ME Teaching Assistant Training & Orientation

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Today's agenda

1. Feedback from August 2020
2. Classroom climate
3. Grading and rubrics
4. Links to resources

Please take a moment to complete our feedback survey.

Feedback from August 2020

From the post-session survey (n = 21):

- Respondents found the session generally useful, thought the pace was appropriate, and viewed the materials as helpful.
- Differences in response were roughly divided by experience as a TA (i.e., a new TA and a highly experienced TA held different views of the training session).
- Some respondents asked for more coverage of several issues: classroom climate and management, and grading.

We will send you a link to a very brief survey after today's session.

Classroom climate: DISCLAIMER

We cannot sufficiently cover all dimensions of classroom climate and management in this short section. The goal is to provide you with basic background and links to resources, and encourage you to have open discussions with your instructional team about how to handle specific situations.

When in doubt, talk to your lead instructor for advice.

Classroom climate: University policy and values

“Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Purdue University views, evaluates, and treats all persons in any University related activity or circumstance in which they may be involved, solely as individuals on the basis of their own personal abilities, qualifications, and other relevant characteristics.

Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in Purdue’s Equal Opportunity, Equal Access and Affirmative Action policy which provides specific contractual rights and remedies. Additionally, the University promotes the full realization of equal employment opportunity for women, minorities, persons with disabilities and veterans through its affirmative action program.” (emphasis mine)

See also:
https://www.purdue.edu/purdue/ea_eou_statement.php

Classroom climate: creating a safe and productive space

We have lots of research that indicates creating a welcoming and safe space in the classroom or laboratory is essential for productive academic and social engagement among students.

Engagement and **involvement** are terms used to describe student connections to their program and community, for instance by studying, seeking help from instructors or peers, engaging the social life on campus, and many other actions and behaviors.

Decades of research have linked engagement and involvement to all manner of positive outcomes--academic, personal, and professional.

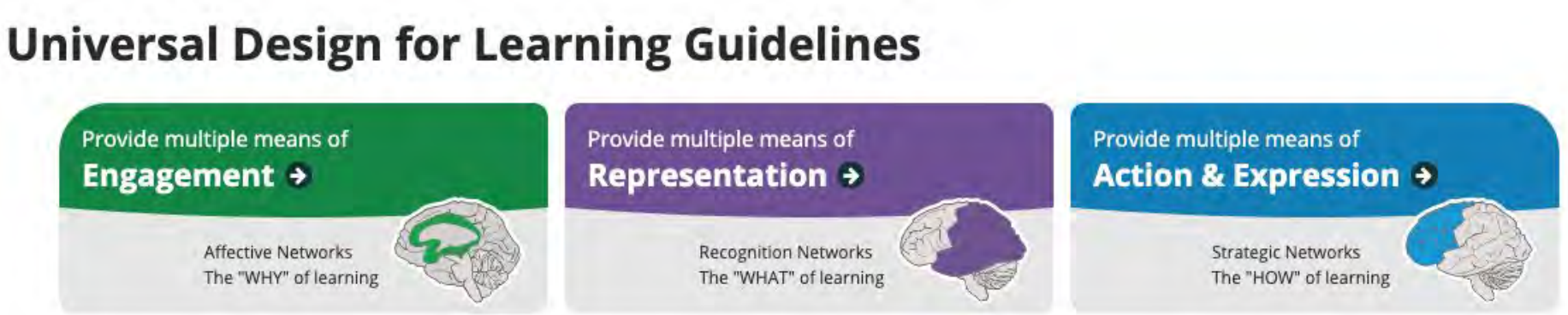
Classroom climate: creating a safe and productive space

The opposite of engagement is **isolation**, as can happen in a classroom environment when a student feels unwelcomed, alienated, discriminated against, or otherwise unconnected to the class, their peers, or the academic material.

Part of our job as educators is to create and nurture environments in which all students can be engaged and involved.

One view: Universal Design for Learning (UDL)

UDL is a set of principles that respect the different abilities and ways that students learn. UDL focuses on inclusion.



See also: https://udlguidelines.cast.org/ or https://www.cast.org/impact/universal-design-for-learning-udl

Examples of inclusive practices

Use **simple, direct language** rather than idiomatic expressions. This is helpful for English language learners.

Accommodate students with auditory or visual disabilities or concerns appropriately.

- Students may want to sit in a specific location in the classroom so they can see or hear the presentation clearly.
- Students may want to sit in a specific location in the classroom to avoid ambient noise or other distractions.

