

TEACHING ASSISTANT MANUAL

Department of Physics

New Mexico State University

August 2005

TO THE GRADUATE TEACHING ASSISTANT

One of the principal goals of the department is to provide excellent undergraduate instruction in physics. Our graduate Teaching Assistants (TAs) play a significant role in our progress toward this goal.

We believe that laboratory is an important part of undergraduate instruction in physics. Students frequently comment that it is in the laboratory that they really begin to understand what their lecture professor is trying to tell them. We think that laboratory experience can help students develop not only measurement skills but also analytical and communication skills.

This handbook has been developed to assist you in the performance of your TA duties. In it you will find descriptions of TA duties, specific information about training and orientation, and other pertinent information about departmental organizations.

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August 2001

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TEACHING ASSISTANT MANUAL

I. GENERAL INFORMATION ABOUT YOUR ASSISTANTSHIP

A. *Appointment*

Your Graduate Teaching Assistantship (TA) appointment is generally made for one academic year, though sometimes for a single semester only. The assistantship is renewable, dependent upon performance, progress in your graduate physics program, successful completion of duties, and availability of funds. The amount of your assistantship is stated in your appointment letter. Personnel forms are to be completed immediately upon your arrival to the campus. Ms. Jan Bailey (Room 256) will provide you with information about payroll and tax forms and issue you keys. You are paid on a monthly basis (five paychecks per semester, last working day of each month) and you can pick up your paychecks from Ms. Clark or Ms. Alexander in Room 256. You may also elect to have your paychecks directly deposited into your bank or credit union; direct deposit arrangements can be made at the Payroll Office in Hadley Hall. Your Teaching Assistantship carries with it recitation duties related to laboratory instruction, grading laboratory reports, grading homework papers, and occasionally tutoring and classroom instruction. Teaching assistants are required to attend all orientation and training meetings designated for TAs.

B. *Renewal*

Requests for renewal of assistantships are made near the close of the spring semester (unless your appointment is for the fall semester only). The renewal decision is made depending upon your previous performance, progress in your graduate physics program, successful completion of duties, and availability of funds.

C. *Summer Employment*

Requests for summer employment are also made near the close of the spring semester directly to the departmental secretaries; awards are based on availability of positions. A summer TA assignment generally consists of teaching laboratories or lecture courses and possibly grading homework, for a nominal 20 hours per week. The department will assist as much as it can with other summer placement if you make your wishes known as early as possible.

D. *Mail and Local Address*

Each TA must have a local contact address, e-mail address, and phone number on file in the Physics Office. Office space assignments are made in the department office, and you will be assigned a mailbox in the Graduate Reading Room (Room 261). Free e-mail accounts are available to all NMSU students; go to <https://accounts.nmsu.edu/%7Eaams/register/>. PLEASE CHECK YOUR MAIL BOX AND E-MAIL DAILY. These are the primary ways we can get important messages to you.

II. BEING A TA IN THE PHYSICS DEPARTMENT

A. Selection of TAs

The TAs in the department are generally selected from the pool of physics graduate students. Most new physics graduate students are TAs for at least one year, unless specific arrangements have been made to work on a Research Assistantship (RA). Very few graduate students remain TAs during their entire graduate careers. Occasionally, some TAs are graduate students in physics-related disciplines.

B. TA assignments and duties

The primary assignments are usually a combination of undergraduate laboratory instruction and grading. The detailed duties are determined by the faculty supervisor of the course taught or graded. TAs are also expected to keep office hours and be available to their students. Those teaching laboratory sections are required to obtain student evaluations of teaching near the end of the semester. The standard TA assignment is designed to occupy 20 hours per week; the remainder of your time is for your graduate studies. Your assignment is made at the beginning of each semester by the Department. You should contact your assigned supervisor(s) as soon as your assignment is made. University and departmental orientations will be available. The faculty and staff of the department can provide various kinds of assistance and information to you as you begin your duties.

