

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

(Affiliated to University of Rajasthan)



Syllabus

Department of Environmental Science

P.G. DIPLOMA

IN

ENVIRONMENTAL AUDIT, ISO AND SUSTAINABLE
DEVELOPMENT

(PGD-EAISDC)

As per New Education Policy-2020

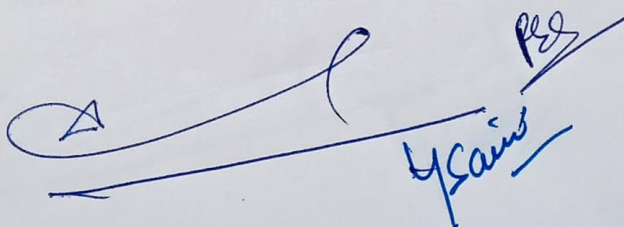
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Preamble:

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 AND ISO AND 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 AND ISO AND 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:

A large, stylized handwritten signature in blue ink, possibly reading 'Y. Saini', is written across the bottom of the page. To its right, there are smaller initials 'P.S.' and a horizontal line.

- ✓ 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:

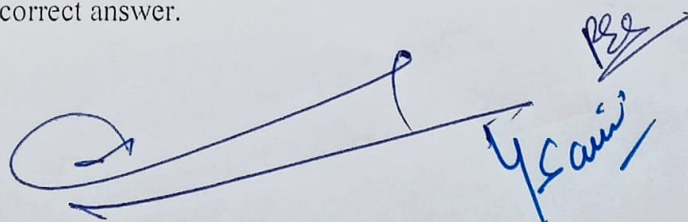
A candidate who has secured more than 55% or CGPA of 3.5 in the UGC Seven Point scale [36% or Pass marks for SC/ST/Non-creamy layer OBC/SBC] or equivalent in the Bachelor degree in Science or Engineering or Technology or Medicine or Pharmaceutical Science shall be eligible for admission to P.G. diploma 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.


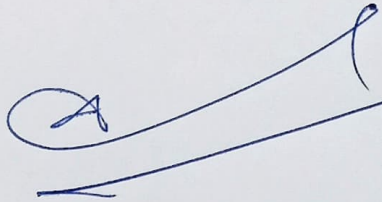
Course structure and Scheme of Examination:

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.



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3. Parts "B" of EoSE theory paper will consist of four questions from each unit with internal choice of 14 marks 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.



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

S.No.	Code	Paper Title	Marks		Total
			External	Internal	
1.	EAISOSD 1	Environmental Management and Environmental Audit	70	30	100
2.	EAISOSD 2	Environmental Audit Procedure & its Application	70	30	100
3.	EAISOSD 3	ISO Certification and Environmental Management System	70	30	100
4.	EAISOSD 4	ISO Documentation Categories	70	30	100
5.	EAISOSD 5	Sustainable development and its application	70	30	100
6.	EAISOSD PBT6 A	Practical Based on Theory Paper	60	40	100
7.	EAISOSD PBT6 B	Practical Based on Training and Visits Project	60	40	100

Abbreviations Used:

Course Category

DSC: Discipline Specific Core
 DSCP: Discipline Specific Core Practical
 DSE: Discipline Specific Elective
 DSEP: Discipline Specific Elective Practical
 GE : General Elective
 AEC: Ability Enhancement Course
 AECC: Ability Enhancement Compulsory Course
 SEC: Skill Enhancement Course
 SEM: Seminar
 PRJ: Project Work
 RP: Research Publication

Contact Hours

L: Lecture
 T: Tutorial
 P: Practical or Other S:
 Self Study

Relative Weights

CIA: Class
 Internal
 Assessment (Test/Attendance/ Classroom Participation/Quiz/Home Assignment etc.)
 EoSE: End of Semester Examination

The medium of instruction and examination shall be English only.

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S.No.	Code	Paper Title	Course Category	Credit	Contact Hours Per week		EoSE Duration (Hrs.)	
					L	P	Thy	P
1.	EAISOSD 1	Environmental Management and Environmental Audit	DSC	6	4	0	3	0
2.	EAISOSD 2	Environmental Audit Procedure & its Application	DSC	6	4	0	3	0
3.	EAISOSD 3	ISO Certification and Environmental Management System	DSC	6	4	0	3	0
4.	EAISOSD 4	ISO Documentation Categories	DSC	6	4	0	3	0
5.	EAISOSD 5	Sustainable development and its application	DSC	6	4	0	3	0
6.	EAISOSD PBT6 A	Practical Based on Theory Paper	DSC	6	0	12	0	4
7.	EAISOSD PBT6 B	Practical Based on Training and Visits Project	DSC	6	0	12	0	4

BS

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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 consist four questions one question from each unit with internal choice. Each question will carry 14 marks.

OBJECTIVE: To promote the key concepts of Environmental Auditing Management system among the students. It enhances the procedural approach for this environmental management tool.

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

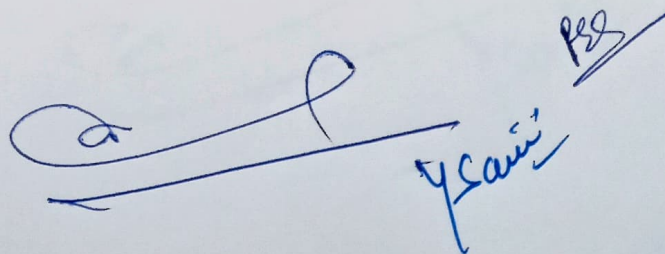
Introduction to environmental audit, objectives, Types of environmental audits: based and client driven types. Benefits of environmental auditing; environmental audit programme in India.

