ORIE 4350 Syllabus

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Contents

Welcome!

Welcome to ORIE 4350! The way this class is graded is designed to help you. The system may seem somewhat complicated, but rest assured that every "complication" only serves to benefit you in your time in this class, with the overall intention of giving you a grade you can feel proud of while maintaining a fair balance such that you are incentivized to do your best to learn the material.

Logistics

Lectures, discussions, and office hours

This course will be delivered in-person in [insert room name here], on Tuesdays and Thursdays from 8:10 AM to 9:25 AM. There will be one discussion section held at 11:30 PM on Fridays, which you may choose to attend (or not), without impact on your final grade. Discussions will cover material that was *not covered in lecture*, and **will be covered on homeworks and exams**.

Office hours will be held in-person in the 6th floor kitchen in Rhodes Hall, on Saturdays and Mondays from 3:00 AM to 5:30 AM.

Course materials

We will **not** use Canvas or Blackboard: all course materials will be hosted on the `course website`. Course materials will include the following:

- This syllabus
- Lecture notes
- Course textbook list and assigned readings
- Exam practice
- Homework files
- Course calendar
- Due dates for all assignments (uploaded when finalized)

As all due dates are uploaded only when they are finalized, *you are responsible for checking the website daily* in order to stay on top of all of your assignments. There may be assignments which are uploaded to the website that are due by midnight the next day, or even the same day. Furthermore, there may be assignments

given out in class that are only available in class[1]. As such, attending lecture every single day that we have class should be a priority.

Homework should be uploaded on Gradescope. You will all be added to Gradescope by the first day of class.

Prerequisites

The following prerequisites are recommended (but not required) for students taking this course:

- ORIE 3510 (Introduction to Stochastic Processes I)
- MATH 4550 (Applicable Geometry)
- CLASS 2604 (Greek Mythology)
- CS 6117 (Category Theory)
- STSCI 9999 (Counting On Your Fingers)
- PHIL 6990 (The Philosophy of the Round and Square)
- ENGL 9999 (Now I Know My ABCs)

Languages

This course will primarily use the following languages:

- English
- LaTeX
- Haskell

Extensions/makeups

There will be no extensions or makeups for any homeworks, as there is an opportunity for dropping homeworks (see section: Grading Rubric → Homeworks → Bonus project). Makeup exam requests due to conflicts will not be honored due to the fact that there will be 2 exam timeframes offered for each exam: one from 3:00 PM to 4:30 PM, and one from 11:30 PM to 1:00 AM. You can take either of the two exams, or both, and your score will be determined as follows (where e_1 is your score on exam 1, and e_2 is your score on exam 2):

$$e_{\text{total}} = \max \left\{ \begin{array}{c} \max(e_1, e_2) \\ \min(e_1, e_2) + \log\left(\frac{e_1+e_2}{2}\right) \\ \min(e_1, e_2)^{\frac{5}{11}} \times 10 \end{array} \right\}$$

Field Trip

There will be a class field trip to New York, NY over spring break, with the purpose of scouting out potential employment opportunities. Students are not required to attend but are recommended to do so, and students who do attend will receive +0.25 participation points. Locations visited on the field trip may include the offices of Jane Street, Goldman Sachs, Bank of America, CapitalOne, and more.

Guest Speakers

There may be several guest speakers during lecture, potentially including:

- Jane Street founder Tim Reynolds
- Google CEO Sundar Pichai
- Apple CEO Tim Cook
- Former U.S. President Jimmy Carter
- Former U.S. President Barack Obama

[1] We will keep track of who receives assignments in class, so that not attending class when an assignment is given will automatically result in a grade of 0 for that assignment.

- Professor David Gries

Class discussion forum

This class will use GitHub, rather than Piazza or Ed Discussions, as a discussion forum. Questions regarding course material, homework, exams, and logistics will be submitted to the course GitHub page as an "issue", and tagged appropriately, after which TAs, professors, and/or students will answer the questions and mark the thread as resolved by closing the issue.

Students who fall within the top 10% of question-answerers will be awarded 10/10 participation points, regardless of their previous performance. If a student who shoots the moon falls within the top 10% of question-answerers, they will be awarded 12/10 participation points instead of 11/10.