Scaffold material so that learners with varying levels of prior preparation can all engage with the content.

Implicit bias in the classroom

Implicit biases are the **unconscious mental shortcuts** we use, especially when under stress or time constraints, as heuristics when making decisions or interacting with others.

From Georgetown: "For example, maybe, without even realizing it, you have a picture in your mind of what a "good student in the major" looks like, and maybe that picture has a very particular demographic profile. Or maybe you see a particular kind of name on your roster and think, completely unintentionally and perhaps even unconsciously, "That student is going to have trouble writing in the English language." Those are examples of implicit bias, and they can attach to *race, nationality, class, religion, gender, sexuality, or any of a number of other identity-related categories*, and they can lead to an environment that's not equally conducive to learning for all of your students." (emphasis mine)

See also: https://commons.georgetown.edu/teaching/design/inclusive-pedagogy/#implicitbias

Combating implicit bias

Educate yourself about your implicit biases: project implicit

Make judgments based upon **evidence**, rather than intuition or other heuristic information. Collect data when you need to, via informal polls, using clickers, or by talking to students.

Especially when under stress, **slow down** your decision making to reduce your reliance on unconscious processes.

Racism and sexism in the classroom

Racism (discrimination based upon membership in a specific racial or ethnic group) and **sexism** (descrimination based upon sex or gender) both undermine classroom effectiveness by creating an welcoming environment.

Actions or behaviors motivated by racist or sexist views can be **illegal**.

Discriminatory actions in the classroom by either instructors or students are **obviously unacceptable and against Purdue policy**. This includes racist and sexist 'jokes' and other behaviors that create an unwelcoming or hostile environment on the basis of race or sex (also including age, veteran status, gender identity and expression, and many other factors).

See also: Purdue's portal to report hate or bias

Racism and sexism in the classroom

Note: The WHO defines gender as:

"Gender refers to the characteristics of women, men, girls and boys that are socially constructed. This includes norms, behaviours and roles associated with being a woman, man, girl or boy, as well as relationships with each other. As a social construct, gender varies from society to society and can change over time." (emphasis mine)

The WHO's 'working definition' of sex is:

"Sex refers to the biological characteristics that define humans as female or male. While these sets of biological characteristics are not mutually exclusive, as there are individuals who possess both, they tend to differentiate humans as males and females." (emphasis mine)

See also: WHO website

Combating racism and sexism

Educate yourself: Purdue has assembled resources on anti-racist practices, as well as training materials from the Boiler Inclusion Project.

Go through **SafeZone training** via the LGBTQ center.

Use **inclusive pedagogies** that highlight contributions of people from various backgrounds and social identities. Use examples in class that span social, national, economic and other contexts.

Classroom climate checklist

- ❑ Educate yourself using Purdue or other resources about racism, sexism, ableism, and other '-isms' in higher education.
- ❑ Be prepared to intervene in ways that are proportional to the actions and behaviors you witness, so that you can continue to promote a welcoming environment.
- ❑ Convey the message (through your actions) that you are approachable and helpful.
- ❑ Use inclusive pedagogies, principles of universal design for learning, and other inclusive practices.
- ❑ Talk with your instructional team about strategies to build an inclusive and welcoming environment, and agree across the team on strategies you will all use to achieve this goal.

Classroom climate scenarios

1. You are one of the TAs for ME 200 (Thermodynamics). You overhear a comment by a student in the form of a ‘joke’ that has its origins in a stereotype. What should you do?

- With appropriate directness, you can:
  - Talk to the individual privately about what you heard and why it was inappropriate or offensive.
  - Talk to the individual and the others present and discuss why the remark was inappropriate or offensive.
  - Engage the course instructor for advice on how to handle the situation.
  - Report a bias incident through Purdue’s reporting system.
- The goal is to emphasize that the instructional team is building an inclusive environment, and that everyone (instructors and students) will have a better experience when we intentionally achieve this together.

Classroom climate scenarios

2. You are a TA for a course with four-person project teams that were randomly assigned. During a lab, you witness several team members engaging in exclusive behavior* that marginalizes a teammate. What can you do to assess the situation and support the student's learning?

- Engage with the team and ask them a set of questions about their roles, progress, and needs as a way to understand team dynamics.
- With appropriate directness, describe the exclusive behavior you witnessed, help the team understand why it was exclusive, and suggest ways to be inclusive. Explain the role of time constraints and stress in often driving exclusive behaviors or activating our implicit biases.
- The goal is to identify exclusive behaviors (whether unconscious or not) and help students shift to more inclusive behaviors.

