

## SUBJECT TEACHING GUIDE

G799 - Life Cycle Assessment

Degree in Chemical Engineering

Academic year 2021-2022

1. IDENTIFYING DATA			
Degree	Degree in Chemical Engineering	Type and Year	Optional. Year 4
Faculty	School of Industrial Engineering and Telecommunications		
Discipline	Subject Area: Option B: Industrial Environmental Management Subject Area: Option D: European Project Semester Optional Module		
Course unit title and code	G799 - Life Cycle Assessment		
Number of ECTS credits allocated	6	Term	Semester based (2)
Web			
Language of instruction	English	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIAS QUIMICA Y BIOMOLECULAR
Name of lecturer	JONATHAN ALBO SANCHEZ
E-mail	jonathan.albo@unican.es
Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 4. SEMINARIO (S4059)
Other lecturers	MARIA MARGALLO BLANCO MARTA RUMAYOR VILLAMIL JAVIER PINEDO ALONSO

### 3.1 LEARNING OUTCOMES

- Understanding the concept of Life Cycle Thinking
- Learning the fundamentals about how to perform a Life Cycle Assessment study
- How to use open-source and free Life Cycle Assessment software (group project)

#### 4. OBJECTIVES

Life Cycle Assessment (LCA) is a well-known methodology applied to products, processes and services which considers its full life cycle: from the cradle (as natural resources) to the grave (as air emissions, liquid effluents and solid wastes).

The course covers all aspects about how to perform an LCA study: definition of the goal and scope as well as the target audience, gathering data on resource consumption and emissions, burdens to the environment, checking the robustness and significance of results and conclusions, and reporting and reviewing to ensure transparency and quality.

This LCA course includes LCA fundamentals as well as practical activities based on group projects. For project development, the students learn how to use open-source and free LCA software.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	Lecture 1. Life Cycle Assessment fundamentals 1.1 Sustainable Development 1.2 Development of the LCA concept 1.3 Life Cycle Sustainability Assessment 1.4 Life Cycle Thinking
2	Lecture 2. Life Cycle Assessment methodology 2.1 Goal and Scope definition 2.2 Life Cycle Inventory 2.3 Life Cycle Impact Assessment 2.4 Interpretation
3	Practical activities. Group projects using LCA software

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Exam corresponding to the lectures	Written exam	No	Yes	40,00
Final report of the group project	Work	No	Yes	20,00
Final oral defense of the group project	Oral Exam	No	Yes	25,00
Intermediate oral defense of the group project	Oral Exam	No	Yes	5,00
Exercises of Life Cycle Assessment	Work	No	Yes	10,00
<b>TOTAL</b>				<b>100,00</b>

##### Observations

Attendance is strongly recommended to the students. Individual contribution of each student to the group project will be checked in the oral defense of the project during the practical activities.

If the final mark from the test and the group project is below the minimum mark (5.00), the student can pass a retake exam in June (date determined by the ETSIIyT board). An additional retake exam is possible in July (date determined by the ETSIIyT board).

In the event of the course cannot be completed by the established face-to-face mode, all remaining assessment activities will be carried out online using the Moodle platform, with the exception of the oral assessments. The kind of assessment and the share of the final marks will remain the same.

##### Observations for part-time students

Partial time students can pass the course thanks to the exam corresponding to the lectures that will take place before the start of the group projects. A retake exam is possible in June on a date to be determined. A second retake exam is possible in July on a date to be determined.

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

R. Horne, T. Grant, K. Verghese, Life Cycle Assessment: Principles, Practice and Prospects. Ed. CSIRO Publishing, (2009).

A. Azapagic, R. Clift, S. Perdan, Sustainable Development in Practice: Case Studies for Engineers and Scientists. Ed. John Wiley and Sons, (2004)

H. Baumann, A.M. Tillman, The Hitch Hiker's Guide to LCA, Ed. Studentlitteratur, (2004)

M.A. Curran, Life Cycle Assessment Handbook: A Guide for Environmentally Sustainable Products. Ed. Wiley-Scrivener, (2012)

W. Klöpffer, B. Grahl, Life cycle assessment (LCA) – a guide to best practice. Wiley-VCH, (2014).