

**Graduate Course Outline**  
**Department of Economics**  
**School of Business and Economics**

**ECON 6030-3**  
**Foundations of Cost-Benefit Analysis (3,0,0)**

**1. COURSE OVERVIEW**

**Calendar Description**

Students are introduced to the principles and practice of cost-benefit analysis and how it is applied to evaluating public policies and specific projects. Topics include the conceptual and economic foundations of cost-benefit analysis; valuing benefits and costs in primary and secondary markets; discounting benefits and costs; evaluation criteria; incorporating uncertainty and risk; the role of option price and value; existence value of projects; social discount rate; and predicting and monetizing impacts. Applications relate to such areas as human resource, natural resource, recreation economics plus economic development and urban planning.

**Educational Objectives/Graduate-Level Learning Outcomes**

After successfully completing the course, students will be able to:

1. Justify the importance of cost-benefit analysis as a tool for sustainable economic management.
2. Discuss cost-benefit analysis as a tool for measuring efficiency and making decision and its limitations.
3. Measure social surpluses and changes in welfare with or without distortions.
4. Evaluate benefits and costs in primary markets with or without distortions.
5. Analyze the benefits and costs in secondary markets with or without distortions.
6. Apply discounting in cost-benefit studies.
7. Integrate risk and uncertainty in cost-benefit studies.
8. Explain the role of option price and value.
9. Calculate the existence value of projects.
10. Assess the importance of the social discount rate.
11. Estimate monetized impacts from investment projects.
12. Conduct and assess a cost-benefit study.

**Course Topics**

1. Introduction to Cost-Benefit Analysis
  - Individual versus social costs and benefits
  - Types of cost-benefit (CBA) analyses and their purposes
  - Basic steps of CBA: Coquihalla highway example
  - Bureaucratic and political lenses
  - Demand for CBA
  - Cost of doing CBA
2. Conceptual Foundations of Cost-Benefit Analysis

- CBA as a framework of measuring efficiency
  - Using CBA for decision making
  - Fundamental issues related to willingness to pay
  - Concerns about the role of CBA in the political process
  - Limitations of CBA: other analytical approaches
3. Economic Foundations of Cost-Benefit Analysis
    - Demand curves
    - Supply curves
    - Social surplus and allocative efficiency
    - Government surplus and allocative efficiency
    - Measuring changes in welfare
  4. Valuing Benefits and Costs in Primary Markets
    - Practical versus conceptually correct
    - Measures of benefits and costs
    - Valuing outcomes: willingness to pay
    - Valuing inputs: opportunity costs
  5. Valuing Benefits and Costs in Secondary Markets
    - Valuing benefits and costs in efficient secondary markets
    - Valuing benefits and costs in distorted secondary markets
    - Indirect effects of infrastructure projects
    - Secondary market effects from the perspective of local communities
  6. Discounting Benefits and Costs in Future Time Periods
    - Basics of discounting
    - Compounding and discounting over multiple periods
    - Timing of benefits and costs
    - Comparing projects with different time frames
    - Inflation and real versus nominal dollars
    - Relative price changes
    - Long-lived projects and horizon values
    - Time-declining discounting
    - Sensitivity analysis in discounting
  7. Dealing with Uncertainty: Expected Value, Sensitivity Analysis, and the Value of Information
    - Expected value analysis
    - Sensitivity analysis
    - Information and quasi-option value
  8. Option Price and Option Value
    - Ex ante willingness to pay option price
    - Determining the bias in expected surplus: signing option value
    - Rationales for expected surplus as a practical benefit measure
  9. Existence Value
    - Active and passive use value
    - Measurement of existence value
  10. The Social Discount Rate
    - Does the choice of discount rate matter?

- Theory behind the appropriate discount rate
- Deriving the social discount rate from market rates: four alternatives
- Shadow price of capital
- Using the optimal growth rate approach to discounting
- Intergenerational discounting
- Social discount rate in actual practice

#### 11. Predicting and Monetizing Impacts

- Predicting impacts
- Monetizing impacts
- Illustration of impacts

#### 12. Applications of Cost-Benefit Studies

- Selected applications of cost-benefit studies

## Texts/Materials

### Textbooks

Boardman, Anthony E., David H. Greenberg, Aidan R. Vining, and David L. Weimer. 2010. *Cost-Benefit Analysis: Concepts and Practice*. Pearson/Prentice-Hall.

