



Caltech

TA Handbook: Resources for Teaching Assistants

Brought to you by the:

Caltech Center for Teaching and Learning

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A new Caltech initiative under development in 2012-13, providing institute-wide resources and programs on teaching and learning for faculty, TAs, and students.

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Caltech Project for Effective Teaching (CPET)

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A graduate student organization offering workshops, teaching certificates, and ongoing professional development.

[www.http://www.its.caltech.edu/~cpet/](http://www.its.caltech.edu/~cpet/)

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1. Welcome to your New Role: Serving as a Teaching Assistant (TA) at Caltech

Responsibilities and Expectations

If you are a first-time teacher or even just a first-time Caltech TA, you're probably already wondering: exactly what responsibilities and expectations come with your TA position? What is your purpose as a TA? How is your course organized, and what is your role in that organization?

While many aspects of TA'ing vary widely, as outlined below, the most important thing to keep in mind is that your **purpose as a TA is to help students learn**, while supporting your professor's vision for the course and managing your own various responsibilities effectively. Being a TA is a balancing act between those three things; this Handbook is intended to help you succeed.

The only rule of course organization at Caltech is that there *are* no rules. Caltech's remarkably informal, non-bureaucratic structure extends to classes. You may TA as a part of a class like Ch 1, which has a definite TA hierarchy including a head TA, head grader, recitation TAs, and grading TAs, each with clearly defined responsibilities; or you may be the only TA for a seminar course with no obvious duties. You may be an undergraduate or a graduate student while TA'ing (take note, undergrad and grad TAs can be great resources to each other—the former having most likely taken the exact course recently, the latter bringing alternative perspectives and experience to the course). The important thing is to clearly understand your responsibilities, and make sure they match your professor and fellow TAs' expectations, before the class begins.

Meeting with your professor for an hour or so, in the weeks before the course starts, is extremely important; you can avoid a lot of confusion and misunderstanding by setting up course structures, expectations, and processes at the beginning of the term. The course overall, and your portion of it, will run much more smoothly if the professor and all TAs have a shared understanding of course rules and division of responsibilities.

The questions below can help clarify your responsibilities. Ask your professor, a former or more experienced TA, and/or the professor's assistant.

1. Will there be regular TA-professor meetings?
2. Who will be responsible for writing problem sets and exams? For grading them?
3. Are the TAs expected to help prepare lecture or lecture notes? To make lecture notes available to the class?

4. Are the TAs expected to attend lecture? To take detailed lecture notes?
5. Will the TAs be asked to deliver any lectures? If not, will they be free to teach a lecture if they wish to?
6. Are the TAs expected to hold office hours? How often?
7. In courses with multiple TAs, how will the TA duties be divided?
8. Will there be any review sessions out-of-class? Who will prepare and facilitate them?
9. Who will review requests for extensions on problem sets and exams? Are the TAs allowed to grant extensions? If so, with or without notifying the professor?
10. What is the procedure for making changes in grades/points if a mistake has been made on problem sets? Exams?
11. Are the TAs expected or allowed to prepare supplementary course materials for students?
12. Who will talk to students wishing to add or drop the course, and who will sign the add/drop card?
13. In courses with multiple class meeting times, who will review student requests to switch sections?

Typical Types of TA Assignments

	Responsibilities usually include:	Responsibilities sometimes include:
General TA	<ul style="list-style-type: none"> • Grade problem sets and/or exams • Prepare problem sets and/or solution sets • Hold regular office hours • Attend lectures and interact with students 	<ul style="list-style-type: none"> • Facilitate review sessions • Deliver lectures in class • Set up classroom (e.g., Audio/ Visual or other equipment)
Recitation TA	<ul style="list-style-type: none"> • Prepare and hold recitation sessions • Prepare exams, quizzes, homework • Attend lectures and interact with students • Prepare review session material 	<ul style="list-style-type: none"> • Lead demonstrations • Write recommendation letters • Substitute teach the lecture portion
Grading TA	<ul style="list-style-type: none"> • Grade homework and/or exams • Prepare solution sets 	<ul style="list-style-type: none"> • Attend class lectures • Resolve grading disputes

Laboratory TA	<ul style="list-style-type: none"> • Maintain equipment • Know the techniques used in the lab • Supervise labs, interact with students • Set up and clean up lab 	<ul style="list-style-type: none"> • Hold office hours • Attend class lectures (if any) • Design experiments • Develop and distribute pre-lab
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Supporting the Course

In addition to knowing your responsibilities, the following information can help you convey the structure and approach of the course to students. Being ready to explain and implement these aspects of course design are part of your role as a TA, too.

- What is the “big picture” of the course? Where does it fit in students’ options, core requirements, or electives? What interesting and important questions does the course answer? Why take it?
- How is the course organized overall? What are the important units, concepts, and abilities the course addresses?
- How are students’ grades determined (assignments, exams, problem sets, etc.) and in what proportion?
- What are the course policies for collaboration on homework, exams, lab write-ups, etc.?
- What format do exams take? How can students’ best prepare for them?
- What are the policies on make-up exams and late assignments?
- Are there materials on reserve in a library, or linked to a website, that might offer additional help?

2. Teaching and Learning

The Big Picture

Perhaps for the first time, you are facilitating other people’s learning—not just being taught or teaching yourself! Along with this privilege comes the responsibility to set an example of respect, hard work, dedication, and continuous learning for your students.

Your own experience as a student should prove helpful in guiding your teaching efforts. What did you hope for from your instructors? What did they do that helped or enabled you to learn, and what did they do that made your life more difficult? Emulating your best instructors and avoiding the

mistakes of your worst ones—while still being yourself—will help you greatly as you begin to teach.

However, your students are not necessarily “you”—they arrive with their own prior knowledge, strengths, weaknesses, study habits, preferences, cultures, and more. You can successfully translate your own learning experiences into teaching by using them as a starting point while realizing that students are diverse in many ways.

Our two very best, most fundamental rules for successful and effective TA'ing are:

Flexibility

Some students learn quickly by reading and writing, others by discussing the subject orally, still others through visual diagrams and representations. Many learn best through concrete examples, but some do better when they begin with an abstract principle. While almost everyone learns well by doing, there are wide variations in the amount of direction people prefer when approaching a new activity. Some students (and TAs) are outgoing or talkative; others are more reserved. As a TA, be flexible and strive to offer enough variety in your teaching so that all of these different students can “catch on” to something. Then, watch your students' responses for constant feedback. For example:

- If the beautiful analogy you spent hours dreaming up just isn't working, try a different approach (it doesn't mean your analogy wasn't beautiful!).
- If you adopt a more convenient notation, offer a special handout for those who haven't seen it before.
- When working sample problems, don't be too quick to take offense at the student who never lifts her pen—or at the student who is so deep in note-taking that he doesn't hear your question!
- Introduce new lab equipment with a helpful demonstration, but allow the inevitable tinkering in the corner unless safety is an issue.
- Be aware that many Caltech students skip lectures and learn from their textbooks, though some prefer to work just the opposite way.
- Be flexible about your office hours and the ways you interact with students. E-mail is popular with most Caltech students. Ask your students if they would like to get updates, information, and clarifications via e-mail, and have a sheet ready to hand around to get the addresses of those who do. Let them know that they can reach you other ways, too,

if you are comfortable with them doing so.

- If you (or your students) were educated outside of the U.S., recognize that the American university experience involves more explicit teaching and guidance than is the norm in many countries. Be aware of this difference and open to adapting to it.

