

## Course Project I

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**Objective.** The course project objective is to further explore topics covered in the course with your classmates.

**Why.** The purpose of the project is for you to engage more deeply with aspects of the course and do something original with it. As Columbia University students, this is also an opportunity to practice and polish your writing and **communication** skills, which are in high demand these days.

**Who.** The course project must be completed in teams of four/five members. You will find the groups you are assigned to in Courseworks under the People section.

**Where.** Please plan to meet with your team in person. If your team includes Columbia Video Network (CVN) students, you may arrange for a remote option.

**What.** Practically, there are three deliverables for the project:

1. **IEOR4004 Team check in (due October 23rd)**

Each team is required to meet with either Dr. Kaya, Salam, or Mohamed before October 23rd and discuss project progress. These meetings will be held in person and scheduled by the student teams.

2. **Final report (due October 30th)**

The final project report should detail your investigations. This means discussing and presenting the given problem and its application, summarizing and interpreting relevant background information and studies, how you went about modeling and solving the problem (including assumptions, sets, parameters, variables, objective function(s), and constraints), how you estimated your parameters from given data, and your findings: results, interpretation and insights. It should be 5 to 15 pages, with the following sections: introduction, background, methods, results and conclusions, and bibliography. You can see the tentative grading structure in Table 1.

3. **Student team self-assessment (due October 30th)**

At the end of the project, you will complete a survey evaluating each team member's participation honestly and constructively. While each person may contribute in different ways, all members should be able to answer questions about the project during the final meeting with the IEO4004 teaching team.

This means you should not leave all the formulation and modeling work to one person while others focus only on reporting — that often leads to miscommunication and weaker results. Communicate openly, respect each other's time, and remember: you have the power to make each other's lives easier (and the project more successful!).

**How.** To produce a quality product, you will need to put in continuous effort and real insight over the duration of the course. All your work should be clearly written and cleanly presented — this will factor into your grade on the project. Write with a professional audience in mind. As a brief administrative note, The Columbia Honor Code certainly applies to the project. While the applications, algorithms, and theory you discuss may not all be entirely original, the project itself is original work and should appropriately cite the relevant references as needed.

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Description	Grade
Including the appropriate names and following the format	0.5 point
Quality of writing	1 point
Inclusion and standardized usage of necessary references	0.5 point
Accurate parameter estimation	2 points
Accuracy and sensibility of the mathematical model for the budgeting problem	4 points
Accuracy and sensibility of the mathematical model for the min. distance problem	4 points
Accuracy and sensibility of the mathematical model for the fairness problem	4 points
Adequacy of discussion on results and insights	2.5 points
Total	17.5 points

Table 1: *Tentative* Grading Criteria for Project Reports

**Collaboration.** The project will be completed in groups of 4 to 5 students which will be determined randomly. These groups will be available to you approximately 1 week before the project is published. One of the group members will be randomly assigned as the group leader and their responsibility is to initiate the contact with the rest of the group **by October 3rd, Friday**. If the group leader does not reach out by the team confirmation deadline, inform the TAs (Mohamed or Salam) about it and ask them to assign a new team leader.

Remember, this project is a collaborative exercise. You will work in small groups and need to build a culture of collaboration between yourselves. You should expect to have regular meetings, once or twice a week, is a good idea. You also have access to our teaching assistants; I would recommend joining their office hours. Group work is an important part of this experience. Working in groups is different from working on your own so it is important that you bear the following things in mind:

- **Inclusion:** Work on making the group welcoming to all members. Treat everyone with respect and value. Give everyone the space and opportunity to offer suggestions and ideas. If you find yourself engaging more with one or two group members, make the extra effort to engage with others. If someone doesn't show up for the meetings, reach out to them and work on making them a part of the group. Worst case, let me know if you feel excluded from a group or if you think someone is AWOL.
- **Contribution:** You must make the effort to contribute to the group. Voice your ideas or use email/text to communicate your ideas to the group. The quality of your contribution is important, but quantity often dictates quality, so don't be shy about sharing your ideas. Be willing to help other group members achieve the goals set for them.
- **Model membership:** Be present in all meetings. Research the topic and/or complete your assigned tasks before a group meeting. Help create and revise the plan that will get you to achieve the project goals.

**Closing Thoughts.** Start working on your project early. For the executive summary (the conclusion section of your final report), envision conveying this information to upper management.