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### FIRST SEMESTER 2022-2023

**COURSE HANDOUT**

**Date: 29.08.2022**

In addition to Part-I (General Handout for all courses appended to the timetable), this portion gives further specific details regarding the course.

# *Course No.* : ECON F471

***Course Title***  **: Resources and Environmental Economics**

***Instructor-in-charge* : Dr. Sudatta Banerjee**

**1. Scope and Objective:** This course examines economic perspectives on the allocation of natural resources and the management of environmental quality, with emphasis on the use of economic concepts in the design and evaluation of public policies. Environmental goods are not like normal goods. They need to be used sustainably. Since there are no proper markets to value environmental goods, they need different methods of valuation. The course deals with many of these valuation methods. The course examines how the natural environment is being degraded. So, analysis is done on the role of government in preserving the environment and the failure of government in this regard. National and international policies to preserve the environment are also considered. The course basically aims to create familiarity with environmental issues, make students aware of the importance of environmental preservation and the cost-benefit analysis attached to it, and enable them to take correct decisions in any business field, keeping in mind the concept of sustainable development.

**2. Text Book:**

1. **Charles D. Kolestad: Environmental Economics**

**3. Reference Books:**

1. **RN Bhattacharya: Environmental economics: An Indian perspective**
2. **Pearce and Turner (1990): Economics of natural resources and the environment**

# A. M. Freeman (1999): The measurement of environmental and resource values

**4. Course Plan:**

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| --- | --- | --- | --- | --- |
| **Topic** | **No. of Lectures** | **Learning Objectives** | **Topics to be Covered** | **Chapter in the Text Book** |
| **1** | 1 | What is environmental economics? | Environment economics and environment policy, economics, ecological economics, and resource economics | Chapter 1 (TB) |
| **2** | 2 | Relationship between environment and economy | The environment- economy interaction; The Circular Economy | Ch. 2 (Ref ii)  +class notes |
| **3** | 3-4 | Economic valuation of environmental benefits and costs | Concept of total economic value; Preference-based valuations | Ch. 4 (ref i)  Ch 14 (TB)  Ch 3 (ref iii)  +class notes |
| **4** | 5-12 | Indirect methods of valuation | Environmental quality as a factor input; Household production function; Travel cost method; Hedonic pricing | Ch 16, 17 (TB)  Ch 4 (ref iii)  +class notes |
| **5** | 13-14 | Direct methods of valuation | Contingent valuation method/ experimental markets | Ch. 10 (ref ii)  Ch 18 (TB)  Ch. 6 (ref iii)  +class notes |
| **6** | 15-16 | Exhaustible Resources | The fundamental principle of exhaustible resource use; Optimal resource use; Resource prices and backstop technology; The effects of changing parameters; Monopoly and the rate of extraction | Ch. 18 (ref ii)  +class notes |
| **7** | 17-19 | Renewable Resources | Growth curves; rate of exploitation; cost and revenues; preservation values | Ch. 16 (ref ii)  +class notes |
| **8** | 20-21 | The extinction of species | The problem of extinction; Open access and species extinction; Profit maximization and extinction; Reasons for extinction | Ch. 17 (ref ii)  +class notes |
| **9** | 22-23 | Development, Preservation, and Conservation | Conservation and Preservation; Development and the total economic value; Irreversibility and the Krutilla-Fisher algorithm; Safe minimum standards | Ch. 20 (ref ii)  +class notes |
| **10** | 24 | A case study of wetlands | Social inefficiency in wetland resource use; Wetlands- concept, total economic value; Sources of inefficiency in wetland resource use; Methodologies for the measurement of wetland use inefficiency; Mechanisms for social cost internalization. | Ch. 21 (ref ii)  +class notes |
| **11** | 25-28 | Social choice | Individual preferences regarding environmental protection, Social choice from individual values, examples | Ch. 3 (TB)  +class notes |
| **12** | 29-32 | Efficiency and markets | What is efficiency? Efficiency and competitive markets, supply, demand, and efficiency | Ch. 4 (TB)  +class notes |
| **13** | 33-35 | Demand for environmental goods | Environmental goods (public good), types, Willingness to pay and accept, revealed preference | Ch. 7 (TB)  +class notes |
| **14** | 36-37 | Risk and Uncertainty | Environmental Risk; Making choices about risks; Regulating risk with liability; Liability versus direct regulation; Insurance | Ch. 12 (TB) |
| **15** | 38-40 | Development and Growth | Income and demand for environmental quality; Productivity growth and technological change; Green national accounting | Chapter 20 (TB) |

**5. Learning Outcomes:**

**Topic 1: What is Environmental Economics?**

Environmental Economics is concerned with the impact of the economy on the environment, the significance of the environment to the economy, and the appropriate way of regulating economic activity so that balance is achieved among environmental, economic, and other social goals. We first discuss how environmental economics relates to environmental policy. We also discuss about how environmental economics meshes with the larger discipline of economics. We distinguish between environmental and ecological economics. We discuss the connection and difference between environmental and resource economics.