Honesty

Let your students know that you are not infallible, and do not forget it yourself. Don't feel you have to be prepared with every answer, or have every lab or demonstration work perfectly, in order to earn your students' respect. For example:

- Sometimes a wonderful answer is, "I don't know, but I'll try to find out and get back to you" (and then make sure to get back to them).
- Sometimes a fellow student can explain a problem or concept so that it "clicks."
- If a demo or lab goes wrong, it's okay to say so, and it can be a learning moment for students (see Labs section below for more ideas).

When you can honestly learn something new from your students, it validates them and lets you model ongoing learning.

For many of your students, Caltech provides the first academic challenge serious enough to make them discover effective learning strategies. Furthermore, the goal of their coursework here is to learn not only the material, but also how scientists think—and that includes you. So certainly don't hesitate to share learning tips or to give advice on study strategies. If you are new to teaching, this will be your first opportunity to start to develop your own style, which depends on your intellectual approach, "stage presence," personality, and other variables. Over time and with good feedback, you'll learn what does and doesn't work for you and your students.

Luckily, you can also draw on a lot of good research on how human beings learn, which applies even here at Caltech.

"How Learning Works" and Making it Work at Caltech

This section outlines some of the most thoroughly researched findings on learning and teaching, along with tips and advice from Caltech TAs and instructors to show you how to put them into practice. The following seven "principles" are from the 2010 volume, *How Learning Works* (Ambrose et al.), a thoroughly documented source developed at Carnegie Mellon and written

specifically about teaching and learning in higher education.

1. Students' prior knowledge can help or hinder learning.

- Students are not “blank slates”—they have both knowledge and experience to draw from.
- Expect that your students will come to you with unique levels of preparation.
- Through interaction in class and looking at their work, find out and build upon what the students already know.
- Also look for student *misunderstandings* or *misconceptions* (e.g., common mistake patterns in work, explaining a concept using the wrong fundamental ideas). These can be difficult to “undo,” especially because students may think they already know.

2. How students organize knowledge influences how they learn and apply what they know.

- Provide a larger context for the material you are teaching. Show them the “big picture” and why the material is relevant.
- Students will come up with some way to organize their learning—whether their self-designed scheme makes sense or will be helpful in the future or not. Showing them the “map” of how key experts (you, the professor) organize the material gives them a much better starting point.
- Remind students where you are in the “map” frequently. When there is a lot of material, it is easy to lose track of where and how it fits together. Later on, having a solid conceptual map helps students transfer learning to new problems, future courses, and more challenging situations.
- Recognize that learning how to organize new knowledge is an added mental task for students, so try to go at a reasonable pace. This is often somewhat beyond your control, as you will rarely be in charge of the course syllabus and pace. But whatever pace the professor may choose, don't “firehose” your students with information.
- Communicate with the other teaching staff for your course—the professor as well as other TAs and graders. Exchanging information regularly helps all of you to gauge students' understanding, make sure you're all emphasizing the same organizational structure for the ideas, and adjust the course appropriately.

3. Students' motivation determines, directs, and sustains what they do to learn.

- Show enthusiasm for the subject matter by being energetic, giving examples you find

interesting, and having fun with your teaching assignment. Your enthusiasm for the course is contagious. You don't have to be a ball of lightning all the time, but hopefully it is some measure of enthusiasm for your subject that has brought you to Caltech — share it with your students.

- Appeal to your students' interests and direct your motivational efforts toward promoting their curiosity about your subject, rather than placing undue emphasis on their performance.
- Help students succeed rather than fail. The questions you ask and the standards you set when grading should not be too lenient, but if they are too challenging, students will not be able to live up to them.
- Show respect for your students intellectually and personally. Striking a reasonable balance between motivation and information content is essential to your success as a teacher.

4. To develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned.

- Break down complex, multi-step problems into discrete types of thinking, manipulations, strategies, or approaches. This can be difficult, because you probably know them so well that they're automatic and you can skip steps.
- Name each piece or step, and show students how to apply it in different contexts.
- Use examples that appear different superficially, but use the same underlying skill or technique, so they will be ready to use the right approach in other problems that at first appear different.

5. Goal-directed practice coupled with targeted feedback enhances the quality of students' learning.

- Let students know the purpose of various problems, quizzes, or assignments (i.e., the goals, or what the work will help them be able to do).
- For in-class work, give immediate and comprehensive feedback. Be encouraging. Reward success openly and immediately, and allow students to feel comfortable expressing uncertainty.
- For problem sets or other work that students hand in, return their graded work, with feedback, quickly. If too much time goes by, students forget how they were thinking about the problems, and the feedback is less likely to help them learn.

- When a mistake is made, students need to receive specific feedback delineating why an answer or approach is wrong, but even mistakes can be corrected without undermining a student's dignity. Try to use a point of confusion as a stepping-stone to a clearer explanation.

6. Students' current level of development interacts with the social, emotional, and intellectual climate of the course to impact learning.

- Expect that your students will come to you with different degrees of intellectual, social, and emotional maturity. College can be a time of rapid and uneven changes in these areas.
- Get to know your students. Address them by name and encourage them to do the same with you. Participate in student life. You can probably get an invitation to dinner at an undergrad house if you are interested.
- Engage students in the material by encouraging them to interact with you and with each other. Collaboration is an integral part of most students' learning experience at Caltech. Some will be more prepared for the social aspects of learning and collaboration; others can benefit from some prompts and guidance.
- Your interactions with students should be overwhelmingly positive. However, be prepared for the chance that you may be misunderstood or stereotyped. You might be the target of remarks or jokes by students who are still developing their ability to interact in mature ways with teachers and other authorities. When you are uncomfortable in such a situation, *simple, direct and honest communication* is in general the best option—name what is happening, why it is not appropriate in a Caltech class, and your expectation that it stop. If the behavior persists, you may want to talk to someone (see the “Harassment Policy” section of this Handbook).

7. To become self-directed learners, students must learn to monitor and adjust their approaches to learning.

- Your students will come to you with different “study skills” in place. Some might no longer work. They may not know how to study for a Caltech exam in your field, step away from a problem set at the point of diminishing returns, or prioritize their work.
- When students are struggling, ask how they are approaching the work and studying. Suggest some alternatives, along with why they might work better.
- Highlight key points in the quarter when the work will be more intense, and encourage

students to plan for the variations in workload accordingly.

- Encourage a viewpoint among students that interprets mistakes as opportunities to learn and grow, rather than judgments on their innate ability. As a TA, you can have more of an impact than you might think by telling students specifically what they are doing well in terms of their work and actions, rather than labeling them as “smart” or “great” overall.

Pitfalls (What NOT To Do)

While we have tried to focus this handbook on effective practices—what TO DO—there are a few pitfalls worth mentioning that you can and should avoid. Take it from experience: steer clear from these, and if you slip up, recognize what has gone wrong and get back to the effective practices above right away.

- **Don't**...be a mean and uncaring instructor. When students come to office hours, don't grumble about the other work you were doing when they interrupted. When students come to you with special circumstances, try to deal with them fairly and within the context of the Honor Code.
- **Don't**...insult your students, either by telling them how easy the material is or by being condescending. Be very wary whenever the words “clearly,” “obviously,” or “trivial” creep into your vocabulary. Students find these words offensive and infuriating! Even if you find some students less than respectful, don't retaliate; instead, model the behavior you'd like them to learn from you.
- **Don't**...bore your students and yourself. If you're not engaged, chances are nobody else is either. Find a way to shake things up a bit.
- **Don't**...confuse students by teaching at your level instead of theirs. Sometimes it takes a bit of extra work to recall what connections and subtleties your students are and are not prepared to appreciate.
- **Don't**...oversimplify the material until your students feel great but haven't learned enough. While this route is tempting for a new TA who wants happy students, it means you're ultimately doing a disservice to students.

