

<b>Course title:</b> Environmental Management System				
<b>Course code:</b> NRE 133		<b>No. of credits:</b> 4	<b>L-T-P:</b> 42-18-0	<b>Learning hours:</b> 60
<b>Pre-requisite course code and title (if any):</b>				
<b>Department:</b> Energy and Environment				
<b>Course coordinator:</b> guest.faculty17@terisas.ac.in			<b>Course instructor:</b> Dr Amit Singh	
<b>Contact details:</b>				
<b>Course type:</b> Elective			<b>Course offered in:</b> Semester 3	
<b>Course Description</b> As the concept of curbing pollution changes from end-of-pipe solutions to pollution prevention, it becomes vital for students to become acquainted with the complex and trans-disciplinary nature of environmental management issues specially in a corporate setting and of the inherent challenges in multi-disciplinary group approaches. Students are then introduced to the wide range of tools used in environmental management and for environmental decision-making. To conclude the course, the evolution of environmental management from being a side issue for firms to becoming a core issue and newer approaches are discussed so that firms practice sustainable management is discussed.				
<b>Course objectives</b>				
1. Understand environmental management system (EMS) definitions, concepts, and guidelines and requirements of the ISO 14001 standard				
2. Understand the stages of EMS implementation, learn best practice techniques, apply environmental-management principles to achieve continual improvement in an organization				
3. To provide a basic understanding of various tools and techniques such life cycle assessment, environmental audits, evaluation of environmental performance for environmental decision-making				
<b>Course content</b>				
<b>Module</b>	<b>Topic</b>	<b>L</b>	<b>T</b>	<b>P</b>
1.	The context of environmental management, overview of the state of the global environment, the earth's natural systems, sustainability and sustainable development–Case study	2	2	
2.	Introduction to the evaluation tools, environmental management system (EMS), organizational barriers, management responsibility, elements and extent of application, EMS structure	4	1	
3.	ISO 14000-Background, the ISO 14000 series, business and standards, voluntary standards and GATT/WTO, ISO 14000 and world practice, ISO 14000 in US, ISO Europe, international chamber of commerce principles, ISO in developing world; ISO 14001 & elements of EMS-environmental policy, planning, implementation and operation checking & correction action and management review–Case study	8	2	
4.	Auditing Scope and objectives, standards for auditing, registration, implementing the audit, procedures, benefits, environmental auditing as a management tool-Case study	8	2	
5.	Life Cycle Assessment Components of LCA, measuring environmental impact (life-cycle stages of product, boundaries, functional unit, issues at each life-cycle stage, benefits of LCA), strategic framework for LCA and LCA-a tool for sustainability-Case study	8	2	
6.	Newer concepts of corporate environmental management product design for the environment (ISO 14062), product stewardship, principles of clean production, packaging, sustainable procurement, the social responsibility function of	8	2	

	corporations, eco-labelling, ecological and carbon footprints (ISO 14064-65)–Case study			
7.	Evaluating Environmental Performance Collecting data, analyzing data, evaluating information, reporting and communicating, reviewing–Case study	4	2	
8.	Minor project and presentations: Mid-term and at the end of the semester		4	
	<b>Total</b>	<b>42</b>	<b>18</b>	

#### Evaluation criteria

- Test 1: 15% written test
- Test 2: 15% written test
- Test 3: 50% written test and case studies discussions
- Minor project /presentations: 20% presentation on selected topic

#### Learning outcomes

After attending the course the students would be

- acquainted with the environmental management system and its benefits (Module 1 and 2)
- able to identify and review audit-related documentation, prepare checklists and audit process (Module 3 and 4)
- able to apply tools such life cycle assessment, environmental audits, evaluation of environmental performance for environmental decision-making (Module 5)
- to evaluate the effectiveness of systematic EMS monitoring processes. (Module 6 and 7)

#### Pedagogical approach

Lecture, case studies and minor project

#### Materials

Required text

1. Christopher S. and Mark Y. (2007) *Environmental Management Systems*, (third edition), Earthscan Publications, First South Asian Edition.
2. David L.G. and Stanley B.D. (2001) *ISO 14000 Environmental Management*, Prentice Hall.
3. Earthscan J.B. (edited) (2005) *Environmental Management in Organizations*, the IEMA Handbook (Sections 1.1, 1.2, 1.3, 3.2, 3.4, 4.3, 4.4, 5.3).
4. Gilbert M.M. (2004) *Introduction to Environmental Engineering and Science*, Second Edition, Pearson Education.
5. Harrison R.M. (edited) (2001) *Pollution: Sources, Effects and Control*, (selected chapters), Royal Society of Chemistry.
6. LaGrega M.D., Buckingham P.L. and Evans J.C. (1994) *Hazardous Waste Management*, McGraw-Hill International Edition, New York.
7. Madu C.N. (2007) *Environmental Planning and Management*, Imperial College Press, (Chapters 2, 3, 4, 6, 7, 8, 10).
8. Welford R. (edited) (1996) *Corporate Environmental Management: Systems & Strategies*, Vol. 1&2, (Volume 1, Part 1; Part 2, chapters 3, 7, 8; Part 3, chapter 14).

#### Suggested readings

1. Cases in Environmental Management and Business Strategy Richard Welford.
2. Environmental Management Strategies: The 21st Century Perspective, Gabriele Crognale (Prentice Hall Ptr Environmental Management Series, Vol 5).
3. International Institute for Sustainable Development. 1992, Business Strategy for Sustainable Development: Leadership and Accountability for the '90s. IISD, Winnipeg, Canada, p. 116.
4. Kenneth M.M. (1999) Basic Concepts in Environmental Management, Boca Raton, FL, Lewis.
5. United Nations Industrial Development Organization Report on an Expert Group Meeting on the Potential Effects of ISO 9000 and ISO 14000 Series and Environmental Labeling on the Trade of

Developing Countries (1995) Vienna, 23-25.

6. US EPA (1997) The Environmental Audit Program Design Guidelines for Federal Agencies, EPA 300-B-96-011, Washington, D.C.
7. Virginia H.D. and Mary R.E. (eds.) (1999) Tools to Aid Environmental Decision Making, New York, Springer.

Case studies

Websites

Journals

1. Journal of Cleaner Production
2. Journal of Environmental Economics and Management

**Additional information (if any)**

**Student responsibilities**

Attendance, feedback, discipline, guest faculty etc