

Graduate Teaching Workshop - Grading Guidelines

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Introduction

Grading is usually the *primary* responsibility of a Teaching Assistant. As such, it will take up the most time, not just in the process of grading but also in defending your grading methodologies to the professor and to the student. Grades generally have been used for the following purposes with varying degrees of validity (Wankat and Oreovicz, *Teaching Engineering*, 1993, p. 229):

- Reward or penalty for student accomplishments
- Communication to others about what the student has accomplished
- Predictor of future performance

Regardless of where you stand on the value of grades, you are being paid to give a quantitative assessment of your confidence in this student's understanding of the course material. Others will use this information to determine whether a student is ready for future work, rewards, or should be held back. So your actions can have potentially far-ranging consequences.

The Course Instructor is ultimately responsible for the following

- *Assessing* the student's skill level and knowledge based on their performance in the class
- Attaching a grade to the student's performance throughout the quarter.

As a grader, you are primarily responsible for

- *Scoring* the student's deliverables (exams, assignments, presentations)
- Helping them learn from their mistakes by your written and oral feedback.

There are many different philosophies about how grading should be approached but at minimum, you will need to obtain or develop a quantitative and objective assessment criteria. This criteria measures student performance against a set of expectations outlined by the course instructor and the syllabus. This means careful evaluation of their work, positive and corrective feedback, and maybe follow-up sessions to help them understand what went wrong.

The Teaching Assistant also has a secondary responsibility to the student. Grades are a poor feedback mechanism because they only address the end result. Consider a class with only a midterm and a final as the assessment criteria. A student has only one chance at a midcourse correction to demonstrate their performance. So while the TA is not the *primary* point of instruction, through the process of grading the deliverables, they become an essential *secondary* point of instruction by providing feedback on those assignments

Teaching Assistant Responsibilities for Grading

- You should grade all material in a fair and consistent manner.
- You should ensure that students know when they can expect their assignments graded and returned, consistent with the course syllabus. The TA should adhere to these guidelines (you'd expect no less from your instructors).
- You should ensure that the students receive the assignment description and all supporting documents on time.
- You should grade all assignments / exams with a set of *grading criteria*, either developed by the course instructor or yourself, that can be made available to students after grading to resolve any disputes. Grading criteria should be made available to the students with the assignment description / exam.
- You are strongly encouraged to give students feedback about what they did correctly and incorrectly.

General Guidelines for Equitable Grading

Grading can become one of the bitterest topics of contention in a class if not approached properly. Poor grading can interfere with a student's willingness and motivation to learn because the student's will not perceive the correlation between what they've learned and how they're being measured. Instead, they will feel victims of an arbitrary assessment system that doesn't measure what they believe they've achieved.

Student complaints are often thought of as noise and whining, and some of it may fall into that category. In reality, students complain when a strong mismatch results between the expectations of a student, honestly based on what they believed to be their success in achieving the goals of the class, and the assessment of their success by the TA or the instructor.

Dealing With Students Complaints About Grading

- “You made a mistake. The answer is correct and here's why...”
- “You never said we had to know this for the test / assignment / paper.”
- “This is what you told us to do. Why did you take off points?”
- “My friend got the exact same answer as I did but I lost more points for it.”
- “I did more analysis and work here than the other projects but you took off more points because some of my analysis was wrong?”
- “I don't understand why you took off points here. I got the right answer.”

You should make the assumption that your students are attempting to pass the class in good faith. This means that they are doing the reading, the assignments, and attending lecture. When they come up with these complaints, it's likely that they have a good reason for them. It is your responsibility to evaluate them on a case by case basis. After some filtering, you will inevitably discover that some of these complaints are just bargaining. It is much better to be proactive and keep these situations from occurring in the first place.

The majority of the student complaints about grading can be categorized as issues of fairness and consistency.

