Module for Applied Mathematics ITAs

Goals

The goal of this project is to create a resource for International Teaching Assistants in Applied Mathematics. The resource should provide information about TA duties, University procedures and handling various situations that may arise while being a TA in Applied Mathematics at the University of Western Ontario. It should also demonstrate how to effectively conduct a lecture, tutorial or help center, and how to be efficient when marking assignments, quizzes, midterms, etc. Finally, it should help eliminate the language barrier which exists between students and TAs by creating lists of common phrases, abbreviations and terms and providing proper pronunciations where applicable.

General Information

One of the most important things for an International Teaching Assistant to remember, and this applies to all TAs, is that they are only an assistant. When there is a question or concern about the teaching assistantship, you should contact the course professor. While it is your job to assist them throughout the semester, it is also their job to be available to answer any questions you might have regarding your duties.

Many items, including Western's Code of Conduct, can be found online. For instance, the code of conduct can be found here:

`http://www.uwo.ca/univsec/board/code.pdf`

The handbook of Academic Policy is found here:

`http://www.uwo.ca/univsec/handbook/`

If you have questions regarding these documents in relation to your TA duties, you should contact the course professor.

Teaching assistantships are given in the form of a full TA (maximum of 10 hours per week) or a half TA (maximum of 5 hours per week). It is the Teaching Assistant's responsibility to keep track of their hours and let the course professor know if the hours are being exceeded.

Duties Specifications

As a teaching assistant you may have a wide range of duties ranging from marking, proctoring, giving tutorial sessions, working in a help center or holding office hours. The duties vary from course to course, and although it is difficult to give a general list of exact duties, we can provide an overview for all courses, and more specific details or extra duties can be outlined by the professor. You should always meet with the course professor at the beginning of the semester, and at that point you should find out exactly what your duties will be for the term. The following is a list of what might be expected of you in each of the roles listed above.

MARKING
As a marker, you may be requested to mark assignments, quizzes, midterms and even final exams. Midterm dates are often set at the beginning of the semester, and once the date is set it is reasonable to ask the professor when you will be expected to mark the exam, which is often done as a group and may take an entire afternoon, and may require you to be on campus on a weekend. Final exam dates are typically set by the university, and the schedule can be found online partway through the semester. As a marker, you may also be requested to type and/or post solutions to be given to students in class or on the web. Often, solutions are provided for you when marking, but sometimes they are not. If you are not comfortable creating your own solutions, talk to the professor.

Marking Tips
When marking an assignment, quiz or midterm exam, keep in mind that students should receive solutions once the papers have been given back. If you are not asked to type or post solutions for students, you should ask the professor if solutions will be available. If solutions are available, it is not necessary to fix every mistake made by a student. There are many ways to efficiently let the student know they have made a mistake, and it is then their responsibility to go to the solutions to find out exactly what their mistake was. If the student is still confused by what the marker has done, it is their responsibility to talk with the TA or professor about the problem.

To let a student know they have gone wrong, you should use common indicators such as an "X" next to an incorrect step, or even circle the mistake. Another way is to place the number of marks the student has lost for making a particular error next to the error. These are all common ways to indicate that a mistake has been made and students should understand their meaning. It is not necessary to write the correct steps on the student's page, as this takes an extraordinary amount of time, and since solutions should be given it is redundant. If the student has left out a problem, make note of this on the paper to avoid

situations where students can claim that you forgot to mark a question. On an exam where there may be room to complete a question on the same page that the question is given, put a line through the page to indicate that the student has left out this question. Again, this will avoid situations where students can write solutions after the exam has been given back and claim that you forgot to mark it.

If you are unsure where a student has gone wrong, you should think about why you are unsure. Could it be because there is more than one way to solve the problem and you are unsure of some of these ways? You should not feel incompetent if this occurs. Instead, arrange to meet with the professor so that he can explain what methods are acceptable, and if these methods are new to you, an explanation or a resource should be given to you. Perhaps you are unsure because the student is completely on the wrong track, and if this is the case you should refer them to the solutions, or even the section in the textbook where the topic is covered. If the student chooses to use your suggestion and is still having trouble, it is their responsibility to talk to the TA or professor in order to obtain extra help with a topic.

PROCTORING

As a proctor, you may be responsible for arriving at an exam location prior to the exam in order to help set up the exam room (the time should be given by the professor). During the exam you may be responsible for answering student's questions, taking attendance (including looking at student IDs), and picking up exams at the end.

To find out more about proctoring, see the University of Western Ontario Conduct of Examinations document, found here:

`http://www.uwo.ca/univsec/handbook/exam/administration.pdf`.

