

MATHEMATICS 302, PART I

Apprentice Teaching I

University of California, Riverside
Fall Quarter, 2002
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Preamble

To quote the UC Riverside General Catalog, this two quarter course sequence is “intended to aid in the learning of effective teaching methods such as the handling of mathematics discussion sections, preparation and grading of examinations, and student relations,” and it is graded on a satisfactory (**S**) or no credit (**NC**) basis. For the most part, it deals with methods that have been successful in the past. While it is probably impossible to create any foolproof methods for doing a good job in the classroom, it is hoped that the material will encourage and help you to develop a teaching style that fits your personality and to allow your students to benefit maximally from their classroom experiences. As with other jobs, being a good teacher requires practice and experience that cannot be provided in a short course, but it is to be hoped that the information and suggestions in the course will help you avoid some standard pitfalls and make things go a little more efficiently. The Fall Quarter course will deal with the absolute necessities for conducting classes, and the Winter Quarter course will deal with issues that are important to enhancing teaching effectiveness.

General responsibilities of a teaching assistant. Roughly speaking, these fall into three categories:

1. Helping the development of individual students in the course section.
2. Carrying out the plans and implementing the guidelines of the course, and, for discussion sections, the course instructor.
3. Furthering your own training and development as a graduate student and a teacher.

Neglect of any of these risks damage to yourself and your students, and it could even lead to loss of your position!

The UCR booklet, *The Next Step: A Handbook for UCR Teaching Assistants*, contains a great deal of information that either complements or supplements these notes. Every TA should have a copy of this handbook; the Teaching Assistant Development Program (TADP) distributes the booklet free of charge. There will be references to it at various points throughout these notes.

Recently the Mathematical Association of America has published a book with the title,

A Handbook for Mathematics Teaching Assistants,

by Thomas Rishel, and a preliminary electronic version of this book is available online at the following site:

<http://www.maa.org/pfdev/tahandbook.html>

Not surprisingly, that book overlaps considerably with these notes, and it contains additional material as well as somewhat different perspectives. References to sections of Rishel's book will be made throughout the notes.

Last but not least, **in the classroom YOU represent the Mathematics Department and the University of California at Riverside!!!** In the end it is to everyone's advantage if we all do our jobs in a way that reinforces the positive opinions that both have earned.

INTRODUCTION — A CRASH COURSE

The following sections of Rishel's book should also be read at this point:

- Introduction
- Types of TA Assignments: Recitation, Lecture, Grading
- Before You Teach: A Checklist
- Day One
- Advice to TAs
- Advice to International TAs: A First Assignment
- Some silly stuff ... [*really a detailed checklist of everyday things*]

It is all well and good to offer a two quarter sequence on apprentice teaching, but there are things that a teaching assistant should know right away before they can be discussed in detail. So this section is a summary of the most fundamental do's and don't's as well as things to do before the first class. If the latter have not yet been done, you should take care of them as soon as possible.

Formal and informal sources of information. You are strongly encouraged to interact with other teaching assistants in the Department, and the Department will cooperate in furthering this to a reasonable extent (*e.g.*, no materials for picket signs!). However, you should be aware that peer information carries no guarantees for accuracy, especially when it comes to official matters. When questions about rules, regulations and policies arise, check things out with those in authority, including the office staff, the Chairman of the Graduate Committee, the Graduate Advisor, the Undergraduate Advisor and the Department Chairman.

Before the first meeting of class. Make sure you know where the classrooms for your teaching assignment are located; better yet, look inside them before classes begin. Get your textbooks, solutions manuals (if applicable), paper and pencils, *etc.* Normally copying material for classes is reserved for the primary instructor, but this might not hold for specific elementary classes (check with the instructor). Attend **all** organizational meetings that are scheduled. If you are a TA, get in touch with the primary instructor and learn about all the policies and procedures to be followed.

