ME 589 Sustainable Design of Technology Systems

M/W: 165 Chrysler Building

Course Goal

Students in ME 589 learn the *necessary conditions for sustainable technology design* and how to:

1) evaluate technology systems simultaneously from the environmental, economic and social perspectives

2) identify gaps in the sustainability of technology systems

3) generate effective ideas to improve the sustainability of technology systems.

Course Structure

Sustainable design is best learned on two paths. On one path the student reads case studies and studies methodologies used to evaluate sustainability and generate new ideas. On the second path the student conducts project work that applies what is being learned on the first path in context. ME 589 follows this approach.

During Part 1 of the course, we read case studies and discuss them in class while finding a project team and topic to work on. During Part 2 of the course, we read about environmental, social, and economic assessment methods that are then applied to our projects. During Part 3 of the course, we identify sustainability gaps in our project topics and propose new ideas to improve sustainability while also considering how we could prove that these ideas stand some chance of being adopted by end-users. Each class will require about 30-60 minutes of reading with a small quiz at the end of it. This is due before class. In-class, we will discuss questions students have regarding the material, additional examples will be shared related to the pre-class assignment, students will be given class time to work on applying the topic of the day to their own projects, and we will rally at the end of class to discuss struggles particular teams are facing with the material.

Assignments are created that will build into a final report for the class. The course has two exams that assess the quality of reflection and retention regarding what was read before class, discussed in class, and then applied after class.

Students work in teams of 4 individuals. Each team picks a technology (defined as a product, process, or engineered system) to evaluate from the sustainability perspective. Ideally, this is a technology that has been developed because somebody thought it was sustainable but for which a detailed analysis has not yet been performed. The team will work together to evaluate that technology from the environmental, economic, and social perspectives. The team will then identify gaps in the sustainability of the technology and propose improvements. Each in-class session will contribute to this process, with each in-class session providing input material to the final report (written as a conference paper with rich supporting information).

Instructional Team

Professor Steve Skerlos (Links to an external site.) (skerlos@umich.edu)

Office Hours: Monday and Wednesday 5-6pm (Meet at 165 Chrysler; Distance students by appointment)

Dr. Sarang Supekar (Links to an external site.) (supekar@umich.edu)
Office Hours: 12:30-2:30 on Friday (Findley Rooms D & E in GG Brown Building; Distance students by appointment)

Mr. Tae Lim (taelim@umich.edu)

Office Hours: 12:30-2:30 on /Monday (Findley Rooms D & E in GG Brown Building; Distance students by appointment)

Course Grades

Pre-Class Quizzes 5%

Reading Reflection and Retention Exams (2 x 10%): 20%

Team Project Assignments: 5%

Interim Report (Written) 10%

Interim Report (Oral) 5%

Final Report (Written) 20%

Final Report (Oral @ Design Expo) 10%

Participation (Contribution to Team) 15%

Participation (Contribution to In-Class Sessions) 10%