3. Practical Advice for Specific TA Duties

Getting Started: Your First Meeting with Students

For new and experienced TAs, the first session with a new group of students is a challenge that can cause more than a little anxiety. The first meeting of a lecture, recitation section, or lab gives students and teacher the first opportunity to learn about each other and find out what they can expect of their working relationship throughout the term. Standing up and filling the silence before a group of expectant strangers can be daunting, but a few simple strategies can help you navigate “first contact.”

Before the session, prepare yourself by learning what you can about how the course works. Talk with the instructor, TAs from previous years, and people you know who have taken the class. Find out about the students you can expect: who takes the class, why, and with what level of preparation? Be aware of any extraordinary reputation the course has gained in recent years. Finally, make sure you understand how the course will be run this year. If the instructor has not created a course information sheet, you and other TAs may want to write one up yourselves. Such a sheet might include items like the names and contact information for the instructor and TAs, the course meeting time and place, information on sections, homework and exam schedules, collaboration and grading policies, syllabus, and required and recommended texts for the course. Of course, if you make your own info sheet, run it by the professor for approval before distributing it to students.

Plan out a program for your first meeting with students. If you’re not sure how much material you can cover, plan too much rather than too little, but prioritize and identify good stopping points throughout the lesson. Over-preparation can be a big help if you are nervous in front of your new students! When you’ve planned your session, think ahead and visit the meeting room to make sure you’ll have all the materials you need, from simple chalk, markers, and erasers to working lab equipment, overheads, textbooks, and other supplies.

The best way to begin a first meeting is often with straightforward introductions. Give students your name and contact information, including any times and places you don’t want to be contacted! Adding a little more information about yourself—for example, your research topic at Caltech, your undergraduate school, or where you are from—helps encourage students to interact with you. You can also ask students to introduce themselves, including a few pieces of information you would find helpful or entertaining. These introductions can be verbal in a small group, or you can ask students

to write them on index cards for you to keep.

Course administration and organization is likely to be on everyone's mind at the first session. Clarify or highlight things the instructor has already gone over, and supply information that is still missing. If the course is a lab, scheduling and safety issues may need to be addressed. Now is also the time to present your own perspective on what you will be doing together this term; this might mean discussing your favorite part of the course material, explaining why you think the subject is important, or sharing your own private strategy for mastering the concepts you'll be studying.

After dealing with course mechanics, move on if possible to some actual course material. For example, you might plan a review of topics from the first lecture, a preview of things to watch for next week, or a short lesson on the use of some ubiquitous piece of lab equipment. Give students an outline of what you have planned to cover and where you are going with the lesson. If you are comfortable improvising, you may offer to treat a different "burning question" instead if they prefer. Try to close a minute or two early to sum up the session, remind students of the next meeting, and take final questions.

Most importantly, set the tone and type of interaction on the first day that you want throughout the quarter. That means getting students involved and active in some way, and following through on your expectation students' participation. If you regularly prompt students for—and wait for—questions, contributions, and discussion throughout the session, the pattern will be established earlier and is easier to maintain than to start later on. Don't be thrown by unexpected questions, but remember that, "I don't know, but I'll try to find out" is a perfectly acceptable answer in most situations.

Recitation Sections

The purpose of recitation sections is to offer students a more interactive environment than can generally be found in lecture. In recitation sections you can focus on the specific concepts students are having the most difficulty with, and discuss how the course material applies to the homework problems. We offer the following specific suggestions to help you succeed as a recitation instructor:

A. Preparation: Preparing yourself for recitation is *absolutely essential*.

1. Ask yourself what the purpose of your recitation section is, and how it relates to the larger

course goals. The purpose may change as the school year proceeds. You can safely assume that your students will want to know about the main points they were supposed to learn in lecture, and they would love to get some specific advice on upcoming homework, quizzes, and exams. It is often useful to give a “big picture” view of topics covered in class during the week.

2. Try to get feedback from students about what problems they are having and what they would like to learn from you. Then follow up by implementing their suggestions.
3. You need to do many of the same things your students are supposed to do, preferably *well in advance* of the time they start doing them. If there is reading assigned, you might be asked about it, so it is wise to give it, at minimum, a cursory read.
4. You should attend the course lectures so you know what topics have been covered and what approach the professor took in explaining the material. This can also help you get a feeling for what the students do and do not understand.
5. Know where your recitation classroom is, make sure it has the mechanical things you will need (like chairs and chalk, for example), and have any props, handouts, or demonstrations ready to go well before class time.
6. Make an outline of important things you will want to discuss, prepare concrete examples you can present, and try to anticipate what questions are likely to be asked of you and how you will try to answer them.
7. Arrive early, even if most of your students tend to arrive late. Arriving early also allows you to talk informally with some of your students and get to know them a bit better.

Remember, recitation sections are almost always optional. If students think their time is better spent in bed or in the library, that's where they will be. *It is very hard to draw them back once you lose them.*

B. In the Classroom: Running an effective section classroom is truly an art, and one that varies dramatically from person to person. Here are some general tips on how you can improve your classroom presentation style.

Verbal Communication:

1. Speak clearly and loudly using words and examples your students can understand. Speak slowly, even if you are nervous. Don't be afraid to stop and think. In fact, while students are

absorbing the material, reassess your presentation. *Were you clear?* If not, try to explain the concept in a different way.

2. When a student asks you a question, make sure you understand what they would really like to know. Repeat the question before you try to answer it, possibly rephrasing it and asking the student if your restatement is accurate.
3. Try to refer to your students by name. *It really does make a difference.*

Written Communication:

4. Start with a clean board, print using large letters (this may take some practice), use symbols consistent with the lecture and text, and organize your written presentation.
5. Don't stand in front of what you write. Move around so that all the students can read the board. Make sure that you give your students plenty of time to write down what you put on the board.
6. Avoid obscure abbreviations and unreadable diagrams at the board. Never erase part of something and "re-use" another part; this can make taking notes a nightmare.
7. Handouts can be extremely helpful, and students really appreciate them. They help students listen to what you say. Students are also much more likely to participate in discussions if they aren't struggling to catch up writing notes.

Classroom Environment:

8. Make it obvious when you are starting class. "Any questions before we begin?" is a good line to use. Wait until you have everyone's attention before you proceed. Start by reviewing familiar material and work your way up to the new and more difficult stuff, so that students have a chance for their brains to "warm up."
9. Try to actively involve the class in discussion, and give them some time to practice new concepts. Most people learn best by doing and thinking for themselves—try to provide time and space for this. Varying the classroom routine to include small group problem-solving or round-table debate can keep students engaged and greatly enrich both your experience and theirs.
10. Keep your class informed. Start class with an agenda of what you hope to cover, and end by reviewing what was discussed and asking for final questions.
11. Don't make your battle to keep the students awake any more difficult than it has to be. A warm room with poor lighting begs people to fall asleep. If there is anything wrong with

the room, call the Facilities Service Center (x 4717) and let them know.

- 12.** You, not your students, should manage the classroom environment. However, you don't have to make your judgments in a vacuum. You may ask how students would like to see the class time used, make up a questionnaire to solicit their (anonymous) feedback, ask them to let you know if you use unfamiliar units or notation, or have them inform you if you speak too softly or too fast. A sample feedback form can be found in Appendix A of this manual; you can photocopy it, or use it as a starting point for creating your own form. Student feedback may include suggestions you can pass on to the professor or the department.

Try to make your classroom a comfortable and fun learning environment, both for you and for your students.

Labs

Here are a few useful tips to ensure that a lab session runs smoothly.