- *Fairness* can be tied back to the class material and expectations. Did the assignment or exam properly evaluate the student based on the assessment goals and expectations outlined at the beginning of the term? Given the course prerequisites and class material, could a student accomplish the goals of the assignment? These really have to be addressed when the assignment is created. Occasionally, you will discover that the assignment may have exceeded the parameters of the class — beyond just challenging the students to learn. In these cases, you may want to adjust grades accordingly and reevaluate the design of the assignment.
- *Consistency* has to do with how the grades were assigned relative to the rest of the class. The more graders, sections, and people, the greater the variability of the grades. This is a classic problem in educational assessment. There are numerous confounds to being objective. For example, fatigue can play a big factor in how you grade papers. If you're tired and irritable, you may tend to grade later papers harshly compared to earlier ones. If you're just tired or bored, you may grade later papers with less rigor.

Some Suggestions for Grading

- General suggestions include:
 - Give yourself enough time to grade a set of assignments. Try to grade them in the same relative time blocks but remember to take breaks if you get tired or start to drift.
 - If there are multiple sections across students, grade one section/problem at a time.
 - Make sure you look over your grades, if you have time, and check for inconsistencies.
 - Give feedback on every assignment that you grade.
 - Double check your math.
 - Always keep the larger learning context in mind - does the student demonstrate an understanding of the material - implementation aside.
- *Don't change a grade without a good reason!* Remember that your job is to be fair and equitable. Changing a grade means that you may be making an exception that will treat other students unfairly (and word **will** get around). On the other hand, because you are the grader, you may feel that a special

circumstance or a student's effort and interest in the course may warrant it. If you're not sure, feel free to refer the student to the course instructor.

- You are required to have grading criteria when grading. Make sure that these are made available to the students. For large assignments, make sure that they see the criteria before they begin. This way, the students can work to gain the knowledge, skills, or work that will meet your expectations. If you're clever about how you design the criteria, you can sneak in some teaching goals. Note: If you alter the criteria during the course of grading, make sure that the students know this and are aware of your rationale..
- Remember that a grade is an abstract measurement that represents what the students know or can do. Normal distributions exist because given an average group of students you will have a mixture of high and low learners. But you should watch for other distributions and statistical indicators. Where is the mean and where did you expect it to fall? Is the distribution bi- or tri-modal? Is the scattering completely random. This could be indicators of poor assignment or test design or uneven grading procedures.
- When determining how much a problem is worth or how much the student has earned. Try to enumerate points in your grading criteria as positive values. It's much more objective to start with some total value and to assign an answer a % of the total than to develop a list of negatives and subtract from the total.

Bad Example: InsertionSort (10 points)

- 5 doesn't sort the list
- 3 wrong data structure used
- 6 wrong algorithm used
- 1 poor style.

Clearly, you can take off more than 10 points from this criteria if you're not careful.

Better Example: InsertionSort (10 points)

- 3 points, Algorithm does a partial sort
- 7 points, Algorithm works but student used a poor data structure
- 4 points, Algorithm sorts but it's not an InsertionSort.
- 9 points, Algorithm works but poor style
- 0 points, Algorithm crashes

Giving Good Feedback

- Make sure that anything you grade has feedback on it that will help the student understand the following.
 1. what went wrong to prevent future errors.
 2. what they did correctly to preserve that behavior.
 3. what they can do to improve their current level of knowledge or ability.
- Part of your role as an educator is to encourage as well as evaluate. When discussing assignments or exams, make sure you say something positive about what the students have done (except in that rare case where their work has no merit) and how they can improve. Positive feedback helps encourage students to continue working. For example:
 - “You didn’t get the right answer because you missed a step here. Otherwise, most of your solution was fairly well done. Next time, just remember to follow through with this step and you’ll be fine.”
 - “I like the way you set up your discussion in this paragraph. However, I don’t follow where your example is going. I think if you came up with a stronger case, you will have a better section here.”
- Don’t overly criticize your students. It may convince your student that there is no use in continuing. Remember that it took you some time to acquire the knowledge that you have now. Remember the saying that it’s much easier to lead a donkey with a carrot than a stick.
- Good students need encouragement also. An ‘A’ is just one form of reward. You can help them improve their own knowledge by pointing out where they can go with what they know or showing them additional resources that they can access.
- Don’t overload students with feedback.
- Lastly, make sure your students know that you have confidence in their ability to do the work that you’ve outlined for them.

