Exploring Approaches to Grading:

Philosophies & Methods for Assessment & Feedback

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What is Being Assessed? … Progress toward Goals

Goals/Objectives can exist at *all levels*

- Goals/objectives for a single section, chapter, or unit, or for entire course

1. Content Goals

- Theories, formulas, terminology & vocabulary… **"what" and "why"** of your subject
- Example: *Law of Falling Bodies (all masses fall with the same constant acceleration) & related formulas*

2. Practices (Process Skills)

- Thought processes, tools, skills, etc., used in the application of content goals… **"how"** people carry out work in your subject
- Examples:
  - *Deriving new equations from other formulas*
  - *Using laboratory equipment & choosing the best/correct tool for the task*
  - *Keeping a proper lab notebook & recording data*
  - *Repeating measurements & combining them statistically*
  - *Applying the scientific method & deriving valid conclusions from data*
  - *Using scientific style for writing & speaking*
  - *Working productively with partners/colleagues*

3. Attitudinal Goals

- Individual feelings of enjoyment, interest, seriousness, fun, ethical importance, etc., associated with subject matter

4. Community-Building Goals

- Classroom established as place of learning, inquiry, openness, acceptance, etc.
- Sense of belonging to larger field-of-study (e.g., larger community of astronomers or chemists)

Formative vs. Summative Assessment

Formative Assessment

- ***During*** project or task, "on-the-fly"
- Often is ***informal*** (no records or scores)
- Can be recorded as ***formal*** notes, impressions, or scores — *examples:* points for keeping good records, employing new skills, good teamwork, staying on task, etc.
- Examples:
  - *Classroom "facilitation"*
    - Circulate through class during lab experiment, small-group discussions, etc.
    - Listen first!
    - Ask questions (usually "Socratic") to help students clarify their ideas, move away from erroneous conclusions, or adhere to desired task goals
  - In-class *clicker questions*
  - Very short *mini-quizzes*

Summative Assessment

- ***At end*** of project, task, or unit of study
- Usually is ***formal*** — end-of-unit exams, final course exam, final course letter grade
- Should use clearly articulated rubrics, grading matrices, or other tools to provide ***structure*** and ***objectivity*** (see below)

TA Responsibilities Vary Widely!

- *Minimal*: grading assignments, holding office/tutoring hours, maybe attending lectures
- *Maximal (conducting entire course):* preparing & delivering weekly mini-lectures; writing quizzes; determining requirements, formats, and grading criteria for lab reports; calculating final letter grades (*example:* Intro Physics labs)
- *Somewhere in between:* (*example:* Organic Chemistry labs, Biology 275 lecture)

Tools for Grading & Assessment

Use a Quantitative Basis for Scoring

- Use **numerical "points"** (instead of letter grades) on individual assignments, exams, lab reports
- Award **partial credit** for correct steps/methods, even if final "answer" is wrong

Scoring Single Questions or Problems:

- Create a ***"mini-matrix"*** or ***"mini-rubric"*** for each question (or part of question) — this makes partial credit easy to award

Example:	2 pts.	Correct formula and setup
	2 pts.	Correct calculation steps and substitutions
	1 pt.	Correct units and significant figures on final answer
	5 pts.	*Total*

- *Choose a **maximum score** that is…*
  - Not "too coarse" (too few points possible)
  - Not "too fine" (too many points possible)
  - Fractional points? … Avoid them!
- Score the ***same question*** on all papers before proceeding to the next question
- Establish a mental "curve" for partial-credit as your grading proceeds on a single question
- Trust your judgment!

Scoring Lab Reports, Essays, and Large Projects:

- Use a ***rubric*** with detailed descriptions of levels of accomplishment (see next section: ***Rubrics***)

- Or use a ***"matrix"*** (like a highly simplified ***rubric***) to give **basic breakdown** of points (see next section: ***Basic Point Matrix****)*

- Fill in a **blank rubric or matrix sheet** while grading, then attach to graded report

- Distribute your matrix or rubric at **start of course** (with initial course syllabus) *or* **when task is first assigned**

- Can accompany with **exemplar(s)** of excellent student work (get student's permission and remove names or identifiers) or create your own sample report
  - *Note:* This can be hard to do without giving away the "answers"!