- 1. Preparation:** You should know exactly what the students are supposed to learn and why they have to learn these things. This includes being thoroughly familiar with the details of the experiments and knowing why they are done in a particular way, as well as what the students should get out of them. This usually means knowing how the experiments tie in with the lecture material, if yours is not a freestanding lab class. It is also highly recommended that you perform the experiments once yourself before teaching the students. Even if you've done something similar before, familiarize yourself with the instrument or setup in the lab in which you'll be teaching. Otherwise, you can waste a lot of valuable time (and perhaps be embarrassed) when something goes wrong.
- 2. Know all the lab rules** before the first lab begins, and enforce them from day one. Laboratory rules *must be strictly enforced because they are for the safety of the entire class* (even if your immediate supervisor does not make much of them). Your own adherence to rules and firm discipline when safety is at issue are critical in order to avoid serious problems.
- 3. First Aid:** In labs where there is a potential for student injury, you should know the location of the first aid kit, basic first aid rules, and procedures for getting emergency assistance.
- 4. Your group of students is your responsibility.** It is generally required that you be

present in the laboratory from the start of class until the last student is gone. If you absolutely *must* leave the lab during class, or if you are absent on a given day, find out from your Lab Supervisor how to request an appropriate, qualified person to supervise your students during your absence. If your course involves individual lab groups working at different times, set up a procedure for arranging times that are compatible with your work and personal life as well as with undergraduate schedules.

5. **Make your students think.** Do not take on the responsibility of solving problems for the students, except where they are not intended to be a part of their learning experience (i.e., equipment failures). Help students work through problems on their own.
6. **Are your students adequately prepared?** Make sure that the students understand the essential operating principles underlying the equipment they are using. Generally the lab experiments are designed to take most of the time of the lab period, so it is essential that students read through the experiments *before they arrive*. One way to ensure that they prepare is to assign them a few simple questions from the reading— and then check that they've made an effort to answer them. To save your own time, you can go over the answers at the board while each student checks his or her neighbor's work. This is an easy way to do a short "prelab lecture."
7. **Laboratory reports:** Not all students know how to write good lab reports or lab notebooks; it is important for the TA to help them and let them know what is expected.
8. **Ask questions of your professor or lab supervisor.** In classroom teaching, saying "I don't know, but I'll find out," is perfectly acceptable in most situations. However, when safety is concerned, as it often is in lab teaching, this sometimes isn't good enough. If you don't know, ask someone who does.
9. **If something goes wrong, but safety is not in jeopardy,** attempt to troubleshoot while using it as a "teachable moment" for students—after all, malfunctions are part of doing science, and labs are an important place where students learn how to diagnose and fix problems. Clearly articulate to students your process for investigating and ruling out what might have gone wrong. If you can, involve them in the troubleshooting. However, if you suspect a problem that will take the entire lab period to find and fix, or that requires intervention outside of the lab period, stop and move students on to another task, experiment, or part of the course, so they continue to use the time productively.

(Our thanks to Dr. Jane Raymond, Laboratory Supervisor in Chemistry, for sharing her excellent materials for this section of the TA Handbook.)

Office Hours

Many TA assignments will require you to hold office hours, during which you effectively act as an individual or small group tutor, guide, and mentor. During office hours, topics can include:

- Clarification of concepts presented in lecture.
- Guidance regarding the homework assigned for the course.
- Review or summary relating to an imminent exam.
- Academic, career, and sometimes personal counseling.

Simply holding office hours is no guarantee that anyone will show up. How do you get students to come in when they need help? Here are a few ideas that have worked for other TAs:

- Schedule office hours and tutorial sessions at times convenient for your students! (“Convenient” times at Caltech are *never* early in the morning.) If you are a TA for a small class, you will probably be able to arrange office hours to fit into your schedule and students’ schedules.
- The default location for office hours is, naturally, your office. If for some reason you do not have an office, your option and/or the option you are TA’ing for *really* ought to provide you with an office if you are expected to hold office hours—be sure to ask the option administrator, head TA if there is one, or the professor. For a more convenient and informal atmosphere, however, you can try holding office hours at a different location, like the Red Door Café or the Coffeehouse.
- Many students will still not show up to office hours, even if they are at a convenient time, unless you remind them and encourage them to show up.
- Write a note on their problem set: “Let’s discuss this problem during office hours” or even “Please see me about this—I have some helpful (examples, explanations, etc.) for you.” Students are more likely to respond to a message directed at them personally.
- Keep a box or folder for extra copies of course materials (copies, problem sets, solution sets, and other handouts) near your office door (but don’t leave graded student work in public spots—you have a responsibility to keep their grades private). When students come by, say hello and ask if they had any problems. If the students know *where* you are and *who* you are

(and that you aren't a monster), they will be more likely to come by for help. Again, this won't work for everyone (you'll see students trying to sneak past your door to avoid contact), but many will appreciate the attention.

- Advertise your office hours with a weekly e-mail reminder to the students. You can include general clarifications or corrections to the problem set or other ideas for how they can benefit from seeing you during office hours.
- Make the students feel comfortable during office hours. Listen to the students and give them your undivided attention (don't check e-mail or answer the phone while they are in your office). Don't put them down or be critical ("This question is so easy," "You are wrong," "You're wasting my time," are things you should NOT say).
- Periodically ask students for feedback about what would help them most during office hours.
- Pay attention to everyone in your office hours, not just the person who asks the most questions. Many times, a group of students will come in together and only one or two students will end up actually understanding the problem. The others may just "tag along" and write down enough to solve the problem without understanding it. This can be difficult to do when a group of collaborating students comes in at the same time, but make an effort to interact with each student.
- If you or your students have trouble speaking or understanding English, writing phrases, diagrams, or equations on a white board or on a piece of paper can aid communication.

Working with students during office-hours differs appreciably from classroom teaching, and in many ways it is more challenging.

The following suggestions may help:

1. Preparation is essential. Usually this means working out the assigned homework for the course on your own, going to class, and getting clarification on things you yourself do not understand. Never use a problem set key as a crutch. You should understand the material cold. If you don't, brush up on it until you do. Don't wait until a student asks you about it to discover you can't solve the homework or understand the lecture! By working out the homework in advance, you can help ensure the questions are clearly worded and soluble, and that you see in them the same things the professor hopes the students will discover.

2. Your objective in office hours should be to help students practice the skills or understanding needed to solve future problems on their own. The greatest pitfall in tutoring is to answer a student's immediate question without clarifying the root source of the confusion. Here are some ways to help a student understand a problem:
 - Ask the student to tell you how they think they should solve the problem. This may include going over the work they have already done. This will help you to figure out how much the student already knows. It may be that the student simply made a math error, and otherwise understands the important concepts needed to solve the problem. Or, the student may have no idea of what they should be thinking about. Most will be somewhere in between.
 - Once *you* have figured out what problem the student is having, try to help *them* figure out where they went wrong. Simply telling them the answer will not help. Neither will sending them away to have them figure it out on their own. Try asking open-ended questions to guide them through the process. For example:
 - a) What do you need to know to solve this problem?
 - b) Can you break the problem down into a number of steps? Which of those steps do you know how to do? Which ones are you unsure of?
 - c) How did you get from this step to the next step?
 - d) I don't understand what you did in this part of the problem. Can you explain it to me?
 - e) Can you draw a diagram/write down an equation that describes this part of the problem?
 - If a student thinks they know the answer to a problem, and wants to know if they are right:
 - a) Is your answer what you would expect to get for this problem?
 - b) Does it make sense?
 - c) Can you show this is about the right answer from a graph or from an order-of-magnitude calculation?
3. It is reasonable to have the student show you their answer and for you to then say they are correct. It is, in general, not good to tell the student the answer to a problem, even if it is necessary for them to show their work. Courses have different policies regarding problem sets and the Honor Code, so check with the professor if in doubt.
4. Don't stick doggedly to one line of explanation. The explanation or method presented in class or in the textbook is not likely to be the only way to explain something. Keep an open mind -- the student may find a way of solving a problem that you didn't think of. Presenting alternative explanations or analogies will help the students remember and understand a concept better. If

you use analogies, remember that every analogy breaks down at some point! Be sure to explain the limits of the analogy to the students.

