

September 22, 2009

### **Supplementary Submission**

To: Senate Undergraduate Studies Committee

From: Livio Di Matteo, Chair, Economics

Re: Commitment Clarification, Proposed New Program, Honours Bachelor of Science in Resource and Environmental Economics

The Economics Department proposes an Honour's BSc in Resource and Environmental Economics (HBScREE) that combines the analytical content of a degree in economics with scientific literacy and knowledge of natural resources and the environment in a degree that would provide the student with the analytical tools to analyze public policy in the resource and environmental sectors with the backgrounds of both economic analysis and science. These skills are vital to students seeking positions of leadership and social and environmental responsibility. This degree is in keeping with the commitment of the Academic Plan (p. 15, Section III) to:

"educating students who are recognized for their **leadership** and **independent critical thinking** and who are aware of **social** and **environmental** responsibilities"

This proposed new program integrates this commitment into the courses and learning path of the degree. See Appendix A for an outline of the structure of the degree. The key economics courses in this proposed degree designated to impart this commitment are as follows:

#### ***Social Responsibilities***

Economics 3131 (Cost-Benefit Analysis)

Students will learn program evaluation and the measurement of social and economic impacts of environmental programs. Case studies will be employed to deal with specific environmental issues.

Economics 2203 (Intermediate Macroeconomics)

Part of social responsibility is ensuring that initiatives are also fiscally responsible and intermediate macroeconomic theory will provide students with the background to assess fiscal policy and government budgetary positions in an independent and critical manner.

### ***Environmental Responsibilities***

Economics 2212 (Environmental Economics)

The basic theory of externalities and economic environmental awareness will be imparted in this course. Students will learn that all economic activities have an environmental and social impact and that government intervention to mitigate negative environmental externalities is sometimes required.

Economics 4131 (Natural Resource Economics)

The economics of optimal and sustainable resource harvesting and economic activity will be studied in this course. Part of the emphasis of the course will be in the distinction between renewable and non-renewable resources and the social responsibility that we have to ensure the sustainability of these industries for future generations.

### ***Leadership***

Economics 1100 (Principles of Economics) & Economics 2017 (Intermediate Microeconomics I)

Modern leadership in both government and organizations requires a basic familiarity with the issues of resource scarcity and choice, opportunity cost and budget constraints and Economics 1100 provides a survey of these issues in both a microeconomic and macroeconomic context. This is further reinforced by intermediate microeconomic theory (Economics 2017) that extends the theory of the consumer and the firm into a more sophisticated framework for analysis.

### ***Independent Critical Thinking***

All economics course in this degree foster the capacity of independent analysis and evaluation of policy issues and critical thinking using marginal analysis and the cost-benefit principle. However, the tools of welfare economics are particularly useful to critical thinking and these are imparted in Economics 2037.

Economics 2037 (Intermediate Micro II)

Social choice using economic principles is studied in this course. How do we decide on optimal policies? How do we aggregate preferences and make decisions that affect the many? What is the role of information asymmetry in shaping the decision making process? Principal-agent problems and strategic interaction round out the tools required for independent critical thinking.

## APPENDIX A

### ***PROPOSED STRUCTURE OF NEW DEGREE***

#### *Year I*

Economics 1100

Calculus 1180

Political Science 1100 or History 1100

Environmental Studies 1120/Geography 1120

1 additional FCE Science

#### *Year II*

Math 2331 (Statistics 1), Math 2333 (Statistics II)

Economics 2203 (Intermediate Macroeconomics), Economics 2017 (Intermediate Micro I), Economics 2037 (Intermediate Micro II), Economics 2212 (Environmental Economics)

Environmental Studies 2013/Philosophy 2013 (Environmental Philosophy)

Environmental Studies 2210/Biology 2210 (Introductory Ecology).

