

**S.S.JAIN SUBODH P.G. (AUTONOMOUS) COLLEGE**

**(Affiliated to University of Rajasthan)**



**SYLLABUS**

**DEPARTMENT OF ENVIRONMENTAL SCIENCE**

**POST GRADUATE DIPLOMA**

**in**

**ENVIRONMENTAL AUDIT, ISO & SUSTAINABLE DEVELOPMENT**

**(PGD-EAISDC)**

**Preamble:**

Industrialization is basically considered for the comfortable living of human beings. We are getting different types of goods and luxuries due to industrial products though, these are positive aspects of industrialization, along with the development in science and technology the calamities related to industries and environmental pollution problems are increasing day by day. Bhopal Gas Tragedy, Chernobyl Accident, Three Mile Island Nuclear Accident, etc. are some of the examples of safety violation. The above mentioned incidences are to enough to understand the severity of Industrial calamities. To avoid such circumstances various laws and orders implementation is necessary but not the fact is that not only laws but proper training and education about safety rules and their implementation are prior requirements for any industry. In this ever increasing era of industrialization, accidents are becoming a part of process and therefore, there is need of qualified and experienced manpower that can handle the complex industrial situations and avoid the calamities. Nowadays, there is high demand for such safety professionals from different industries. In many nations, it has been made mandatory to appoint well trained and qualified professional for the Industry. Every year around 20 students from our college and 100s of students from other Department of Environmental Science complete M. Sc. degree and join Environmental Consultancy or Industry as an Environmental Professional. With their M. Sc. Environmental Science, if they get add-on course as a P.G. Diploma in **ENVIRONMENTAL AUDIT, ISO & SUSTAINABLE DEVELOPMENT** for a person joining industry as Environment Officer, these students will get immediate entry in the industry and good salary package after completion of their P.G. Considering the present scenario in mind, Department of Environmental Science, propose to start P.G. Diploma in **ENVIRONMENTAL AUDIT, ISO & SUSTAINABLE DEVELOPMENT**. The course is designed for the students and employees from industries who will be exposed to comprehensive and rigorous training covering all areas of Environmental management.

**Objectives:**

To develop highly qualified professional manpower the basic requirement lies on systematic quality based coaching and training in Advanced Science and Technologies. Therefore, the course is designed to train and provide expert human resource to safety management and

expected to bring direct benefits to industry and society. The course is based on following objectives:

- ✓ To develop an expert manpower to handle the complex industrial environment.
- ✓ To give knowledge about occupational health, industrial hygiene, accidental prevention techniques to the students.
- ✓ To make the student aware about safety auditing and management systems, pollution prevention techniques etc.
- ✓ To train the students about risk assessment and management.
- ✓ M. Sc. Environmental Science students will get an add on diploma.
- ✓ It will produce well trained, qualified and expert manpower for the Industrial sector.
- ✓ Better placement opportunity for M. Sc. Environmental Science students.
- ✓ Course will be useful for in-service people from the industry.
- ✓ More interaction between Institution and Industry

**Eligibility for Admission:**

A candidate who has secured more than 55% or CGPA of 3.5 in the UGC Seven Point scale [36% or Pass marks for SC/ST/Non-creamy layer OBC/SBC] or equivalent in the Bachelor degree in Science or Engineering or Technology or Medicine or Pharmaceutical Science shall be eligible for admission to P.G. diploma in Environmental Audit And ISO And Sustainable Development course. For candidates from outside state of Rajasthan 60% or CGPA of 4.0 in the UGC Seven Point Scale will be applicable irrespective of the category.

**Academic Duration of Course and Examination:**

The course will complete in one year duration. This course includes internal assessment/Assignments, lab work and Industrial training/ relevant institutional training/Consultancy training in authorized consultancies etc.

**Course structure and Scheme of Examination:**

1. Each theory paper carries 100 marks. The internal assessment will be 30 marks and EoSE shall carry 70 marks. The EoSE will be of 3 hours duration. There will be a practical examination of 100 marks in the end of session based on the theory paper/industrial Training.