Pearce, D., G. Atkinson and S. Mourato; "Cost-Benefit Analysis and the Environment: Recent Developments," OECD, 2006.

### Suggested Readings

The RFF Reader in Environmental and Resource Policy, 2nd Edition, W. E. Oates, Resources for the Future, 2006.

Canadian Cost-Benefit Guide: Regulatory Proposals, Treasury Canada, 2007.

Abrams, Burton A. and George R. Parsons. "Is CARS a Clunker?" *The Economists' Voice* (August 2009): 1-4.

Ackerman; et al. (2005). "Applying Cost-Benefit to Past Decisions: Was Environmental Protection Ever a Good Idea?" *Administrative Law Review* 57: 155.

Adler Mathew and Eric Posner (1999) "Rethinking Cost Benefit Analysis," *Yale Law Journal* 109: 165-246.

Arrow, Kenneth, et al. 1996. "Benefit-Cost Analysis in Environmental, Health, and Safety Regulation: A Statement of Principles" AEI-Brookings Joint Center.

Brennan, G., 2007, "Discounting the Future Yet Again," *Politics, Philosophy, and Economics*.

Banzhaf, H. Spencer. "Objective or Multi-Objective? Two Historically Competing Visions for Benefit-Cost Analysis" *Land Economics* 85 (February 2009): 3-23.

Chandra, Amitabh and Eric Thompson. "Does Public Infrastructure Affect Economic Activity? Evidence from the Rural Interstate Highway System" *Regional Science and Urban Economics* 30 (July 2000): 457-490.

Steven Kelman. "Cost-Benefit Analysis: An Ethical Critique" *AEI Journal on Government and Society Regulation* (January/February 1981) pp. 33-40.

Economic Analysis at EPA, Chapter 4 "Lead in Gasoline." Resources for the Future Washington DC. 1997.

Farrow, Scott and W. Kip Viscusi. "Towards Principles and Standards for the Benefit-Cost Analysis of Safety" *Journal of Benefit Cost Analysis* 2 (3) Article 5

Harberger, Arnold C. and Richard Just. "A Conversation with Arnold Harberger" *Annual Review of Resource Economics* 4 (2012): 1-377.

Harrington, Morgenstern, and Nelson (2000) "On the Accuracy of Regulatory Cost Estimates," *Journal of Policy Analysis and Management* 19 (2): 297-322.

Howe, Charles W. "Project Benefits and Costs from National and Regional Viewpoints: Methodological Issues and Case Study of the Colorado-Big Thompson Project" *Natural Resources Journal* 26 (Winter 1986): 77-92.

Joskow and Schmalensee, 1998, "The Political Economy of Market Based Environmental Policy: The US Acid Rain Program," *Journal of Law and Economics* 41 (1), 37-83.

Kneese, Allen, 2006, "The Faustian Bargain: Risk, Ethics, and Nuclear Energy" RRF Reader.

Krupnick, Alan, 2006, "How Much Will People Pay for Longevity?" RRF Reader.

Moore, Boardman, Vining, Weimer, and Greenberg, "Just Give Me a Number: Practical Values for the Social Discount Rate." *Journal of Policy Analysis and Management* 23:789 (2004).

Myrick Freeman III and Paul R. Portney, "Economics Clarifies Choices about Managing Risk," RRF Reader.

OMB Guidance on Cost-Benefit Analysis.

Portney, Paul, 2006, "Time and Money: Discounting's Problematic Allure," RRF Reader.

Portney P. Paul and Winston Harrington, 2006, "Health-Based Environmental Standards: Balancing Costs with Benefits," RRF Reader.

Posner, Richard. "How to Evaluate the Catastrophic Risks and the Possible Responses to Them." Chapter 3 of *Catastrophe*.

Schroeder, Christopher, "The Precautionary Principle," Center for Progressive Regulation Perspectives.

Smith, V. Kerry and Eric M. Moore. "Behavioral Economics and Benefit Cost Analysis" *Environmental and Resource Economics* 46 (2010): 217-234.

Stavins, Robert and Adam Jaffe. "Unintended Impacts of Public Investments on Private Decisions: The Depletion of Forested Wetlands" *American Economic Review* 80 (June 1990): 337-352.