Miscellaneous Grading Issues

I'm spending 50 hours on grading. Is it always like this?

No and It Depends. Instructors are sometimes notorious for giving long tests but you should also be conscious of spending too much time on trying to catch every little error. Remember that your job is to assess something based on a set of grading criteria. The criteria should be the final arbiter. For example, if a program fails to pass a test, feel free to debug it for fun but don't spend a lot of time on it. The students obviously turned in something that didn't meet the criteria. Highlight the critical sections, offer some debugging suggestions, and move on. If you're grading a long test or an essay, you may just need to spend that much time. Remember that the burden of learning the material should be on them. It's difficult to repair a lack of understanding or effort through feedback. If you think that you're doing too much work, get some feedback from other teaching assistants.

Should I accept late assignments?

If your course instructor hasn't set up a policy for this, you should discuss this with them. Nothing in life is absolute but you do have to set up some standards of fairness. Does a student who turns an assignment in late have an unfair advantage over those who turned it in on time? Maybe. But you're ultimately not doing them any favors by allowing them this grace period because they're getting behind on other assignments, including the class reading. On the other hand, sometimes a student may be unavoidably detained. A fair general policy is to set up a schedule for point deductions for late assignments then deal with individual cases as they occur. If a student has not notified you ahead of time or has been habitually tardy, it is perfectly acceptable to refuse the assignment because your time is valuable also.

That said, I've sometimes ignored the late penalties because I'm more concerned with the quality and depth of work than I am with the exact day that it was turned in.

Should I accept assignments that don't meet the submission criteria?

If your submission criteria is absolute, for readability, compiling, or evaluation purposes, and you've made the submission criteria an important part of the assignment then it's acceptable to reject the ones that don't. If the submission criteria are really guidelines then determine whether the assignment still meets the learning goals and evaluate it based on this. It is entirely within your right to refuse or return an assignment ungraded because it does not meet the criteria and to give the student a chance to resubmit.

What if I don't understand a student's solution but they seemed to get the correct answer?

Flag it and come back to it when you have more time. They may be using an alternate approach or they made two wrongs and achieved a right (rare). If you're still not sure, check with the instructor. It may even be useful to not assign a grade to it and have the student meet with you. If they can convince you that they understand their solution and they understand the "correct" approach, let them have the points.

What if I suspect academic dishonesty?

It's different for each type. If you suspect copying on an exam, try and find the matching answer. Make sure you keep track of the students sitting next to the offender. If you suspect the student copied from other code, there are programs available in the College that will help you to detect this. If you suspect plagiarism (very prevalent with the World Wide Web search engines), try to follow up through the references or through a quick Web search. In all cases, let your instructor know that this may be a problem and show them your evidence. **Do not confront the student yourself!!!!** I can't stress that enough. You should insulate yourself from this unfortunate aspect of teaching. It is your job to refer the student to your instructor. If there is sufficient evidence, the issue gets referred to the Dean of Students who handles disciplinary action.

Program Grading

Things the Students Should Have

- The assignment description and submission deadlines
- Coding style requirements
- General grading criteria (what will the program get if it crashes, produces wrong output, etc.)
- Assignment submission procedures
- Access to the compiler or evaluation environment
- Any support code necessary to complete the assignment.
- Sample input and output files (if appropriate - you may require them to generate their own)

Things You Should Have Prior to Grading

- The assignment description
- Access to the compiler or evaluation environment
- The location of the student's submissions
- Test sets that match the assignment criteria.
- Sample Data and Answer Files (or Program Running Characteristics)
- Style guidelines (That have also been made available to students)
- The Cheatfinder program (to catch duplicate code)

Things You May Want Prior to Grading

- Is an autograder available? Is there a batch file that will allow you to take the assignments and automatically generate output files?
- A spreadsheet or grading sheet for documenting what the students get.