2. There will be two parts in EoSE theory paper. Part A” of theory paper shall contain 10 Short Answer Questions of 14 marks, based on knowledge, understanding and applications of the topics/texts covered in the syllabus. Candidate has to attempt seven questions out of 10 and each question will carry two marks for correct answer.
3. Parts “B” of EoSE theory paper will consist of four questions from each unit with internal choice of 14 mark each. The limit of answer will be five pages.
4. Each Laboratory EoSE will be of four hour durations and involve laboratory experiments/exercises/ Seminar presentation Project work or field study / Industrial Training/ consultancy training and viva-voce examination consisting of 100 Marks.
5. The aim of Project work or field study / Industrial Training/ consultancy training is to introduce students to research methodology in the subject and prepare them for pursuing research in theoretical or experimental or computational areas of the subject. The project work or Field Study is to be undertaken under guidance jointly by Head of the Department and a senior faculty or a Scientist or any other suitable person with proven research excellence in the concerned field of study. Project work or field study / Industrial Training/ consultancy training can also be taken up in an outside institution of repute Department. The guide will make continuous internal assessment of the Project work or field study / Industrial Training/ Consultancy training. EoSE for Project work or field study / Industrial Training/ consultancy training and seminar will be held at department of the college by a board of three examiners consisting of HoD, two senior faculty of the department or expert from interdisciplinary department of the institution.
6. Supplementary/ due paper/ special examinations will be resolute as per the institutions autonomous rules
7. Grade/CGPA/percentage/division will be decided as per the autonomous guidelines of the institution.

**Proposed course for P.G.D. in EAISOSD\***

S.No.	Code	Paper Title	Theory Hours	Practical Hours	Marks		Total
					External	Internal	
1.	EAISOSD 1	Environmental Management and Environmental Audit	4	2	70	30	100
2.	EAISOSD 2	Environmental Audit Procedure & its Application	4	2	70	30	100
3.	EAISOSD 3	ISO Certification and Environmental Management System	4	2	70	30	100
4.	EAISOSD 4	ISO Documentation Categories	4	2	70	30	100
5.	EAISOSD 5	Sustainable development and its application	4	2	70	30	100
6.	EAISOSD PBT6	Practical Based on Theory Paper /In-plant Training and Visits Project			120	80	200

## **PAPER -I ENVIRONMENTAL MANAGEMENT AND ENVIRONMENTAL AUDIT**

**Duration: 3 hrs.**

**Max. Marks: 70**

**Note: There will be two parts in end semester theory paper.**

**Part A of the paper shall contain seven short answer questions of 14 marks. Each question will carry two marks for correct answer.**

**Part B of the paper will contain four questions one question from each unit with internal choice. Each question will carry 14 marks.**

### **UNIT- I: Introduction to Principles of Environment Management**

Definition of Environmental management, Goals of Environment Management, significance of environmental management, scope of environmental management, Development and environmental linkages, Introduction Environmental Management Tools

### **UNIT- II: Environment Management Practices in India**

Changes in Environmental Management Practices, Environmental concerns in India, Actions for Environmental Protection Indian initiatives- National committee on Environmental Planning and Coordination, The Tiwari committee.

### **UNIT III: Introduction to Environmental Audit**

Introduction to environmental audit, objectives, Types of environmental audits: based and client driven types, Benefits of environmental auditing; environmental audit programme in India.

### **UNIT IV: General Methodology of Environmental Audit**

General audit methodology and audit process: Introduction, the basic steps of an environmental audit program. Element of audit process, audit protocols.

### **Reference book:**

1. Environmental Audit, Hemant Pathak, createspace Independent Pub, 2015.
2. Environmental Management (Science and Engineering for Industry 1st Edition), I.V Murali Krishna, Valli Manickam , eBook ISBN: 9780128119907, 2017.
3. Environmental Management, T V Ramachandra and Vijay Kulkarni, 9788179931844.
4. Environmental Management, Ajith Sankar, Oxford University Press; Illustrated edition, 2015.

