Program for PhD course: *Advanced LCA - Consequential and IO-based Life Cycle Assessment* (5 ECTS)

2023 edition, Aalborg University.

Organised by the Danish Centre for Environmental Assessment (DCEA)in collaboration with the International Life Cycle Academy (ILCA)

Lecturers:

Professor Jannick Schmidt (JS) AAU & 2.-0 LCA
Professor Massimo Pizzol (MP) AAU
Postdoc Agneta Ghose (AG) AAU
Associate Professor Søren Løkke (SL) AAU

BEFORE April 11th, 2023
Watch the videos and note down your questions:
Video lecture M1.1: Attributional and consequential responsibility (BW)
Video lecture M1.2: ISO 14040/44: A standard for consequential LCA (BW)
Video lecture M1.3: Fully reflecting physical and monetary causalities (BW)
Video lecture M1.4: Temporal issues in LCA (BW)
Video lecture M1.5: Learning from non-intuitive results (BW)

ON Tuesday, April 11th , 2023, 10:00 – 12:00
Module 1, Part 1, online
Online introduction: Welcome & course overview (MP))
Online interaction with Polls, and Q&As on the videos (MP, SL, JS)
Online discussion: Strengths and weaknesses, challenges and opportunities of consequential LCA? (BW, SL; JS)

BEFORE April 13th, 2023
Watch the videos and note down your questions:
Video lecture M1.6: The comparability algorithm: Defining the functional unit (BW)
Video lecture M1.7: The linking algorithm: Composing a consumption mix (BW)
Video lecture M1.8: Identifying the determining product (BW)
Video lecture M1.9: The co-product algorithm (BW, JS)
Video lecture M1.10: Errors in background databases (BW)

ON Thursday, April 13th , 2023, 10:00 – 12:00
Module 1, Part 2, online
Online interaction with Polls, and Q&As on the videos (BW, SL)
Online group exercise: checking the case studies, status, roundtable and potential consequential elements (MP)
Online discussion: Communicating consequential models (SL, MP, JS)

BEFORE April 18th, 2023
Watch the videos and note down your questions:
Video lecture M2.1: LCI as a model: basic matrix notation and operations for LCA (MP)
Video lecture M2.2: Getting around in Brightway2 (MP)
Video lecture M2.3: Navigating product systems (MP)
Video lecture M2.4: Importing background data (MP)
Video lecture M2.5: Importing foreground data (MP)

ON Tuesday, April 18th , 2023, 10:00 – 12:00
Module 2, Part 1, online
Online interaction with Polls, and Q&As on the videos (MP)
Online group exercise: Heat and electricity production matrix exercise in Brightway2 (MP)
Online discussion: Making reproducible LCA studies (MP)

BEFORE April 20th, 2023
Watch the videos and note down your questions:
Video lecture M2.6: Uncertainty analysis, in Brightway2, comparative Monte Carlo simulation (MP)
Video lecture M2.7: Sensitivity analysis in Brightway2, local (OAT) sensitivity analysis (MP)
Video lecture M2.8: Global sensitivity analysis (MP)

ON Thursday, April 20th , 2023, 10:00 – 12:00
Module 2, Part 2, online
Online interaction with Polls, and Q&As on the videos
Online group exercise: Exercise on modifying background database for sensitivity (MP)

BEFORE April 25th, 2023
Video Lecture M3.1: Monetary supply and use tables and how they are constructed from raw data. Constructing consequential and attributional IO models. (JS)
Video Lecture M3.2: Basic prices, producer's prices, and purchaser's prices. The role of markets. (JS)
Video Lecture M3.3: Integrating fixed capital formation and use into the core supply-use table. Integrating final consumption into the core supply-use table. (JS)
Video Lecture M3.4: Dealing with imports and exports. Closed-country models versus multi-regional IO models. (JS)
Video Lecture M3.5: Creating a physical mirror of economy: Physical supply use tables, focussing on fundamental balancing requirements for materials and energy. (JS)

ON Tuesday, April 25th , 2023, 10:00 – 12:00
Module 3, Part 1, online
Online interaction with Polls, and Q&As on the videos (JS, AG)
Introduction to homework: Calculating footprints within supply-use framework (Excel) (JS, AG)

BEFORE April 27th, 2023
Homework: Calculating footprints in Excel or Phyton
Video Lecture M3.6: Hybrid LCA: Tiered and embedded analysis (JS)
Video Lecture M3.7: Disaggregating/detailing supply-use tables and IO models. Hybrid-LCA in practice and related challenges (JS)
Video Lecture M3.8: Consequential modelling in an IO database. Example of electricity markets (JS)
Video Lecture M3.9: Modelling of waste treatment and by-product utilisation in the supply-use framework (JS)
Video Lecture M3.10: Introduction to hybrid LCA in SimaPro. Hybrid LCA in practice (JS)

ON Thursday, April 27th , 2023, 10:00 – 12:00
Module 3, Part 2, online
Q&A on Homework: Calculating footprints with within supply-use framework (Excel) (JS, AG)
Online interaction with Polls, and Q&As on the videos (JS, AG):
Online exercise: Hybrid LCA in SimaPro (JS, AG)

Monday, May 15th , 2023, 08:30 – 16:00 (Full day) *room 3.429, Rendsburggade 14, 9000 Aalborg*
Module 1, physical on-site
Portfolio Group Exercise: Apply the comparability algorithm to document the functional unit for your study report. Revise foreground system if needed (MP, SL, JS)
Lecture: Ascribing land use changes to its drivers, conceptual framework for the modelling of indirect land use changes in life cycle inventory (JS)
Portfolio Group Exercise: Applying the co-product substitution algorithm (MP, SL; JS)
Portfolio Group Exercise: Finalising the case study inventory and documentation (MP, JS, SL)
Portfolio Group Exercise: Communication issues and strategy (MP, JS, SL)

Tuesday, May 16th , 2023, 09:00 – 16:00 (Full day) *room 3.429, Rendsburggade 14, 9000 Aalborg*
Module 2, physical on-site
Portfolio Group exercise: A reproducible and working version of the case study in Brightway2 (MP, AG)
Lecture: Advanced LCA simulations in Brightway2 (Pierre Jouannais)
Portfolio Group exercise: Comparative uncertainty analysis on the case study (MP, AG)
Portfolio Group exercise: Sensitivity analysis on the case studies (MP, AG)

Wednesday, May 17th , 2023, 08:00 – 15:00 (Full day) *room 3.429, Rendsburggade 14, 9000 Aalborg*
Module 3, physical on-site
Portfolio Group Exercise: Working with Hybrid datasets (JS,AG)
Lecture: Application examples: economy wide level (from municipal to global), product focus, corporate focus, and project/programme/plan/policy focus (JS)
Portfolio Group Exercise - continued: Working with Hybrid datasets (JS, AG)
Closing: Wrap-up and feedback (MP, JS, BW, SL, AG)