Suggested Criteria Items

You'll need to assign some point values to the following items.

- Does the program compile?
- Does the program crash while running?
- Does the program produce incorrect output?
- Did the program meet all the assignment criteria?
- Is there sufficient documentation?
- Does the program have good style or design?
- Did the student use good software engineering processes in building or designing the code?
- How efficient is the code?

Suggested Procedures

1. Make sure you understand the program assignment.
2. Download the code from the students and print it out. (Note: Using 'enscript -2rG <assignment name>' on your Unix account will save paper). You may want to review all the code before you start compiling it. Some code will be definitely wrong and you can save yourself some crashing and core dumps.
3. Develop a batch file that compiles the code and runs the sample inputs on them if there isn't one already. This will save you *lots* of time.
4. Check the program output. It's up to you to decide whether the formatting was done correctly but don't quibble too much over white space and carriage returns.
5. Look at the code.
 - If there were errors, what caused them and did the student document these bugs in the program header? (You should strongly encourage students to document their own errors and take off fewer points for them as opposed to errors you have to discover on your own).

- Did the program meet the class style requirements - good modularity, self-documenting code, good commenting, etc.?
 - Did the student fake the output? (Don't laugh, you'd be surprised what people try to pull off. We've seen students hard code entire graphs into their programs).
6. Give some feedback or corrective code to the procedures that produced wrong results. Be sure to note and encourage particularly good code.
 7. Make a list of common errors and recommendations to hand out to students with the assignments.
 8. Total the points and record them.

Sample Criteria

This is from a freshman level assignment. Programming assignments for upper level students and graduate students will have more of the points distributed to implementation rather than style.

Implementation of P3 :	[] /	60

1. followed correct algorithm	[] /	15
2. item.java performs as expected	[] /	10
3. shelf.java performs as expected	[] /	10
4. warehouse.java performs as expected	[] /	15
5. all classes support driver	[] /	10
Extra Credit :		

1. used DEBUG constant	[] /	+3
2. used Main in each class for incremental programming.	[] /	up to +7
Programming Style :	[] /	40

1. Documentation: purpose, @param, @return...	[] /	10
2. Documentation: in-line	[] /	5
2. Flow Mechanisms	[] /	5
3. Subroutine Scope and Parameters	[] /	5
4. Data Structures	[] /	5
5. Modularity	[] /	5
6. Overall Style (layout, constants, etc.)	[] /	5

Exam Grading

Things the Students Should Have

- A list of exam topics.
- A description of the exam (length of time, type of questions, materials they will need to supply)
- The exam date and time.

Things You Should Do While Proctoring an Exam

- Make sure that all students have the same amount of time to work on the exam. This means fair start times and making sure all tests are in when you call time.
- Write the time remaining for the exam where the students can see it.
- Be available to answer questions. Write answers to general questions on the board (mistakes on the exam questions for example).
- Watch for students that may be cheating. If you think you see this, document the incident. **Do not confront the student about what you suspect!!!!** You may ask a student to move to the front row. Let the course instructor know about the incident or to deal with the situation if they are present.
- Make sure that you have all the copies of the test after class.

Things You Should Have Prior to Grading

- You should also have looked the exam over for errors prior to giving it.
- The answers to the exam
- Grading criteria (you may have to generate these yourself but make sure that the person who wrote the exam has a first pass at this).

