequisites

18cp at 100 level or above

Corequisites

Co-badged status

Unit description

This unit is designed to provide students with an introductory exposure to environmental economics. In addition to dwelling on the key concepts, tools and methods used in environmental economics, the unit provides an understanding as to why it is crucial to incorporate the environment as a factor of production in our economy, what the key challenges are in doing so and how effective the available policy instruments are. Several topics such as the economics of climate change, economics of land use development and urban planning, and sustainable development will be covered in order to highlight the role environmental economics plays in addressing contemporary societal challenges. The emphasis of this unit is also on helping students develop a set of basic analytical and mathematical tools that could be used to assess and derive practical policy recommendations. The unit builds on several real case studies that provide students with a hands-on introduction to basic cost-benefit analysis (using Excel) involving future discounting and uncertainty.

## Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

## Learning Outcomes

On successful completion of this unit, you will be able to:

An ability to perform basic cost-benefit analysis of environmental projects, policies and

their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.

An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.

An ability to comprehend and relate to the environmental and economic consequences of land development, transportation infrastructure and urbanization--develops and augments urban planning skills in the context of climate change, natural resource scarcity and budget constraints. A brief understanding of the political economy of government interventions with respect to urbanization and the environment--helps develop skills relating to policy formulation and analysis.

Understanding of the linkages between physical science and economics as well as the basic capability to integrate the two--taught through socio-economic-climatic models and natural resource management models.

## General Assessment Information

Assignment 1 tests quantitative skills.

Assignment 2, which is qualitative, must be completed in small groups. External students may work on this assignment individually.

Mid-term and final exams are closed book exams and need to be taken during the scheduled weeks (unless exceptions have been permitted).

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Assignment 1</u>	15%	No	March 19
<u>Mid-Term Exam</u>	40%	No	April 09
<u>Assignment 2</u>	15%	No	May 28
<u>Final Exam</u>	30%	No	June 04

## Assignment 1

Due: **March 19**

Weighting: **15%**

The first assignment involves cost-benefit/wtp analysis (15 marks out of 100)--This assignment is usually given after week 2, when students become familiar with CBA and willingness to pay (wtp) techniques.

An electronic copy of the assignment must be submitted by the due date.

On successful completion you will be able to:

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.
- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.

## Mid-Term Exam

Due: **April 09**

Weighting: **40%**

Exam covers course materials in lectures 1-5.

This is a closed book exam. Maximum time allowed will be 100 minutes.

On successful completion you will be able to:

- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming,

environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.

- An ability to comprehend and relate to the environmental and economic consequences of land development, transportation infrastructure and urbanization--develops and augments urban planning skills in the context of climate change, natural resource scarcity and budget constraints. A brief understanding of the political economy of government interventions with respect to urbanization and the environment--helps develop skills relating to policy formulation and analysis.
- Understanding of the linkages between physical science and economics as well as the basic capability to integrate the two--taught through socio-economic-climatic models and natural resource management models.

## Assignment 2

Due: **May 28**

Weighting: **15%**

The second assignment has two parts: first part-- project report preparation (10 marks out of 100) and second part-- presentation (5 marks out of 100)--This assignment is handed out in the post-mid term session and students normally have 3-4 weeks to work on the report. External students may work alone on this assignment.

An electronic copy must be submitted through turnitin.

The report must not exceed 2 pages in length (single spaced and 12 font size). References will not count towards the page limit.

The project report has an external component to it, which requires each group/student to consult/ meet with a relevant environmental or urban agency. This process also requires groups/students to receive feedback from the instructor while planning the external component.

Presentations are due in class.

On successful completion you will be able to:

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.
- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience

and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.

- An ability to comprehend and relate to the environmental and economic consequences of land development, transportation infrastructure and urbanization--develops and augments urban planning skills in the context of climate change, natural resource scarcity and budget constraints. A brief understanding of the political economy of government interventions with respect to urbanization and the environment--helps develop skills relating to policy formulation and analysis.
- Understanding of the linkages between physical science and economics as well as the basic capability to integrate the two--taught through socio-economic-climatic models and natural resource management models.