0.5 FCE Environmental Studies (Science Stream) at second or third year level.

#### *Year III*

Economics 3117 (Mathematical Economics),

Economics 3131 (Cost-Benefit Analysis),

1.5 FCE Economics Elective at the second, third or 4<sup>th</sup> year level.

2.0 FCE Environmental Studies (Science Stream) at third or fourth year level.

0.5 FCE Environmental Studies (Arts Stream) at third or fourth year level.

#### *Year IV*

Economics 4217 (Econometrics)

Economics 4131 (Natural Resource Economics)

1 FCE Economics elective at the third, fourth or 5<sup>th</sup> year level.

Environmental Studies 4800

1.5 FCE Environmental Studies (Science Stream)

0.5 FCE Environmental Studies (Arts Stream).

## Request for Calendar Change Form

Tracking No:  
(Senate Secretary's Office  
use only)

Date:  
15/09/2009

To Secretary of Senate  
From Name(Dean): \_\_\_\_\_ Faculty \_\_\_\_\_  
Andrew Dean Science and Environmental Studies  
Department the change relates to \_\_\_\_\_  
Economics \_\_\_\_\_  
Contact Person \_\_\_\_\_  
Livio Di Matteo \_\_\_\_\_

Is the proposed calendar change Undergraduate

### Instructions:

1. In all cases please complete and attach section 1 and 2
2. If the calendar change affect other departments/schools/faculties complete and attach section 3
3. If the answer to any of the questions below is yes, explain. Attach separate sheets with reference to the question

- |  |                                 |   |
|--|---------------------------------|---|
| 1. Do the proposed changes affect other departments/ schools/faculties in terms of their calendar change?                                | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 2. Is a transition plan needed for student in progress?  | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 3. Are the proposed changes likely to affect student enrollment in your department/school/faculty?                                       | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 4. Are the proposed changes likely to affect student enrollment in other departments/schools/faculties at Lakehead University?           | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 5. Will the proposed changes require additional teaching space and/or teaching staff and/or equipment and/or other resources?            | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 6. Will the proposed changes affect existing teaching loads within your department/school/faculty?                                       | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 7. Will the proposed changes increase demand for teaching support services such as the library, computing services and technical staff ? | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 8. Will the proposed change require direct or in-kind support from outside the academic unit?  | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 9. Do the proposed changes include change in course(s) which is/are required core course(s) for a major?                                 | Yes<br><input type="checkbox"/> | No<br><input checked="" type="checkbox"/> |
| 10. Do the proposed changes include a change in course which is service/required course(s) in another program?                           | Yes                             | No  |

- |  |                          |                                     |
|--|--------------------------|-------------------------------------|
|  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11. Do the proposed changes include change in course(s) which is/are open elective available to any student in any program?      | Yes                      | No                                  |
|  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 12. Do the proposed changes include change in course(s) which is/are elective in a major i.e. restricted to students in a major? | Yes                      | No                                  |
|  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Signatures:

Date approved by faculty council

### Section 1

#### Description of the Proposed Calendar Change:

The Economics Department proposes an Honour's BSc in Resource and Environmental Economics (HBScREE) that combines the analytical content of a degree in economics with scientific literacy and knowledge of natural resources and the environment in a degree that would provide the student with the analytical tools to analyze public policy in the resource and environmental sectors with the backgrounds of both economic analysis and science. [1] Such policy advice could be applied to recreation, agriculture, wildlife habitat, industry, public health, logging, mining, water quality and energy issues. This degree would be unique in that it would focus primarily on natural resource and environmental from the perspectives of mining, forestry, wildlife, and water resource issues and not agriculture.

The sustainability of the environment and the natural resource base is a key 21st century issue. Within economics, the sub-field of environmental economics deals with resource allocation and choices made with respect to policies dealing with water quality, air pollution, waste disposal and climate change. The sub-field of natural resource economics deals with the economics of resource extraction and resource depletion and the use of the resource base to ensure future availability. Degrees and programs in resource and environmental economics have become more prevalent and a number of universities now have graduate and undergraduate programs in resource and environmental economics housed jointly across disciplines and faculties.

At the University of Wisconsin, the Department of Agricultural and Applied Economics in the Department of Agricultural and Applied Life Sciences has degrees with majors in natural resources and environmental economics. Similarly, the University of Nebraska-Lincoln has a natural resource and environmental economics program in their Agricultural Economics faculty that combines natural science with economics, law, and other social sciences. At the University of Guelph, the Department of Food, Agricultural and Resource Economics has graduate programs that emphasize the economics of agricultural markets, food business economics and natural resource and environmental economics.

