

Fair Grading & Effective Feedback

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Session objectives:

- How to grade fairly
 - How to provide effective feedback
 - How to maximize grading efficiency
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1. Strategies for Fair Grading: As TAs, our goal when grading is to provide students with a fair assessment of their work. Consider the following tips for achieving this target:

- Be clear with your expectations. Communicate to the students the policies for the course (ex. late work penalties and collaboration rules) and the expectations for submitted work. Make sure you talk with your professor **before** the term begins so that you can communicate these expectations accurately. Consider providing a version of the grading rubric or an example problem and solution to students to clarify expectations for written work. Setting these expectations up front will make things go smoother later.
- Use a rubric when grading (see below) and publish it or a solution set when the graded assignment is handed back. Students can then understand why they got the grade they received.
- Provide consistent answers to all questions about grading for all of your students. Also, ensure equal access to your answers. It may help to set limits such as “no clarification questions 24 hours before an assignment is due” or “no questions after the last office hours/recitation/class” so that everyone has the same information.
- When grading with multiple TAs, be sure to communicate with each other for consistent grading. If the assignment can easily be split up, have each TA grade a single question/section. If this is not possible, have all TAs use the same detailed rubric and grade together in the same place so issues can be discussed with the group as they arise. Although this could result in decreased consistency in feedback, if the other two options are not feasible, consider splitting the class into marking sections and have each TA grade for each section. However, be sure to rotate sections between TAs evenly so that each student is graded by all TAs equally.
- Try to ensure you spend an equal amount of time grading each student. It’s easy to spend a lot more time on the first few assignments. Budget your time and use a stopwatch if necessary.
- Take a break! When you are tired you are more likely to make mistakes.

2. Rubric Design Guidelines

Rubrics are scoring tools made by instructors to standardize the evaluation of students’ work. They take time to develop but are useful in speeding up the grading

process and allow you to grade more consistently. If published after graded assignments are returned, a rubric can help students understand the grade they received. Rubrics can also be published when a project is assigned to assist students in meeting your requirements and provide a mechanism of self-evaluation.

When starting to design a rubric, consider which **criteria** you would like to grade. Criteria can include data interpretation in a lab report or teamwork in a group project. When picking criteria think about the course's overall teaching goals and the purpose of the assignment.

Next, for each criterion develop a **scale** of student performance. Scales can have 2 levels if quick yes or no calls need to be made on a minor point or as many levels as needed if complex and integral to the assignment. For example, assessing the level of teamwork in a group project may need 3 levels: contributes and cooperates consistently, contributes and cooperates inconsistently, and does not contribute and is uncooperative. In general, pick the smallest number of levels that distinguishes between different qualities of student work.

Then, assign **points** to each level. At this time you can decide how much weight each criterion will have. Is data interpretation or teamwork more important?

Once your rubric is finished give it a **test run** and mock grade a few assignments. Does your rubric differentiate between different qualities of work? Are there additional criteria you would like to add? Can another grader understand your description of the levels? Reassess as needed.

3. **Strategies for Providing Effective Feedback.** Another important role of a TA is to provide constructive, appropriate feedback to students on their work.
 - Use consistent wording in your feedback as the rubric so it is clear which part of the rubric is being applied to the feedback/grade. A small printout of the rubric with areas circled can directly inform students where improvement is needed and save you time.
 - Be sure to comment on the good as well as the bad.
 - Avoid the temptation to correct/point out every single mistake. While you should still award points appropriately, you should also prioritize your feedback to point out the N most important areas for improvement. The appropriate value for "N" would depend on the nature of the course, the students and the assignment, but a good number might be around 5. You do not want your students to focus on correcting minor spelling/formatting errors when major conceptual ideas (e.g. error propagation) are missed!

4. **Strategies for Efficient Grading.** Below are some tips for saving time while grading without cutting the quality of the feedback:
 - Print out the rubric ahead of time and mark off scores and comments as you grade. Staple the rubric to the assignment.

- On the rubric, add check boxes for common comments to save yourself writing comments on each assignment.
- If multiple students have the same problem with an assignment, do not waste time writing the same comment on each paper. Instead, write your comment once and send it to all students. But be sure not to single out any individual students! You could even create a key and mark a symbol on their paper that corresponds to a particular comment noted in your summary.
- Provide feedback only when it can be acted on, such as rough drafts and homework. For terminal assignments, such as final exams, there is no need to give comments. Some students may want feedback on terminal assignments, and you can provide it if asked.

