

2) ADVANCED AND INNOVATIVE TECHNIQUES FOR ENVIRONMENT AND WATERSHED MANAGEMENT

NSQF Level: L6/L7

SECTOR: Green Jobs

ELIGIBILITY: Bachelor's degree in any Science Stream

FEES: Tuition Fees- Rs 3000/- (Rs 100/- per credit)-30 credits

Laboratory Fees- Rs 2000/-(Rs 2000/- per Semester)

Total Fees- Rs 5000/-

CERTIFICATE COURSE: 6 months (450 hours)

Credits: 30

KEY COMPETENCIES: We assume that this course will be offered to students who have completed graduation and not necessarily lead to NSQF level 8

The course duration is 6 months covering two segments environment and watershed.

Environment itself is a very broad term and the course is more towards land & Water

This course could cover following job roles.

1. Environment conservation officer (L7)
2. Environment auditor (L6)
3. Environment Surveyor (L6)
4. Watershed Development Manager/Supervisor (L6/L5)
5. Soil & water Lab Technician (L6)

ASSESSMENT: Assessment includes continuous assessments which will comprise of following:

- ✓ 20 marks of theory component
- ✓ 20 marks of internal assessments
- ✓ 60 marks of skill assessment conducted by assessors of SSC

Course Structure: The course can be run in any of the 2 semesters in a year.

Course aims at training of students in Environment protection, Pollution, monitoring and auditing, the environmental parameters safety aspects as well as innovative techniques of hydro geological mapping, surveying and artificial recharging looking the requirements of the industries. Six month training to a batch of 50 students will be provided that will include 150 hours theory and 300 hours of extensive field work and experimentation.

Objectives:

- To train the students about environment protection pollution monitoring and allied aspects related to industries.
- To develop skills in identifying, quantifying and analyzing environmental parameters
- To develop skills in Occupational safety.

Structure:

The course consists of lectures, practical training, workshops and conferences with leading figures from the world of Environment, entrepreneurs, managers, journalists ,designers and architects, publishers and manufacturers. The course will also include visits to industries, for Environmental Audits, Geological survey, pollution monitoring etc. To complete the course, internships will be organized in industries, agencies operating in the Environment and Water Management sector. The course will be carried out in collaboration with industries and associations in the government organization.

CONTENTS**Environmental Audit:**

Preamble, scope and objectives of environmental auditing,
Applicability of statutory, Environmental statement audit, contents of EA report,
Requirements of Rule 14 for Environmental Audit under Environmental protection Act1986,
importance for industries; Concepts of a. Signatory, b. Consumption Audit, c. Pollution audit,
d. Hazardous audit, d. Solid waste audit, e. Disposal audit, f. Cost audit, g. Investment audit,
h. Voluntary audit.

Water budget and Water audit:

Distribution of water on Earth; Hydrosphere and concept of hydrogeological cycle;
Components (evaporation, precipitation, runoff, infiltration etc) and their interdependence;
Hydrometrological station; instrumentation and data collection; Hydrology of surface water
and Concept of ground water; Vertical distribution of ground water and concept of aquifers;
Concept of water audit, budget, surface water budget and ground water estimation.

Occupational safety:

Safety management: General principles of safety management; need for safety humanitarian; economics, legal and social consideration of industrial safety; role of management in industrial safety; safety management principle and practices. Safety and Housekeeping: Typical accidents due to poor housekeeping; disposal of scraps and other trade wastes; Prevention of spillage; marking of aisles. Use of colors as an aid for good housekeeping.

Air and water pollution monitoring:

Basics of air and water pollution, major pollutants, Water analysis for physico-chemical characteristics: pH, Electrical Conductivity, hardness, alkalinity, chloride etc. Air sample analysis: NO_x, SO_x, particulate matter etc.

Introduction to Survey Methods

- Geological Surveying and Mapping – Plane Table, Magnetic Compass etc
- Site Survey
- Rock Stability
- Rock Mechanics and
- Slope Stability

Engineering aspects of Soil and Water conservation Structures and its relevance in Watershed Management

Exploration Methods

- Resistivity Method
- Related Software's

Logging Methods

- Core Logging

Well Hydraulics, Water quality and Artificial recharge

Analytical Methods: Concept of porosity and permeability, Darcey's law, laboratory methods to determine porosity, Pumping test in field, Water quality monitoring, BIS for DW, Irrigation waters and Industry, Water Quality parameters, Conventional and Unconventional methods of artificial recharge, Rain water Harvesting, Concept and components of watershed Identification and study of watersheds, hypsometric analysis, Area treatment and drainage

line treatment in water shed development, soil conservation and conservational structures.
Analytical Methods of Geomaterials (Water, Soil and Rock samples)

RS-GIS methodologies and related software's

Major Equipment and Facilities Required:

1. ABEM Wadi Resistivity meter
2. Automatic water level recorder
3. ARC-GIS software's, Flow meter
4. High volume air samples, Noise dose meter, Indoor air quality, stag monitoring.

Industry Collaboration: GSDA,BAIF,NEERI,CGWB,ROLTA and DATA MITCON,
Nathan and Nathan, Ultratech LTD, Yogiraja Envirnomental Consultant, Awnera, VSI,
Thermax