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 Books

1. Bose, S. and Parekh, A. The Environment Audit:-Holy Grail or Essential Management Tool. The Management Accountant. 1994.
2. Corello, V. T., Mumpower, J. L., Stallen, P. J. M., Uppuluri, V. R. R. Environmental Impact Assessment, Technology assessment and Risk Analysis. Springer-Verlag Berlin Heidelberg. 1985.
3. Glasson, J. Therivel, R. and Chadwick, A. Introduction to Environmental Impact Assessment. Routledge, London. 2006
4. GOI – Ministry of MoEF Gazette Notification under sub-rule (3) of Rule 5 of Environment (Protection) Rules. 2006.
5. Morris, P. and Therivel R. (Eds) Methods of Environmental Impact Assessment. 2nd Edition, Spon Press London. 2001.
6. Petts, J. Handbook of Environmental Impact Assessment- Volume 1 and 2. Blackwell Publishers, UK 2005.

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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 consist four questions one question from each unit with internal choice. Each question will carry 14 marks.

OBJECTIVE: Main motive of the paper is for affirmative inculcation of decision making procedures along with auditing procedure of the core areas like water, energy and solid waste.

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

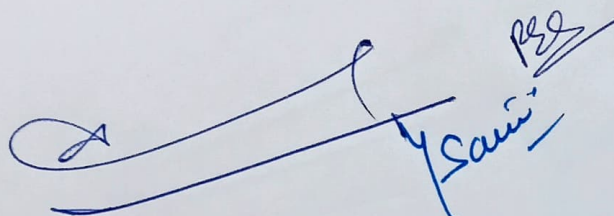
General Aspects and need of Energy Audit and Management, Definition and Objective of Energy Management, General Principles of Energy Management, Energy Audit: Types, Methodology and Approach, understanding Energy Costs, Bench marking, Energy performance, Energy Audit Report. Water Audit, Benefits of 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. Changing Course. Stephan Schmidheiny & BCSD, MIT Press, 1992
3. Natural Capitalism: Creating the next Industrial Revolution, Paul Hawken, Amory Lovins & L. Hunter Lovins, 1999
4. The Sustainability Wave: Building Boardroom Buy-in (Conscientious Commerce), Bob Willard, 2007.


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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 consist four questions one question from each unit with internal choice. Each question will carry 14 marks.

OBJECTIVE: ISO certification system with new evolved standardization norms carrying out various certification processes are meant for strong guidelines among the disciples.

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 II: 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 III 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. 2nd 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. 2nd Edition, Spon Press London. 2001.

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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 consist four questions one question from each unit with internal choice. Each question will carry 14 marks.

OBJECTIVE: New curricula of EMS and CSR will exemplify the latest trends of Economical Environment with Sustainable Development.

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 Labeling: Introduction, types, objective, guiding principles major participants of eco-labeling, key steps of labeling, benefits of eco-labeling, specific challenges posed by eco-labeling 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 Skeptical Environmentalist: Measuring the real estate of the World, Bjorn Lomborg, Cambridge University Press, 2001
5. Prahalad C.K. The fortune at the Bottom of the Pyramid, Wharton School Publishing, 2005

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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 consist four questions one question from each unit with internal choice. Each question will carry 14 marks.

OBJECTIVE: The portfolio of Indian Environmental Scenario with Socio Economic Development base in curriculum design promotes the power of thinking and understanding in the era of recent global environmental recovery plan for varied sectors among students.

Unit -1 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. Sustainable Development- Issues and Perspectives; R.N Pati and Odile Schwarz-Herion; D. K. Print world Pvt. Ltd.; 2007
2. Concepts of Environmental Management for Sustainable Development; M.C. Dash; Dreamtech Press; 2019
3. The Age of Sustainable development, Jeffrey D. Sachs and Ban Ki Moon, Columbia University press; 2015
4. Economics Of Sustainable Development; Sabanna Talwar; Global Research Publications; 2012
5. Leadership for Sustainability: Strategies for Tackling Wicked Problems , R. Bruce Hull, David P. Robertson and Michael Mortimer, Island Press, 2020

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PRACTICAL

Laboratory Work /Industrial Visits and Project Report: Candidates are required to work for the Project work or for an Industrial Training or Internship related to the subject at least for 8 weeks and submit the report to the Department. The report will be evaluated by the panel of examiners in the final examination where the candidate shall present their work by Power Point Presentation followed by Vivavoce.

A Project work / Dissertation topic may be allotted by the department

Dissertation Report Submission Guidelines:

The dissertation report should contain the followings:

1. Dissertation report will contain a cover page, certificate signed by student and supervisor, table of contents, introduction, Objective, Literature review, methodology, results and discussions conclusion, and references.

- The paper size to be used should be A-4 size.
- The font size should be 12 with Times New Roman.
- The text of the dissertation may be typed in 1.5 (one and a half) space.
- The print out of the dissertation shall be done on both sides of the paper (instead of single side printing)
- The total no. of written pages in dissertation report should be 40 to 60.

2. The candidate shall be required to submit three hard bound copies of dissertation along with a soft copy emailed to the department as per the date announced.

3. The candidate will defend her/his dissertation/project work through presentation before the External examiner at the end of semester and will be awarded marks.

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