ECE 470/*569A* Artificial Intelligence
Summer 2025
Term Projects

I. Objectives

ECE 470: To design and implement the Genetic Algorithm to solve a real-world problem

ECE 569A: To design and implement some Artificial Intelligence (AI) techniques to solve a real-world problem

- Projects should be done in groups of **3 to 4** (all undergraduate or all graduate students in the same team). The same standard will be used to grade all projects regardless of the number of members per team. All team members will receive the same grade

- The topic must be approved by the instructor. Send your topic proposal to (kinli@uvic.ca) with the title and a brief description of the chosen problem before starting your work on the Project Proposal

- It must be clearly stated in the Project Final Report who is responsible for which part of the project. At least two members of the team are expected to make the oral or poster presentation

- All emails related to the Project must have the following in the email title:
  i. 470 or 569A
  ii. Team Number (to be given by the instructor)
  iii. Team info/Project Title/Proposal/Progress Report/Final Report/
  iv. Or Individual Presentation or Poster participation

II. Grading Breakdown:

1. Project Team Name and Members (1%): by June 3, 2025
2. Project Proposal (5%): by June 20, 2025
3. Project Progress Report (5%): by July 11, 2025
4. Project Final Report (10%): By August 1, 2025
5. Project Presentation/Poster Participation (5%) – July 25, July 29, July 30, August 1, 2025
6. Project Presentation/Poster and demo (15%) – July 25, July 29, July 30, August 1, 2025

1. Project Team Name and Members (1%) by June 3, 2025
- If you have trouble finding a team, send me an email and I will arrange a team for you.
- Your team needs project approval before starting the Proposal

2. Project Proposal (5%) by June 20, 2025
- Submit a project proposal (**250 to 500 words)** with the following sections:

  A. **Problem Statement and Motivation:** What is the problem that you are proposing to solve? Why is it important to solve this problem? Why do we need AI techniques to solve this problem?

  B. **Problem Formulation:** What is the objective function? What is the search space look like? How big is the search space?

C. **Programming Language:** What programming language, standard libraries and/or toolboxes will be used to implement the proposed algorithm? For examples, C/C++, JAVA, Python, Matlab

D. **Evaluation Approach:** How will the proposed solution(s) be evaluated? What standard datasets/benchmarks are available for the problem? What is the approach to generate problem instances if there are no standard benchmarks?

E. **Milestones:** Present a timeline of what and when various parts will be accomplished. As a team, how the work will be divided among all members?

F. **References:** Other people's work cited in your proposal

3. Project Progress Report (5%) by July 11, 2025

- Describe the work done so far, challenges faced, preliminary results if any, and discussion (**maximum 750 words)**

4a. 470 Poster Presentation and Demo (15%): July 25, July 29, July 30, August 1, 2025

- Present your project with a poster (typical size 2' X 3' sheet(s) on cardboards)
- Answer questions and demo your project with your own devices

4b. *569A* Oral Presentation and Demo (15%): July 25, July 29, July 30, August 1, 2025

- Bring your own devices for the presentation and demo
- Each team has 8 minutes for presentation and demo, and 2 minutes for Q&A (speakers will be cut off at the 8-minute mark); note that the time allotted for presentation and Q&A may change depending on the number of teams

4c. (470 Poster) / (*569A Oral*) Participation (5%): July 25, July 29, July 30, August 1, 2025

- **Students in ECE 470** are expected to attend the oral presentations given by the ECE 569A students
- Each 470 student must submit 3 questions, one each to a 569A team, for 3 different teams (the three teams must not be presenting on the same day), in written form, via email to the instructor (kinli@uvic.ca) by 23:59 August 1, 2025
- These questions will be graded on the quality of the inquiry and their understanding of the presented projects

- **Students in ECE *569A*** are expected to attend the poster presentations given by ECE 470 students.
- Each 569A student must submit 3 questions, one each to a 470 team, for 3 different teams, in written form, via email to the instructor (kinli@uvic.ca) by 23:59 August 1, 2025.
- These questions will be graded on the quality of the inquiry and their understanding of the presented projects

5. Presentation Schedule (??? 470 and ??? 569A teams, to be determined)
July 25:
July 29:
July 30:
August 1:

6. Final Report (15%) by August 1, 2025

- Each team will submit a report of no more than **3000 words** that outlines the motivation for the selected problem, describes and justifies the approach used, and clearly presents the results and findings of the project according to the template below
- Final reports are to be sent as a PDF file, and links to codes in a repository such as GitHub, to the instructor by email (kinli@uvic.ca)

III. Final Report Template (not more than 3000 words)

Title Page

- Course Name and number (ECE 470 or *ECE 569A*)
- Title of Project
- Team Name and Team Number
- Team Member Names, V#s

Table of Contents

Abstract/Executive Summary

1. Introduction

- Background
- Motivation

2. Related Work

3. Problem Formulation

4. Methodology and Evaluation

5. Results and Discussions

6. Conclusion

7. Future Work

Appendix

References

IV. Grading Rubric

Report: (80%)

- Problem description and motivation [5%]
- Related work [5%]
- Problem Formulation [15%]
- Methodology and Evaluation: [20%]
  - Well-defined approach to solve the problem
  - Accurate and precise evaluation of your solution
  - Sufficient experiments to validate your results
- Results presentation and discussion [25%]
  - Comparisons (optimal solution, previous solutions, and/or your solution improvement)
  - Use graphs, charts, and/or tables to effectively display results
  - Justify the obtained results
  - Challenges faced and how did you overcome them
- Conclusion and future work [5%]
- Proper citations in your report [5%]

Code: (20%)

- Source code quality [10%]
- Run and compile [10%]