Exclusive behavior: common examples

- Speaking with a teammate in a language not all team members speak. (this excludes some teammates from the discussion)
- Men in the group 'talking over', mansplaining, or otherwise not including their women teammates in actions and decisions. (this may be an unconscious action [implicit bias] or an overt sexist action, but the result is exclusion of a teammate)
- Not sharing team resources, designs, work products, etc. with some teammates. (this behavior can have many origins, but the result is the exclusion of teammates who do not have access to the information)

Classroom climate: strategies for disruption

Apply an approach that aligns with the severity of the situation.

less severe

- Reflect back, rather than directly confront: “I think I heard you say (...). Is that what you said? What did you mean by that?”
- Elevate the issue to a general discussion, rather than focusing on an individual student: “Lots of people feel that way. Why do you think that is?”
- Directly but gently educate the student/group on why the behavior was problematic and how it undermines the inherent worth and dignity of individuals as well as the learning environment.
- Use your authority as a member of the instructional team and a Purdue employee to intervene and immediately stop the problematic behavior.

more severe

See also: Univ. of Florida resource on difficult conversations

Classroom climate: summary

Creating an inclusive, non-discriminatory learning (and campus) environment is hard, takes intentional work, and requires all members of the instructional team to work together.

To disrupt racist, sexist, or other discriminatory behaviors, you may need to intervene to discuss the situation with students and educate them about how they can promote an inclusive environment.

Grading: DISCLAIMER

- Grading can be done in many different ways, to achieve many different purposes. There is no one ‘right’ grading philosophy or process. Approaches to grading are highly contextual.

- Grading practices in ME courses are a function of history, instructor habit/preference, and the needs of the course.

- As such, your responsibility is to understand the expectations, philosophies, and specific practices of grading student work in your assigned course, as defined by the instructor(s) and/or senior TAs.

Grading: philosophy

- Because grading is contextual, you can ask many questions about a graded assignment:
  - Am I grading for process/procedure (solution) or final outcome (answer)?
  - Do I care about conceptual knowledge (does the student understand the concept) or procedural knowledge (can they apply it to this problem)?
  - Is this a high-stakes (final exam) or low-stakes (quiz) assessment?
  - Are there elements of this problem that I will not grade? For instance, if this problem contains a trigonometry calculation, do I care if the student calculated the angle correctly?
  - How many discrete performance levels can I use on this problem? For instance, will I give points in 1-point, 2-point, or ½-point increments?

Grading terms: rubric

- A rubric is a guide for graders that explicitly indicates the key criteria on which the work will be graded.
- Rubrics have a scoring system:
  - Positive scoring awards credit for work done correctly → the score starts at zero and increases
  - Negative scoring deducts credit for work done incorrectly → the score starts at full credit and decreases

- In technical courses, we often use analytical rubrics, which break a problem/solution down into important discrete parts with little overlap.

Grading terms: learning objective

- A learning objective (LO) is a brief statement about what students are expected to learn in a course. In engineering, these are often expressed as ‘what students can (or will be able) do’.
  - Ex. (fluid mechanics): At the conclusion of this course, students will be able to apply concepts of mass, momentum, and energy conservation to solve flow problems.

- LOs can exist at the course level, the ‘chapter’ level, and/or the problem level.

- LOs can be conceptual (“...able to apply concepts of…”) or procedural (“...use finite difference approaches to solve…).

Grading terms: alignment

- The best rubrics are expressed in terms course- and/or chapter-level LOs. Why? When 'aligned' rubrics are used routinely, they:
  - reinforce for students the things they need to be able to do (i.e., the LOs).
  - allow students to track their progress on each LO across the semester to identify their strengths and weaknesses.
  - allow the instructional team to track performance for individual students and the class as a whole on the things the instructor said were important (the LOs).
  - provide a common vocabulary to talk about the course, the content, and the graded assignments.
- 'Aligned' grading practices connect the LOs to the content, the assignment, and the grading using a rubric. They also use written comments on the student's submission to convey further detail.

Grading terms: alignment

- The best rubrics are expressed in terms course- and/or chapter-level LOs. Why? When 'aligned' rubrics are used routinely, they:

These 'aligned' practices communicate to students: (i) what are the important components of this course (the LOs), and (ii) how are they performing on them?

Grading is therefore a conversation with the student about their performance on the things you tell them are important in the course.