Things You May Want Prior to Grading

- A spreadsheet for recording student grades

Suggested Criteria Items

- Correctness of the solution
- Correctness of the procedures used to reach the solution
- Creativity in approaching the problem

Suggested Procedures

1. Look over all the exams before starting. Get a feel for what was answered well and what wasn't. Look at what you think is the best answer and what you think is the worst answer.
2. Make sure you have an uninterrupted block of time to look these over.
3. Grade one problem at a time. (Grade everyone's 1st problem, then the 2nd, and so on.) When you finish with that problem, look over the exams in reverse order to make sure you've graded evenly. Try not to take a break between problems. Make sure you've graded everyone's exam for that problem before stopping. This will help reduce inconsistency.
4. If the exam answers aren't being made available to students, make sure you write down what was incorrect about the problem. (It's much easier to make the answers available).
5. Make sure you explain why their approach was incorrect.
6. Double-check your math when you're done.
7. It couldn't hurt to generate a class average and standard deviation.

Sample Criteria

3. Describe and diagram a 4-bit ripple carry adder. Show how the following input will be evaluated by your adder: $101 + 110$. (15 points)
- A. Description of ripple carry adder (3 points)
- 2 points - correctly describes what a ripple carry adder does
 - 1 point - Mentions why it is called a “ripple-carry” adder.
- B. Diagram of ripple carry adder (5 points)
- 4 points - correctly diagrammed AND/OR gates of adder
 - 1 point - remembered input and outputs of adder.
- C. Example diagrammed correctly (2 points)
- 1 point - returned correct answer
 - 1 point - showed correct bits carried from one adder to the next..

Notes made during grading

B - 2 points - logic is slightly wrong in an adder but general implementation correct

B - 5 points - Only diagrammed one adder and 3 black boxes, as long as adder is correct. (Including input and output).

Problem / Short Answer Grading

Things the Students Should Have

- A list of problems and page numbers or an assignment sheet with the problems.

Things You Should Have Prior to Grading

- You should look over the problems and generate your own answers first.
- The answers to the exam
- Grading criteria

Things You May Want Prior to Grading

- A spreadsheet for recording student grades

Suggested Criteria Items

- Correctness of the solution
- Correctness of the procedures used to reach the solution
- Creativity in approaching the problem

Suggested Procedures

1. Make sure you understand what is being asked. Sometimes, problems can be very ambiguous. If there are some different interpretations of the problem resulting in different solutions or approaches, make sure you understand these before you arbitrarily take off points for not meeting your solution.
2. Grade one problem at a time. (Grade everyone's 1st problem, then the 2nd, and so on.) When you finish with that problem, look over the assignments in reverse order to make sure you've graded evenly. Try not to take a break between problems. Make sure you've graded everyone's assignment for that problem before stopping. This will help reduce inconsistency.
3. If there are missing or unexplained steps in a proof or equation, make sure you highlight these and ask the student to reflect on the logic.
4. If the answer is incorrect, check to see if it was an arithmetic error (everyone hates being penalized for a stupid mistake - make sure the logic is correct).
5. Give positive feedback for good solutions.
6. Make sure your math is correct when adding up the points.

Essay and Term Paper Grading

Things the Students Should Have

- The Problem description and due date
- A set of assignment requirements - including minimum length, style guidelines, formatting, and topics. (Suggestion: Don't accept handwritten papers!!)
- The source materials necessary to generate the Essay or Term Paper

Things You Should Have Prior to Grading

- You should also have looked the topics over.
- You should make sure you have a fairly good understanding of the class material.
- Some general grading criteria. Because of the qualitative nature of these types of assignments, you may want to develop some major categories of points and assign students some % of the points per category for meeting your criteria.

Things You May Want Prior to Grading

- A spreadsheet for recording student grades
- A large block of time to read and grade these.

Suggested Criteria Items

- Accuracy of the logic used to argue the point of the paper
- Documented support of the major points.
- Correctness of the procedures used to reach the solution
- Creativity in approaching the problem
- Quality of the overall presentation
- Quality of the overall paper layout and writing style.