TUTORIALS/HELP CENTER

Tutorial teaching and help center duties may range from preparing extra problems to solve on the board to an entire class, to being available in a classroom at a certain hour to answer student's questions. In any of these situations the teaching assistant must be prepared so that students gain as much as possible from this time. Extra problems may be given to the TA by the professor, or the teaching assistant may be expected to find some extra problems on their own. There are many resources, including the course textbook, to find such problems. It is useful to choose problems where solutions are not given, and of course you should not do problems that are given on an assignment.

If a student has trouble with an assignment problem, the most important thing to remember is that it is not your job to give a student the answer, but it is rather your job to help the student understand the steps involved in solving a group of problems similar to one given on an assignment. How do you effectively help a student without giving away an answer? Here are some suggestions.

- Get them to talk to you rather than doing all the talking yourself. This way you will get a better idea of what they are struggling with, and they will learn how to effectively

communicate with you as well. If you are solving a problem on the board for an entire class, ask questions like "What should I do next?" and let them know its important that they respond, even if it takes a minute or two of silence first. Over time they will become more and more comfortable with communicating their ideas. If one or two students are always answering your questions, feel free to ask the rest of the class for participation without singling out one particular student.

- If they say "I don't know where to begin" it may be more helpful to take them through the proper section of the textbook rather than try to help them solve the problem. If there isn't a textbook around, you should be prepared to give a brief overview of the concept and have a very simple problem ready to solve so that they get the general idea.

- Get students to work together so that they help each other. Students may be hesitant to do this at first, but should become more comfortable with this over time. It is often easier for a group of students to admit they are having trouble rather than an individual. There is a distinction between working together and cheating, so make sure that students know that although ideas should be shared, assignments should be completed individually.

- Determine how the student learns. Some students learn best if you draw a picture for them to illustrate a concept. Others may want you to take them through a simple problem with them so that they can then do another problem on their own. Others may prefer verbal explanations.

Example:
Let's say a student is trying to solve the following problem:

$$\lim_{x\to 2} \frac{x^2-4}{x-2}.$$

If the student does not know where to start, make sure they first understand the concept of a limit. You can illustrate this by choosing any simple function and drawing its graph, or by making a table of values. If their problem is with the division by zero that occurs when plugging in $x = 2$, help them recall the different methods of factoring (in this case its a difference of squares but since they may see something in the future that is a little more complicated a more thorough review might be best). Students often have trouble canceling terms, and are unsure when it is appropriate to cancel. This may be a good opportunity to remind them when it is and isn't ok to cancel by using a couple of simple examples. It is also important that they use proper notation when going from one step to another. Students often do not see the importance of this, so it should be stressed.

It is also important to use the chalkboard in an effective way. Your ideas should be clear and coherent rather than scattered from one board to another so that students can follow. A good way to practice your chalkboard skills might be to use a friend as your audience. When using the chalkboard during a tutorial or help session, it may be useful to often step

back so that you can see the entire board (as students see it) to make sure your writing is legible and your solutions/ideas are laid out clearly.

COMPUTER LAB DUTIES

When giving a tutorial or help session in a computer lab, technical issues may arise. If this occurs, the TA should know who to contact or where to direct the student. For instance, if the student cannot login in a particular lab, they should contact ITS at (519) 661-3800. ITS is located on the main floor of Support Services building (SSB) and are generally open between 8:30am and 4:30pm. They can be reached after hours at (519) 661-3525. More information is available at `http://www.uwo.ca/its/reach/contactus.html`.

Before your first computer lab session, you should be familiar with the room, how to login to the computers, how to access Maple, Matlab and any other software you may need, and how to use the projector. If you are unsure how to do these things after visiting the room, speak to the course professor or ITS if necessary.

Maple/Matlab primer

The department does not have tutorials prepared for TAs who are not familiar with Matlab, Maple, etc. However, there are built in resources in both Matlab and Maple which are very useful.

Matlab

When opening Matlab, there is a "help" menu which can be found in the top left of the window. If you choose the first option, "product help" a new window will appear with many tabs including "Contents", "Index", "Search results", etc. If you are looking for general information about Matlab you will find this under "Contents". If you are looking for specific examples, or are looking for help regarding proper notation and use of Matlab's built in functions/commands, the best place to look would be under "Search results." For example, if you type the word "for" above the Search results tab, background on executing a block of code multiple times (*i.e.* a for loop, will appear on the right hand side of the window. If you scroll down you will find many examples which should help you.

Maple

Maple help is very similar. The location of the help is the same as Matlab, and there are also options to read general information regarding Maple, or search specific topics. If you type "for" into the search, you get background on for loops and other types of repetition statements, and if you scroll down there are several examples of how to write a for loop in Maple.