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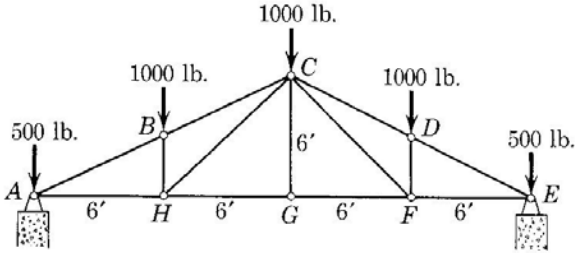
assignment, and the grading using a rubric. They also use written comments on the student's submission to convey further detail.

A negative scoring rubric based upon specific errors

Rubric item	associated points
1. Find reaction forces	**9 points**
A. draw FBD of structure	5
no coordinate system	-1
no labels on forces	-1
incorrect reactions	-2
forget external forces	-2
include internal forces	-2
B. write equil. equations	3
each missing equation	-1
incorrect signs	-1
C. solve for reactions	1
math error	-1
2. Find forces in members	**6 points**
A. draw appropriate FBD	2
incorrect labels/coord. system	-1
incorrect internal forces	-1
A. write equil. equations	3
each missing equation	-1
incorrect signs	-1
C. solve for reactions	1
math error	-1



A positive scoring rubric based upon learning objectives

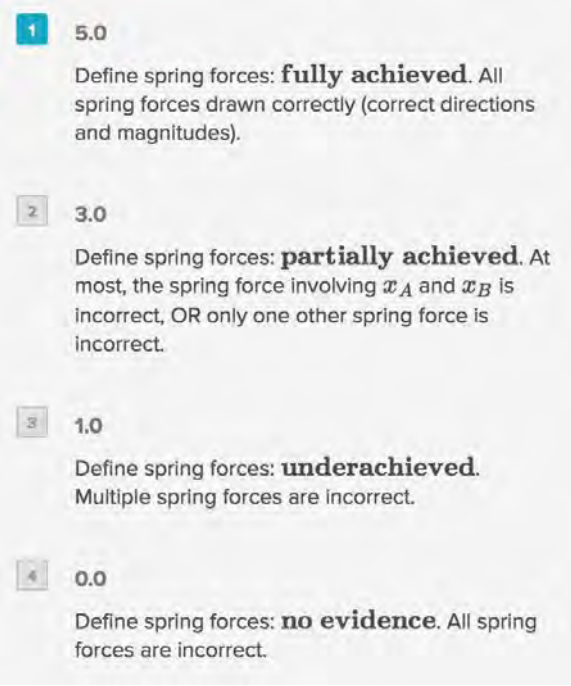
Rubric item (points)	Levels of achievement NE	UA	PA	FA
1. Draw FBDs (+7)	0	2	5	7
2. Write equil. equations (+6)	0	2	4	6
3. Complete numerical solution (+2)	0	1	-	2

Note:
N.E.: no evidence
U.A.: underachieved
P.A.: partially achieved
F.A.: fully achieved