- *Don't be **too lax** or **too harsh*** in your scoring!
  - Talk with supervising professor & other TAs, and be **consistent** with them.
  - Strive for a **spread** of scores.

Rubrics

- Examples — see Manoa Assessment Office website:
  `http://manoa.hawaii.edu/assessment` — links: "Create Rubrics" and "Rubric Bank"

- ***Performance Criteria (Characteristics)*** axis

  - Itemizes **content, skills,** and/or **behavior** expected (and which will be evaluated) in assignment
  - Each criterion is given a **relative weight** (either percentage or integer multiplier factor)

- ***Evaluative Range (Level of Mastery)*** axis

  - When multiplied by a criterion's **weight**, this value translates to **points**

  - Most rubrics employ between 3 and 6 levels. I recommend ~5 levels:
    4 = **Exceeds** criterion/expectations <— *reserved for truly exceptional work*
    3 = Fully **meets** criterion/expectations <— *this is "full credit"*
    2 = **Approaches** criterion/expectations
    1 = **Beginner**-level execution of criterion
    (0 = Criterion **absent** in work)

  - Choose a scale that is not too *coarse*, not too *fine*!
  - Stick to *integer values* when evaluating.

- ***Grid***

  - When first distributed, rubric grid contains (somewhat repetitive) **performance descriptions** in each and every square

  - Can use an **empty matrix** for actual scoring (***same axes***, but with descriptions stripped out)

- Distribute rubric at **start** of course (with initial course syllabus) or when task is first assigned… *not* when the graded assignment is returned!

Design Project Assessment Rubric
(sample analytic rubric)

Course No.: _____ Date: _____

Team/Student: _____ Reviewer: _____

Topic (Weight)	Unacceptable (0)	Marginal (1)	Acceptable (2)	Exceptional (3)	Points
Design Problem and Boundaries (1)	Little or no grasp of problem. Incapable of producing a successful solution.	Some understanding of problem. Major deficiencies that will impact the quality of solution.	Overall sound understanding of the problem and constraints. Does not significantly impair solution.	Clear and complete understanding of design goal and constraints.	
Alternative Designs (2)	Only one design presented or clearly infeasible alternative given.	Serious deficiencies in exploring and identifying alternative designs.	Alternative approaches identified to some degree.	Final design achieved after review of reasonable alternatives.	
Use of Computer–Aided Tools (2)	Serious deficiencies in understanding the correct selection and/or use of tools.	Minimal application and use of appropriate tools.	Computer–aided tools used with moderate effectiveness to develop designs.	Computer–aided tools are used effectively to develop and analyze designs.	
Application of Engineering Principles (2)	No or erroneous application of engineering principles yielding unreasonable solution.	Serious deficiencies in proper selection and use of engineering principles.	Effective application of engineering principles resulting in reasonable solution.	Critical selection and application of engineering principles ensuring reasonable results.	
Final Design (3)	Not capable of achieving desired objectives. No implementation of resource conservation and recycle strategies.	Barely capable of achieving desired objectives. Minimal utilization of resource conservation and recycle potentials.	Design meets desired objectives. Moderately effective utilization of resource conservation and recycle potentials.	Design meets or exceeds desired objectives. Effective implementation of resource conservation and recycle strategies.	
Process Economics (1)	No or totally erroneous cost estimates presented.	Reasonable cost estimates presented, but no profitability analysis included.	Reasonable profitability analysis presented, but no interpretation of the results.	Effective use of profitability analysis leading to improvement recommendations.	
Interpretation of Results (2)	No or erroneous conclusions based on achieved results.	Serious deficiencies in support for stated conclusions.	Sound conclusions reached based on achieved results.	Insightful, supported conclusions and recommendations.	
OVERALL PERFORMANCE	**Unacceptable**	**Marginal**	**Acceptable**	**Exceptional**	**TOTAL**
POINTS REQUIRED	**0–9**	**10–19**	**20–29**	**30–39**	

*Rubric shared by Connie M. Schroeder, University of Wisconsin-Milwaukee on the POD listserv, April 14, 2008.

