

VII Semester

| Environmental Protection and Management | | | |
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| Course Code | 21CV753 | CIE Marks | 50 |
| Teaching Hours/Week (L:T:P: S) | 2+2+0 | SEE Marks | 50 |
| Total Hours of Pedagogy | 40 | Total Marks | 100 |
| Credits | 3 | Exam Hours | 3 |

Course objectives:

- This course will enable students to gain knowledge in Environmental protection and Management systems

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills .
2. Encourage collaborative (Group Learning) Learning in the class.
3. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking.
4. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.

Module-1

Environmental Management Standards: Unique Characteristics of Environmental Problems - Systems approach to Corporate environmental management - Classification of Environmental Impact Reduction Efforts -Business Charter for Sustainable Production and Consumption – Tools, Business strategy drivers and Barriers - Evolution of Environmental Stewardship. Environmental Management Principles - National policies on environment, abatement of pollution and conservation of resources - Charter on Corporate responsibility for Environmental protection.

8 hours

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| Teaching-Learning Process | Chalk and talk, powerpoint presentation |
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Module-2

Environmental Management Objectives: Environmental quality objectives – Rationale of Environmental standards: Concentration and Mass standards, Effluent and stream standards, Emission and ambient standards, Minimum national standards, environmental performance evaluation: Indicators, benchmarking. Pollution control Vs Pollution Prevention - Opportunities and Barriers – Cleaner production and Clean technology, closing the loops, zero discharge technologies

8 hours

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| Teaching-Learning Process | . |
| | Chalk and talk, powerpoint presentation |

Module-3

Environmental Management SystemEMAS: ISO 14000 - EMS as per ISO 14001– benefits and barriers of EMS – Concept of continual improvement and pollution prevention - environmental policy – initial environmental review – environmental aspect and impact analysis – legal and other requirements- objectives and targets – environmental management programs – structure and responsibility – training awareness and competence- communication – documentation and

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| document control – operational control – monitoring and measurement – management review. 8 hours | |
| Teaching-Learning Process | Chalk and talk, powerpoint presentation |
| Module-4 | |
| Environmental Audit: Environmental management system audits as per ISO 19011- – Roles and qualifications of auditors - Environmental performance indicators and their evaluation – Non conformance – Corrective and preventive actions -compliance audits – waste audits and waste minimization planning – Environmental statement (form V) - Due diligence audit | |
| 8 hours | |
| Teaching-Learning Process | Chalk and talk, powerpoint presentation |
| Module-5 | |
| Applications of EMS : Waste Audits and Pollution Prevention opportunities in Textile , Sugar, Pulp & Paper, Electroplating, , Tanning industry, Dairy, Cement, Chemical industries, etc. Trans boundary movement, disposal, procedures, of hazardous wastes. | |
| 8 hours | |
| Teaching-Learning Process | Chalk and talk, powerpoint presentation |
| Course outcome (Course Skill Set) | |
| At the end of the course the student will be able to : | |
| <ol style="list-style-type: none"> 1. Appreciate the elements of Corporate Environmental Management systems complying to international environmental management system standards 2. Lead pollution prevention assessment team and implement waste minimization options 3. Develop, Implement, maintain and Audit Environmental Management systems for Organisations | |

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour)**

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks (duration 01 hours)**

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Christopher Sheldon and Mark Yoxon, "Installing Environmental management Systems – a step by step guide" Earthscan Publications Ltd, London, 1999.
2. ISO 14001/14004: Environmental management systems – Requirements and Guidelines – International Organisation for Standardisation, 2004
3. ISO 19011: 2002, "Guidelines for quality and/or Environmental Management System auditing, Bureau of Indian Standards, New Delhi, 2002
4. Paul L Bishop „Pollution Prevention: Fundamentals and Practice , McGraw- Hill International, Boston,2000.
5. Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations, Second Edition, NSF International, Ann Arbor, Michigan, January 2001.

Web links and Video Lectures (e-Resources):

1. <https://youtu.be/fj79O9RSvcA>
2. <https://youtu.be/XGYbyI0xqmw>
3. https://youtu.be/ID_gk0aSo0Y
4. <https://nptel.ac.in/courses/120108004>
5. <https://www.slideshare.net/RajendraGhuge/environmentmanagement-notes>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- <http://nptel.ac.in>
- <https://swayam.gov.in>