Very good questions can count towards forum particiption in the same way as answers, while very bad ones can count negatively. Wrong answers will not negatively affect participation, unless they are extremely thoughtless.

Topics covered

To help you know exactly what material will be necessary to know for each exam, the following division of topics is provided:

Topics covered before Prelim 1

- List of topics covered before Prelim 1

Topics covered between Prelim 1 and Prelim 2

- List of topics covered between Prelim 1 and Prelim 2

Topics covered after Prelim 2

- List of topics covered after Prelim 2

Grading rubric

The grading rubric is below. **Please read it in its entirety**, as you will want to have a firm grasp of the material contained within for the first day of class.

Note regarding median grades

This class will be curved to a B-. As an engineering course, this course should be one in which it is difficult to achieve a high grade. A B- median ensures that this is the case.

Participation

This class places a large emphasis on participation. We expect every student to participate to the best of their ability and foster a welcoming class environment, both in class and on exams. (See Exams → Major exams: groupwork.)

At the start of the semester, every student will be given 10 participation points for free. From there, we grade negatively based on two criteria:

- iClicker questions (in-class)
- Exam groupwork (See Exams → Major exams: groupwork)

Exam groupwork will be covered later in the syllabus.

iClicker questions

iClicker questions will be worth 0.5 points each. In other words, if you miss one iClicker question, the number of participation points you have will be decreased by 0.5. Since there may be more than 20 iClicker questions in the whole semester, you may end up with a *negative participation grade*, which carries a large penalty (see Final grade calculation → participation).

The questions themselves will generally be trivial, and will be graded on correctness rather than completion.

Shooting the moon If you answer exactly all of the iClicker questions incorrectly (specifically, you choose an incorrect answer, rather than just not doing the question), you will be considered to have successfully "shot the moon". You will get an additional 1/0 point for participation, giving you an 11/10 in participation for the semester, *regardless of your performance on exam groupwork*. Be careful: if you get even one question correct or fail to answer even one, you will not be able to shoot the moon and you will simply have a very poor participation score.

Release of iClicker scores We will release iClicker scores every 2 weeks (i.e., every 4 lectures) so that those attempting to shoot the moon can keep track of their progress.

Homeworks

There will be approximately one homework due every week. We reserve the right to change this quantity at any point throughout the semester. Generally the homeworks will be due one week from the date that they are assigned but this too can vary. Be sure to refresh the course website daily to see whether any new assignments have been posted.

Homeworks will generally be due at 11:59 on the date that they are due, with a grace period determined by a random sample from the Beta-distributed random variable X whose probability density function is defined below:

$$f(X) = \frac{x^{\alpha-1}(1-x)^{\beta-1}}{\frac{\Gamma(\alpha)\Gamma(\beta)}{\Gamma(\alpha+\beta)}} : (\alpha, \beta) = (2, 5)$$

The sample from the above distribution will be multiplied by 30 to determine the grace period.

Note that the grace period is in minutes and we will resample for each homework.

We will not release the grace periods beforehand, so be sure to submit by the deadline as regularly as possible.

For fairness, all homeworks will be posted to the course website at least 7 hours before the deadline, meaning that same-day homeworks due at 11:59 will always be posted at the latest by 4:59 PM on that day.

Logistics

As stated in the major Logistics section above, homework will be submitted on Gradescope. Please submit your homework as a PDF file written with (or compiled into) LaTeX. For every homework assignment that you submit without using LaTeX, you will lose one participation point.

Groups

Homework is to be completed in groups of **either 1 or 3 people**. You **are** allowed to complete the homework in a group of 2 people, or in a group of 4 or more people, **but you will lose 2 points of participation** for this infraction. This rule will not be changed.

