CEnREP Courses – Fall Semester

Introduction to Resource and Environmental Economics, *ARE 336*
Application of basic economic tools to understand and evaluate environmental/resource policies. Concepts such as property rights, non-market goods, allocation over time, externalities, and public goods. Current policy issues such as global climate change, evaluating natural resource damages from oil spills, reducing the costs of regulations, protecting estuaries, and dealing with non-point source pollution.

Energy Economics and Policy, *ARE 495*
This course provides an overview of energy markets from an economics perspective. Specifically, we will cover markets related to the production and consumption of oil, natural gas, coal, and electricity. In addition to discussing general supply/demand conditions and market structures of these goods, we will also consider various regulations that impact these markets. The goal is that this class will help students frame the many interesting policy debates surrounding various forms energy consumption and production using tools commonly employed in economic analysis.

Forest Economics, *FOR 319*
Economic approaches for evaluating the production and costs of forest management, timber harvesting activities, and nontimber forest products. Estimating the financial returns of long-term investments in timber or other forest resources, including discounted cash flow analysis and capital budgeting techniques. Property taxes and income tax treatment of timber and their effects on investment returns. Demand estimation and timber supply analyses.

Forest Economics, *FOR 519*
Economics applied to problems in forest management, including timber demand and supply models, optimal rotation length, benefit-cost analysis of forestry projects, impacts of forest taxation and consideration of non-market forest goods and services.

Environmental Policy, *PA 550*
Focus on formation and impact of environmental policy in the U. S. Examination on decision-making processes at all levels of government. Comparisons between political, economic, social and technological policy alternatives. Emphasis upon application of policy analysis in environmental assessment and consideration on theoretical perspectives on nature of the environmental crisis.

Environmental and Resource Economics, *ECG 715*
Theoretical tools and empirical techniques necessary for understanding of resource and environmental economics, developed in both static and dynamic framework. Discussions of causes of environmental problems, possible policies and approaches to nonmarket valuation. Analysis of resource use over time using control theory for both renewable and exhaustible resources.

CEnREP Courses – Spring Semester

Environmental and Resource Policy, *ECG 515*
Application of price theory and benefit-cost analysis to public decisions related to resources and environment. Emphasis on evaluation of water supply and recreation investments, water quality management alternatives, public-sector pricing, common property resources and optimum management of forest and energy resources.

Dynamic Environmental & Resource Management *ECG 590*
This course will examine inter-temporal problems involving the management of renewable and non-renewable resources. Examples include the conservation of endangered species, the determination of optimal harvesting levels and the setting of harvest regulations, the management of pollution and the control of invasive pests. All of these issues involve important trade-offs between current and future costs and benefits. These trade-offs will be examined by casting the problems as dynamic optimization problems. Model solutions will then be obtained and interpreted. We will also examine some of the thorny issues involved in economic analysis of these topics, including model uncertainty and discounting. Students can expect to gain an appreciation of inter-temporal allocation problems and to be able to formulate and analyze dynamic optimization models. This course is designed to be of use to economics majors interested in environmental and resource economics as well as to students in biology, forestry and wildlife and natural resource management interested in modeling and decision analysis.

Energy Policy *PA 598*
In spring 2018, this course provides an introduction to U.S. energy policy, using a contemporary electric utility Integrated Resource Plan (IRP) as both a conceptual and weekly roadmap. By way of the IRP, the course reviews the critical technical, economic, and public policy considerations that go into development and operation of an electric utility's generation portfolio.

The first half of the course emphasizes the policy context of energy supply and consumption, including utility choice of generation technology, projected load growth, the economics of electricity generation and distribution, power purchase and contracting, and compliance with environmental regulations and requirements.

The second half of the course takes the form of an extended group project, in which students will develop alternatives to the utility IRP, defending their scenarios and findings to a hypothetical Public Utilities Commission. In between, guest lectures will add real-world context to the material discussed in class.

Topics in Environmental and Resource Economics *ECG 716*
The course will focus on natural resource management. Natural resources will be viewed as a form of capital and the tradeoffs between current and future consumption will be highlighted. The main methodological tools used will be dynamic optimization in both discrete and continuous time (optimal control and dynamic programming). Current value Hamiltonian conditions and the Bellman equation will be discussed and interpreted from an economic/natural resource perspective. Application areas include the management of both non-renewable and renewable resources, with an emphasis on the

management of endangered, invasive and harvested species. The economics of long-run resource issues and sustainability will also be discussed.

Empirical Methods for Development Economics and Applied Microeconomics *ECG 790*
This course will provide a survey of the main tools used in applied development microeconomics. There will be a brief introductory section on causal inference and statistical inference, followed by 6 sections on core topics: randomization; matching and regression; difference-in-differences and panel data; instrumental variables; regression discontinuity; estimation of general equilibrium effects. Additional topics that may be covered, time permitting, include: selection models; GLS and SUR; interpretation of coefficients in nonlinear models; estimation of binary outcome models; GLM and the retransformation problem; quantile regression; other applied topics per student request.

This course is organized around tools rather than topics. That is, we will closely examine the empirical tools listed above and how they are used in a variety of applications. This course is *not* a survey of empirical research in various sub-fields. There are a few options for students interested in such a course; please talk to me if you are interested. While the particular applications we study will come largely from development economics, the course is intended to be useful to students in diverse areas of applied micro.

Because the primary goal of the course is to build understanding of identification strategies to estimate causal effects, we will focus on simple linear models. For the most part, the intuition for identification carries over to nonlinear models, but there are some important technical differences that we will not cover in detail. I will provide notes and citation for future reference. The same applies to quantile, semi-parametric and non-parametric estimators.

Undergraduate

Introduction to Resource and Environmental Economics, *ARE 336*
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