Another sample rubric, for Oral Presentations:

Sample Rubrics Packet

From Dannelle D. Stevens, Ph.D.,

3 to 5 level Rubric Example

Changing Communities in Our City

Task Description: Each student will make a 5 minute presentation on the changes in one Portland community over the past 30 years. The student may focus the presentation in any way s/he wishes, but there needs to be a thesis of some sort, not just a chronological exposition. The presentation should include appropriate photographs, maps, graphs, and other visual aids for the audience.

	Excellent	Competent	Needs work
Knowledge/ Understanding 20%	**The presentation demonstrates a depth of historical understanding by using relevant and accurate detail to support the student's thesis.** **Research is thorough and goes beyond what was presented in class or in the assigned texts.**	**The presentation uses knowledge which is generally accurate with only minor inaccuracies, and which is generally relevant to the student's thesis.** **Research is adequate but does not go much beyond what was presented in class or in the assigned text.**	**The presentation uses little relevant or accurate information, not even that which was presented in class or in the assigned texts.** **Little or no research is apparent.**
Thinking/ Inquiry 30%	**The presentation is centered around a thesis which shows a highly developed awareness of historiographic or social issues and a high level of conceptual ability.**	**The presentation shows an analytical structure and a central thesis, but the analysis is not always fully developed and/or linked to the thesis.**	**The presentation shows no analytical structure and no central thesis.**
Communication 20%	**The presentation is imaginative and effective in conveying ideas to the audience.** **The presenter responds effectively to audience reactions and questions**	**Presentation techniques used are effective in conveying main ideas, but a bit unimaginative.** **Some questions from the audience remain unanswered.**	**The presentation fails to capture the interest of the audience and/or is confusing in what is to be communicated.**
Use of visual aids 20%	**The presentation includes appropriate and easily understood visual aids which the presenter refers to and explains at appropriate moments in the presentation.**	**The presentation includes appropriate visual aids, but these are too few, in a format that makes them difficult to use or understand, and/or the presenter does not refer to or explain them in the presentation.**	**The presentation includes no visual aids or visual aids that are inappropriate, and/or too small or messy to be understood.** **The presenter makes no mention of them in the presentation.**
Presentation skills 10%	**The presenter speaks clearly and loudly enough to be heard, using eye contact, a lively tone, gestures, and body language to engage the audience.**	**The presenter speaks clearly and loudly enough to be heard, but tends to drone and/or fails to use eye contact, gestures, and body language consistently or effectively at times.**	**The presenter cannot be heard and/or speaks so unclearly that s/he cannot be understood.** **There is no attempt to engage the audience through eye contact, gestures, or body language.**

Figure 1.6: Part Four: 3 Level Rubric: Description of Dimensions with all levels of performance described. © Stevens, D. D. & Levi, A. J. (2005). *Introduction to Rubrics*. Sterling, VA: Stylus Press.

Basic Point "Matrix"

- A ***matrix*** shows **basic breakdown** of possible points

- Can simply list items, *without* descriptions of what full credit or ideal work looks like:

Example:

3 pts.	Statement of Goal/Objective
7 pts.	Introduction & Theory
5 pts.	Procedure & Apparatus
15 pts.	Data
15 pts.	Calculation, Graphing & Results, Error Propagation
5 pts.	Conclusions & Analysis of Sources of Error
50 pts.	*Total*

- …Or can include **brief descriptions** of what *fully met expectations* looks like:
  - *Example: (from sophomore/junior-level physics lab)*

Grading Criteria for PHYS 274L Written Reports **NAME**: _____

Exp. #_____ **TOTAL**:_____

1) ABSTRACT: (5 pts.) _____
- a) Objective(s): (1 pts.)
  - i. States, clearly and briefly, the purpose of the experiment.
  - ii. States, clearly and briefly, the quantities to be measured.
- b) Method Summary: (2 pts.)
  - i. Describes the overall setup, materials, and procedures used.
- c) Results Summary: (2 pts.)
  - i. Overall results are given.

