# CS 330 Deep Multi-Task and Meta-Learning
# Final Project

## 1 Final Project Requirements

The CS330 final project requires implementing, evaluating, and documenting a a new research idea that pertains to the main topics of the course. Students are expected to prepare a proposal, milestone report, and final report, and present their work in the final poster session, with specific details below.

**Dates.** The proposal is due **Oct 14**; the milestone is due **Nov 2**, and the final report is due **Nov 20**. All due dates are 11:59 pm PT, and all reports should be submitted in pdf format to Gradescope. Presentations of the proposal will be during class on **October 14**, and final project presentations will be during class on **November 16 and 18**.

**Groups.** Project groups should contain **between 1 and 3 students**. You are welcome to work on the project with students not enrolled in the class – in this case, we'd still like to know the size of the group. The expectations for the project scope will increase depending on the number of students in each group. For groups of two or three, we also expect a short paragraph to explain the role of each group member along with the final report. Groups larger than three are not permitted without special permission from the course staff. Note that you should form your groups by October 7th, though you are encouraged to do this earlier so that you can start on your project.

**Project Mentors.** Your group will be assigned a TA who can help provide some guidance on the project, if it would be helpful. The TA staff does not have expertise in all application areas, but can provide general advice or pointers to related work. We will do our best to assign a TA with the most relevant experience.

## 2 Choosing a Project

All projects should evaluate novel ideas that pertain to multi-task learning, meta-learning, or their applications. For students conducting research in a lab on campus, you are encouraged to pursue a project related to your research area but are not required to. It's also a good idea to think early about the data (simulated or real) that you'll need to collect, and the computational resources you'll need.

You may discuss the topic of your final project with course staff by email, private message in Piazza, or in office hours. If you are not sure about the topic, we encourage you to speak with us. If you are looking for ideas for your project, we will soon post a document on Piazza, which contains some ideas we have collected from the AI community, though we also encourage you to come up with your own.

Here are some examples of *weak* project proposals that do not satisfy the project requirements, and how they can be improved:

1. Weak: run an existing algorithm out of the box on a new application.
   Strong: develop a modified (or new) algorithm that is particularly suited for the challenges of the new application

2. Weak: reimplement an existing meta-learning algorithm
   Strong: reimplement a recent paper and investigate an algorithmic extension of the method that may have been mentioned as future work in the paper.

3. Weak: sweep hyper-parameters, do architecture search of some algorithm
   Strong: investigate the weaknesses of a particular algorithm when tested in new ways and pursue a solution

## 3 Project Proposal

**Project Proposal Document.** The project proposal should be a **one-page** single-spaced extended abstract motivating and outlining the project you plan to complete. You proposal should have the following structure:

1. **Objective** 1/4 page. Explain the objectives of the project and why the objectives are relevant and important

2. **Related Work** 1/4 page. Briefly review the most relevant prior work, and highlight where those works fall short of meeting the objectives described above.

3. **Technical Outline** 1/2 page. Explain your approach at a high-level, making clear the novel technical contribution, and describe the evaluation plan.

Submit one proposal per group. The proposal should be a one page PDF that includes the names of the project team members. The deadline for the proposal is **October 14** at 11:59 pm, though we encourage you to develop your idea for the project sooner. Submitting to gradescope follows the pattern of submitting homework. Submit a PDF of your proposal under the assignment "Project Proposal."

**Project Proposal Presentations.** Students are expected to prepare a short in-class presentation of the project proposal on **October 14th** at **1 pm**. The amount of time allotted per presentation will depend on the number of projects, but is expected to be around 2 minutes. The proposal presentation should include the problem that the project is aiming to solve, an outline of the proposed approach, and the planned experiments. Slides will be collected by a TA, using Google Slides.

At least one group member must be present to present, unless granted an exception from the course staff. Students with an exception will instead submit a video recording. In early October, we will send out a form where your group may request an exception for both the proposal and the final presentations.

## 4 Milestone Report

Your milestone report should be one page and answer the following questions:

1. What experiments have you conducted so far?
2. Are there any changes to the research hypothesis or objective from the proposal based on your initial findings?

The milestone report must report on at least one experiment that you have done since the proposal. This experiment does not need to be successful, but you should have attempted something. If it did not work as expected, you should briefly discuss why. You are encouraged to include a plot or figure. Like the proposal, the milestone report will be graded by course staff.

Submit one milestone report per group, as a one page PDF, with the names of all project members. The deadline for submission is **November 2nd** at 11:59 pm. Submitting to GradeScope follows the pattern of submitting homework - submit a PDF of your milestone report under the assignment "Milestone Report."

## 5 Final Report and Presentation

**Final Report.** The final report should be in the style of a research paper, preceded by a one-page extended abstract. One report is required per group. The one-page extended abstract should summarize the main findings and accomplishments of your final project, while the main paper should describe and motivate the method in detail, and discuss the results, including any relevant figures or plots. The extended abstract should be attached as the first page of the full report.

Successful reports will have a main body that is about eight pages in length, but there is no hard length limit or requirement on the length or format, except the one-page extended abstract. For group projects, we also ask you to each individually submit a few sentences about what each member of the group contributed to the final project.

Submit one final report per group with the names of all project members. The deadline for submission is **November 20th** at 11:59 pm. Submitting to GradeScope follows the pattern of submitting homework - submit a PDF of your report under the assignment "Final Report."

**Presenting the Final Project.** Students are expected to prepare an in-class presentation of the final project on **November 16th or 18th** (day will be assigned by a TA). The amount of time allotted per presentation will depend on the number of projects, but is expected to be around 4 minutes. The final presentation should include the problem that the project is aiming to solve, an outline of the final approach, a summary of the experimental results, and a description of the main takeaways. The presentation should also include any work that is planned to be done before the completion of the final report, though there will only be 2-4 days between the presentation and the final report deadline. Slides will be collected by a TA, using Google Slides.

All group members are expected to help present, unless granted an exception from the course staff. Students with an exception will either submit a video recording, or have a subset of the team present. In early October, we will send out a form where your group may request an exception for both the proposal and the final presentations.

## 6 Grading

The project will count for 55% of the course grade. This 55% is broken up as follows:

- Written proposal: 5%
- Proposal presentation: 5%
- Written milestone: 5%
- Final presentation: 15%
- Written report: 25%

For students who do the fourth assignment, it will either replace another assignment grade, or part of the project grade, or neither, depending on what leads to the highest overall grade. If it replaces part of the project grade, then the overall averaged project grade with the breakdown above will become 40% of the final grade instead of 55%.