Structural Optimization
Final Project

You may use ChatGPT or other AI tools to assist you with this project. If you do use any AI tools, you must briefly report (1) how you used it to assist you and (2) whether you found it useful.

Final Project Deliverables:

- Write a short report summarizing your results. Your report must include the following:
  - A brief 200 to 300 word abstract
  - An introduction section that covers the problem motivation and the numerical techniques you used to solve the problem
  - A results section illustrating what domains you used, what solution parameters you selected and optimization convergence plots. Illustrate your topology optimization results, stress or modal plots or anything that illustrates your results.
  - Conclusions section describing the main results of your work, what methods worked and what you might do differently.
- Prepare a single slide summarizing your key resulting and findings. You will share this slide with the class.
- Your grade will be based on your report (60 points) and slide (40 points).

Pick one of the following final projects topics described below:

1. Perform topology optimization using either stress-constrained mass minimization or mass-constrained stress minimization.
2. Perform topology optimization using compliance minimization with a constraint on the mass and a constraint on the fundamental frequency.

You can use the demonstration code from the course notes. For your problem, you must:

- Examine at least two different domain types, such as using different boundary conditions and loads case or changing the shape of the design domain itself.
- Examine how the optimized topology changes as a function of the mass constraint bound, stress-constraint bound or frequency bound. Provide a rationale for the behavior you observe.