Satisfactory performance in your teaching and other assigned duties is expected. One responsibility that any teacher has is to be on time for every class. Should you find it necessary to miss a laboratory because of illnesses or other reason, it is your responsibility to make arrangements to have your class covered by another capable person. Once you have made these arrangements, you must inform the faculty member in charge and a department secretary about the changes. If you are unable to make arrangements for coverage, it is imperative that you inform the faculty member supervising your class or a department secretary if you cannot reach the faculty member. It is a good idea to make arrangements at the beginning of the semester with another TA who would be able to fill in for you on short notice.

Tardiness to labs creates an especially serious problem. If you know you will be a few minutes late, please call one of the departmental secretaries (646-3831) so that your classroom may be opened and the students informed about your late arrival, so they will not leave before you arrive.

C. Information About Undergraduate Courses

The following descriptions will familiarize you with some of the undergraduate courses that will comprise most of your teaching duties:

PHYS 110G – General education course: introduction to physics.

PHYS 120G – General education course: introduction to acoustics, often taken by music majors.

PHYS 211/212 – Non-calculus sophomore-level treatment of mechanics, heat, sound, electricity and magnetism, and optics; for non-technical majors.

PHYS 213 – Calculus-based mechanics; for science majors and some engineers.
PHYS 214 – Calculus-based electricity and magnetism; for science majors and some engineers.
PHYS 215/216 – Calculus-based sophomore-level treatment of mechanics, electricity and magnetism, and optics; for engineering and other technical majors.
PHYS 217 – Calculus-based heat, light and sound; for science majors and some engineers.
PHYS 315 – Modern physics.
PHYS 370 – Geometrical optics.
PHYS 471 – Modern experimental optics.
PHYS 475/575 – Advanced modern physics laboratory for upper-division undergraduate and graduate students.

D. Orientation and Training Program

Orientation is primarily done by the faculty supervising the TA. Those teaching laboratories receive orientation during the weekly laboratory course meetings. Course graders receive instruction from the professor teaching the course. Graduate students should feel free to interact with these faculty.

E. Faculty and Staff Assistance

1. Faculty. The faculty members maintain an interest in not only your academic success, but also your success as a teaching assistant. Each course you are assigned will have a faculty member designated as the instructor, who will be your direct supervisor. You will meet with this faculty member frequently for discussions of how the laboratory is to be handled, and you should go to this faculty member when questions or problems arise. Suggestions and feedback are encouraged. With open lines of communication between faculty and TAs, undergraduate students receive better instruction.

2. Support Personnel.

- a. Instructional Support Coordinator. The ISC, Ms. Chris, Pennise, in Room 207 provides support to the TAs in the teaching labs. This person can assist you with some of the “nuts and bolts” of your day-to-day teaching activities and is available to assist in setting up the laboratory experiments and in keeping the apparatus functional. You must notify the ISC promptly whenever any piece of laboratory apparatus is not working.
- b. Secretaries. The Department secretaries (Reina Clark and Josie Alexander) in Room 256 can provide help with reproduction of teaching material and examinations.
- c. Computer support. James Greis in room GN263 can provide support of instructional computers.
- d. Machinist. Marc Schwartz manages the machine shop in Room 171.
- e. Glass Shop. George Smith is in charge of the glass shop in Room 168.

III. GUIDELINES FOR LABORATORY INSTRUCTION

A. General

The results of most formal research on the effectiveness of laboratory instruction in increasing students learning are ambiguous, but some useful ideas are presented in the document *Goals of the Introductory Physics Laboratory*, prepared by the American Association of Physics Teachers Committee on Laboratories; excerpts from this are given in Appendix B. We at NMSU believe that laboratory is a successful and necessary part of undergraduate instruction in physics. We feel that laboratory skills can help students develop measurement and communication skills, as well as an improved understanding of physics, if the lab is well designed, proper instruction is provided, and thoughtful evaluation of the student's work is given.