In many ways, the most vital portion of preparing for the beginning of a course is your communication with the instructor at the beginning of the course. Some absolutely necessary points to discuss are your teaching responsibilities, your grading responsibilities, your role in preparing tests, taking attendance, what to do about cheating, any points in the syllabus that are unclear, and future communication with the instructor.

You should take time to familiarize yourself with the entire course, including the notational conventions of the text. These may not seem very well chosen (for example, I have always disliked the terms **concave upward** and **concave downward**), but students will ask questions using this terminology. Any system of notation is confusing for

nonmathematically oriented students, and introducing alternative systems is likely to make the situation worse. It might also be worthwhile to locate other texts for the course you are teaching. Such books are often useful sources of additional examples and quiz problems. Many books of this sort can be found in the Department reading room (Surge 277) or the main office (Surge 202).

Check your mailbox before going to teach in case there is any last minute news.

Frequent sources of concern. Before doing anything for the first time, it is natural for people to worry about things that could go wrong. Here are a few worries that other new teaching assistants have faced and usually overcome.

Bad student reactions. Teaching assistants can be concerned about whether the students will like or respect them. Worrying too much about this can hinder your ability to deal with the subject you are trying to teach. Arriving early and either talking to students informally or listening to their conversation is often useful for learning about student concerns and interests. Although you are in a position of authority, you can still be friendly. Of course, it is more important for students to respect you than like you. The best way for you to do this is to convey an air of professionalism and confidence. After all, you have been appointed to the job because of your abilities, and the students should be made to recognize this fact.

Losing control of the class. Once again, an air of professionalism and confidence is the first step. Careful preparation and anticipation of events go a long way to preventing this problem. Trying too hard to control everything can be counterproductive; it is better to have an agenda beforehand, and invite students to provide some input (for example, ask for specific problems to be worked). Students who know what to expect tend to be more receptive. If you do feel that you are in a situation where you are losing control, **please contact the instructor or someone in authority immediately before you actually do lose control!!**

Loss of student interest. Mathematics tend to be a very dry subject, especially for students who are either not interested in mathematics at all or only interested in the subject as a means to an end. However, if you become anxious about this, there is a good chance that you will become inhibited, and inhibited people are often boring. Keep in mind that you have personal experiences and knowledge about mathematics that are worth sharing with your students. Tell them what is interesting to you about the subject (without expecting them to feel the same), give your reasons for feeling this way, and ask your students about what, if anything, in mathematics is interesting to them. People are more interested in a topic when it includes material that addresses their interests.

Fear of making mistakes or inability to answer students' questions. Mistakes are best managed by quick acknowledgment of the error and moving on. You should be adequately prepared to avoid making too many mistakes, but it is unreasonable to expect total perfection. If you are in a situation where you cannot answer a

question, it is better to avoid bluffing your way out and to admit you do not know the answer. However, in such cases you usually have a responsibility to get back to the students later with an answer.

Fear of students that are particularly articulate or may appear to know more than you do. Some students may act as if they know the subject better than you do, and some may even have a better knowledge of some particular aspect, but you have been selected to be a teaching assistant on the basis of your knowledge, and you have broader knowledge and experience with the subject than the students. Offering an opportunity for a student to speak before the class can be effective in some cases.

Summary. You are not expected to know it all, you are not expected to do an absolutely perfect job, you should be confident of your abilities, and you should adopt a perspective which make the job a relatively enjoyable experience for you. If you enjoy what you are doing, the chances are that you will avoid the potential nightmares described above and that the students will also be relatively content.