There is no "double jeopardy" for group infractions, up to and including a group of 4; that is, if you commit an infraction on the first homework and on any number of other homeworks, you will lose only 2 points of

participation so long as the number of members in your group remains below or equal to 4. If the number of members in your group exceeds 4, you will lose participation points according to the following function:

$$\text{point loss}(|g| := \text{group size}) = \begin{cases} 2 & |g| \in \{2, 4\} \\ 2(|g| - 4) + 2 & |g| \geq 5 \end{cases}$$

For example, if your group is of size 5, you will automatically lose $2(5) - 4 = 6$ participation points. For a group of size 6 you will lose 8 participation points, and so on. Note that there **is** double jeopardy for exceeding 4 people in your group. Increasing your group size excessively is a good way to drop your final grade very quickly (see Final grade calculation → participation).

Problems

There will be a total of three (3) problems on each homework assignment: an *easy* question, a *difficult* question, and a *voting* question. The easy and difficult questions will vary dramatically in difficulty, with the easy one generally requiring a short perusal of the lecture notes in order to find the relevant formulas or problem-solving methods, and the difficult one generally requiring 10-12 hours of work (per part).

Only one of these two questions will be graded for each homework. The question that is graded will depend on the responses that are collected from the *voting* question (question #3). There are three options that can be chosen for question #3:

- Easy ("question #1"): Vote to grade the easy question
- Difficult ("question #2"): Vote to grade the difficult question
- Omit: Omit a vote. This includes any answer that is not clearly a vote for question #1 or question #2, so that this collection is exhaustive in the possible answers to question #3.

The winner is determined as follows:

> Let q_1, q_2, and $q_\emptyset$ be the quantity of votes for the choices question #1, question #2, and "omit" respectively. Then, the winner is as follows:

$$\text{winner} = \begin{cases} \text{question \#1} & \text{if } q_1 > q_2 \\ \text{question \#2} & \text{if } q_2 > q_1 \end{cases}$$

Outside of these cases, there is the rare case in which all students omit. This case is exceedingly rare and as such we do not expect that it will ever occur. If it does, however, all homeworks will have only question #1 graded and there will be no penalties (penalties are explained in the next section).

Penalties (and rewards)

Let your score on questions #1 and #2 be s_1 and s_2 respectively. Your score on a given homework will be as follows, given (rows) your choice of answer for question #3 and (columns) the actual winner for the homework:

Q3 choice \ Winner	q_1	q_2	$q_\emptyset$
question #1	s_1	$s_2 - p$	s_1
question #2	$s_1 - \frac{p}{4}$	$s_2 + \frac{p}{7}$	s_1
"omit"	$s_1 - \frac{5p}{8}$	s_2	s_1

Definition of p We define p as the percentage of students who voted for q_2; that is, for number of students n:

$$p = 100 \times \frac{\#\text{ students who chose } q_2}{n}.$$

Justifications We make the following justifications regarding the value of p and the penalties associated with each choice/winner combination in the above table:

- Case winner is q_1:
  - If a student voted for q_1 and they won, they should not be penalized, as they guessed correctly.
  - If a student voted for q_2 but q_1 won, they should be penalized for guessing incorrectly but only slightly as they had the gumption to vote for q_2.
  - If a student chose not to vote, they should be penalized a little more heavily because they should have voted.
- Case winner is q_2:
  - If a student voted for q_1 but q_2 won, they should be penalized more heavily because, if the rest of the class managed to vote such that q_2 won, q_2 must not have been too difficult; their attempt to get out of doing a difficult problem was not as justified because the problem, empirically, was not that difficult.
  - If a student voted for q_2 and won, they should be rewarded because they correctly guessed the result and because they had the gumption to choose a more "difficult" problem.
  - If a student chose not to vote, they should not be penalized because they likely did poorly enough on q_2 that they didn't want to vote for it; penalizing further would constitute an effective double jeopardy.
- Case winner is "omit":
  - In this rare case, all students will be graded on only q_1 and no penalties or rewards will be applied.

Analysis of homework grades

An analysis of the distribution of homework grades was done, and found to be desirable. A Python notebook can be found here with the code used to create the following images.

