Ph.D. programme in Civil Systems Engineering

Life Cycle Assessment in Civil Engineering

eng. Cristina Oreto

Credits: 3 CFU
Number of hours: 18 hybrid hours
Date: 11, 12, 18, 19, 25 and 26 June 2026

Objectives: The course aims to provide the students with the general principles of Environmental Life Cycle Assessment (LCA) applied to construction systems, with specific focus on civil infrastructures and road pavements. The students will be introduced to the main theoretical concepts needed to model LCA systems and boundaries, to correctly allocate inventory flows to the functional unit, to identify and properly select the impact category indicators and characterization models. The students will be able to read and interpret LCA models and studies in the field of civil engineering.

Course programme: The course will cover all the necessary theoretical and applicative concepts to apply Life Cycle Assessment to civil engineering systems and interpret its results. The theoretical concepts concern the methodological framework of LCA and international ISO standards, the possible goals and audience of a LCA, the identification of the functional unit and definition of the system boundary, the analysis of the life cycle inventory, the identification of the flows of energy and materials, the allocation procedures, the data quality, the identification and selection of impact category indicators and characterization models and the main impact assessment methods. The use of Life Cycle Assessment to evaluate and quantify the environmental benefits of low-energy technologies and circularity in the field of civil infrastructures will be discussed through scientific articles.

Teaching materials: Lecture notes, presentations and research papers.

Assessment methods: Intermediate and final presentation of the project work.

Contact for information:
eng. Cristina Oreto
Department of Civil, Construction and Environmental Engineering
Email: cristina.oreto@unina.it

Lectures Program

N	Date	Schedule	Duration	Topic
1	11/06/26	09:00 - 12:00	3 hours	- Introduction to Life Cycle Assessment - Methodological framework and ISO standards - Goal and scope definition
2	12/06/26	09:00 - 12:00	3 hours	- Life cycle Inventory analysis - Allocation procedures - Data quality
3	18/06/26	09:00 - 12:00	3 hours	- Impact category indicators - Characterization - Impact assessment methods
4	19/06/26	09:00 - 12:00	3 hours	- Inventory databases - LCA tools
5	25/06/26	09:00 - 12:00	3 hours	Applications of life cycle assessment to conventional and innovative civil engineering solutions.
6	26/06/26	09:00 - 12:00	3 hours	Final presentations and discussion with the PhD candidates.

Sito Web: www.dicea.unina.it |e-mail: dicea@unina.it |Pec: dip.ing-civ-ed-amb@pec.unina.it |C.F./P.IVA:00876220633