## Final Exam

Due: **June 04**

Weighting: **30%**

Mostly covers post-mid term course materials. It may include one or two topics from the pre-mid term (this will be advised on i-Learn).

This is a closed book exam, maximum time allowed will be 100 minutes.

On successful completion you will be able to:

- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.
- An ability to comprehend and relate to the environmental and economic consequences of land development, transportation infrastructure and urbanization--develops and augments urban planning skills in the context of climate change, natural resource scarcity and budget constraints. A brief understanding of the political economy of government interventions with respect to urbanization and the environment--helps develop skills relating to policy formulation and analysis.
- Understanding of the linkages between physical science and economics as well as the

basic capability to integrate the two--taught through socio-economic-climatic models and natural resource management models.

## Delivery and Resources

Reading materials including lecture notes are provided on iLearn.

Lectures are recorded and made available on iLearn.

Technology used: iLearn, computers for performing assignment tasks, MS office software, excel, etc

## Unit Schedule

Refer to MQ timetable for teaching dates and lecture location.

Students may find the below books (available in the MQ library) useful for an introduction to environmental economics--

**Environmental Economics: An Introduction by Barry C. Field and Martha K. Field, McGraw Hill Education Publication**

However, this is NOT a required reading.

**Also refer to:**

**Environmental and Natural Resource Economics, 10/e, by T. Tietenberg and L. Lewis, Pearson Global Edition**

(This is tentative list of topics, and some topics may receive more attention compared to others)

Topic 1---Introduction to basic microeconomics, cost-benefit analysis, sustainability (weak versus strong) and willingness to pay idea.

Green Accounting: The case for counting environmental degradation as capital depreciation

Case Study: Are we being served, Economist article

Topic 2---Environmental Challenges: market failure, externalities, property rights, Coase bargaining

Case Study: Paul Krugman: California Death Spiral

Topic 3---Valuing the Environment, CBA, value of water, payment for ecosystem services

Case Study: Valuing Biodiversity By Partha Dasgupta

Topic 4---Industry production and pollution abatement costs; Health impacts of industrial/ environmental pollution, Environmental Kuznets Curve, ecological resilience and hysteresis

Case Study: The Economics of Pollution Control, by Daniel Phaneuf

Topic 5---Policy Instruments for Managing Renewable and Non-Renewable Resources: Taxes/ Quotas, subsidies and regulations: controlling point and non-point sources of pollution.

Economics of managing fisheries/oil/coal/forests

Case Study TBA

Topic 6---Economics of Climate Change: Environmental damages and cost benefit accounting.

Case Study TBA

Understanding and managing catastrophic possibilities: Risks: objective versus subjective risks and mitigation versus adaptation tradeoff.

Case Study TBA

Topic 7---Urban Growth and the Environment: The political economy of urbanization, role of property taxes, environmental impacts of urbanization

Case Study TBA

Topic 8--Economics of Transport/Infrastructure: Sustainable options, renewable and non-renewable fuels, fuel efficiency and Rebound effect

Case Study TBA

Topic 9---Economics of Land use Planning: Urban sprawl, land use and water scarcity—agriculture versus urbanization

urbanization, energy dependence and health impacts of urban sprawl

Case Study TBA

## **Learning and Teaching Activities**

### **Tutorials**

Tutorials will be conducted during regular teaching hours.

### **Lectures**

These are the main lecture sessions conducted once per week.

### **Class presentations**

Presentations will be held as a part of the second assignment (external students need to present in class as well).

### **Project report preparation**

Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.

### **Revision questions**

These are handed out a week before the exams.



## Class Discussion on Handouts

Happens during weekly lectures

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [ask.mq.edu.au](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

### Learning outcome

- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.

