

## **Integrating the SDGs through Systems Thinking for Course Projects in ME6101**

**By Roger Jiao, 01/31/2020**

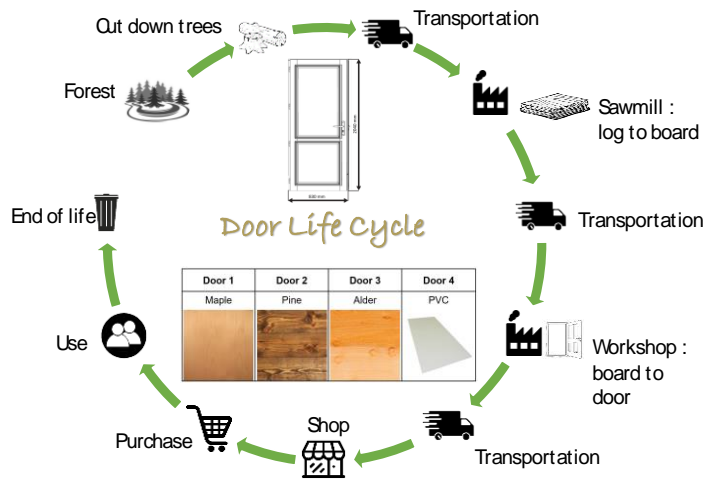
In Fall 2019, the Mechanical Engineering course, Engineering Design, was enriched in line with the SDGs. The goal was to cultivate our students with systems thinking of sustainable communities. To impact students' learning and engagement related to the SLS theme, design principles and guidelines were discussed with explicit treatment of energy systems design in the broader context of sustainable communities. The students were exposed with the prevailing sustainable design principles and various methods that designers can utilize in fundamentally understanding multiple stakeholders' interaction with products, experiences, or services as a constituent within a community. Students were encouraged in their course projects to articulate in-depth analysis of sustainable development and trade-offs between economic, social and environmental impacts. Students studied life cycle analysis and systems thinking in the projects and explored implications for understanding communities and designing systems or artifacts, and gained experience of sustaining an open innovation and co-creation community that engages both on-campus and off-campus projects. Students worked through the stages of problem definition, data acquisition, evaluation of design alternatives, selection of a preferred alternative, and design development. Selected student projects related to SDGs:

- Eco-Design, by Julien Vasseur, ME 6101 Fall 2019:
  - Reviewed the state-of-the-art of sustainable development and trade-offs between economic, social and environmental impacts.
  - Analyzed the prevailing sustainable design principles and various methods that designers utilize in fundamentally understanding multiple stakeholders' interaction with products, experiences, or services as a constituent within a community.



- 
- Life Cycle Assessment in Sustainable Design, by Romane Drougard, ME 6101 Fall 2019:
  - Conducted a case study of four unglazed interior doors. This technical element must have the same thermal, mechanical and acoustic performance for different materials that can be used for its production, which comply with the legislation in force.

- It was proposed through the realization of the Life Cycle Analysis of this door to provide elements of choice that can help the optimization of the environmental profile according to the criteria that can be preferred by the user.



- 
- Car-sharing of Electric Vehicles Optimization, by Arthur Nayroles, ME 6101 Fall 2019:
  - Proposed a systems optimization approach to explicit treatment of techno-social systems design in the broader context of sustainable communities.
  - Revealed promise of the prevailing sustainable design principles and various methods that designers utilize in fundamentally understanding multiple stakeholders' interaction with products, experiences, or services as a constituent within a community.

