SARVAJANIK UNIVERSITY
INCLUSIVE | INTEGRATED | INNOVATIVE

Faculty of Science

M.Sc. Environment Science (Environmental Management)

Semester - III

SARVAJANIK UNIVERSITY
Faculty of Science
M.Sc Environmental Management

Faculty: Science	**Department:** Environmental Science
Program: M. Sc. Environmental Science (Environmental Management)	**Type of Subject:** Theory + Practical
Subject: Environmental Law and Policies	
Semester- III	

Student Learning Outcomes (SLOs):

- The paper will enable students to acquire knowledge on various laws, policies, control and management of pollution in various abiotic environment.
- The paper describes a network of regulations and customary laws that address the effects of human activity on the natural environment.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. Sharma B.K (2016): Environmental Chemistry, Krishna Prakashan, U.P
2. PUROHIT and AGRAWAL (2012): Environmental Pollution-Causes, Effects and control, Agrobios, Jodhpur.
3. Rao M.N (2012): Air Pollution, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
4. Bhargava S.K (2015): Practical Methods for Water and Air Pollution Monitoring, New Age International Publishers, New-Delhi.
5. Maiti S.K (2003): Hand Book of Methods in Environmental Studies-I, ABD Publishers, Jaipur.
6. Maiti S.K (2003): Hand Book of Methods in Environmental Studies-II, ABD Publishers, Jaipur.
7. Kulkarni Vijay and Ramchandra T.V (2015): Environmental Management, TERI press, New Delhi.
8. Ramchandra T.V (2018): Management of Municipal Solid Waste, TERI press, New Delhi.

UNIT 1: Life Cycle Assessment **07 Hours**

1.1 Origin of LCA
1.2 LCA Code of Conduct
1.3 Methodology for LCA
1.4 Applications of LCA

UNIT 2: Environmental Audit **07 Hours**

2.1 Practice in developed Countries
2.2 Audit Objectives
2.3 Audit Methodology
2.4 Environment Audit Report

UNIT 3: Environment Impact Assessment **07 Hours**

3.1 Purpose and Goal
3.2 Methodology of EIA
3.3 EIA of Hazardous Waste
3.4 Limitations of EIA

UNIT 4: Environmental Management **07 Hours**

4.1 Environment Management Systems
4.2 Preparation of EMS
4.3 ISO – 14010 Audit Standards
4.4 ISO – 14020 Labelling Standards

UNIT 5: Indian Policies- I **08 Hours**

5.1 The Water (Prevention and Control of Pollution) Act, 1974
5.2 The Air (Prevention and Control of Pollution) Act, 1981
5.3 The Environment (Protection) Act, 1986
5.4 The Noise Pollution (Regulation and Control) Rules, 2000

UNIT 6: Indian Policies- II **08 Hours**

6.1 Municipal Solid Wastes (Management and Handling) Rules, 2000
6.2 The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008
6.3 The Bio-Medical Waste (Management and Handling) Rules, 1998
6.4 E-Waste (Management and Handling) Rules, 2011

UNIT 7: Indian Laws Forest-I **08 Hours**

7.1 The Indian Forest Act, 1927
7.2 Wildlife Protection Act, 1972
7.3 The Forest Conservation Act, 1980
7.4 The Biological Diversity Act, 2002

UNIT 8: Indian Laws Forest-II **08 Hours**

8.1 National Green Tribunal Act, 2010
8.2 The Wetland (Conservation and Management) Rules, 2009
8.3 Coastal Regulation Zone, 2011
8.4 The National Forest Policy, 1988

Practicals:

1. Seminar on various Case Studies (Minimum four).

SARVAJANIK UNIVERSITY
Faculty of Science
M.Sc Environmental Management

Faculty: Science	**Department:** Environmental Science
Program: M. Sc. Environmental Science (Environmental Management)	**Type of Subject:** Theory + Practical
Subject: EIA & Risk Analysis	
Semester- III	

Student Learning Outcomes (SLOs):

- The paper will make students aware with the prevailing hazards, disasters and will provide the knowledge to take necessary steps during such conditions.
- The paper will enable students to acquire knowledge, technical skills needed for awareness towards ecological balance and maintaining a balanced development.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. Dhameja S.K (2017): Environmental Engineering and Management, S.K Kataria & Sons, New-Delhi.
2. Tandel Yogendra: Disaster Management, Synergy Knowledgeware, Mumbai
3. Smith Keith (2009): Environmental Hazards: Assessing Risk and Reducing Disaster, Routledge, USA.
4. Mistry K.U (2012): Fundamentals of Industrial Safety & Health – I, Siddharth Prakashan, Ahmedabad.
5. Mistry K.U (2012): Fundamentals of Industrial Safety & Health – II, Siddharth Prakashan, Ahmedabad.