If a student asks for **personal or career counseling**, remember that you may not be the most qualified person for the student to be talking to. If you don't feel confident you can provide the help or advice a student needs, refer them to the Counseling Center, a Resident Associate (RA) in their house, the Office of the Dean of Undergraduate Students, the Graduate Dean's Office, the Career Development Center, the Diversity Center (which offers confidential support), or other resource (see "On-Campus Resources for Students and TAs" in this Handbook). If you are not sure where to refer the student, please ask—your head TA, professor, or any of the offices listed here.

Grading

Grading is perhaps the most thankless portion of any educational workload, yet it is absolutely crucial. Without effective and timely grading, students don't receive feedback on how they are doing, how to improve, and lack meaningful feedback on their learning. Several suggestions follow:

1. Make sure that you understand the course's policies at the *beginning* of the course this will save you much time and pain over the long run. Some important things to cover are:
 - a) Who sets the grading policies? These include subjects like how many points each problem is worth, how much should be taken off for mistakes, what penalties apply to late work, and (more and more often) what computer programs students can use on their homework sets. If these things are left to your discretion, it is a good idea to talk to the other TAs and set a course policy, which you can then explain to the students.
 - b) What is the course policy regarding work done after a test's official time limit? Many tests at Caltech are given as timed, take-home assessments, so it is not uncommon to find a notation indicating at what point a student ran out of time, followed by answers to the last few questions.
2. You should work out the problem(s) or perform the lab(s) you are grading *before* you even look at the key and certainly before you begin throwing red ink around. You should at least go through the key carefully and decide how you will take points off for mistakes on each problem. Try to provide correction in terms with which the students are familiar and that were discussed in lectures or pre-lab meetings.
3. Consistency in grading is always important, but it is probably most difficult to achieve in a large

course. If the grading is divided among many graduate students, you should meet with each other and design a grading scheme that everyone can follow. If you are grading a large number of problem sets, it is critical that you keep track of how many points you are taking off for common errors. Differences of two or three points for the same mistake can be particularly galling. Your students will confer about their problem sets and their grading! Grading by a scheme and keeping track of it will also help you grade late submissions quickly and fairly.

4. Let students know what they did wrong and how much it hurt their score. Circle the point where their logic failed and clearly indicate how many points were deducted as a result. Ideally, write legible comments nearby explaining their error. Provide encouraging comments when students find a good alternative approach to a problem.
5. Many of your students will spend far more time looking over their graded homework or lab reports than you will be able to spend grading them. Don't be surprised when an angry student comes to you saying, "I want my two points!" Be ready to deal with such complaints fairly and competently. Doling out points automatically and refusing to consider any grading changes are both inappropriate ways to deal with the situation.
 - a) Take a look at the student's work and see whether it was graded incorrectly.
 - b) If the student is incorrect but does not understand the concepts presented, explain to them what they have done wrong.
 - c) If you have made a grading mistake, correct it and record the change; it is very important to students to feel that you are a fair grader. If you have made the same mistake on many papers, you should follow up by issuing a "recall" of the problem sets to the class, or offering to change the grades of students who come in. At the very least, inform students of the error so they are not learning something incorrectly.
6. Talk to the course professor and/or section TA if you notice common errors or important misconceptions in the student work you are grading. This communication is invaluable, especially if you have a purely grading assignment and do not otherwise interact with the students.
7. Know what to do if you fear an Honor Code violation has occurred. Read the section on the Honor Code in this manual, and follow its advice. Consult with the course professor first about a violation, unless you have a previous understanding that you should act on your own.

4. Getting Feedback

Importance of Feedback

One of the most rewarding aspects of teaching is hearing pleased students comment on their great TA. Conversely, however, one of the most frustrating aspects of teaching is ignorance of how your efforts are being received. Without feedback, it's very difficult to tell whether your teaching methods have been successful, whether you are teaching at too high or too low a level, and what you might want to consider doing differently. That said, interpreting feedback neutrally can be difficult; here are some tips for getting helpful feedback and making productive use of it.

How to Get Helpful Feedback

There are several good ways to obtain feedback from your students, spanning a range of frequency, approach, and degree of formality. For assistance designing, implementing, and interpreting student feedback—whether in one section or across a larger course—please contact the center for teaching and learning: <http://teachlearn.caltech.edu>. The center will be making additional resources, such as sample forms and feedback instruments, available at mid-quarter.

- **Fast and Frequent:**

Quality feedback can be as simple as a “minute paper”—or a half-sheet of paper with one or two quick questions—which students turn in before leaving class, lab, or recitation. Typical questions include asking students to jot down one interesting, helpful, important, or surprising concept or idea learned that day; and one puzzling, still unclear, or yet unanswered question or concept. By collecting these and going through them regularly, you can get an idea of what students are getting and what remains confusing for them, and address those areas appropriately.

- **Facilitated:**

Some large courses have undergraduate “ombudspersons,” which represent student opinion about how the course is going. The ombudspersons can help you get feedback as well. Caltech’s center for teaching and learning, <http://teachlearn.caltech.edu>, can also facilitate a short discussion with a section about how their learning is going, and summarize that information for you as the TA. This approach helps in that the facilitator can ask follow up questions and find out where students are struggling in ways they might be uncomfortable reporting directly.

- **Informal:**

You can also ask your students directly for feedback; often, this is more effective one-on-one, or in office hours, than in a recitation section. Another option is to ask the professor or an experienced TA to observe your teaching and give you their comments and suggestions.

- **Mid-quarter:**

CPET offers a sample feedback form for you to use or adapt: <http://www.its.caltech.edu/~cpet/resources.html>. The most helpful time to get feedback is while you still have time to make improvements—at or before mid-quarter. When you do, and students see how you follow up (including some explanation of things you can't change, or areas where student opinion is split), they may be more likely to give you thoughtful feedback at the end of the course, via the Teaching Quality Feedback Report (TQFR)—not to mention having a better experience in your class, and knowing you are listening to their input.

- **End-of-quarter:**

As mentioned above, the “TQFR” is an on-line system for end of quarter teaching feedback. The more your students participate, the better the information! As a TA, you can help by encouraging students to use the TQFR thoughtfully. Summary data can provide great evidence for your teaching portfolio.

Following up on Feedback

Feedback is helpful, and without it, we are in the dark about what's working and what we can improve. But it can also be puzzling: half of your students may think the pace is great, while a quarter think it's too fast, and another quarter are left behind. Some may appreciate your open-ended questions, while others find them confusing. Then there are the outliers—the extreme praise, and extreme student venting. What's a TA to do? First, recognize that no matter how impartial you think you'll be, feedback about one's own teaching is difficult to approach neutrally. Here are some ideas that might help:

- Approach your feedback like a tiny, very noisy dataset. Don't go overboard analyzing, but apply some basic and reasonable analysis (or at least sorting) to see it as neutrally as possible.
- If a comment is truly an outlier, make sure you interpret it as one person's opinion (i.e., valid to that student, but perhaps not indicative of an overall pattern).
- Do look for patterns—those are places where you can improve or change, which will help multiple students, and make life easier for you.

- Get another perspective. The center for teaching and learning can look over your feedback (confidentially) and offer a second opinion, as can CPET.
- Follow up with students. Let them know, in summary form, what the class said, what the patterns were, and what changes you can (and will) make. It also helps to explain aspects of the course you can't change, and if possible, why they are the way they are.