**Topic 2: Relationship between environment and economy**

This topic deals with the environment-economy relation in detail and discusses about circular economy. We also discuss the existence theorems of the natural environment.

**Topic 3: Economic valuation of environmental benefits and costs**

This topic deals with the concept of total economic valuation of environmental goods and services incorporating distinction between the standard-based objective valuation techniques and preference-based subjective valuation methods.

**Topic 4: Indirect methods of valuation**

In this topic, we learn a few methods which value on the basis of some indirect factors like travel costs, property prices, etc.

**Topic 5: Direct methods of valuation**

Here we construct markets that are used to generate the value of an environmental good. These markets are either hypothetical or experimental and these are discussed in this topic.

**Topic 6: Exhaustible Resources**

In the case of exhaustible resources, it will be depleted so long as the harvest rate is positive. In this topic, we learn to derive the optimal rate at which to deplete the resource.

**Topic 7: Renewable Resources**

The essential feature of renewable resources is that their stock is not fixed and can be increased or decreased. It will increase if the stock is allowed to regenerate. Nonetheless, there is a maximum stock- no renewable resource can regenerate to levels above the carrying capacity of the ecosystem in which it exists. This chapter investigates some of the theorems which have been derived with regard to the optimal use of renewable resources. We discuss growth curves, exploitation rates, costs, and revenues.

**Topic 8: The extinction of species**

The danger of species extinction applies to harvested resources. Also, any resource with a significant minimum critical size faces a real problem of extinction, particularly, if the resource is subject to open access harvesting. This topic explains open access and extinction, and how profit maximization can be related to extinction.

**Topic 9: Development, Preservation, and Conservation**

A given habitat can either be developed or preserved in its natural state. Whereas in the case of conservation, the natural habitat is maintained but the resource itself is used for commercial purposes. We understand these issues in detail. We introduce the concept of total economic value in this context and understand the costs and benefits associated with the case. We learn why this analysis is important as development can lead to losing preservation benefits forever and thus discuss sustainability.

**Topic 10: A case study of wetlands**

In this topic, we use economic principles and methods to understand the issue of wetland ecosystem management. We understand the market and information failure in the case of wetland management.

**Topic 11: Social Choice**

Individuals in a society have widely differing opinions and views regarding the right amount of environmental protection. In this topic, we start with individual preferences and understand how social or group decisions can be made. The focus is on developing methods for helping to make specific societal decisions.

**Topic 12: Efficiency and markets**

Like normal production decisions, here also in the case of the environment, we discuss here how much pollution is to be produced. Clearly, some pollution is necessary. We here determine how much pollution is efficient. We understand efficiency in obtaining the right overall amount of pollution control and efficiency in allocating pollution control responsibility to specific polluters. We learn about efficiency and market equilibrium and also market failures leading to government intervention. We deal with some cost-benefit analysis to determine efficient outcomes.

**Topic 13: Demand for environmental goods**

In this topic, we discuss of environmental goods and their types and specifically willingness to pay and accept, with revealed preference.

**Topic 14: Risk and Uncertainty**

Governments first focus on environmental problems where the relationship between pollution sources and damage is clear and certain. As these large sources of pollution are cleaned up, attention is given to more difficult sources of pollution. These sources are in realms of risk and are characterized by accidental pollution. The goal is not to eliminate but to manage risks. The risks are harmful. A conceptually similar uncertainty relates to the benefits, the environment may provide and these may be threatened by development and pollution. In this topic, we try to understand risk from a conceptual perspective as well as understand the various means for reaching socially acceptable levels of risk. We discuss private markets like insurance, decentralized regulation, public provision of risk-reducing technologies, and conventional direct regulation of activities.

**Topic 15: Development and Growth**

In this topic, we shall examine how income affects the demand for environmental quality. Another objective will be properly accounting for environmental protection in our aggregate measures of economic performance, e.g., GNP.

**6. Evaluation scheme:**

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| --- | --- | --- | --- | --- |
| **Component** | **Duration (minutes)** | **Weightage (%)** | **Date and Time** | **Nature of Component** |
| Mid-semester exam | 90 | 35 | 31/10 11.00 - 12.30PM | CB |
| Quiz | 20-30 | 10 |  | OB |
| Assignments | - | 15 |  | OB |
| Comprehensive Examination | 180 | 40 | 17/12 AN | CB |

**7. Consolation Hour**: To be announced in the class

**8. Notices**: Notices, if any, would be put on CMS.

**9. Make-up Policy**: Make-up will be granted only on genuine grounds and if prior permission is taken.

**10. Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

**Instructor-in-Charge**

**ECON F471**