5. Handling Complaints about Grades. It is important that TAs address complaints about grades in a fair and transparent manner. These tips will help you address these concerns while maintaining fairness.

- Discuss ahead of time with the professor and other TAs any mechanism for students to earn back points on assignments and exams. Having such an option encourages the students to iterate on their work and confront their mistakes. This is essential for learning the course material.
- Having a clear, detailed rubric is essential for transparency and clarity. With the expectations clearly laid out, a rubric is a useful tool for explaining why a student earned a particular grade.
- Make an effort to ensure consistent and transparent treatment of complaints. Ensure any opportunities to earn back points are clearly communicated and made available to all students where appropriate.

6. Family Education Rights and Privacy Act (FERPA)

What is it for?

- Protects the privacy of student records
- Prescribes the release of and access to these records

When is it relevant to TAs?

- Returning of assignments
- Maintaining grades and student information
- Communicating with students (emails, feedback, etc.)

FERPA Pop Quiz! Are these actions okay?

Q1: Can a TA return graded problem sets by leaving them at the front of the room or in a box outside their office?

A1: No, this will allow students to view other students' graded assignments. Instead, some alternative options are:

- Fold assignments in half and staple them. Write the students' name on the front so the name is the only writing visible.
- Place graded assignments in a sealed envelope (envelopes can be reused by asking students to hand in the next homework set in the same envelope).

- Assign codenames or a number to each student. Ask students to use this codename/number instead of their real name on homework they hand in. Be sure to not use a system that is easy to figure out (e.g. do not assign numbers on alphabetical order).

Q2: A student comes to a TA's office to pick their exam and also asks for their friend's exam, because their friend is too sick to pick up their own exam. Can the TA help the sick student out?

A2: No, the sick student must make their own arrangements with the TA to pick up their exam at a later time. (Also see the next question!)

Q3: Midterm exams were returned today but a student was too sick to pick up their exam. They email the TA to ask for their grade. Can the TA send the grade via email?

A3: The TA can send grades via email only if the TA can verify the student's identity. The Caltech FERPA office suggests that you:

- Send the email to their **caltech.edu** email address only (the student must use their access.caltech credentials to access this email).
- Put the grade in the body of the email, not in the subject line.
- If sending grades to more than one student, send each student a separate email.

Q4: After an exam, some students ask the TA for statistics on the grades, for example, the mean and standard deviation. Can the TA provide this information?

A4: Yes, this is okay to provide as long as individual grades cannot be identified. The Caltech FERPA office suggests that you only do this when the class size is greater than 10 students.

Contacts and Resources

- FERPA: Mary Morley, mmorley@caltech.edu
- Undergraduate honor code violations: Board of Control, boc@ucgs.caltech.edu
- Graduate honor code violations: Graduate Honor Council, GHC@caltech.edu
- Teaching questions and advice: Center for Teaching, Learning and Outreach, ctlo@caltech.edu
- General concerns:
 - Graduate Dean's office: gradofc@caltech.edu
 - Undergraduate Dean's office: 626-395-6351
- Other resources to talk to:
 - Head TA, Professor, Other TAs, previous TAs!

References

- Walvoord B.E. and Anderson V.J. Effective grading: A tool for learning and assessment.

- Center for Teaching Vanderbilt University: Grading Student Work
cft.vanderbilt.edu/teaching-guides/assessment/grading-student-work/

Grading & Feedback Appendix A: Example Written Assignment Rubric

This is for an example assignment where students must submit a summary of assigned textbook readings for that week. Note that each criterion can have a different scale.

Total: 10 points

1. The work covers all assigned materials (2 points)
2 points: All readings are covered.
1 point: At least half of the readings are covered.
0 points: Less than half of the readings are covered.
2. Each completed reading is correctly summarized (2 points)
2 points: All attempted readings are correctly summarized
1 point: At least half of the attempted readings are correctly summarized
0 points: Less than half of the attempted readings are correctly summarized
3. The work connects the readings with ideas discussed in lecture (4 points)
4 points: All important ideas and concepts are well covered.
3 points: Only one important point or a few minor points missed.
2 points: Multiple important points are missed.
1 point: The student made an attempt but was unable to demonstrate a connection between the lecture material and the reading.
0 points: No attempt was made.
4. The readings are correctly referenced in proper bibliographic format (1 point)
1 point: Yes. 0 points: No.
5. The spelling and grammar did not impede understanding (1 point)
1 point: Yes. 0 points: No.