If you are concerned that you will not be able to perform your duties as a TA in the current role you've been given (due to lack of knowledge, background with Maple, C++, etc) talk to the course professor immediately. He or she may have additional resources for you to learn more, or suggestions of how you can "catch up." It is not unusual for a TA to attend some of the lectures, including labs, throughout the semester, so that he or she can also learn more about the course material and effectively perform the TA duties assigned to them. There may be exceptions where you can be reassigned to a different teaching

assistantship, however this would be up to the department.

OFFICE HOURS
Office hours give students a chance to speak to the TA one-on-one. Many of the suggestions given above apply to office hours as well, however there are additional guidelines you may want to follow so that students get the most out of this time. The following list outlines some of these things:

- If there are several students waiting to see you outside your office, it may be helpful to find out if they have similar problems. If so, you should find out (in advance) if there is a classroom nearby where you can help several students at once rather than answer the same questions over and over. If students have very different concerns/questions, place a time limit on the amount of time you spend with one student so that everyone gets a chance to ask their questions.

- Students may also use office hours as a chance to ask questions regarding a previous assignment/exam that you have marked. Make sure you are prepared to record a changed grade if necessary, and always let the professor know of any changes when office hours are over.

Discipline Issues

Although discipline issues should not typically arise, there is a chance that you may find yourself in an uncomfortable situation throughout the semester due to cheating, late submission of assignments, or just classroom issues such as excessive noise while you're helping others or doing problems on the chalkboard. If any of these situations arise, here are some suggestions.

Noise in the classroom

It is disrespectful for other students to make noise (whether its talking on a cell phone, talking to another student, etc) while others are trying to learn. If this happens, politely tell the noisy student to stop whatever it is they are doing. This is often enough since university students are supposed to be mature, and everyone should be there to learn. However, if the student does not listen after asking politely a couple of times you should find out the name of the student and report it to the professor.

Late Submission of an Assignment

If a student drops off an assignment past the due date, you should make note of the time and date of submission. It is possible that professors occasionally give extensions on assignments, but some professors choose to deduct marks for being late, or refuse to mark them if the deadline has long passed (especially if solutions have already been posted). Contact the professor and ask if there were any exceptions given to the due date, and report that a student submitted the assignment at a particular time after the due date. The

professor can then decide how to proceed. The professor may have a strict policy regarding late assignments which is clearly stated at the beginning of the semester, for instance in the course outline. You should find out whether or not there is a policy in place at the beginning of the semester, and if so you should follow that policy unless you are told otherwise. In cases where a student has a valid reason for late submission, or for not submitting an assignment at all (*e.g.* a doctor's note) you should inform the professor so that they can decide if the student should do a make-up assignment, if the marks for the assignment should be added to the final exam, etc.

Cheating

There are many things that are considered cheating, including

- using notes during a closed book exam
- copying an assignment from another student
- copying from another student on a midterm or final exam
- plagiarism (from another student, the web, a textbook, a paper, etc).

If you discover that students are copying from one another on assignments, keep track of the names of these students. You should contact the professor before recording any grades or handing back the assignments so that the professor can take a look at the assignments in question as well and decide how to proceed. He or she may choose to simply give a warning to the entire class (this may happen in cases where it is not 100% certain whether or not cheating has occurred), deduct marks from the assignment, or give the students zero on the assignment. These are common ways of dealing with this problem, but there may be other ways as well. It is a good idea to discuss this with the course professor at the beginning of the semester so it is clear how this will be dealt with.

If you discover a student cheating on a midterm or final exam, there is a policy in place which can be found here:

`http://www.uwo.ca/univsec/handbook/exam/administration.pdf`

You should read this document before proctoring an exam so that you are aware of the appropriate response to cheating.

Pronunciation Guide/List of Common Phrases and Abbreviations

The link below provides pronunciation study links for

- mathematics
- statistics

- computer science
- economics
- engineering
- physics
- biology
- chemistry
- greek letters.

`http://tap.msu.edu/team/res_guide.htm`

This resource is very useful for students wishing to improve their language skills. In addition to this resource, the following is a list of common abbreviations/notation used in mathematics:

- neq – not equal to ($\neq$)
- $\sin(x)$ - the sine function
- $\cos(x)$ - the cosine function
- $\tan(x)$ - the tangent function
- $\cot(x)$ - the cotangent function
- $\sec(x)$ - the secant function
- $\csc(x)$ - the cosecant function
- ! - factorial
- $\forall$ - for all
- $\exists$ - there exists