Remember that teaching is a skill like any other. You can improve your teaching ability, and at times you may need to adjust your teaching style to fit your particular situation. If you are not sure what you are doing wrong, or would like some general teaching tips for your TA position, contact the Caltech center for teaching and learning, <http://teachlearn.caltech.edu>. Work to be the best TA you can, but remember – you won't please all of the people all of the time!

5. Balancing Time Commitments for Teaching and Research (and Classes!)

General Principles

It is perfectly normal to feel overwhelmed with responsibilities during a term when you are expected to TA and make progress on your thesis research. In addition to TA'ing and working on research, many first and second (and third...) year graduate students also have the additional burden of taking classes themselves. This section addresses the problem of not having enough time to do everything you need to do. The short version of the advice given here is: **prioritize, be organized, and know your limits.**

First, it's a good idea to know how much of a time commitment is expected from you for each activity (from yourself and others), and what goals you are expected to accomplish (from yourself and others). Find answers for these questions:

1. How many hours am I expected to TA per week?

Not all TA assignments are allotted the same number of GTA (graduate teaching assistant) hours per week. Your division or option graduate student secretary should keep records of GTA hours assigned to each class and each student. You may also be able to figure out GTA hours from your paycheck. Your GTA hours can give a rough idea of how much time is expected, and whether your TA assignment should take more or less time than the assignments of other people you know.

2. What duties are included in my TA hours?

All activities directly related to your job as a TA are included in your TA hours. This includes, but is not limited to, attending course lectures, attending labs, grading homework and exams, writing tests and problem sets, holding office hours or recitations, giving lectures, preparing lectures, and organizing supplies for field trips or labs. See the “TA Responsibilities” section for more information. A good way to figure out what is expected of you is to find out what was expected from the TA in previous years, since most classes aren’t being taught for the first time. Is the amount of work expected from you in line with the official time allotment?

3. How many hours am I expected to do research?

To be a full-time student at Caltech, you need to register for at least 36 units each term. These units can be for classes you are taking, and/or for research credit. Also, part or most of your stipend likely comes from RA (research assistant) hours. In general, however, most advisors pay little or no attention to these numbers. If it’s not obvious how much time commitment is expected from you, it’s best to ask in advance.

4. What does your advisor expect you to accomplish in those hours of research? What about classes?

Does your advisor understand that you have other time commitments? Do they expect you to do as little as possible in your role as a TA? Spend less time on classes and get “OK” grades instead of outstanding ones? Or do they understand that you may not get as much research done this term?

5. How do you benefit from being a TA? What do you want to accomplish this term?

Besides the obvious reward of helping someone to learn, there are definite benefits to being a TA. In other words, it is not necessarily in your best interest to spend as little time as possible on your TA assignments. Consider these advantages:

- Being a TA can help you improve your speaking skills. Giving a course lecture or lab lecture is a way to gain experience in public speaking. Being able to give a good talk is a necessary skill if you wish to go into academia! Less formal TA activities, such as office hours or interactions in lab, also give you the opportunity to learn how to explain difficult concepts in a clear and concise manner.

- TA'ing a class allows you to learn more about that particular subject. Even if it is a class about your field of interest, you probably don't know everything about the subject, and can learn something from the students and the professor.
- Having teaching experience is important when looking for a job in academia, particularly at liberal arts colleges or large state universities where teaching classes will definitely be part of your responsibilities.

Of course, not all TA assignments provide significant interaction with students (although you can always ask the professor if you can teach a lecture while they are busy or at a conference). You may decide that a grading-only TA is less important than getting that manuscript published this term. Or, you may decide that it would be nice to get some teaching experience this term by giving a couple of "guest lectures" in the class you are TA'ing, and can sacrifice a few hours of research.

So now you have figured out how many hours you need to be successful at TA'ing, research, and classes... and it's more time than you actually have. Two ways of dealing with this problem are addressed below: being an efficient TA and how to deal with conflicts involving your time and priorities.

Tips to help you be an efficient TA:

I. Before the term begins (or at the beginning of the term):

- Establish your responsibilities with the professor and other TAs. Try to eliminate conflicts or misunderstandings before they happen.
- Make sure lab equipment and computers are in working order and you know how to fix them! Equipment that breaks down in the middle of a lab will waste huge amounts of everyone's time (and will be upsetting to you and the students).
- Get helpful hints, homework solutions, and words of wisdom from students that have previously TA'ed the course. You should always do the problem sets yourself so that you can answer students' questions, but having something to work with can be a great time saver.

II. During the term:

- Be organized! (even if the professor isn't organized):

- Keep updated spreadsheets of grades.
- Always grade by a grading scheme so that if a student comes to you wanting points back you can address the problem quickly and fairly.
- Make a simple TA or class website and post clarifications or corrections to problem sets and important due dates. Then the students won't need to constantly ask you about these details, and they can find this information at any time. A class e-mail list is also an easy way to make sure information gets to students, TAs, and the professor!
- Try to grade a problem set all in one sitting. This can be difficult because of lack of meaningful due dates in some classes. If the professor doesn't want to have firm deadlines for assignments, arrange for a compromise. For example, if a problem set is turned in late, you don't need to have it graded until the end of the term. Or, you can wait until you have most or all problem sets until you grade them. If you do this, make sure that the students and professor know about this policy—peer pressure might make everyone turn their homework in on time!
- Set limits on the times when students can find you to ask questions. Establish office hours or a weekly help session and post times on the web site. However, don't blow up at a student if they find you at another time. If they come looking for you, consider it a compliment—it means you are a useful TA. Help them with their problem and then remind them of your office hours for next time.

Solving conflicts

Conflicts can occur between an advisor or professor and a graduate student when these people have different ideas about how the student's time should be spent. Internal conflict can also occur because a graduate student can't physically accomplish everything they are supposed to do.

I. If you are working yourself too hard:

Caltech students are smart and work hard, and often they put enormous pressure on themselves to do everything perfectly. This is generally an impossible task to accomplish when a student is expected to spread his or her time over multiple tasks. At some point we, the students, must learn to "let it go". How many professors do you know who have piles of unfinished work on their desks? Having well-defined priorities is crucial to wading through unmanageable loads of work (see

above). For example, you may decide to put off grading a problem set until the weekend so that you can finish the experiment that is finally working! Here are some ways to get help with self-imposed stress:

- You are not alone! Other students have experienced similar difficulties. Talk to other graduate students about how they dealt with having too much to do.
- Talk to someone outside Caltech—a member of your family or another friend. A different perspective on the situation at Caltech can help.
- Some periods of time may be more stressful than others (for example, midterms, around your oral exam, proposal deadlines). When this happens, see if you can delay or swap responsibilities with others. For instance, if you need to take three midterms, but the other TA is not taking any classes, ask him or her to take over your TA responsibilities for that week. Then, you can make it up to them at a later time.
- Don't forget to sleep!!! The amount you can get done by working for 20 hours and sleeping for 4 hours is probably not a lot more than you can do by working for 10 hours, sleeping for 10 hours, and goofing off with friends, family, and pets for 4 hours. Your efficiency will increase by getting a decent amount of sleep, and the quality of your work will be higher. Sleep and exercise help to reduce stress.
- Make use of the Caltech Counseling Center, located in the Student Health Center: it is a free service for all students—graduate and undergraduate alike. They will talk with you and find ways to help you relieve stress. The Counseling Center website is <http://www.counseling.caltech.edu/> and their extension is x8331.

II. If others (the professor or your advisor are probably prime culprits) have entirely unrealistic expectations of what you should be doing:

There are a number of ways to resolve conflicts between the TA, and the professor of the course or your research advisor. However, all of them require you, the TA, to take the initiative:

- Talk to a trusted friend or fellow grad student (or fellow TA) about the problem.
- If you are having a conflict with the course professor, talk to your research advisor about the problem (if you feel comfortable doing so). Each division also has an academic officer and each option has an option representative who may be able to help you with TA problems. If your advisor expects you to TA without spending any time doing the work, talk to the professor of the class.
- If you need support in your role as a TA you can also visit the Office of the Graduate Dean,

office 230 in the Center for Student Services.