## Assessment tasks

- Mid-Term Exam
- Assignment 2

## Learning and teaching activities

- Tutorials will be conducted during regular teaching hours.
- These are the main lecture sessions conducted once per week.
- Presentations will be held as a part of the second assignment (external students need to present in class as well).
- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.
- Happens during weekly lectures

## Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

## Learning outcomes

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.
- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.
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augments urban planning skills in the context of climate change, natural resource scarcity and budget constraints. A brief understanding of the political economy of government interventions with respect to urbanization and the environment--helps develop skills relating to policy formulation and analysis.

## **Assessment tasks**

- Mid-Term Exam
- Assignment 2
- Final Exam

## **Learning and teaching activities**

- These are the main lecture sessions conducted once per week.
- Presentations will be held as a part of the second assignment (external students need to present in class as well).
- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.

## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## **Learning outcomes**

- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.
- Understanding of the linkages between physical science and economics as well as the basic capability to integrate the two--taught through socio-economic-climatic models and natural resource management models.

## Assessment tasks

- Mid-Term Exam
- Assignment 2
- Final Exam

## Learning and teaching activities

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- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.
- Happens during weekly lectures

## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

## Learning outcomes

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.
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- Understanding of the linkages between physical science and economics as well as the basic capability to integrate the two--taught through socio-economic-climatic models and natural resource management models.

## **Assessment tasks**

- Assignment 1
- Mid-Term Exam
- Assignment 2
- Final Exam

## **Learning and teaching activities**

- Tutorials will be conducted during regular teaching hours.
- These are the main lecture sessions conducted once per week.
- Presentations will be held as a part of the second assignment (external students need to present in class as well).
- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.
- These are handed out a week before the exams.
- Happens during weekly lectures

## **Critical, Analytical and Integrative Thinking**

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

## **Learning outcomes**

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.
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## **Assessment tasks**

- Mid-Term Exam
- Final Exam

## **Learning and teaching activities**

- Tutorials will be conducted during regular teaching hours.
- These are the main lecture sessions conducted once per week.
- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.
- These are handed out a week before the exams.
- Happens during weekly lectures

## **Problem Solving and Research Capability**

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

## **Learning outcome**

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.

## **Assessment task**

- Assignment 1

## **Learning and teaching activity**

- Tutorials will be conducted during regular teaching hours.
- These are the main lecture sessions conducted once per week.



- Happens during weekly lectures

## Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

### Learning outcome

- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.

### Assessment task

- Assignment 2

### Learning and teaching activity

- These are the main lecture sessions conducted once per week.
- Presentations will be held as a part of the second assignment (external students need to present in class as well).
- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.
- Happens during weekly lectures

## Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:



## Learning outcomes

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.
- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.
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## Assessment tasks

- Mid-Term Exam
- Assignment 2
- Final Exam

## Learning and teaching activities

- These are the main lecture sessions conducted once per week.
- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.

## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

## Learning outcomes

- An ability to perform basic cost-benefit analysis of environmental projects, policies and their outcomes, through the use of numerical examples. No prior exposure to economics is assumed. An ability to comprehend the role of discounting in inter-temporal and inter-generational environmental and economic tradeoffs-concept of discounting and its relevance explained through examples and policy contexts.
- An appreciation of basic economic concepts, frameworks and methods associated with managing environmental problems. Examples include CBA, willingness to pay, green accounting, environmental valuation methods, Coase theorem, property rights and public goods, market failure, taxation, subsidies and quotas in pollution management, resilience and hysteresis, trade and environment, health costs of pollution, global warming, environmental risks and catastrophes, water scarcity, biofuels, urban sprawl, transportation, renewable and non-renewable resource management, etc.
- Understanding of the linkages between physical science and economics as well as the basic capability to integrate the two--taught through socio-economic-climatic models and natural resource management models.

## Assessment tasks

- Mid-Term Exam
- Assignment 2
- Final Exam

## Learning and teaching activities

- These are the main lecture sessions conducted once per week.
- Presentations will be held as a part of the second assignment (external students need to present in class as well).
- Some time may be allocated during the post-break sessions for students to work on their projects in class. However, a majority of this task needs to be completed outside the classroom.