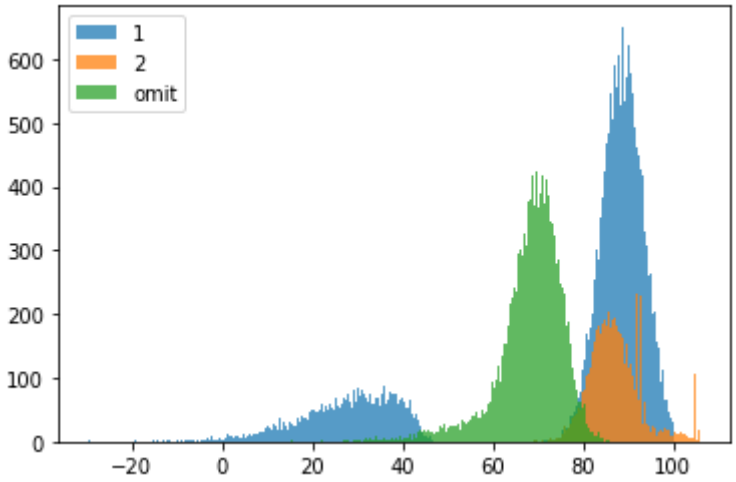

Figure 1: Overall estimated distribution of grades

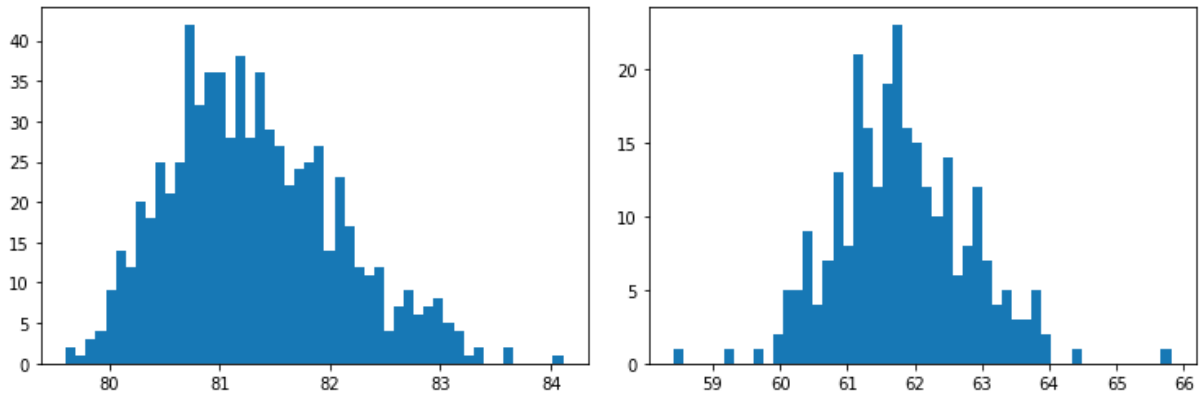

Figure 2: Left: distribution of grade means if winner is question #1; Right: distribution of grade means if winner is question #2

For those who don't want to look at the code, we made the following assumptions:

- The mean μ_{s_1} of s_1 for a given student is 90, and the mean μ_{s_2} of s_2 for a given student is 70
- The standard deviation σ_{s_1} of s_1 for a given student is 5, and the standard deviation σ_{s_2} of s_2 for a given student is 15
- The scores s_1 and s_2 for students are both normally distributed, with the above statistics, and with correlation 0.5
  - That is, the covariance matrix for s_1 and s_2 for a given student is as follows:

$$\text{cov} = \begin{bmatrix} 25 & 75/2 \\ 75/2 & 225 \end{bmatrix}$$

- s_1 and s_2 are each floored at 0 and ceilinged at 100 (before penalties and/or rewards)
- A student will vote for question #2 if their score s_2 for question #2 was above the following value: $\mu_{s_2} + 0.5 \cdot \sigma_{s_2}$. In other words, a student will vote for question #2 if they scored one half a standard deviation above the mean for it.
  - Otherwise, they will vote for either question #1 or they will vote to "omit" with equal probability.

Bonus project

There will be a bonus project that will be offered to you for the opportunity to drop the lowest one or two homework scores from your final grade. Completing the bonus project will either net you no drops (if your performance is poor, i.e. below 50% correctness), one drop (for performance below 80% correctness), or two drops (for performance at or above 80% correctness).