UNIT 1: Nature of Hazard **07 Hours**

1.1 Introduction
1.2 Environmental Hazard
1.3 Hazard, Risk and Disaster
1.4 Current Views on Hazard

UNIT 2: Types of Disaster **07 Hours**

2.1 Earthquakes
2.2 Floods
2.3 Industrial Disaster
2.4 Man-Made Disaster

UNIT 3: Risk Identification, Assessment and Management **07 Hours**

3.1 Risk Detection Technique

3.2 Risk Progression Chart
3.3 Risk Analysis and Assessment
3.4 Elements of Risk Management

UNIT 4: Hazard Identification, Assessment and Management **07 Hours**

4.1 Preliminary Hazard Analysis
4.2 Hazard and Operability Studies
4.3 Fault Tree Analysis
4.4 Event Tree Analysis

UNIT 5: Environment Impact Assessment **08 Hours**

5.1 Introduction
5.2 Methodology
5.3 Environmental Risk Assessment
5.4 Limitations of EIA

UNIT 6: Environmental Audit **08 Hours**

6.1 Introduction
6.2 Range of Audit Objectives
6.3 Audit Methodology
6.4 Environmental Audit Report

UNIT 7: Environmental Management Systems **08 Hours**

7.1 ISO - 14001
7.2 ISO - 14010
7.3 ISO - 14020
7.4 OHSAS -18000

UNIT 8: International and National Efforts **08 Hours**

8.1 Transboundary Movement of Hazardous Waste
8.2 Montreal Protocol
8.3 Environment Protection Act
8.4 The Seventh and Eighth Plan

Practicals:

1. Submission of Report based on Industrial Visit.
2. Seminar on Kol-Dam Hydropower Project of Himachal Pradesh, India.
3. Measurement of Noise in various environment.

SARVAJANIK UNIVERSITY
Faculty of Science
M.Sc Environmental Management

Faculty: Science	**Department:** Environmental Science
Program: M. Sc. Environmental Science (Environmental Management)	**Type of Subject:** Theory + Practical
Subject: Environmental Sampling and Data Analysis	
Semester- III	

Student Learning Outcomes (SLOs):

- The student will attain a foundational knowledge and comprehension of the physical, computational, and perceptual basis for remote sensing.
- The student will gain familiarity with a variety of physical, biological, and human geographic applications of remote sensing.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. William Emery and Adriano Camps. Introduction to Satellite Remote Sensing. Elsevier Publication. ISBN: 9780128092545
2. Norman Kerle, Lucas L. F. Janssen, Gerrit C. Huurneman. Principles of Remote Sensing. ITC educational Textbook Series.
3. Basudeb Bhatta, (Oxford Publications, New Delhi). Remote Sensing and GIS. ISBN: 9780195692396.
4. Thomas Lillesand, Ralph W. Kiefer, Jonathan Chipman (Wiley). Remote Sensing and Image Interpretation, 7th Edition. ISBN: 9781118919477

UNIT -1: Sampling Methods **07 Hours**

1.1 Sample and Sampling Techniques, Law of Statistical Regularity, Law of Inertia of Large Numbers
1.2 Necessity of Sampling
1.3 Methods of Sampling
1.4 Merits and Demerits of Sampling Techniques

UNIT-2: Environmental Sampling **07 Hours**

2.1 Sampling Plan
2.2 Types of Samples
2.3 Preservation of Samples
2.4 Sampling and Analysis

UNIT-3: Water Sampling **07 Hours**

3.1 Objectives and Sampling Locations
3.2 Sampling and Types
3.3 Sampling Frequency and Containers
3.4 Water Samplers and Field Report

UNIT-4 Ambient/Stack Sampling **07 Hour**

4.1 Instruments for Sampling Waste Gases
4.2 Sampling Methods
4.3 Sampling by HVS
4.4 Stack Sampling Techniques

UNIT-5 Microbial Analysis of Environmental Samples **07 Hours**

5.1 Microbial Sampling of Surfaces
5.2 Microbial Sampling of Water and Analysis – Direct Bacterial Count, PA Test, MPN Test and IMViC Test
5.3 Potable test of Water, Presumptive, Completed and Confirmed test
5.4 Microbial Sampling of Air and Soil

UNIT-6 Data Collection and Analysis **08 Hours**

6.1 Types and Collection of Data
6.2 Variables and Characteristics
6.3 Methods of Presentation of Data
6.4 Classification and Tabulation of Data

UNIT-7 Carbon Capture and Storage **08 Hours**

7.1 Carbon Capture and Sequestration (CCS)
7.2 Carbon Sequestration: Geological storage, Ocean storage and mineral storage
7.3 Carbon Capture and Utilization (CCU)
7.4 Ecological Sanitation

UNIT-8 Geospatial technologies in environment **08 Hours**

8.1 Remote Sensing – History, Development, types, Principles
8.2 Stages of Remote Sensing Process
8.3 India's Remote sensing Program and its Application
8.4 Application of Remote Sensing in NRM and Disaster Monitoring Mitigation & Preparedness

Practicals:

1. Fundamental exercise on generation of a basic thematic map layer using any GIS open-source software.
2. Detection of coliforms by MPN.
3. Determination of pollutants in ambient air using HVS.