



COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	AE701	SEMESTER	7th
COURSE TITLE	LIFE CYCLE ANALYSIS		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS		CREDITS
Teaching Hours	4		4
COURSE TYPE	Specialised general knowledge		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_148/		

(2) LEARNING OUTCOMES

Learning outcomes
Life Cycle Analysis or Assessment (LCA) is the process of recording and analysing the environmental effects of a product, system or process (use of energy and raw materials, air, water, soil pollution, etc.) throughout the life cycle, from conception to completion. LCA, as it prevailed in the international literature, is a relatively new scientific method which was developed to help deal with the environmental problems that have worsened in recent years. Its purpose is to assess objectively and with the greatest possible quantitative approach the environmental impacts associated with a given activity under consideration (e.g. product, process, etc.) throughout the entire cycle from birth to its death (from production to disposal). Although until now the application of the LCA methodology has mainly dealt with products, LCA is also related to any other economic system, such as, for example, raw materials, services, business strategies and government policies. Today, LCA is an important environmental management and decision-making tool that assesses a) the impacts of energy use and material processing, including the disposal of their waste into the environment, and b) the possibilities of achieving environmental improvements in combination with rational use of raw materials and energy. LCA allows consistent comparison of alternative system designs with respect to their environmental performance. The course aims to provide students with a coherent understanding of the concepts of LCA, Life Cycle Costing, Ecological Design and the methods of applying them to a product, system or process. Upon successful completion of the course students will have acquired the necessary knowledge, skills and competence, and will be able to: • Describe and plan the life cycle of a product or service. • Comprehend the environmental burdens caused by the different stages of the life cycle. • Understand Life Cycle Analysis and Environmental Impact Analysis issues. • Exhibit specialized problem-solving skills, which are required in research and/or innovation, and consequently develop new knowledge and processes by integrating knowledge from different fields. • Carry out a Life Cycle Analysis study of products and services.
General Competences
• Search for, analysis and synthesis of data and information, with the use of the necessary technology • Decision-making • Team work • Project planning and management • Respect for the natural environment • Working in an interdisciplinary environment

(3) SYLLABUS

- Introduction – Definitions.
- What is Life Cycle Analysis
- Environmental Management Systems.
- Quantitative Methods and Life Cycle Analysis (LCA).
- LCA application methodology.
- The ISO 14040 and 14044 standards.
- LCA Databases.
- Uncertainty in the LCA.
- Assessment of impacts and improvements.
- Environmental Design Tools.
- Assessment and application tools for LCA (Software).
- Environmental product statements.
- LCA case studies.

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	• Use of PowerPoint slides • Communication with students via e-mail • Use of asynchronous distance learning (e-class)	
TEACHING METHODS	Activity	Semester workload
	Lectures	52
	Study and analysis of bibliography	30
	Essay writing	18
	Course total (25 hours workload per credit)	100
STUDENT PERFORMANCE EVALUATION	Students' performance is evaluated in the Greek language. The final grade is determined by: • A written exam (at the end of the semester) that contributes 100% to the final grade, applying one or more of the following evaluation methods: open-ended questions, multiple choice questions, short-answer questions, problem solving. Final Grade = 100% Exam Grade	

(5) ATTACHED BIBLIOGRAPHY

- Curran, M. A. (ed) (2012) *Life Cycle Assessment Handbook: A Guide for Environmentally Sustainable Products*. Salem, MA, USA: Scrivener Publishing LLC
- Klöpffer, W., Grahl, B. (2014) *Life Cycle Assessment (LCA): A Guide to Best Practice*. Berlin: Wiley-VCH. ISBN-13: 9783527655649
- Matthews, S.H., Hendrickson, C.T., Matthews, D.H. (2015) *Life Cycle Assessment: Quantitative Approaches for Decisions that Matter*. LCAtextbook.com