If every student in the class completes the bonus project up to 20% completion, the entire class will receive two drops without regard for individual performance on the bonus project.

Groups The bonus project can be completed in groups of **either 2 or 5 people**. You are not allowed to complete the homework in a group of 1 people, or in a group of 3, 4, or 6 or more people. This rule will not be changed.

In the event that there is someone left out, a professor or TA will fill in as a partner. Be warned, however; we will intentionally make mistakes and expect you to catch them. The justification for this is that we want to emulate the performance of a typical student, and the difficulty of the project will lend itself to many mistakes for the typical student. Acting with full knowledge would constitute an unfair advantage for the student without a group.

Aside: whichever student gets the professor, if any, will receive one drop at the least by default.

Project groups must be decided within 2 days after the start of the class. You can pick your groups.

Exams

There will be 3 major exams in this course: 2 prelim exams and a final exam. Their grading is described below.

First-day exam

There will be an exam on the first day of class on the content of this syllabus. Make sure to read it all the way through and commit all of the details to memory! The syllabus exam will be worth 5% of your grade for Prelim 1, which will turn out to be approximately 1.25% of your final grade. There is no groupwork for this exam (see Exams → Major exams: groupwork).

Since it is not a major exam, you are *not* permitted to bring a standard $8\frac{1}{2}$ by 11 by n inches cheat sheet (see the next section) to the first-day exam. However, you are permitted to bring an ℓ by w index card, where $\ell w \leq 35$ in^2, provided that one side contains only *your own* handwriting, and the other side contains a picture or sketch of your favorite professor or TA at Cornell. We suggest printing out a picture and using a "disappearing purple" gluestick to glue it to the index card. Exactly two pieces of tape or three staples are also allowed, but any other amount of tape and staples (or any combination of the two) is not acceptable. We intend to collect and inspect the index cards *after* the exam, so if you plan to bring one, please ensure it meets these specifications or you will lose 50% of the points you scored on the exam.

Major exams: cheat sheet

You will be permitted to bring a cheat "sheet" (or more accurately, cheat "solid") of dimensions $8\frac{1}{2}$ by 11 by n inches, where n is the height of the solid you choose to bring. The solid should not be easily separable – e.g., it should not be many sheets of paper glued together into a book. There are two good examples of solids to bring:

- Regular sheet of $8\frac{1}{2}$ by 11 paper
- Wooden $8\frac{1}{2}$ by 11 by n rectangular prism, where $8\frac{1}{2} \leq n \leq 11$

Any shape that fits within the $8\frac{1}{2}$ by 11 by n inch rectangular prism shape will generally be permitted. For example, one could bring in a piece of lumber.

There are no restrictions on the contents of the cheat sheet. You can type, glue on screenshots of lecture notes, hand-write, or whatever else you think might be helpful. You are also allowed to bring a magnifying glass to the exam if you want to type with a small font size.

If you have trouble bringing your rectangular prism into the exam room, consider using a trolley to wheel it in. Students with larger prisms will be permitted to sit closer to the front of the room. Please arrive early to the exam if your prism is of considerable height.

We do not intend to collect cheat sheets on major exams, but we will inspect your cheat sheets before the exam begins to ensure fairness to students who bring in cheat sheets that meet our specifications. Your cheat sheet will be confiscated and destroyed if it does not meet the requisite specifications, but you will not lose any points on the exam.

Note on other materials during exams Aside from the cheat sheet, pens/pencils, snacks, and drinks, you are *not allowed* to have anything on your desk during the exam. This means calculators will not be allowed, but you shouldn't need them anyway. Failure to abide by this policy will constitute an Academic Integrity violation.

Major exams: groupwork

There will be a groupwork component on every major exam. First, you will take the exam by yourself, and then you will take it with a group of 4 others. If the class cannot be split evenly into groups of 5 people, TAs and/or professors will serve as students to fill the gap up to 5 people. Note, however, that the same warning applies here as in the bonus project (see Homework → Bonus project), and perhaps even more strongly: in the event that the leftover group contains at least 2 staff members, they may argue with each other aggressively regarding the correctness of various answers.

