

### ME 343: Instructions for end of quarter project

Total number of points = 100.

At the end of the quarter, you are expected to submit a 5-page report on a final project of your choosing. The report for your project should involve at least the following components:

1. 5 points. Description of the engineering topic you chose; the choice of topics is open but it should be related to a mechanical engineering field, rather than a pure computer science topic, such as image or speech.
2. 5 points. Describe the problem of interest, its difficulties and challenges.
3. 10 points. Review the literature, solutions and approaches that are relevant to your problem.
4. 10 points. Propose and describe the algorithm that you picked to solve your problem. This should be preferably a published method or a known technique that has been tested and “validated” before, in order to limit last minute surprises. Example of methods include methods covered in class: Gaussian processes, DNN, GAN, RNN, reinforcement learning, Monte-Carlo decision trees.
5. 20 points. Implement your method using your language and framework of choice. You can use TensorFlow or PyTorch. You do not need to write extensive code for this project. Reusing existing code is fine as long as you cite your sources and describe the changes and additions you have made to the code. Turn in your code with your assignment.
6. 5 points. Choose and describe the datasets, problem settings and parameters that you used for your code development, testing, and final benchmarks.
7. 5 points. Describe the steps you have taken to verify that your code is correctly implementing the algorithm.
8. 10 points. Discuss and interpret the results of your method using your benchmark problems. Make sure you explore a range of inputs and algorithm parameters to give a good sense of how the method performs. You may include poor results for bad combinations of parameters/inputs as long as explanations are provided for the observed behavior.
9. 5 points. Discuss the limitations of the proposed approach and open avenues for improvement.

We recommend to keep it simple. Start with a modest project and clearly achievable goals. Then if all goes well, you can add “bonus” results. It’s better to start simple and add later, than start with an ambitious goal and then abandon it for something much simpler at the last minute.

We will ask you to submit the following intermediate reports. You should formulate an intermediate project goal, called Milestone 1. This is to make sure that you pace yourself and are on track for a good report at the end. Milestone 1 typically consists of some preliminary computer program, and early validation of your implementation at this point. This is an intermediate stage in the development of the full project.

1. 10 points. Due date: February 13, 11 PM. One-page report containing: description of the problem you have chosen, sample literature, detailed description of Milestone 1.
2. 15 points. Due date: February 27, 11 PM. Two-page report containing: report and results for Milestone 1. Turn in your report and code.

Final project due date: March 20th, 11 PM.

We advise you to try to complete most of the work by March 13th, and keep the last week to focus on the written report.