

## **RG-741 Environmental Science (MS RS & GIS)**

### **Course Summary:**

This course deals with basic understanding of environment and ecosystems. It covers ecosystems and their evolution, environmental pollution, risk analysis and environmental hazards etc. The course contents also include classification and status of existing renewable and nonrenewable energy resources. An in-depth understanding of environmental impacts and their qualitative and assessment, mitigation and management is also covered in the course. Additionally, necessary skills are imparted in the use of state of the art technologies including remote sensing and GIS for different environmental investigative studies.

### **COURSE SYLLABUS**

Program: RS & GISc

Department: Space Science (SS)

Course Code: RG-741

Course Name: Environmental Sciences

Credits: CR 3-0

Instructors: Dr. Imran Shahid

Email: imran.shahid@grel.ist.edu.pk

Office: Room 228, Block II

Phone: 051-9075545

### **CONTENTS**

- 1. Introduction to Environmental Science**
- 2. Air and Air Pollution**
  - a. The Atmosphere
  - b. Types and Sources of Air Pollution
  - c. Effects of Air Pollution
  - d. Controlling Air Pollutants
  - e. Indoor Air Pollution
- 3. Global Atmospheric Changes**

- a. The Atmosphere and Climate
  - b. Global Warming
  - c. Ozone Depletion in the Stratosphere
  - d. Acid Deposition
- 4. Freshwater Resources and Water Pollution**
- a. The Importance of Water
  - b. Water Resource Problems
  - c. Water Management
  - d. Water Pollution
  - e. Improving Water Quality
- 5. Human Population Change and the Environment**
- a. Population Ecology
  - b. Human Population Patterns
  - c. Demographics of Countries
  - d. Stabilizing World Population
  - e. Population and Urbanization
- 6. Risk Analysis and Environmental Hazards**
- a. Environmental Risks and Hazards
  - b. Movement and Fate of Toxins
  - c. Health Effects of Pollutants
  - d. Precautionary Principle
- 7. Solid and Hazardous Waste: An Unrecognized Resource**
- a. Solid Waste
  - b. Reducing Solid Waste
  - c. Hazardous Waste
  - d. Managing Hazardous Waste
- 8. Ecosystems and Evolution**
- a. Earth's Major Biomes

- b. Aquatic Ecosystems
- c. Evolution
- d. Ecology
- e. The Flow of Energy Through Ecosystems

#### **9. Agriculture and Food Resources**

- a. World Food Problems
- b. The Principle Types of Agriculture
- c. Challenges of Agriculture
- d. Solutions to Agricultural Problems
- e. Controlling Agricultural Pests

#### **10. Nonrenewable Energy Resources**

- a. Energy Consumption
- b. Coal
- c. Oil and Natural Gas
- d. Nuclear Energy
- e. Decommissioning Nuclear Power Plants

#### **11. Renewable Energy Resources**

- a. Direct Solar Energy
- b. Indirect Solar Energy
- c. Other Renewable Energy Sources
- d. Energy Solutions: Conservation and Efficiency

#### **12. The Environmental Dilemmas We Face**

#### **13. Environmental Impact Assessment (EIA)**

- a. Implications of the widening environment and sustainability
- b. Impact Identification
- c. Impact Analysis / Prediction
- d. Characteristics of environmental impacts

- e. Social Impact Assessment
- f. Evaluation of Impact Significance
- g. Significance Criteria
- h. Impact assessment and mitigation
- i. Summary

#### **14. EIA Project**

#### **15. The role of Remote Sensing & GIS in Environmental Sciences**