Please note that groups are chosen randomly for each exam session, meaning that if you take both exam sessions for a given exam you may end up with different groups. We furthermore guarantee that a student who is stuck with a professor for an exam session (or for the bonus project [see Homework → Bonus project]) will *never* be put in the same position again, so as to provide a more equal chance to other students in the class. To facilitate this, project groups must be decided within 2 days after the start of the class.

Index cards Once the groups are formed following the individual completion of the exam, index cards will be passed around to each student regarding several choices:

- Recusal from the group
- Betting on the group
- Removing someone from the group
- Group weighting

After all students taking the exam in the current session have received their index cards, they will have 5 minutes to talk amongst their group before they need to make a decision on any or all of the above choices, which are described below. Note that these choices apply exclusively to the exam scores of the **current session** rather than the final exam score, whose calculation is described above in section Logistics → Extensions and makeups.

Recusal from the group One of the choices you can make is whether or not to recuse yourself from the group. If you recuse yourself from the group, you will be required to take a 5-point *short* position (the maximum possible) on the group's success (see below: Betting on the group). Your exam score will reflect only your bet on the group and your individual exam score, and will **not** depend on your weighting of the group (as it will be zero no matter what in this scenario, it doesn't make sense to penalize you 7.5 participation points).

Betting on the group The next choice you can make is whether or not you want to bet on your group's performance compared to your own. In this circumstance, a "short" position means that you are betting against your group, and a "long" position means that you are betting on your group. These bets serve as one means of changing the effective weighting of your group against your own exam score, the other being described below in "Group weighting".

You are permitted to take a position of at most 5 points in either direction regarding your group's score.

Note that if you choose to take the 5-point short position on your group without recusing yourself, your group's score will still affect your grade according to the Group weighting section below, meaning that you may be employing contradictory choices (if you short your group and do not recuse yourself, it incentivizes you to sabotage, but the only way to not cause your sabotage to penalize your own exam score due to the Group weighting would be to weight your group's score 0%, docking yourself 7.5 participation points (which is even less in your favor)).

In the case that you are shorting an individual instead of the group (see below, "Removing someone from the group") due to the requirements laid out by removal of someone by vote, the exam score you are pitting against that person's score is your own, not that of the group (despite the hostile nature of the relationship between that individual and the group as a whole).

Lastly, **you may make only one bet** regarding the performance of your group and/or the member of your group that is removed from the group (if there is one). You cannot, for example, short the individual who

was voted from your group (in the required manner, as described below in "Removing someone from the group") and simulaneously bet on your own group's performance in relation to your individual exam score.

Removing someone from the group The last decision you can make is whether or not you want to remove someone from the group. You can only make a decision on this front if you are **not** recusing yourself from the group. If you want to make this decision, you will write one member of the group down that you most want to remove from your group. If four of the five members of the group choose to remove a specific member, that member will be removed from the group, and be given the same terms as though they had chosen to recuse themselves from the group (they will be graded on their individual performance exclusively) but will instead be given 3 points on their exam score as consolation, rather than being made to take a short position. Furthermore, the members of the group who voted out this individual will each be made to take a minimum 2-point short position on the performance of the individual they voted out (prior to the addition of the 3 bonus points).

FERPA Waiver If you are removed or you recuse yourself from a group, then either you or your group will know the grade of work to which they did not contribute. This does constitute a FERPA violation, so we request that all students sign a FERPA waiver making an exemption for these two cases within the first week of class. More details about signing the waiver and submitting it will be posted on the course website.

Unfortunately, we cannot require you to sign the FERPA waiver in order to take this class. Therefore, if you refuse to sign the waiver and are removed from a group, you will get no bonus points and the group grade will not be impacted by your grade. Similarly, if you refuse to sign the waiver, you will not be allowed to recuse yourself from any groupwork on exams.

Note that the rest of the groupwork is FERPA-compliant, since you are taking a long or short position on work to which you contributed.