Laboratory is one of the few one-on-one contacts that undergraduate students have with a college teacher. The direct student-teacher interaction can be one of the most rewarding experiences of college life. The attitude and skill of the instructor affect the quality of the laboratory instruction more than anything else. Students may overlook equipment that isn't working properly, but they won't overlook the ill-prepared teacher or the teacher with a negative attitude.

B. Lab Overview

Laboratory sections generally meet once a week for 2-1/2 hours during the fall and spring terms. You will receive a copy of the lab manual and the hours of the lab sections for which you will be responsible. All students must have a copy of the lab manual - check for this at the first lab period. You should see that they have a copy of the schedule of experiments to be done. The important aspects of lab instruction must be given to the students in the form of a written syllabus by the course instructor at this time. This should include information on grading, absence policies, make-up policies, final exams, weeks when lab is not scheduled because of holidays, and the lab rooms where the students will meet. Because of space and equipment limitations, the labs may be switched between rooms on occasion.

C. TA Responsibilities

BEFORE THE LABORATORY BEGINS:

1. Perform the entire lab experiment yourself if you haven't done it before. Make notes on problems you encounter and inform your students of them (they will appreciate the fact that you have taken the time to do the lab as outlined in the lab manual).
2. Prepare a lesson plan for the lab class. Good lesson plans will have introductory remarks, notes about particular physical concept being examined, and reminders about safety and special features of lab apparatus. It may be appropriate to cover a few interesting points about the "everyday" aspects of the physical concepts illustrated by the lab.
3. Review with the students the evaluation scheme for grading the lab reports, the time allowed for their completion, and turn-in procedures. Grading schemes should be discussed with the faculty lab supervisor before presenting them to the students, as we want to standardize the

lab sections for the same course number insofar as possible.

4. Arrive at the lab a few minutes early to check out the apparatus and to let students into the room. This will give you and the students a chance to get organized before beginning the lab period.

DURING THE LABORATORY INSTRUCTION PERIOD:

5. Begin the lab on time. Start with a well-prepared description of the experiment to done.
6. Interact with the students.
7. Circulate among the work groups. Become aware of what is going on. If problems with the apparatus occur during lab, seek assistance from the Instructional Support Coordinator in Room 207.

AFTER THE LABORATORY:

8. Report inoperative apparatus to the Instructional Support Coordinator promptly. Be very specific about the problems.
9. Grade reports before the NEXT laboratory meeting.
10. When leaving the lab room, check to see that the lab is in good order for the next lab (this includes cleaning the board).
11. Check to see that no laboratory equipment is missing.

D. Laboratory Report Format

Many laboratories require lab reports. The format is specified by the faculty member in charge of the lab, but a common format is described below.

It is suggested that lab reports be made in a hardbound quad paper notebook. This means that students will have all their lab reports together should the need arise to review them (such as for the lab final exam). The essential elements of a lab report include:

1. Title of Experiment
2. List of Lab Partners
3. Objectives
4. Theory
5. Experimental procedure
6. Data collected
7. Analysis of data
8. Results
9. Conclusions

Some of these may be combined or presented in special manners (for example, data and analysis in one single table; or results in the form of a graph). The SI unit system generally should be used throughout the report.

The report is not supposed to be primarily a writing exercise, although it is expected that good English usage will be followed, with correct spelling, complete sentences, good grammar, and conciseness. Each report should be completely identified with the student's name, course,

section, and experiment title. The first part may be an abstract (a summary of what was done and the final results), which probably should be the last thing written. All data must be identified with correct units, and the correct number of significant figures must be used. The results should be compared with the expected values, when possible, and error estimates on the data should be made.

E. Reporting Laboratory Grades

It is your responsibility to grade each week's lab reports. Some lab supervisors want a certain standard for the grade assignments in order to insure uniformity among the different sections. Check with the supervisor at the beginning of the semester so that you can better instruct your students on the system you will follow in grading the lab reports. Final grades may be assigned by you alone, by you with the supervisor's concurrence, or by the supervisor. Again check early for the policy you should follow. Be sure the students are given the rules for grading at the start of the course.

