

Course Title: Life Cycle Assessment for Sustainable Engineering

Course Instructor: Dr. Alissa Kendall. Professor, Civil & Environmental Engineering, Chair Energy Graduate Group, University of California Davis, amkendall@ucdavis.edu

Brief Description: Life cycle assessment methodology is taught emphasizing applications to infrastructure and energy systems. Life cycle design, life cycle cost methods, other tools from industrial ecology, and links to policy are covered as well. Students will engage in review of case studies and conduct group projects that will provide hands-on experience in conducting an LCA or conducting an extensive review of LCA applied to a technology.

Schedule of topics and activities. Subject to changes depending on class size and progress through material.

Readings are in the following online textbook (Spanish version available for some chapters):

<https://lcatextbook.com/versions-of-textbook/> or are uploaded as PDFs to Bloque Neon.

Grading:

(30% of grade) Homework 1: LCA of Energy Generation

(30% of grade) Homework 2: LCA of Colombian Electricity Grid

(20% of grade) Homework 3: LCA of Electric Vehicles in Colombia

(20% of grade) Final Project: 1 presentation and documentation of sources

Date	Activity	Topic	Readings	Homework/ Group Project
Jun 4 a.m.	Lecture	Introduction to Course and LCA. Goal and Scope & Life Cycle Inventory	Required: Chapter 1. Optional: Chapter 4.	none
Jun 4 p.m.	Lecture	Life Cycle Inventory, Energy, introduction to homework	Recommended: Chapter 5 Renewable and Renewable Energy LCA article	Introduction to Tarea 1
Jun 5 a.m.	Discussion / Lecture	Discuss a case study, then LCIA	Read LCA case study 1 posted to course website	½ hour of work time
Jun 5 p.m.	Discussion and Lecture	Transportation Modeling and co-product allocation	Read Freight LCA, skim other papers in folder. GREET.net model. Accessible at https://greet.es.anl.gov/index.php.	HW 1 due
Jun 6 a.m.	Lecture, group time	Life cycle impact assessment (LCIA) + Implementing in Excel	ILCD Handbook, Read the following sections: 1 Introduction, 3.1 CML, 3.10 TRACI, skim 3.12 Other methods. Take note of other resources there	HW 2 due
Jun 6 p.m.	Project time	Work in groups and with Prof. Kendall on final project	Independent literature review for project	HW 3 due
Jun 7 a.m.	Project research time and LCA software demonstration	Work on LCIA via demonstration, group project meeting time	LCIA article to read	
Jun 8 p.m.	Student Presentations	Each group will present and be reviewed by their peers	None	Final project