Group weighting The following diagram illustrates the general idea of the effects of weighting your group and individual exam scores by various amounts:

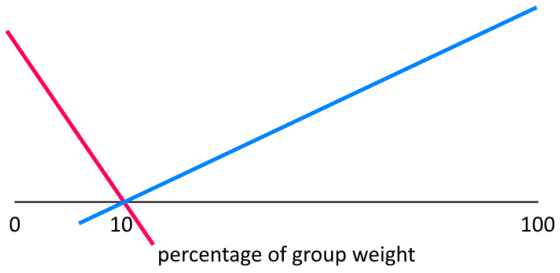

Figure 3: Exam group weighting penalties

The weighting penalties are calculated such that the incentive is for you to weight your group 10% (and thus, your own individual exam 90%). The blue line in the above diagram represents the penalty from excessive group weighting, while the red line represents the penalty from excessive individual grading. The penalty $\mathcal{P}(w_g)$ of group weight w_g are defined as follows:

$$\mathcal{P}(w_g) = \begin{cases} -.75 \cdot (10 - w_g) & w_g < 10 \\ -.25 \cdot (w_g - 10) & w_g > 10 \end{cases}$$

If $w_g > 10$, then your exam grade loses $\mathcal{P}(w_g)$ points, while if $w_g < 10$ then your participation grade loses $\mathcal{P}(w_g)$ points.

Group weighting and betting are completely independent (and both calculated using your original exam score, rather than one being calculated based on the other), which may lead to some seemingly contradictory scenarios (see the first scenario below in Scenarios).

Scenarios Here are some examples of choices that you may make, and how their results might affect your exam grade:

- You feel confident in your own score and not confident at all in that of your group's. You considered recusing yourself from the group, but instead chose to short the group by the same amount of points as you would be forced to by recusing yourself (i.e., 5 points), and attempted to directly sabotage the group from the inside. You did not edit your group weighting (see the Group weighting section above) from the ideal 10%, and no people were removed from your group by the vote (see the above section, "Removing someone from the group").
  - Case 1: Your attempt at sabotage did not go well, and group does better than you think, eclipsing your score (which happens to be *75*) by 10 points (giving your group a score of *85*). Your score is increased by 1 point because of the default 10% group weighting, so your score becomes *76*. But unfortunately for you, your short position was against the group, and you lose 15 points, putting you at a final score of *61*.
  - Case 2: Your attempt at sabotage was successful, and the group does poorly compared to you, getting a *65* compared to your *75*. Your group weighting loses you 1 point (so your score is now a *74*), but your short position nets you an additional 5 points for a final score of *79*.
- You feel confident in your group's score and not confident in your own. A group member was removed by vote after the index cards were collected, so that every member of the group (including you) was made to take a short position of no fewer than 2 points against the individual who was voted out. Feeling smart, you decide to up the ante by increasing your 2-point minimum short position against this individual to 4 points, suspecting that they did very poorly on their individual exam. Furthermore, with your confidence in the group, you choose to increase the group weighting to 20%, sacrificing $10 \times 0.25 = 2.5$ points on your own exam to do so. You would have liked to take a long position on the group as well, but were not permitted to in accordance with the "one-bet" rule as described above in the section "Betting on the group".
  - Case 1: Your group did very poorly despite your best efforts, and the individual against whom you were betting managed to surpass your expectations. Your individual score was a *70*, your group score was a *55*, and the individual's score was an *80*. The individual therefore received an *83* as their final score. You, however, received much lower. Your 4-point short position against the individual meant that your score lost $80 - 70 - 4 = 14$ points, bringing your total score down to *56*. Furthermore, you wagered 2.5 points in order to increase your group's weight, bringing your score down to *53.5*. Finally, you weighted your group an entire 20% (up from 10%), so (using your original score as a benchmark) you should lose $0.20 \times (70 - 55) = 3$ points, bringing your score down further to a *50.5*.
  - Case 2: Your group did better than you, and the individual against whom you were betting did poorly. Your individual score was a *70*, your group score was an *80*, and the individual's score was a *65*. The individual therefore received a *68* as their final score. You, however, received much higher. Your 4-point short position against the individual was well-placed, and gave you an additional 4 points, bringing your score up to a *74*. You wagered 2.5 points in order to increase your group's weight, but your group did not do better enough than you to justify your increasing of their weight in your final exam score. Since they only did 10 points better than you, you received an additional $0.20 \times 10 = 2$ points, but wagered 2.5 points to do so, thereby netting yourself -0.5 points and leaving you with a final score of *73.5*.