## **Paper II: Environmental Audit & Audit Procedure**

**Duration: 3 hrs.**

**Max. Marks: 70**

**Note: There will be two parts in end semester theory paper.**

**Part A of the paper shall contain seven short answer questions of 14 marks. Each question will carry two marks for correct answer.**

**Part B of the paper will contain four questions one question from each unit with internal choice. Each question will carry 14 marks.**

### **UNIT I: Audit Procedure**

Pre-audit procedure, on-site audit procedure and post audit procedure: Initial meeting, communication during the audit, the role and responsibilities of guides and observers, collect and verify information, a summary of findings from the audit, preparation of audit findings, the final meeting.

### **UNIT II: Environmental Auditing and Decision-Making**

Transparency, Audit report distribution, Confidentiality, Participation of Stakeholders on Audits, Audit Follow-up, Auditing and Formal Systems.

### **UNIT III: Basic of Energy Audit & Water Audit**

General Aspects and need of Energy Audit and Management, Definition and Objective of Energy Management, General Principles of Energy Management, Energy Audit: Types, Methodology and Approach, understanding Energy Costs, Bench marking, Energy performance, Energy Audit Report. Water Audit, Benefits of Water Audit, steps of water audit, Water Supply and Usage Study, Process Study, System Audit, Discharge Analysis, Water Audit Report.

### **UNIT IV: Basic of Municipal Waste Audit**

Categories of solid waste, types of municipal solid waste, municipal solid waste management environmental and health risk scenarios, legal framework applicable to municipal solid waste management, functional elements of municipal solid waste management: waste generation, waste handling, sorting, storage, and processing at the source collection sorting, processing and transformation of solid waste disposal, municipal solid waste management systems.

### **Reference Book:**

1. Anjaneyulu, Y. and Manickam, V. Environmental Impact Assessment Methodologies. B.S. Publications. 2002.
2. The Sustainability Wave: Building Boardroom Buy-in (Conscientious Commerce), Bob Willard, 2007.
3. Morris, P. and Therivel, R. (Eds) Methods of Environmental Impact Assessment. 2nd Edition, Spon Press London. 2001.
4. Petts, J. Handbook of Environmental Impact Assessment- Volume 1 and 2. Blackwell Publishers, UK 2005.

## **Paper III: ISO Certification and Environmental Management System**

**Duration: 3 hrs.**

**Max. Marks: 70**

**Note: There will be two parts in end semester theory paper.**

**Part A of the paper shall contain seven short answer questions of 14 marks. Each question will carry two marks for correct answer.**

**Part B of the paper will contain four questions one question from each unit with internal choice. Each question will carry 14 marks.**

### **UNIT I: Environmental Management and Standardization**

Environmental management standards: a common framework for environmental management in business. Historical links between environmental management, International Organization for Standardization (ISO).

### **UNIT II: Introduction and Implementation of ISO 14001**

The introduction and implementation of ISO 14001: planning, implementation and operation, checking, management review, etc.

### **UNIT III: ISO 14000 and ISO 14001**

Environmental Policy, Planning, Implementation and Operation, Checking, Management Review, advantages and disadvantages of ISO 14000 certification, product-oriented standards and process oriented standards.

### **UNIT IV: OHSAS 18001**

Structure and responsibility, training, awareness, competence, communication environmental management system documentation, operational control, monitoring and management

### **Reference books:**

1. Canter, L. *Environmental Impact Assessment. 2<sup>nd</sup> Edition*. McGraw hill Book Company, New York. 1996.
2. Glasson, J. Therivel, R. and Chadwick, A. *Introduction to Environmental Impact Assessment*. Routledge, London. 2006.
3. Kulkarni, V. and Ramachandra, T.V. *Environmental Management*. Capitol Pub. Co., New Delhi. 2006.
4. Morris, P. and Therivel, R. (Eds) *Methods of Environmental Impact Assessment. 2<sup>nd</sup> Edition*, Spon Press London. 2001.

## **Paper IV: ISO Documentation Categories**

**Duration: 3 hrs.**

**Max. Marks: 70**

**Note: There will be two parts in end semester theory paper.**

**Part A of the paper shall contain seven short answer questions of 14 marks. Each question will carry two marks for correct answer.**

**Part B of the paper will contain four questions one question from each unit with internal choice. Each question will carry 14 marks.**

### **UNIT I: Introduction to Environmental Management Systems (EMS)**

Introduction to Environmental Management System basic definitions and terms, Framework for Environmental Management Systems, Approach for developing an Environmental Management System, Plan -Do-Check-Act Cycle, EMS Certification, ISO 9000, 14000 and 14001 quality and environmental management, OHSAS 18001, social responsibility 26000.