6. Teaching and Your CV

Professional Rewards of TA'ing

By TA'ing at Caltech, you help your students learn, assist your professors in the teaching and administration of courses, and hopefully enrich your own experience here. Your teaching activities can also provide lasting benefits to you in the form of increased confidence, new skills, and important experience on your résumé or CV. As you perform each TA assignment, remember to consider what you can carry away from the experience and how you can document it for future reference.

A particular tool used in academia, the “teaching portfolio,” is described in more detail below. However, no matter what field you enter after Caltech, your teaching experience can be valuable in many ways. Here are just a few examples:

- Teaching can improve your speaking skills and your comfort in giving formal or informal presentations.
- Some head TA positions give experience in managing personnel and delegating tasks.
- Innovative teaching can be a valuable illustration of your creativity and initiative.
- Successful teaching shows that you communicate effectively and work well with other people.

The Teaching Portfolio – what is it, and do I need one?

Teaching portfolios are relatively new tools used to describe your teaching work. Ideally, they help you monitor and improve your teaching, help you market yourself in the ever-competitive academic job market, and raise the profile of teaching in the academy. If you have plans to teach in the future, building a teaching portfolio at the outset of your career can help you greatly when you begin searching for jobs. More and more institutions are requesting teaching portfolios from job candidates, so this can be a very useful document to have.

A teaching portfolio typically consists of several types of documents. First, your teaching portfolio should explain your teaching philosophy. This is a one to two page reflection on your personal pedagogical beliefs: how should courses be taught? What should students gain from a

course in your specialty? What do you want the students to learn about science in general? What are your responsibilities as a teacher? It can be helpful to get together with some friends and discuss various ideas about teaching before writing your philosophy. The statement you come up with can be a very useful guide as you apply your ideas in the classroom. It's also useful to revisit your teaching philosophy at the end of a term and see whether your theoretical ideas about teaching work well in reality! Some faculty positions will ask for a teaching philosophy statement as a stand-alone document, either up front or later in the interview process.

If you are also assembling a complete teaching portfolio, additional documents, whether presented in print, pdf, or on-line, should serve as evidence of your teaching experience and how you put your teaching philosophy into practice. Above all, they need to be clearly organized in sections, so that reviewers can find elements easily. Typical portfolio "artifacts" or documents include a sample syllabus (whether one you authored and used for your recitation or lab, or one that you create for a typical course you hope to teach in the future); sample handout(s) to distributed to the students as practice or review; sample lesson plans, problem sets, or other materials you have created for teaching purposes. If you have a student who has benefited greatly from your guidance, you might ask them if you could copy or scan their work and include it in your portfolio as a demonstration of learning (ask if the student would like her or his name removed).

Another critical component in a portfolio is feedback from the supervising professor, students, and/or your peers. Student feedback is very important; an easy way to gather information about your abilities is to use the feedback form on the CPET website and/or summary data from the TQFR. Written comments can be especially insightful and interesting. If you feel that you have done a particularly good job TA'ing for a professor, you might ask him or her to write a letter attesting to your skills. Also, if you know another teaching assistant whose work you respect, you might consider asking them to observe you teach and discuss your methodology afterward, and include positive comments in your feedback section. If some comments are poor, don't worry—evidence of improvement is very useful, and there will always be students who dislike a particular teaching style. [See "Getting Feedback" for more tips.]

For more information on teaching portfolios, or for feedback on your draft teaching philosophy statement or portfolio, contact the center for teaching and learning,

<http://teachlearn.caltech.edu>. We can provide examples of portfolios, help you evaluate and improve your teaching, and offer feedback on your portfolio-in-progress. The Career Development Center can also help you with this and other ways to document your teaching for potential employers.

7. Caltech Honor Code, Caltech Code of Ethics and Responsible Conduct of Research

Honor Code

Creativity flourishes in an atmosphere of trust and respect and is inhibited by suspicion and disdain. The Honor System is an agreement among all members of the community to live and work together honorably, trusting implicitly in the honesty, sincerity, fairness, and consideration of others.

The honor code states:

No member of the Caltech community shall take unfair advantage of any other member of the Caltech community.

The Board of Control (BOC) administers the honor system for undergraduates, whom you may be teaching. The Graduate Honor Council (GHC) administers this for graduate students. If you suspect that a student has violated the honor code, you must contact either the BOC or the GHC. Keep in mind that by contacting the BOC or GRB you are initiating a flexible, confidential, and rational process. To contact the BOC, please email boc@caltech.edu. For the GHC email, GHC@caltech.edu. The Chairs of these groups will consider the issues, manage the process, oversee a preliminary investigation and work with their respective boards (if appropriate) to determine:

1. Whether or not an Honor System violation has been committed.
2. How to nullify the advantage that has been taken.
3. How to protect the Caltech Community.

One commonly encountered honor code issue facing teaching assistants is the question of

collaboration on problem sets. This seems to be a consequence of different initial assumptions on the part of undergraduates and graduates with regard to collaboration policies.

Typically, the understanding among undergraduates with regard to the collaboration policy is that collaboration is allowed unless explicitly prohibited, as is the use of material such as notes, problem sets, and solutions from previous years, which are usually on file in the library. The usual test to distinguish between collaboration and merely copying someone's answer is an understanding of the solution, and the ability to reproduce it without referring to it.

The best way to avoid any misunderstanding is to ensure that the collaboration policy is made explicit in the course syllabus at the start of the course.

An issue mentioned above, but worth emphasizing at greater length, is the use of previous years' homework keys by students working on current problem sets. This practice is so common at Caltech that some undergraduate Houses even keep their own archives of past solution sets. Students may well assume use of these keys is allowed unless the professor and TAs explicitly state otherwise.

One other common concern is the potential abuse of extensions. A good policy to adopt is to have perhaps one or two fixed-period extensions, say a week, which the student may choose to apply at their discretion. Any further extensions should only be granted when a Dean's note or a medical excuse is presented. As before, extension

[A Code of Ethics for Caltech](#)

Caltech must interact not only with members of the Caltech community, but also with a complex and rapidly changing world. The Institute is dedicated to research and education. In pursuit of these duties we are entrusted with funds, goods, and information by both the private and public sectors, especially the Federal Government, and we must interact with their representatives.

Caltech is committed to the highest ethical standards. From its inception, the Institute recognized that ethical behavior must be viewed as a personal and institutional responsibility. This philosophy forms the basis for Caltech's Honor System, which governs every aspect of our interactions with members of the Caltech community. However, even in dealing with donors, companies, the government, and others having a relationship with Caltech, the Honor

System should serve as a guiding principle in all Institute related activities. Please refer to "[Doing Business the Caltech Way: An Ethics Handbook](#)" for additional information.

If you ever need assistance in resolving certain ethical questions, there are several resources available on campus to assist you. These include the Graduate and Undergraduate Dean's offices, the Vice Provosts, and the Health and Counseling Center.

Responsible Conduct of Research

Caltech researchers are expected to adhere to the highest professional standards in the conduct of research. All research activities undertaken by faculty, staff, and students at Caltech will be conducted in accordance with strict ethical principles and in compliance with federal, state, and Institute regulations and policies. When government funds are involved in the support of research, the Institute's accountability to the government and the public requires that the investigators take particular care to obey all rules and regulations of the government and the sponsoring agencies.