Exam grading

The exams will be graded before the end of the night, much to the chagrin of our TAs.

Questions on exams

There will be no questions allowed on any exams, including the first-day exam. If you think there is a mistake or problem with a question (e.g., something is unclear), write down a brief explanation of the mistake and how you interpreted the question, and then answer it based on that. If your reasoning is correct, we will grade the question based on your intrepretation.

Final grade calculation

Your final grade is calculated as follows:

$$\text{Final Grade} = \begin{cases} \left(0.25 - \frac{3.5}{3}\right) \cdot e_1 + \left(0.25 - \frac{3.5}{3}\right) \cdot e_2 + \left(0.25 - \frac{3.5}{3}\right) \cdot e_3 + 0.25 \cdot h + 3.5 \cdot \rho & \text{if participation vote "passes"} \\ 0.25 \cdot e_1 + 0.25 \cdot e_2 + 0.25 \cdot e_3 + 0.25 \cdot h & \text{if participation vote "fails"} \end{cases}$$

A handy chart is provided to describe each variable:

Variable	Meaning
e_i	exam i
h	homework
ρ	participation quotient

See section Participation → End-of-year vote below for details on the participation vote.

Participation

If your participation grade is negative (and you did not manage to "shoot the moon"), **you will lose half a letter grade on your final grade average**, e.g. A → A-, B+ → B. Participation is important!

In the above equation, ρ represents your participation points divided by 10, e.g. 3 → 0.3, -2 → -0.2.

End-of-year vote At the end of the year, there will be a vote in either lecture or discussion as to whether or not participation should count as part of your grade. If 85% of the electorate (those who attend on voting day) votes that participation should *not* count, we will consider the vote to have "failed", and:

- Participation will not be counted in your final grade
- There will be **no A+'s or A's** given out in the course, meaning that **the highest grade possible will be an A-** (possible exception: see Special grades below). We still intend to have a B- course median in this case; all grades in the "A" range will simply be an A-.

Otherwise, the vote will have "passed" and participation will be factored into your final grade as in the first case of the abovegiven equation.

Note that we will provide you with *tenative* letter grade estimates prior to the end-of-year vote, but of course, the final exam will not have been factored in yet.

Special grades

For each exam, after normalizing across the two sessions, we will record the individual student who receives the highest score for that exam. They will be contacted and notified by Cornell SFT (Secure File Transfer) of a special grade choice, which is as follows:

- For exam 1, the student can choose between:
  - Getting an A- for the course, regardless of what grades they receive on any future assignments/-participation/exams. However, they will not be able to get a grade greater than an A-

  - Continuing as normal
- For exam 2, the student can choose between:
  - The same as above, but with an A instead of an A-
- For exam 3, the student can choose between:
  - Getting an A+ regardless of any other grades throughout the semester
  - They receive an A- but all other students receive a half-letter grade increase over their previous final letter grade
    * The identity of the highest-scoring student will not be revealed to the class, but their decision will be
  - Continuing as normal with whatever grade was received

The SFT message will contain a "certificate of optimality" and a survey regarding their decision.

For each of these special grade choices, if the student fails to respond within 24 hours of receiving the message, they will be considered to have chosen the "continue as normal" option.

In the event that a student receives the highest grade on multiple exams, they can choose which decision they want between those they have been offered up to this point.

Academic Integrity

All students must abide by the Cornell Univeristy Code of Academic Integrity. Work you submit on homeworks, the project, and exams *must* be your own (or you and your group's if it is a group assignment).

Note that you are allowed to collaborate with other students or groups on homeworks (but *not* the project or exams). Of course, blatant copying of someone else's work is an Academic Integrity violation. Please write down the names of anyone you worked with outside of your group, and please give links or other appropriate citation to any resources you use outside of the class notes.

Please read the entire Academic Integrity Code; we may reference parts of it on the first-day exam.

Conclusion

Thank you for taking the time to read the syllabus for ORIE 4350. We wish you the best on your performance this semester!