ISYE and ChBE 6705
Syllabus
Life Cycle Assessment, 3 Credits
MW, 3:30-4:45, and Skyles 271

Instructor Information

Instructor	Email	Office Hours & Location
Valerie Thomas	vt34@gatech.edu	1214 George Tower, by appointment and by announcement
Teaching Assistant(s)	**Email**	**Drop-in Hours & Location**
[TBA]	[TBA]	[TBA]

General Course Information

Description

This course is on the methods and applications of environmental life cycle assessment. Life cycle assessment evaluates the environmental impacts of products, services, or decisions over the entire life cycle, including production processes, use, end-of-life. Students will learn how to carry out: the life cycle process-based method, energy calculations, greenhouse gas calculations, cost analysis, allocation and system expansion, the economic input output LCA method, hybrid LCA, the life cycle process matrix method, consequential LCA, life cycle impact assessment, and how to select and use life cycle inventory data and life cycle assessment software. Students will complete a life cycle assessment project.

Pre- &/or Co-Requisites

The course has no formal prerequisites. Helpful background includes Engineering Economy for cost-benefit calculations, Linear Algebra for input-output and process matrix methods, Chemistry and Physics for emissions and environmental impact calculations, Thermodynamics for energy calculations. Despite the range of engineering and science background that would be helpful, all graduate students are welcome, and a student's project can lean toward the framework of their graduate program.

Course Objectives and Learning Outcomes

Upon successful completion of this course, you will be able to (1) develop a life cycle inventory of a product or service; (3) evaluate lifecycle greenhouse gas emissions and other environmental impacts; (4) understand and use environmentally extended input-output models and process-based life cycle data; (5) carry out an environmental life cycle assessment of a product or service.

Course Requirements & Grading

Assignment	Date	Weight (Percentage)
LCA Project	Inventory: Week 7. Draft: Week 10. **Full analysis**: Week 14	40%
Homework	Weeks 3, 4, 5, 6, 7, 9, 11, 12, 13	20%
Low Stakes Assessments	Weeks 4, 5, 6, 7, 8, 10, and 11	20%

Assignment	Date	Weight (Percentage)
Final Exam	Exam week	20%

Description of Graded Components

Homework assignments will be approximately weekly, to provide experience in the week's material.

Low Stakes Assessments will test mastery of small portions of the material, typically corresponding to the homework.

The LCA project will be carried out over the semester, with staged assignments including: topic proposal, draft life cycle inventory, draft life cycle assessment paper, project data, project presentation, and final project paper. This stream of assignments provides opportunities for feedback and consultation with the professor and other students.

We will have a final exam. The exam will emphasize the topics from the end of the course for which we did not have time for a low-stakes assessment, and will also include material from the previous homeworks and low stakes assessments.

Criteria Used in Determining the Course Grade

The course grade will be determined from the scores on the graded assignments shown in the table above (LCA project, Homework, Low Stakes Assessments, and Final Exam), weighted as shown in the table (40%, 20%, 20%, 20% respectively.) Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Required Materials

Course Text

Course notes will be provided.

Additional Materials/Resources

Matthews H.S., Hendrickson C.T., Matthews D.H. Life Cycle Assessment: Quantitative Approaches for Decisions that Matter. https://www.lcatextbook.com/

Course Website and Other Classroom Management Tools

We will use Canvas.

Course Expectations & Guidelines

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Services Available for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible to set up a time to discuss your learning needs.

Attendance and/or Participation

I expect attendance in every class.

I expect participation in every class. Participation means asking questions, answering questions, working with classmates on group exercises if there is one, and overall making the class better for you and everyone. Participation also includes providing feedback to me on how I can improve the class.

Due to illness or other circumstances, each student may not be able to attend every class in person. If you are sick or need to quarantine, please stay home; no penalty! Just let me know.

On rare occasion, I may be able to provide simultaneous access to the class by Teams or Zoom for students who cannot attend in person. If you are participating online I value seeing you by video; please keep your video on most of the time, and your video should be on when speaking.

I expect to teach each class in person. If for some reason I need to teach remotely, I will let you know.

My priority is for everyone to have an engaging, group-based, personal learning experience.

Collaboration & Group Work

Assignments are to be done individually unless otherwise specified. I do often assign small group exercises, and I do often provide time for students to work together on homework. If in doubt, ask me!

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Credit will be deducted for late submissions. Sometimes I am lenient; I tend to be more lenient for assignments turned in before I need to post the answer or before I or the teaching assistant begins or ends grading. Even so, I much prefer you to do an assignment late than to not do it at all. If you get behind, let me know and I will work with you to develop a workable plan.

Student-Faculty Expectations Agreement

At Georgia Tech we strive for mutual respect, acknowledgement, and responsibility between faculty members and the student body. See http://www.catalog.gatech.edu/rules/22/ for an articulation of some basic expectations that you can have of me and that I have of you. Respect for knowledge, hard work, and cordial interactions will help build the environment we seek. I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Student Use of Mobile Devices in the Classroom

Internet searching and general use of mobile devices may not be done during class time, except if part of an assigned, in-class exercise.

Additional Course Policies

- Please do not consume food or drink during class.
- Environmental concerns vary by perspective and change over time. Discussion is encouraged.