The [Office of Research Compliance](#), which reports to the Vice Provost for Research, is responsible for providing support and training to faculty, students and staff in order to meet these requirements and maintain a robust research compliance program at Caltech. As part of their education, students can be required to take specialized training in research ethics and responsibility.

For additional information, please visit: <http://www.researchcompliance.caltech.edu>

Or contact:

[Morteza Gharib](#) - Vice Provost for Research (626) 395-6339

[Grace Fisher-Adams](#) - Director of Research Compliance (626) 395-2907

7. Caltech Policies

While Caltech respects your ability to make good decisions for yourself and others around you, we also have a responsibility to support and enforce campus and state regulations. Please take a few moments to familiarize yourself with some of [Caltech's policies](#) and what will be expected of you at Caltech both as a student and a TA. TAs are responsible for reviewing all policies and the Caltech catalog. Per the Caltech catalog, "Teaching assistants should not

attempt to date a student in their class, and should disqualify themselves from teaching a section in which a spouse or current partner is enrolled.”

- [Accommodations for Disabilities](#)
- [Acceptable use of Electronic Information Resource \(html\)](#)
- [Conflict of Interest Policy](#)
- [Compliance with Export Laws and Regulations](#)
- [Non-Discrimination and Equal Employment Opportunity](#)
- [Sexual Violence](#)
- [Substance Abuse](#)
- [Unlawful Harassment](#)
- [Whistleblower Policy](#)

9. Campus Resources for Students and TAs

Teaching Resources

Caltech Project for Effective Teaching

Caltech Project for Effective Teaching's (CPET) goal is to help members of the Caltech community become effective educators through practical training, an improved understanding of pedagogy, and individual feedback. We are a group of Caltech post doctoral fellows, graduate students, and undergraduate students dedicated to improving our own teaching skills and helping others do the same. CPET holds a seminar series on teaching methods, best practices, and pedagogy each year and also organizes a certificate program for CPET participants. Learn more at <http://www.its.caltech.edu/~cpet/>

Center for Teaching and Learning (temporary name)

During the 2012-13 Academic Year, Caltech is embarking on a new initiative to create a "center for teaching and learning" --a new resource for faculty, postdoctoral fellows, teaching assistants, and students. It will support all of these groups in finding and using evidence-based, innovative teaching and learning approaches in their courses, curricula, sections, labs, studies, outreach, and more. Please check the website for updates and details as the year progresses. The Center is located in Parsons-Gates room 114. The Director is Cassandra Volpe

Horii, Director: x6225, cvh@caltech.edu <http://teachlearn.caltech.edu>

Caltech Classroom Connection

Now in its fifth year, the Caltech Classroom Connection (CCC) is a program which pairs Caltech volunteers with local pre-college educators. The volunteers contribute their time, knowledge, and energy directly in classrooms to increase precollege student understanding, appreciation, and interest in science, technology, engineering, and mathematics. The [mission](#) of the CCC is to create sustainable, mutually beneficial partnerships between Caltech volunteers and local educators.

Hixon Writing Center

The Hixon Writing Center (HWC) promotes excellence in writing and communication. The HWC operates on the premise that writing is a mode of discovery and learning as well as a tool for communication, and thus strong writing skills are fundamental to learning and success across disciplines. HWC provides one-on-one tutoring (professional or peer) for students may struggle with aspects of academic writing, as well as those who are confident writers and are pursuing projects that would benefit from critical feedback. We also work directly with faculty and TAs to address issues related to writing assignment design, using writing as a tool for learning in the classroom, and assessment. The HWC is undergoing a period of relocation and rebuilding in Fall 2012, and will be offering limited services during that quarter. We will again provide a full suite of resources to students and faculty by Winter 2013. Visit us at <http://writing.caltech.edu> for more information about our services and location.

Caltech Offices and Contacts

Graduate Deans' Office (academic and mental health issues; medical leave, petitions such as underload, overload, permission to work, extensions and incompletes, sabbatical and reinstatement; emergency loans and funding questions, Title IX questions and complaints)

230 Center for Student Services (south wing)

Joseph E. Shepherd, Graduate Dean: x6346, joseph.e.shepherd@caltech.edu

Felicia Hunt, Associate Dean: x6346, fhunt@caltech.edu

Natalie Gilmore, Assistant Dean: x3812, ngilmore@caltech.edu

For more information: www.gradoffice.caltech.edu

Undergraduate Deans' Office (academic and mental health issues; accommodations for disabilities; petitions such as underload, overload, permission to work, sabbatical and reinstatement; tutoring arrangements; behavioral issues; emergency loans and grants; back-up advisor functions)

210 Center for Student Services (south wing)

D. Rod Kiewiet, Dean of Undergraduate Students: x6351, drk@caltech.edu

Barbara Green, Associate Dean: x6351, barbarag@caltech.edu

Lesley Nye, Associate Dean: X6351, lnye@caltech.edu

For additional information: www.deans.caltech.edu

Health and Counseling Center (physical and mental health issues, health insurance)

1239 Arden Road

Kevin Austin, Executive Director: x8331, kpa@caltech.edu,

Call 4701 to page the on-call psychologist during after hours.

After hours physical health: call 626-584-2421 and ask to speak to Dr. Stuart Miller.

For additional information: www.counseling.caltech.edu, www.healthcenter.caltech.edu

Registrar (registration, grades, progress reports, UASH issues, assignment of permanent advisors)

125 Center for Student Services (south wing)

Mary Morley, Registrar: x6354, mmorley@caltech.edu

Kim Mawhinney, Associate Registrar: x1797, kim.mawhinney@caltech.edu

Gloria Brewster (primary undergraduate contact): x6355, ghb@caltech.edu

For additional information: www.registrar.caltech.edu

Financial Aid (financial aid packages, scholarship requirements, loans)

383 S. Hill, (Second Floor) MC 20-90

Don Crewell; Director; x6172; dcrewell@caltech.edu;

Martha Michel, Associate Director: x6533, mmichel@caltech.edu

International Student Programs (immigration matters, advising related to social and cultural issues)

250 Center for Student Services (north wing) x6330, isp@caltech.edu

Laura Flower Kim, Associate Director: x2110, laura.flowerkim@caltech.edu

Daniel Yoder, International Student Advisor: x6330, dyoder@caltech.edu

Caltech Center for Diversity (advising and programming for women, underrepresented minority and LGBTQ students; confidential resource)

255 Center for Student Services (north wing)

Eva Graham, Director: x8103, egraham@caltech.edu

Portia Harris (Women's Center): x3221, pbharris@caltech.edu

Linda Webb, x5722, lindaw@caltech.edu.

Career Development Center (career advising, internships, pre-med program)

3rd Floor Center for Student Services (north wing)

Lauren Stolper, Director: x2150, l stolper@its.caltech.edu Mandy Casani, Assistant Director:

x6433 mcasani@caltech.edu James Berk (pre-health program): x6364 jberk@caltech.edu

Fellowships Advising and Study Abroad

319 Center for Student Services (south wing)

Lauren Stolper, Director: x2150, l stolper@its.caltech.edu

MOSH (residential life issues, student-faculty interaction programming) Geoff Blake, MOSH: x2541, contact at <http://mosh.caltech.edu/contact.asp>

Student Life (clubs, student activities)

165 Center for Student Services (north wing)

Tom Mannion, Senior Director for Student Activities and

Programs: x6174, m annion@caltech.edu

Housing and Dining (practical issues regarding food and housing infrastructure, room assignments)

1st floor Center for Student Services (north wing) for Housing

Peter Daily, Assistant Vice President: x3492, pdaily@caltech.edu

Maria Katsas, Asst. Dir. for Occupancy and Billing: x6176, maria@caltech.edu

10. References

Angelo and Cross, Classroom Assessment Techniques

Ambrose et al., How Learning Works