### **UNIT II: Environmental Performance and Evaluation**

Goals, Objectives and benefits of EPE, indicators and tools Plan-Do-check-act model: ISO14031, applications, case study, Eco Labelling: Introduction, types, objective, guiding principles major participants of eco-labelling, key steps of labelling, benefits of eco-labeling, specific challenges posed by eco-labelling programmes.

### **UNIT III: Life Cycle Assessment**

Evolution of Life Cycle Assessment (LCA), Cradle to grave approach. Different applications of LCA. Procedure for LCA: Defining goal and scope, preparation of life cycle inventory, assessment of environmental impact, Methods to assess impact using methods like ecoindicator-95

### **UNIT IV: Overview of CSR/Sustainability:**

Overview of CSR, Green Marketing, Emergence of new Environmental market, Green marketing, Environmental strategy and Competitive advantage, Green supply Chain Management, Eco Designing, Global Reporting Initiative Guideline G-3.

## **Reference Book**

1. Paliwal, U.L. Environment Audit. Indus Valley Publications. Jaipur2002
2. Petts,J. Hand book of Environmental Impact Assessment Volume1 and 2 .Black well 28 Publishers, UK 2005.
3. Harvard Business Review on Business & the Environment, Harvard Business School Press, 2000
4. The fortune at the Bottom of the Pyramid, C.K. Prahalad, Wharton School Publishing, 2005

## **Paper V: Sustainable Development and its Application**

**Duration: 3 hrs.**

**Max. Marks: 70**

**Note: There will be two parts in end semester theory paper.**

**Part A of the paper shall contain seven short answer questions of 14 marks. Each question will carry two marks for correct answer.**

**Part B of the paper will contain four questions one question from each unit with internal choice. Each question will carry 14 marks.**

### **UNIT I: Principles of Sustainable Development and Environmental Economics:**

History and emergence of the concept of Sustainable Development: Introduction to WTO and International Trade, Environmental Trade Barriers, Green GDP, Natural Resource Accounting, Green Accounting, Environmental GRI reports

### **UNIT II: Indian Environmental Scenario**

State of Environment in India: State of India's Environment Report by CSE and MOEF, State Government Environmental Status Reports, social insecurity, Industrialization. Environmental Compliance Status of Industries, State of the Environment in major cities, Quality Standards of CPCB, State Governments and WHO, Globalization and Environment.

### **UNIT III: Environmental Organizations, Conferences and Socio-Economic Sustainable Development Systems**

Green Peace Movement, WWF, UNEP, NFCCC, UNCED – 1992 (Stockholm Conference, Earth Summit, world earth summit), Montreal Protocol, World Business Council For Sustainable Development (WBCSD), WRI, GRI, World Bank, Socio-economic policies for sustainable development, Cost Benefit Analysis.

### **UNIT IV: Corporate Social Responsibility (CSR)**

Definition of CSR, History & evolution of CSR, The Triple Bottom-line Approach, Philanthropy – Conventional and Strategic Concept of Charity, Corporate philanthropy, Corporate Citizenship, Ethical and Governance issues, Human Rights – UN Charter, Dow Jones Sustainability Index / FTSE4GOOD Index

### **Reference Books:**

1. The Role of Environmental Audit in Environmental Management, Open Dissertation Press, 2017
2. Sustainable Development Goals A Complete Guide - 2020, Gerardus Blokdyk , 5STARCOOKS pub, 2021
3. Cultural Sustainability, Tourism and Development: (Re)articulations in Tourism Contexts (Routledge Studies in Culture and Sustainable Development) 1st Edition, Nancy Duxbury, Routledge pub.,2021

4. Sustainable Development Goals and Indian Cities  
Inclusion, Diversity and Citizen Rights, Ashok Kumar and D.S. Meshram, Routledge pub. ISBN  
9781032193557, 2021