

# Savitribai Phule Pune University

Ad-hoc Board of Studies in Sustainable Development

## Certificate Course in Sustainable Development (Advance)

**Eligibility** : B.Sc.(Science, Geography, Geology), B.E.(Mech. Electronics) or Equivalent.

**Objective** : (1) To learn various techniques useful in sustainable development.  
(2) To train students with hands on skills essential for understanding and dealing with environmental issues.  
(3) To equip students for working in urban and rural area with effecting the sustainable development.

**Duration** : Six Months

**Student Intake** : 20 Nos. (I & II)

**Course fees** : Rs.25,000/-

**Admission process** : Based on interviews.

**Course Structure** : The course is equivalent to 25 Cr. It can be a full-time or part-time course.

### Syllabus

Basic concepts in Sustainable Development. Environmental Protection Act

- Existing natural resources and their Management.
- Threats and concerns to these resources.
- Introduction to applications of existing techniques.  
1 Agriculture, Ocean Temperature, Soil Erosion  
2 Need of Oil – Continuous sharing out.

3 Exploitation of Natural resource resulting in environmental change.

4 Survey, social aspects, remote sensing etc.

### **Environmental Impact Assessment**

- a. Introduction
- b. Methodologies
- c. Prediction And Assessment
- d. Environmental Management Plan
- e. Case Studies 30L + 30P

### **Soild and Hazardous Waste Management**

- a. Municipal Solid Waste Management: An Introduction.
- b. Generation and Characteristics of Waste.
- b. Waste Collection, Storage and Transport.
- c. Waste Disposal.
- d. Waste Processing Techniques.
- e. Source Reduction, Product Recovery and Recycling.
- f. Recovery of Biological Conversion Products: Composts and Biogas.
- g. Incineration and Energy Recovery.
- h. Hazardous Waste: Management and Treatment.
- i. Integrated Waste Management (IWM). 30L + 30P

### **Water Recycling Technology**

- a) Water Quality Control
- b) Background: Water Chemistry
- c) Water Microbiology
- d) Hydraulics And Hydrology
- e) Water Quality And Pollution
- f) Water Distribution Systems And Water Treatment
- g) Wastewater Flows, Characteristics And Treatment 30L + 30P

### **Membrane Technology**

- a) Membranes for water
- b) Desalination vs. Reuse
- c) RO vs. Distillation
- d) Fundamentals of Transport Phenomena
- e) Reverse Osmosis and Nanofiltration I
- f) Forward Osmosis I

- g) Osmosis
- h) Transport phenomena: PRO .vs FO and RO
- i) Membrane Distillation
- j) Microfiltration and Ultrafiltration                      30L + 30P

**Project**

**-10 Credit Equivalent**

L – Lectures                      P-Practical hours.

**Methodology** : The course will be conducted with classroom lectures, each of one clock hour and also field training.

**Assessment** : Final assessment will be based on 100 Marks Written test and 100 Marks Project viva.

**Certificate** : All the students passing the examination will be given certificate with grade. Failed students will be given attendance certificate.

**List of Books :**

1. Environmental Impacts of Production and use of Energy. Essam E El. Hinnawi
2. Oil and Gas, Ashok Desai
3. Water & Waste Water Analysis, Kaul & Gautam

**GIS Reference Books:**

1. Essential Image Processing & GIS For Remote Sensing By Philippa J Mason.
2. Textbook of Remote Sensing and Geographical Information Systems By Kali Charan Sahu.
3. Textbook of Remote Sensing and Geographical Information Systems By M Anjit Reddy.
- 4, GIS Auto Cad Map – NIIT

**Oil Exploration Technologies :**

- 1 Technical Guidelines for Oil and Gas Development By John Gilbert

**Environmental Impact Assessment :**

1. Environmental Impact Assessment And Management By B B Hosett & A Kumar.
2. Methods Of Environmental Impact Assessment By Peter Morris & Riki
3. Environmental Impact Assessment By Richard Morgan
4. Introduction To Environmental Impact Assessment By John Glasson, Rinki Therivel, Andrew Chandwick.

**Solid And Hazardous Waste Management:**

- 1) Hazardous Waste Management By Sumit Malhotra
- 2) Hazardous Material And Hazards Waste Management By Gayle Woodside

**Water Recycling Technologies:**

- 1) Recycling Of Industrial Effluents By R Manivanan