Rubric examples: statics

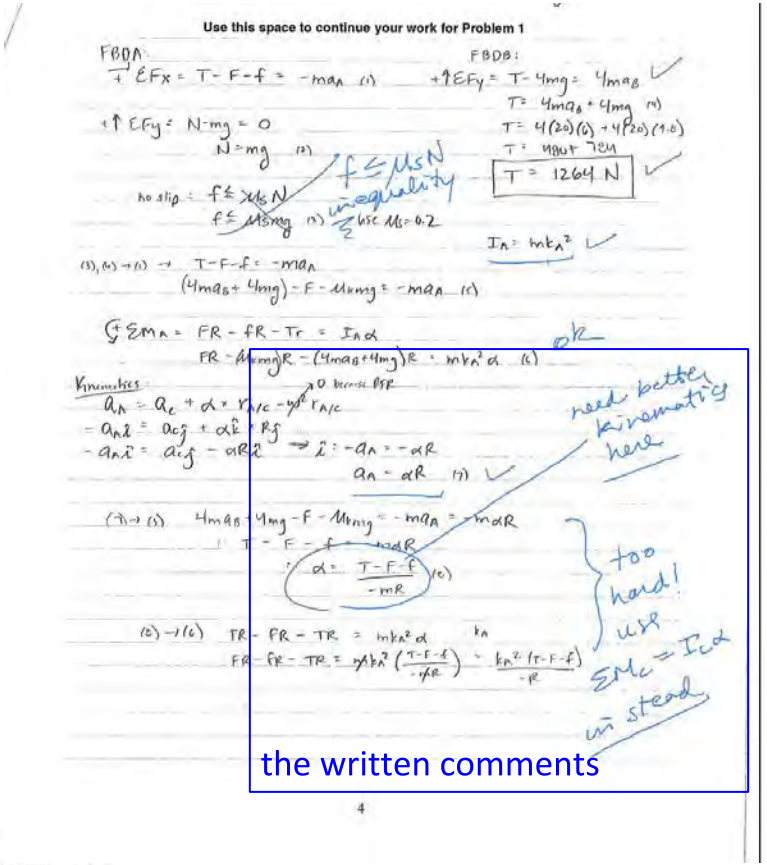
GS uses rubrics plus written feedback

- Rubrics express to students what you value in the problem, and ideally they are *tied to the learning objectives* of the course.
- Points are tied to *levels of achievement* for a rubric item.
- *Positive-scoring* rubrics are the most powerful implementation of this kind of thinking.
- *Written feedback* is provided using a tablet input device.



A graded example (ME 274 Dynamics)

Grading



the achievement levels

4 — **8.0**

Write Newton-Equations: **fully achieved**. Write at a minimum Euler equation for the drum ($\sum \vec{M}_C = I_C \vec{\alpha}$) and Newton equation for the mass $[\sum \vec{F}_y = (4m)a_{b,y}]$.

the LO

5 — **6.0** points per level

Write Newton-Euler equations: **partially achieved**. Meets fully achieved criteria with the exception of minor errors like sign errors.

6 — **4.0**

Write Newton-Euler equations: **under achieved**. Missing several significant elements of the equations, or other omissions or incorrect terms. Examples: missing forces or chronic sign errors, or using $f = \mu_s N$ rather than the inequality $f \leq \mu_s N$.

sample evidence

7 — **0.0**

Write Newton-Euler equations: **no evidence**. A large number of missing elements from the equations.

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Grading quality assurance (QA)

- There are many approaches to QA, some of which focus on students, while others focus on graders. All of them are substantially easier if you use Gradescope.
- Student QA questions:
  - Do the aggregate grading statistics agree with prior experience, intuition, and your actual experience of grading the assignment? The prior experience and intuition probably comes from instructors and senior TAs.
  - Does aggregate student performance across sections (for multi-section courses) seem reasonable? (This assumes the same assignment for each section.)
  - Do students with better prior performance (earlier in the semester) generally perform better on this assignment?

- There are lots of ways to set up automated procedures for these calculations using Excel, Matlab, R, etc.

Grading QA (continued)

- Grader QA questions:
  - Is the distribution of grades (numerical values) for each grader approximately the same (assuming they have graded a sufficiently large sample of student work)?
  - Does each grader apply the rubric items/achievement levels in approximately the same proportion, within and across sections?
  - Has each grader written a similar amount of feedback to students on their work? (This would be based upon a random sample of a grader's work.)
  - Does each grader report spending a similar amount of time grading? (This is self-reported by each grader, but wide disparities in time spent grading the same amount of student work should be explored more deeply for QA purposes.)

- There are lots of ways to set up automated procedures for these calculations using Excel, Matlab, R, etc.

Grading QA (continued)

- What if grading outcomes do not pass QA checks?

1. Review your own grading experience, and ask yourself questions like:
   a. Did I experience any ambiguity when applying the rubric?
   b. Do I think the point distribution across rubric items was appropriate?
   c. Did the rubric emphasize a concept or procedure that students were generally unprepared for?
2. Talk to your instructor(s) and/or senior TA(s). Share your reflection on question #1, and get their advice on further data analysis or other actions you should take.
3. Review grader calibration practices, especially for large assignments like exams in large-enrollment courses. If you feel like you need more guidance or training, you are responsible and accountable for seeking it out from your instructor(s) or senior TA(s).

In summary

TAs play a critical role in our educational enterprise.

- You interact with students.
- You grade their work.
- You potentially go through the academic integrity violation process.
- You are a role model for academic excellence and high standards of conduct and behavior.

You are a very ‘public face’ of ME’s values, and your behavior conveys an important message to our students.

You have responsibility, authority, and accountability to convey positive messages to our students through your actions.

More resources for TAs

- Cornell engineering TA resources (especially the checklist)
- Carnegie Mellon resources (very thorough, filled with TA testimonials)

Please take a moment to complete our feedback survey.