There appears to be a tradition in North America of programs in resource, environmental and land economics originating in faculties or programs rooted in agricultural study. The economics content in these programs is usually limited to courses in micro-economics, environmental economics and natural resource economics. On the other hand, in England, the Department of Economics at the University of Birmingham has an MSc in Environmental and Natural Resource Economics that is primarily economics oriented with no environmental or natural resource courses from a scientific perspective. [2]

[1] A recent report by the American Council of Trustees and Alumni on general education requirements at 100 U.S. colleges and universities – What Will They Learn? (2009) - argues that students are generally deficient in a number of areas including economics, mathematics and science which have become mainly options on a number of campuses but are seen as essential to future U.S. competitiveness in the world economy.

[2] The Birmingham degree structures its courses as follows: microeconomics, econometrics for environmental evaluation, environmental economics, natural resource economics, risk & uncertainty and then a set of economics electives. See <http://www.economics.bham.ac.uk/study/postgrad/environ.shtml>.

Rationale of the Proposed Calendar Change(s):  
(Corresponding to Section 2 where required)

Creation of an Honour's Bachelor of Science Degree in Resource and Environmental Economics

Section 2

Existing Calendar Entries:  
(Page reference based on hard copy or URL based on electronic version of calendar)

Proposed Calendar Entries/Addition/ Deletion  
-If only addition, specify page number and placement in university calendar  
-If only deletion, write Deleted

Admission Requirements

The proposed admission requirements for the HBSc in Resource and Environmental Economics (HBScREE) are designed to provide a background for university studies in both science and social science and are suggested as follows:

- 1 Credit Grade 12 University English
- 2 Credit Grade 12 University Math (from Advanced Functions, Calculus and Vectors or Data Management)
- 1 Credit Grade 12 University Science (from Chemistry, Biology, Physics, or Earth and Space Science)
- 2 additional Grade 12 credits (World History or Geography recommended).

Structure of Degree

Year I

- Economics 1100
- Calculus 1180
- Political Science 1100 or History 1100
- Environmental Studies 1120/Geography 1120
- 1 additional FCE Science

Year II

- Math 2331 (Statistics 1), Math 2333 (Statistics II)
- Economics 2203 (Intermediate Macroeconomics), Economics 2017 (Intermediate Micro I), Economics 2037 (Intermediate Micro II), Economics 2212 (Environmental Economics)
- Environmental Studies 2013/Philosophy 2013 (Environmental Philosophy)
- Environmental Studies 2210/Biology 2210 (Introductory Ecology).
- 0.5 FCE Environmental Studies (Science Stream) at second or third year level.

Year III

Economics 3117 (Mathematical Economics),  
Economics 3131 (Cost-Benefit Analysis),  
1.5 FCE Economics Elective at the second, third or  
4th year level.

2.0 FCE Environmental Studies (Science Stream)  
at third or fourth year level.

0.5 FCE Environmental Studies (Arts Stream) at  
third or fourth year level.

Year IV

Economics 4217 (Econometrics)

Economics 431 (Natural Resource Economics)

1 FCE Economics elective at the third, fourth or  
5th year level.

Environmental Studies 4800

1.5 FCE Environmental Studies (Science Stream)

0.5 FCE Environmental Studies (Arts Stream).



Section 3

The Faculty(ies) affected by the proposed calendar change

Chemistry

Faculty of Social Sciences and Humanities

Political Science

Mathematics

History

Biology

Philosophy

Chemistry

**I have been consulted regarding the attached calendar change and understand the academic and budgetary implication on my Dept./School/Faculty.**

I agree to this calendar change proposal

Yes

No

Name:

Livio Di Matteo

Faculty:

Economics - Science & Environmental Studies

Date:

15/09/2009

*Oct. 3/09*

Signature of Dean



I agree to this calendar change proposal

Yes

No

Name:

Faculty:

Political Science - Social Sciences & Humanities

Date:

Signature of Dean

Section 3

The Faculty(ies) affected by the proposed calendar change

Chemistry

Faculty of Social Sciences and Humanities

Political Science

Mathematics

History

Biology

Philosophy

Chemistry

**I have been consulted regarding the attached calendar change and understand the academic and budgetary implication on my Dept./School/Faculty.**

I agree to this calendar change proposal      Yes       No

Name: *Livio Di Matteo*  
Livio Di Matteo

Faculty:  
Economics - Science & Environmental Studies

Date:  
15/09/2009

Signature of Dean

I agree to this calendar change proposal      Yes       No

Name: *S. ISLAM* *Syed Khalid*

Faculty:  
Political Science - Social Sciences & Humanities

Date: *Sept 24/09*

Signature of Dean

*Syed Khalid*

I agree to this calendar change proposal

Yes

No

Name:

ADAM VAN TUYC

Faculty:

Mathematics - Science & Environmental Studies

Date:

Sept 22, 2009

Signature of Dean

I agree to this calendar change proposal

Yes

No

Name:

Patricia Jasen

Patricia Jasen

Faculty:

History - Social Sciences & Humanities

Date:

Sept 21/09

Signature of Dean

I agree to this calendar change proposal

Yes

No

Name:

Peter hee

Faculty:

Biology - Science & Environmental Studies

Date:

Signature of Dean

I agree to this calendar change proposal

Yes

No

Name:

*Richard A. Berg* Richard Berg

Faculty:

Philosophy - Social Sciences & Humanities

Date:

*Sept 21/09*

Signature of Dean

*Julian S. Dhaet*

I agree to this calendar change proposal

Yes

No

Name:

*Christine Gattardo* *Gattardo*

Faculty:

Chemistry - Science & Environmental Studies

Date:

*Sept 28/09*

Signature of Dean

*Andrew F. ...*

Dr. Andrew F. ...  
Dean, Science & Environmental Studies



## Department of Economics

### Draft Proposal for an Honour's Bachelor of Science Degree in Resource and Environmental Economics (HBScREE)

#### 1. *Rationale for Degree*

The Economics Department proposes an Honour's BSc in Resource and Environmental Economics (HBScREE) that combines the analytical content of a degree in economics with scientific literacy and knowledge of natural resources and the environment in a degree that would provide the student with the analytical tools to analyze public policy in the resource and environmental sectors with the backgrounds of both economic analysis and science.<sup>1</sup> Such policy advice could be applied to recreation, agriculture, wildlife habitat, industry, public health, logging, mining, water quality and energy issues. This degree would be unique in that it would focus primarily on natural resource and environmental issues from the perspectives of mining, forestry, wildlife, and water resource issues and not agriculture.

The sustainability of the environment and the natural resource base is a key 21<sup>st</sup> century issue. Within economics, the sub-field of environmental economics deals with resource allocation and choices made with respect to policies dealing with water quality, air pollution, waste disposal and climate change. The sub-field of natural resource economics deals with the economics of resource extraction and resource depletion and the use of the resource base to ensure future availability. Degrees and programs in resource and environmental economics have become more prevalent and a number of universities now have graduate and undergraduate programs in resource and environmental economics housed jointly across disciplines and faculties.

At the University of Wisconsin, the Department of Agricultural and Applied Economics in the Department of Agricultural and Applied Life Sciences has degrees with majors in natural resources and environmental economics. Similarly, the University of Nebraska-Lincoln has a natural resource and environmental economics program in their Agricultural Economics faculty that combines natural science with economics, law, and other social sciences. At the University of Guelph, the Department of Food, Agricultural

---

<sup>1</sup> A recent report by the American Council of Trustees and Alumni on general education requirements at 100 U.S. colleges and universities – *What Will They Learn? (2009)* - argues that students are generally deficient in a number of areas including economics, mathematics and science which have become mainly options on a number of campuses but are seen as essential to future U.S. competitiveness in the world economy.

and Resource Economics has graduate programs that emphasize the economics of agricultural markets, food business economics and natural resource and environmental economics.

There appears to be a tradition in North America of programs in resource, environmental and land economics originating in faculties or programs rooted in agricultural study. The economics content in these programs is usually limited to courses in micro- economics, environmental economics and natural resource economics. On the other hand, in England, the Department of Economics at the University of Birmingham has an MSc in Environmental and Natural Resource Economics that is primarily economics oriented with no environmental or natural resource courses from a scientific perspective.<sup>2</sup>

## ***2. Admission Requirements***

The proposed admission requirements for the HBSc in Resource and Environmental Economics (HBScREE) are designed to provide a background for university studies in both science and social science and are suggested as follows:

1 Credit Grade 12 University English

2 Credit Grade 12 University Math (from Advanced Functions, Calculus and Vectors or Data Management)

1 Credit Grade 12 University Science (from Chemistry, Biology, Physics, or Earth and Space Science)

2 additional Grade 12 credits (World History or Geography recommended).