Wolf, Charles, Jr. "A Theory of Nonmarket Failure: Framework for Implementation Analysis" *Journal of Law and Economics* 22 (April 1979): 107-139.

## Student Evaluation Philosophy and Methods

### On-Line

Assignments/Case Studies	40%
On-line Discussions	15%
Final Exam	45%

### Face-to-Face

Assignments/Case Studies	25%
Midterm	25%
Class Participation	5%
Final Exam	45%

### Assignments/Case Studies

Students are required to submit four assignment sets with each containing multiple problems from different modules and/or case studies. Assignment problems and case studies will be completed in teams. A grade of zero will be given for all late assignments unless permission is received in advanced.

### On-line Discussion

Six discussion questions will be posted for comment by students at different times throughout the course from different modules. Students are expected to engage in an active debate with each other of the issues involved. The discussion will be monitored to ensure it remains focused on the question asked and that all students are respectful of each other and engaged. The facilitator will assign an on-line discussion grade at the end discussion based on the quality and not the quantity of each student's contributions.

### Final Exam

The comprehensive final exam is three hours in length and consists of a combination of short answer questions based on the lectures, lecture slides, readings and assignments assigned. Translators or other electronic devices are not permitted during exams with the exception of a scientific calculator.

## 2. RELATIONSHIP TO OTHER COURSES

### Prerequisites

Admission to the MScESM

### Co-requisites

None

### Links to Previous, Concurrent and Subsequent courses

This course is a prerequisite for ESMN 6040-Valuation Methods for Benefit-Cost Analysis. Together these courses provide students with a strong grasp of cost-benefit analysis which is applied extensively in subsequent courses in the MScESM program studying different applications of sustainability management.

### 3. COURSE PURPOSE AND FIT IN GRADUATE PROGRAM

#### What is this course's role in the graduate program?

ESMN 6030-Foundations of Cost-Benefit Analysis and ESMN 6040-Valuation Methods for Benefit-Cost Analysis are core courses in the MScESM that provide students with the advanced cost-benefit analysis tools needed to make effective decisions. In making any business decision related to the management of economic sustainability, uncertainties are involved but can be reduced by incorporating relevant market information prior to committing resources. The economic value of nonmarket or intangible impacts of projects can be estimated using advanced methods of cost-benefit analysis such as direct estimation of consumer final demand curves, quasi-experiments, revealed preferences, and contingent valuation methods. This course facilitates sustainable economic management decisions by using market information and behavior to infer the economic value of associated nonmarket impact. It also enhances students' prior knowledge in cost-benefit analysis with more advanced methods of valuations in both private and public investment projects.

### 4. DELIVERY

#### Delivery mode (face-to-face, blended, distance)

The course will be developed for distance, blended, and campus delivery.

#### Delivery Features

- Lectures recorded using Camtasia
- Group work
- Online discussions

#### Instructional Approach

This course employs an active, collaborative learning approach with a heavy reliance on reading, assignments/team case analysis, and online discussion or class participation.

### 5. OTHER

#### Methods for Prior Learning Assessment and Recognition

PLAR is not allowed in graduate programs under Northwest Commission on Colleges and Universities (NWCCU) accreditation standards. No PLAR credit will be awarded, which is permissible under TRU policy.

#### Course Policies

**Academic Integrity** – In accordance with TRU Policy 5-0.

**Examinations** – In accordance with TRU Policy ED 3-9. In addition, students must pass the final exam to receive a passing grade for the course.

**Grading** – In accordance with TRU Policy ED 3-5.

**Late Assignments** - A grade of zero will be given for all late assignments unless permission is received in advanced from the instructor/facilitator.

**Student Academic Appeals** - In accordance with TRU Policy ED 4-0.

**Student Attendance** – In accordance with ED 3-1.

**Team Conflict** - All team members should actively participate in the analysis of the case and the preparation of the report and act professionally towards each other. During the course, if a student feels this is not occurring, they should bring this matter to the attention of the facilitator immediately so they can investigate the conflict and take the appropriate action including assigning students a failing grade for the course. Working effectively in teams and acting professionally towards one's colleagues is a major learning goal of an MBA program. Students should be careful to ensure their behaviour does not become an issue.

**Withdrawals** – In accordance with ED 3-0.