Suggested Procedures

1. If the assignment is an essay, take a first pass at the first 5 and get a feel for what students are saying. If there are multiple topics, divide up the assignments into stacks and evaluate each stack separately.
2. Don't be too overly impressed with a good layout and diagrams. Make sure that they set out a good argument or presentation and defended it with well constructed statements, documented sources, or experimentation.
3. If there's some ambiguity with what's being said, make a note of it and finish reading it first. The paper may resolve it later on.
4. You should grade backwards and forwards to make sure you're applying the criteria evenly.
5. Grade first for content then style - unless the style is glaringly poor. In the second case, you should make style corrections as you go just so you don't have to do it on a second pass.
6. Make sure your feedback asks questions about where the logic failed or where you didn't understand a point the paper was trying to make. In some cases, you may be able to cite other papers or class readings that they should have looked at. Make sure you encourage good argumentation.
7. When you've finished, it couldn't hurt to look the whole set over as a group.
8. Again, make sure your math is correct.

Sample Criteria

Final Project Grades

Team:

Members:

Grading:

Points	Total	Category
	40	Final Report
	5	Summary
	10	Project Process
	5	Support Documents
	15	Results of Implementation / Conclusion
	5	Future Work
	20	Project Presentation
	15	Content
	5	Delivery
	20	Project Post Mortem
	5	Analysis of Project Schedule
	10	Analysis of Project Process
	5	Lessons Learned
	10	Overall Management and Organization of Project
	10	Overall Acceptance Criteria of Project
	100	Total

Comments:

Presentation Grading

Things the Students Should Have

- Presentation Materials (slides, overheads, on-line presentations and so on)
- All team members should be present (assuming it's a team project).

Things You Should Have Prior to Grading

- A Watch or Timer to keep track of presentation length.
- A grading sheet for the group presenting.

Things You May Want Prior to Grading

- Cards indicating the length of time remaining for the talk.
- You may want to verify that all equipment is working properly prior to class.

Suggested Criteria Items

- Organization and coherence of the talk.
- Quality of the content provided (does it address the assignment parameters?)
- Quality of the visual aids.
- Logic used to argue the main points of the presentation.
- The ability of the presenters to answer your questions and those of the audience.
- Creativity in the presentation.

Suggested Procedures

1. Make sure that all students have scheduled a day and time to present a couple weeks in advance. This will help you to plan for those days.
2. Set up guidelines in the assignments for the length of time they will have to present and to answer questions.
3. If your students are inexperienced in giving presentations, give them some suggestions.
4. Check to see if any presenters have any specific audio-visual needs that you will need to address prior to the class.
5. If the presentation needs to be on time and finished on time, make sure you have a watch handy and some way of reminding the presenter(s) of the time remaining.
6. In a large room or auditorium, try to get microphones.
7. Make sure you have a grading sheet available.
8. Take notes during the talk on the grading sheet. This will be feedback for the student.

Sample Grading Criteria

Final Presentation Grades

Team: _____

Grading:

Please note that grading should be based mostly on the quality of the presentation content and not on the content itself (this will be addressed elsewhere in project grading and can be noted in Notes for Grader). Notes about how the content should be graded will be made in the sections provided below.

Points	Total	Category	Description
	50	Content	
	5	Opening Statement	Presentation opening should discuss goals, project objectives, motivation.
	10	Project Process	Discussion of project process - research, implementation, development issues, etc.
	15	Findings / Results	Justification of project - did team give good arguments or proof for how they addressed goals?
	5	Closing Statement	Talk closes with overview, conclusion, and restatement of goals.
	10	Discussion	How well did team handle questions from customer / instructor?
	5	Overall Design	How was flow of talk?
	20	Delivery	
	5	Clarity	Is speaker(s) understandable?
	10	Visuals	Are visuals easy to read and understand?
	5	Engagement	Does speaker engage audience?
	5	Discretionary Points	These points are assigned at speaker's discretion for overall quality, effort, or novelty.
	75	Total	

Notes for Grader:

Comments for Group: