

**OPEN ELECTIVE - III**  
**Environmental Protection and Management**

<b>Course Code</b>	<b>21CV731</b>	<b>Course type</b>	<b>PCC</b>	<b>Credits L-T-P</b>	<b>3 – 0 – 0</b>
<b>Hours/week: L - T- P</b>	<b>3 – 0 – 0</b>			<b>Total credits</b>	<b>3</b>
<b>Total Contact Hours</b>	L = 40 Hrs; T = 0 Hrs; P = 0 Hrs Total = 40 Hrs			<b>CIE Marks</b>	<b>100</b>
<b>Flipped Classes content</b>	10 Hours			<b>SEE Marks</b>	<b>100</b>

<b>Course learning objectives</b>	
1.	It will enable students to gain knowledge in Environmental protection and Management systems

**Pre-requisites : – Nil**

<b>Unit – I</b>	<b>Contact Hours = 8 Hours</b>
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.	

<b>Unit – II</b>	<b>Contact Hours = 8 Hours</b>
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.	

<b>Unit – III</b>	<b>Contact Hours = 8 Hours</b>
Environmental Management System: EMAS, 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 document control – operational control – monitoring and measurement – management review	

<b>Unit – IV</b>	<b>Contact Hours = 8 Hours</b>
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	

<b>Unit – V</b>	<b>Contact Hours = 8 Hours</b>
Applications: Applications of EMS, Waste Audits and Pollution Prevention Control: Textile, Sugar, Pulp & Paper, Electroplating, , Tanning industry. Hazardous Wastes - Classification, characteristics Treatment and Disposal Methods, Transboundary movement, disposal.	

#### Flipped Classroom Details

Unit No.	I	II	III	IV	V
<b>No. for Flipped Classroom Sessions</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>

Books	
	<b>Text Books:</b>
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
	<b>Reference Books:</b>
1.	ISO 19011: 2002, “Guidelines for quality and/or Environmental Management System Auditing”, Bureau of Indian Standards, New Delhi, 2002
2.	Paul L Bishop, “Pollution Prevention: Fundamentals and Practice”, McGraw- Hill International, Boston, 2000.
3.	Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations, Second Edition, NSF International, Ann Arbor, Michigan, January 2001.
	<b>E-resources (NPTEL/SWAYAM/Any Other)</b>
1.	–

Course delivery methods		Assessment methods	
1.	Chalk and Talk	1.	IA tests
2.	PPT and Videos	2.	Online Quizzes (Surprise and Scheduled)
3.	Flipped Classes	3.	Open Book Tests (OBT)
4.	Online classes	4.	Course Seminar
		5.	Semester End Examination

Course Outcome (COs)				
Learning Levels:				
Re - Remember; Un - Understand; Ap - Apply; An - Analysis; Ev - Evaluate; Cr – Create				
At the end of the course, the student will be able to:		Learning Level	PO(s)	PSO(s)
1.	Understand the elements of Corporate Environmental Management systems complying to international environmental management system standards.	Un	1,6,7	1,3
2.	Understand the Lead pollution prevention assessment team and implement waste minimization options.	Un	1,6,7	1,3
3.	Develop, Implement, maintain and Audit Environmental Management systems for Organizations.	Un	1,6,7	1,3

**Scheme of Continuous Internal Evaluation (CIE):**

Components	Addition of two IA tests	Online Quiz	Addition of two OBAs	Course Seminar	Total Marks
Marks	25+25 = 50	4x5marks = 20	10+10 =20	10	100
<b>OBA - Open Book Assignment</b> <b>Minimum score to be eligible for SEE: 40 OUT OF 100</b>					

**Scheme of Semester End Examination (SEE):**

1.	It will be conducted for 100 marks of 3 hours duration.
2.	Minimum marks required in SEE to pass: Score should be $\geq 35\%$ , however overall score of CIE + SEE should be $\geq 40\%$ .
3.	Question paper contains 3 parts - A,B & C, wherein students have to answer any 5 out of 7 questions in part A, 5 out of 10 questions choosing 1 question from each unit in part B & 1 out of 2 questions in part C.

CO-PO Mapping (Planned) [tick mark relevant ones]													CO-PSO Mapping (Planned)		
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	✓					✓	✓						✓		
2	✓					✓	✓						✓		
3	✓					✓	✓						✓		

Faculties involved in framing the syllabus	Signature
Prof. Nitin Deshpande	
Prof. Archana Shagoti	