Grading & Feedback Appendix B: Example Problem Set Rubric

Mathematical problems may be more difficult to create rubrics for because the distribution of points would heavily depend on each problem, as you decide how much each step is worth. So, you might make a marking rubric for the TAs only in order to decide how partial credit is awarded so that every student is graded consistently (i.e. a “scale”).

Each problem might have a different grade breakdown: some may require a derivation, some are just plugging in numbers, some involve plots or diagrams, and some might involve short answers or essays. So, it might not be possible/practical to communicate the rubric to students. Instead, consider writing a list of **general problem set guidelines**

(see example in Appendix C) and/or provide an example of a completed problem set that would score highly.

For your own reference though, here are some examples rubrics for three example “problem set” type questions. Here, we abbreviate the criteria---a TA would still have to develop a scale for each criteria.

Example 1: Compute the electric field of a sheet of charge with charge density X .

Example 2: Fit your experimental data and compute the exponential decay constant. Compare your result to the expected value.

Example 3: Using a diagram, draw a cross section of the Earth, to scale, labeling important depths and the main mineral composition in each layer.

Example 1	Example 2	Example 3
Correct approach (2 pts)	Convert to log-space (1 pt)	Depths (2 pts)
Explains steps (2 pts)	Correct linear fit (2 pts)	Diagram to scale (2 pt)
Shows work (2 pts)	Plot showing best fit (3 pts)	Layer names (2 pts)
Correct answer (4 pts)	Discussion of differences with expected value (4 pts)	Correct minerals in each layer (4 pts)
Total: 10 points	Total: 10 points	Total: 10 points

Grading & Feedback Appendix C: Example Problem Set Guidelines

Here is a real example of problem set guidelines used in Ge/Ay 117 in 2015.

Ge/Ay 117 Problem Set Expectations and Grading

Henry Ngo

The goal of this course is to help you develop Bayesian analysis tools that you can apply to your research. Bayesian analysis is best learned through practice, and the problem sets are designed to help you do exactly that! Therefore, with these goals in mind, the problem sets will be graded by the following guidelines and expectations:

- 1. Your own original work is required.** You are encouraged collaborate with others to discuss the problems, but the actual work (writeup, plots, code) must be created individually by you (refer to syllabus for more details). Many problems involve writing code that you can use in later problem sets and/or research.
- 2. You may type or handwrite your work,** as long as it is legible. However, if you choose to type your work, please typeset your equations (e.g. LaTeX or MS Word Equation Editor) as it is hard to read equations written like: $A=x^5y/(3-t)$.
- 3. You may code in any language you like.** Use something you are comfortable with or something you would actually use in your research.
- 4. But, do not hand in any code.** Unless explicitly requested, do not print out or email your code when you hand in your work.
- 5. Do not use “canned” packages when the problem explicitly asks you to compute something in a certain way.** For example, many software packages include functions to do something like a

polynomial fit. However, the problem set will often ask you to write code to do something like this yourself. Since the problem sets are designed to help you learn how many standard fitting algorithms work, you will be expected to avoid using these “black box” routines and instead write the code yourself. This way, you will have a full understanding of how the routine works! You may use the canned packages to check your work though.

6. Provide a logical narrative of your computations to guide the TA through your thoughts and math. You will be graded on your ability to explain your answers as well as the correctness of your answer. So, when computing a value, please use some words in between your equations to explain what you are doing. When you are asked to compute something with a code, write a few sentences to explain what you computed and how you generated the output. Do **not** explain your work by attaching your code (even if it’s commented). See the provided examples.

7. Your plots should effectively present the required information. Please label your axes properly, use clear labeling of different lines and use your judgment to ensure your plots communicates your data/results well (such as choice of plot type, colours, and range of your axes). Sometimes, plotting normalized probabilities rather than absolute values results in a more effective plot. All your figures should have captions and/or be described in your writeup.