
DEEP REINFORCEMENT LEARNING

FINAL PROJECT OVERVIEW

Professor Mohammad Hossein Rohban

Sharif University of Technology
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1 Project Goal

The goal of the final project is to give students the experience of developing a **workshop-level research paper** in reinforcement learning. Each team will choose a modern research topic, study the recent literature, identify a focused research question, develop a proof of concept, receive mentor feedback, revise the work, and present the final result clearly.

A strong project does not need to solve a major open problem. However, it should demonstrate careful understanding of the literature, a well-defined research question, and a thoughtful attempt to answer that question.

2 Grading Summary

The final project is graded out of **2.5 points**. The project is divided into several phases so that teams receive feedback throughout the semester rather than only at the end.

Phase	Due	Main Deliverable	Points
Team selection	June 2	Form a project team and select an initial project topic.	0.00
Literature review	June 19	Find relevant papers and present the paper choices briefly to the mentor.	0.40
Research proposal and proof of concept	July 13	Submit an at most two-page proposal and a proof of concept for the planned idea.	0.50
Progress checkpoint	July 27	Present current progress, preliminary results, difficulties, and remaining tasks to the mentor.	0.50
Final checkpoint and mentor revision	August 10	Submit a complete draft and receive revision feedback from the mentor.	0.80
Final editing and presentation	August 18	Revise the work and give the final presentation.	0.30
Total			2.50

Outstanding Project Bonus

The top **3 outstanding projects** will receive **0.5 bonus points**. Outstanding projects are selected based on originality, technical quality, clarity of writing and presentation, strength of analysis or experiments, and progress beyond the minimum project requirements.

The progress of each team will be monitored throughout the project, including changes to the draft, mentor meetings, responsiveness to feedback, and improvement over time.

3 Project Structure

Projects can be in **teams of two or three students**. Students who do not have a team by the team selection deadline will be grouped together randomly by the course staff.

Each team should choose one topic from the provided list of suggested project topics. Teams may suggest their own topic only if it is approved by the course staff.

Project Topics Sheet

The list of suggested project topics and related papers is available here:

Project Topics

Students are encouraged to choose from this sheet. The sample papers in the sheet are provided only to help students become familiar with each topic. Teams are not required to use those exact papers in their final project. As the project direction becomes clearer, papers may be added, removed, or replaced.

Mentor Meetings

Mentor meetings are required when specified in the project phases. Teams should come prepared with the checkpoint deliverable. Missing a required mentor meeting without prior coordination may reduce the grade for that phase.

4 Phase Details

4.1 Phase 1: Literature Review

Each team should find and study relevant papers about the selected topic. During the mentor meeting, the team should briefly present the selected papers and explain why these papers were chosen.

The review should include:

- at least six relevant papers, unless the topic is too niche and fewer papers are justified,
- a short summary of each paper,
- a comparison of the main ideas, assumptions, methods, and limitations,
- an explanation of how these papers motivate the team's possible project direction.

The paper list is **not final**. Teams are not required to stay loyal to the initial list. Papers may be added, deleted, or replaced as the team better understands the topic and refines the project direction.

4.2 Phase 2: Research Proposal and Proof of Concept

Each team should submit an at most **two-page proposal** together with a proof of concept. The proof of concept may be experimental, theoretical, implementation-based, benchmark-based, reproduction-based, or analytical, depending on the project.

The proposal should include things like:

- the main research question,
- the motivation and expected contribution,
- the proposed method, experiment, theory, reproduction, benchmark, or analysis,
- the proof of concept,
- datasets, environments, simulators, or theoretical tools to be used,
- expected challenges and fallback plans.

Minor changes are allowed after this phase. However, the main backbone of the proposal cannot be changed without approval from the mentor or course staff.

4.3 Phase 3: Progress Checkpoint

Each team should present its progress to the mentor. The goal of this phase is to make sure that the project is moving forward and that the final submission is still feasible.

The progress presentation should include:

- what has been completed so far,
- difficulties encountered,
- changes from the original proposal, if any,
- remaining tasks before the final checkpoint.

4.4 Phase 4: Final Checkpoint and Mentor Revision

Each team should submit a complete draft of the final paper and present the near-final version of the project to the mentor. The goal of this phase is to receive revision feedback before the final submission.

The mentor will provide comments on the technical content, writing, experiments, analysis, limitations, and final presentation plan.

5 Final Paper Requirements

The final submission should be written as a short workshop-style paper using the **ICML template**. The main paper is limited to **4 pages**, excluding references. Teams may include unlimited appendix pages for extra experiments, implementation details, proofs, figures, ablations, or supplementary discussion.

The main 4 pages should be self-contained. The paper should include an abstract, introduction, related work, method or analysis, experiments or evidence, discussion of limitations, and conclusion.

What Counts as a Good Project?

A good project can be an empirical study, reproduction and critical analysis, benchmark comparison, algorithmic extension, ablation study, or a theoretical proof of concept. The key requirement is a clear research question with a well-supported answer.