On the first day of class. It is probably a good idea to dress less casually than usual; it isn't necessary to be dressed for an opening night at the opera, but dressing for a day at the beach may give students misleading impressions that you are not serious about your job or more of a peer than a person in authority (to paraphrase Gilbert Highet, there is a difference between being friendly and being a friend). Get to the classroom early, erase the board, and put down the basic information so students will know they are in the right place. Introduce yourself to the class, writing down your name, office number, office hours, and electronic address (if applicable). Tell students the author, title and edition of the text and hold it up for them to see. Distribute any material either produced by you as the primary instructor or given to you by the primary instructor. Read the following Department statement or something equivalent on students with disabilities (this is a matter of Federal law, and lapses by the Department can have very severe consequences):

*Students who have been certified by the University to be eligible for **academic adjustments** should go to the Special Services office and request the information on how to proceed this term to get these adjustments made in their courses. **This should be done during the first week of classes.** The Director of Disabled Student Services is Marcia Theise Schiffer, and the telephone extension is **84538**. Only students who have been certified by the University and who have requested the University to send their certification letter to their instructor are eligible for academic adjustments. ### Students who are currently undergoing an evaluation process to determine whether they are eligible for academic adjustments are encouraged to find out **now** what procedures they will have to follow when they are certified by requesting the information mentioned above.*

Explain the grading system and other major course policies. Tell them what they are expected to do. Pause to ask questions several times during the preceding. If a class list is available, you are encouraged to go over it and ask students to identify themselves. You

might also want to encourage students to exchange names and phone numbers with a couple of fellow students (obviously some may already know some fellow students, but this can be a really useful way for students to connect with their peers if they have not already done so). Often students learn the most from interaction with other students outside of class. Explain to students how they can contact you outside office hours by electronic mail (if you use it, which is **very highly recommended**) or by leaving a message in your mailbox (tell them where it is). You are discouraged from giving your home phone number to your students, for you are not responsible for maintaining a 24 hour hotline for them. If there are no more questions, you are ready to begin the first class session. Quarterly schedules are usually too tight to allow the luxury of a meeting only covering formalities. Some students might come with registration problems. All such issues **must** be handled by the Department's office staff.

Objectives of a class session. Most of these should be clear to someone who has made it through an undergraduate program. However, being a graduate student and teaching assistant is often pretty demanding, and under such conditions it's easy to lose sight of one's goals. Therefore we shall give a short list of important points.

1. Reinforcement of material covered previously, either in the present course or a prerequisite.
2. Answering questions about homework, examinations or other previous business.
3. [*For lectures and Mathematics 5*] Explaining new material.
4. Giving and receiving feedback on how well material has been absorbed.
5. Clarifying what is expected from the students.
6. Eliminating misconceptions about the mechanics or substance of the course.
7. Motivating and encouraging students.

In particular, note that *systematically reviewing the “theory” of the course that is covered in lectures is generally **NOT** an objective of a discussion section*).

Do's and don't's. These are really the most important part of this course sequence, but in the spirit of this introduction we shall list a few of the most important points.

- Budgeting your time is important (in particular, you owe this to yourself).
- Being adequately prepared for class is so basic that it is hard to overemphasize.
- Arriving on time to class indicates that you are serious about the session you are teaching.
- Potential distractions like cellular phones, pagers and musical alarms are entirely inappropriate under most imaginable circumstances, and they should be turned off during class unless specific permission is given.
- Mailboxes need to be checked regularly (at least every other day).
- Notify someone in authority if you cannot meet a class. In nonemergency situations you have some responsibility for finding a replacement.
- Maintain confidentiality of student data, and follow the rules mandated on the official

University grade sheets.

- Cooperate with cases of student disabilities.
- Maintain records carefully and grade consistently with others. Give copies of records to the instructor at least twice during the quarter even if these are not requested.
- Follow office hour policies and be there or find an adequate substitute.
- In courses taught by more than one TA, limit independent handouts to disability cases. In general extra handouts are not encouraged; the instructor is the person with primary responsibility in this regard.
- Don't make promises or statements that could even possibly contradict the instructor or Department or University rules. If you don't know the answer, refer students to the appropriate person or office.
- Tutoring for pay in a course you are currently teaching is forbidden by Department policies and University regulations.

On the other hand, TA responsibilities are not meant to be so burdensome that they disrupt academic progress, and you are not expected to be available to students all the time. See someone in authority if your workload seems to be more than you can finish in the hours you are expected to work as a TA.