2) INTRODUCTION: (5 pts.) _____
- a) Includes one or both of the following:
  - i. Scientific and/or historical significance of the experiment.
  - ii. Historical results and those from other sources and methods (e.g. *Handbook of Chemistry and Physics*).

3) PROCEDURE/METHOD: (10 pts.) _____
- a) Procedure:
  - i. Clearly describes apparatus.
  - ii. Clearly describes the reasoning behind the setup.
- b) Figures:
  - i. Figures have captions.

4) THEORY: (10 pts.) _____
- a) Derivation of principal formula(s):
  - i. Logical and correct.
  - ii. All assumptions are stated.
  - iii. All variables are defined.

5) DATA & CALCULATIONS: (40 pts.) _____
- a) Raw Data: (10 pts.)
  - i. Gives units and uncertainties, either estimated or calculated.
  - ii. In table, if several values
- b) Calculated Data: (20 pts.)
  - i. Gives propagated uncertainties with appropriate units.
- c) Charts and graphs: (10 pts.)
  - i. Gives units, error bars, and labeled axes.
  - ii. Has informative caption/title.
  - iii. Significant points are identified.

6) CONCLUSION: (10 pts.) _____
- a) Results: (5 pts.)
  - i. Gives results with uncertainties.
  - ii. Gives the meaning of the result in the context of theory and previous experiments.
- b) Accuracy of results and limitations on accuracy: (5 pts.)
  - i. Gives the accuracy of the result stated.
  - ii. Considers the limitations of the results (i.e. what was the limiting factor in terms of accuracy?)

7) OVERALL: (20 pts.) _____
- a) All references/materials cited. (3 pts.)
- b) Spelling & grammar, appropriate physical vocabulary, clarity of writing (10 pts.)
- c) Title, well-organized, clear layout/format. (7 pts.)

- Distribute the matrix at **start** of course (with initial course syllabus) or when task is first assigned… *not* when the graded assignment is returned!

Meaning & Implications of Final Course Grades

UH Manoa Definitions (from p. 15 of *2014–2015 UH Manoa Catalog)*

A+, A, A– = "excellent"
B+, B, B– = "above average"
C+, C = "average"
C–, D+, D, D– = "minimal passing"
F = "failure"

CR = "C" or above; NC = "C–" or below

What *Really* Is an Undergraduate "Passing" Grade?

- **"C"** ***not "C–"*** is lowest passing grade for many **major-required** courses and **prerequisites**
- **"D"** ***not "D–"*** is lowest passing grade for all **core** and **gen-ed** courses
- **"D–"** is lowest passing grade for **general credit**

Variations

- **Undergrad science LAB** grades (and grade curves) are typically more forgiving than **lecture** grades
  - Labs tend to stress participation, comprehensive write-ups, and collaborative work
  - Science labs: "A" = good to excellent
    "B" = adequate to good
    "C" = below average, but completed all work
    "D" or "F" = missing some experiments or lab reports

- **Graduate student** grades are typically higher than undergraduate!
  - UH Manoa *graduate* grade definitions: (from p. 39 of *2014–2015 UH Manoa Catalog)*
    A+, A, A– = "high achievement" *(above-average to excellent*)
    B+, B, B– = "meets expectations" *(adequate/average)*
    C+, C, C– = "below expectations" (*usually means inadequate to failing)!*
    D+, D, D– = "inadequate performance" (*usually means total failure)*
    F = "failure"
  - Some departments limit the number of "C" grades that a grad student can have (and still qualify for master's degree) without repeating courses.

Incompletes

- **Incomplete "I"** grades should be given to undergraduates only in cases of *extenuating* circumstances beyond the student's control (family emergencies, medical emergencies, etc.)
  "A grade of I is given to a student who has not completed a small but important part of a semester's work if the instructor believes that the incomplete was caused by conditions beyond the student's control." (p .15 of *2014–2015 UH Manoa Catalog*)
  - Use "I" grades *late* in the semester, when only a *minority* of coursework remains to be done. If still early in the semester, encourage students instead to petition for a "late drop" or to withdraw ("W" grade), and to retake the course from the beginning.
  - "I" grades must be accompanied by a *reversion grade*. They automatically change into the reversion grade if not replaced by a letter grade by Apr. 1 or Nov. 1 of the following semester.