---

<sup>2</sup> The Birmingham degree structures its courses as follows: microeconomics, econometrics for environmental evaluation, environmental economics, natural resource economics, risk & uncertainty and then a set of economics electives. See <http://www.economics.bham.ac.uk/study/postgrad/environ.shtml>.

### *3. Structure of Degree*

#### Year I

Economics 1100

Calculus 1180

Political Science 1100 or History 1100

Environmental Studies 1120/Geography 1120

1 additional FCE Science

#### Year II

Math 2331 (Statistics 1), Math 2333 (Statistics II)

Economics 2203 (Intermediate Macroeconomics), Economics 2017 (Intermediate Micro I), Economics 2037 (Intermediate Micro II), Economics 2212 (Environmental Economics)

Environmental Studies 2013/Philosophy 2013 (Environmental Philosophy)

Environmental Studies 2210/Biology 2210 (Introductory Ecology).

0.5 FCE Environmental Studies (Science Stream) at second or third year level.

#### Year III

Economics 3117 (Mathematical Economics),

Economics 3131 (Cost-Benefit Analysis),

1.5 FCE Economics Elective at the second, third or 4<sup>th</sup> year level.

2.0 FCE Environmental Studies (Science Stream) at third or fourth year level.

0.5 FCE Environmental Studies (Arts Stream) at third or fourth year level.

#### Year IV

Economics 4217 (Econometrics)

Economics 4131 (Natural Resource Economics)

1 FCE Economics elective at the third, fourth or 5<sup>th</sup> year level.

Environmental Studies 4800

1.5 FCE Environmental Studies (Science Stream)

0.5 FCE Environmental Studies (Arts Stream).



#### **4. *Learner Outcomes of HBSc REE\****

- Awareness and knowledge of the interdisciplinary nature of environmental and natural resource issues.
- Knowledge of the scientific elements of environmental science and natural resource issues.
- Understand the physical and biological properties of the environment and biological and ecological systems.
- Understand how economic activity impacts the environment.
- Familiarity with the application of economic principles and tools of economic analysis and their application to environmental and natural resource topics.
- Know, understand and use quantitative and empirical tools of data analysis including economic modeling and regression analysis.

\*See also Appendix.

#### **5. *Career Prospects***

- Resource Management Specialist
- Environmental Consultant
- Environmental Policy Analyst
- Environmental Economics Analyst
- Environmental or Industry Lobbyist
- Legislative Assistant
- Land Conservancy Director
- Environmental Interest Groups
- Industry Trade Associations
- Local Governments
- Environmental Consulting Firms
- Provincial and Federal Agencies
- Industries

## APPENDIX

### *LEARNER OUTCOMES FOR ECONOMICS GRADUATES OF LAKEHEAD UNIVERSITY*

- Analyze the determinants of consumer behaviour in a utility maximization framework,
- Analyze the determinants of firm behaviour in a profit maximization framework.
- Familiarity with the basic models of market structure: Perfect competition, monopoly, oligopoly, monopolistic competition,
- Apply game theory to strategic interaction scenarios,
- Be able to describe and use the IS-LM model of the macro-economy,
- Understand and apply concepts in macroeconomic analysis such as real business cycle theory, rational expectations,
- Understand the open economy, capital flows and exchange rate determination and analyze interest rates; know the basic rationale for international trade.
- Know the major schools of macroeconomic thought — Keynesian, Classical, New Keynesian, New Classical, Monetarist, Real Business Cycle
- Analyze the business cycle and its impact on government budget processes
- Evaluate the economic impact of expenditures in closed and open economies
- Use the scientific method to analyze and interpret data
- Understand and apply the basic classical linear regression model
- Apply time series regression techniques
- Apply selected panel estimation regression techniques
- Be able to design and implement a research data analysis project on an economic problem or issue
- Use a statistics package such as STATA or SHAZAM
- Demonstrate an understanding of the role of economics in business and political policy analysis
- Demonstrate an understanding of the role of the economist in implementing a healthy and sustainable economy and fostering critical thinking and environmental and social responsibility.
- Critically review and report literature, develop research questions, plan research methods, collect, analyze and interpret data, and present results in a clear and concise manner.
- Objectively critique opposing viewpoints to make reasoned judgments.