



UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

MIE1715F: Life Cycle Engineering

Fall 2024

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Course Description:

This course introduces the fundamentals of both product and process engineering with an emphasis on life cycle models. A mixture of practical and theoretical topics, methodologies, principles, and techniques are covered such as life cycle analysis and life cycle engineering [e.g., Design For Assembly (DFA), Design For Manufacturing (DFM), Design For Environment (DFE), etc.]. Students develop an understanding of the performance, cost, quality and environment implications of both product design and manufacture and become capable of translating these into engineering “cradle-to-grave” responsibility requirements, goals, and specifications in order to maximize the values of products and the effectiveness of supply chain management while containing the costs to manufacturer, the user, and the society.

Course Outcomes:

The objective of the Life Cycle Engineering (LCE) course is for students to understand how all they create as engineers affects the environment and how decision they make can decrease these impacts. Students will complete one LCE based projects, to give the theory some practice. The primary specific learning and training outcomes are:

- To broaden the ideas of students and give them a brief introduction to life cycle engineering.
- To acquire a basic understanding of the concept of life cycles of products and services.
- To acquire both theoretical and practical understanding of parameters within external environment, work environment, resource consumption, and social impacts as key elements in an analysis of the life cycle of products or services systems.
- To become familiar with the application of life cycle assessment as an environment oriented analytical tool/method for decision support in companies or public administration.
- To be able to plan, carry out and evaluate an elementary life cycle assessment.
- To become familiar with many different life cycle tools.
- To be able to use different life cycle tools.



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Course Topics

1. What is Life Cycle Engineering
2. Streamlined Life Cycle Assessment
3. Life Cycle Design:
 - a. Design for Manufacturing
 - b. Design for Assembly
 - c. Design for Disassembly
 - d. Design for Environment
4. Other Topics in LCE:
 - a. Golden Rules
 - b. Eco Design
 - c. Risk Assessment
 - d. Energy
 - e. Etc.
5. Student Life Cycle Projects
 - a. Student LCA

Course Content Breakdown (CEAB Categories):

Mathematics:	0%
Basic Science:	0%
Engineering Science:	40%
Engineering Design:	20%
<u>Complementary Studies:</u>	<u>40%</u>
Total:	100%