- For graduate-student rules regarding Incomplete grades, see p. 40 of 2014–15 UH Manoa Catalog.

Calculating Final Course Grades

- Course grades are usually based on **percentage/fraction of possible points earned**

- Be sure to **state weighting/breakdown** in initial **course syllabus**:

Example:	10%	Homework
	10%	Quizzes
	20%	Midterm #1
	20%	Midterm #2
	40%	Final Exam
	100%	*Total*

- Design exam questions throughout course to achieve **large spread** in overall scores
  - Include some easy, some moderate, and a few challenging questions
  - A broad range in student scores makes application of a "curve" easier (see below)

Using a "Curve"

Advantages of using a "curve" (example: 20% A's, 25% B's, 25% C's, 30% D's & F's):
- Works well with **large classes** (> 100 students)
- Counteracts exams that are too hard or too easy (and similar problems due to **course inexperience**)
- Counteracts **instructor-to-instructor differences** — "shape" of curve can be determined by department (e.g., all Physics 151L lab TAs are required to apply similar curves)

Disadvantages:
- Bad for **small classes & labs** (20 or 25 students)
- Demoralizes students; promotes student competition instead of collaboration
- Students can't calculate/estimate own grade, and don't know grade cutoffs until end of course

> *"CURVE" PHILOSOPHY: Final grades represent students' **relative** performance.*

Using "Straight" (Flat) Percentages

Example: >90%: A; >80%: B; >70%: C; >60%: D; <60%: F)
(or, for "tougher" courses: >85%: A; >70%: B; >55%: C; >40%: D; <40%: F)
- Best for **experienced teachers** already familiar with course and typical student ability
- "Everyone can get an A" (theoretically) — good for **small** and **advanced** courses
- Students CAN calculate/estimate own grade, and DO know grade cutoffs from the start of course

> *"STRAIGHT" PHILOSOPHY: Final grades represent students' **absolute** performance.*

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Using a Straight-Curve "Hybrid"

Example: *"A total course score of >90% guarantees a course grade of A– or better; >80% guarantees a B– or better; etc.; **BUT** these cutoffs may be lowered at the discretion of the instructor during final grade calculation."*

- Be explicit whether **plus/minus grades** will be used (or deliberately not used)

- Strive for **consistency** with departmental policy/tradition and with other TAs' grading policies
  - *Example:* D's and F's are rarely included in science **lab curves**, and are usually reserved for students with missing work

Keeping Records

- Keep thorough electronic **records** of all grades (like an *Excel* spreadsheet)
- Retain unclaimed assignments, exams, etc. (that are not returned to students) through the end of the following semester. (UH Manoa policy)
- I recommend that you **keep your final gradesheets *forever*.**
    - **Export a final copy of all online assignments & scores** from Laulima or any classroom management system.
    - Archive a **paper** copy of your final gradesheet. Leave a copy with your supervising professor and/or department office.

Dealing with Cases of Academic Dishonesty

- If cheating/plagiarism is suspected, make **photocopies** & prepare evidence to take to supervising professor
- **Meet** with offending student(s) alongside professor, show the evidence, and let the student respond to the allegation
- Decide on appropriate **penalty** with professor, and decide on referral to Office of Judicial Affairs (or not)
- Student has right to appeal your action (first to Dept. Chair, then Assoc VC Students, then to Academic Grievance Committee)

- For UH Manoa definitions of "cheating" and "plagiarism" and related policies, see "Campus Policies" on pp. 79–80 of the *2014–2015 UH Manoa Catalog*. *Page 80 goes on to describe an instructor's options for "Disciplinary Action":*
  "The faculty member must notify the student of the alleged academic misconduct and discuss the incident in question. The faculty member may take academic action against the student as the faculty member deems appropriate. These actions may be appealed through the *Academic Grievance Procedure*, available in the Office of Judicial Affairs. In instances in which the faculty member believes that additional action (i.e., disciplinary sanctions and a UH Manoa record) should be established, the case should be forwarded to the Office of Judicial Affairs [Queen Lili'uokalani Center for Student Services, Rm. 207]."