F. Final Exam

In many laboratories a final exam is given. The supervisor of the lab will give you the instructions for this. You should tell the students the rules for the final exam, and its weight in the final grade, at the start of the semester.

G. Laboratory Manual

At the end of the semester you should return your copy of the lab manual to the department office.

IV. GRADING ASSIGNMENTS

Some TAs will be given assignments to grade homework in physics courses instead of, or in addition to, teaching labs. Grading assignments will be made at the beginning of each semester.

The faculty member to whom you are assigned may have specific requests related to his grading policy that you will need to fulfill. It is the responsibility of the TA to contact the appropriate lecturer or lab coordinator for specific grading instructions. A few general suggestions about grading are as follows:

- A. Treat the student with respect. Do not write comments such as "You fudged here" or "Stupid Mistake."
- B. Emphasize the proper use of units, labeling of axes in graphs, and careful drawing of diagrams.
- C. Emphasize the need to check answers to problems for reasonableness. That is, the student should show that dimensions and units are correct; that limiting cases for which the answer is obvious are correctly given by the student's solution, etc. This implies an emphasis on algebra rather than numerical plug-in during the working of problems.
- D. The student should always show his work. A simple statement of the numerical answer to a problem should be given little, if any, credit.

E. The student should always know the basis of the grade you give.

V. FULFILLING YOUR DUTIES

As a TA you are a valued part of the instructional staff of the Physics Department. Your performance reflects not only on you as an individual, but also on the department as a whole. The faculty views you as a colleague in our departmental effort to provide the best possible instruction to our undergraduate students. The faculty also does not want you to be overworked, because your primary reason for being here is to obtain an advanced degree. You are assigned a certain number of hours per week for each of your assignments, and the time you spend on each of them should be consistent with that assignment.

A. *Failure to meet your responsibilities*

If you fail to meet your responsibilities as a TA in a satisfactory manner, then the following may result:

1. Informal Contact. You will be contacted by the faculty supervisor to discuss the problems related to your performance of duties. If the problem is corrected, no further discussion will ensue.
2. Formal Contact. The faculty supervisor will contact you in writing about the problem or problems related to your performance of duties. Copies of the formal contact are sent to the Department Head, and if warranted, to the NMSU Graduate Administrator. A meeting will be called by the Department Head and other appropriate faculty to discuss the procedures for correcting the problem. This meeting will be followed up with a letter to the TA detailing the correction procedure.
3. Formal Action. If the problem is not corrected as outlined in the formal contact meeting, one of several actions may be taken by the department. These could include reduction in salary for absences from teaching duties (for a problem related to non-performance of teaching duties), temporary dismissal from duties, or permanent dismissed from duties. You can be assured that formal action is taken only after discussions and warnings have taken place.

B. *TA Assignment Hours*

A laboratory session generally counts as 6-7 hours. Others, such as grading, are variable, depending partly on the number of students in the class. The total of these hours should be 20 hours per week for a standard TA.

If you find that you must spend more than the proper number of work hours per week to perform your assigned duties satisfactorily, then you should first request your supervising faculty member to reduce your assignment(s) appropriately. If this does not help, or if for any reason you do not wish to make this request to your supervisor, then you should contact the Department Head.

VI. TA EVALUATION

The TA is evaluated primarily by the faculty members to whom the TA is assigned for teaching and grading duties. Faculty evaluations are based on observations made during drop-in visits or scheduled visits to the labs and the performance by the TA in other assigned duties. This type of evaluation is intended to be informal and is aimed at providing constructive information to the TA about his/her performance.

The TA must also hand out the standard *DEPARTMENT TEACHING EVALUATION SHEETS* to each student in the assigned labs two weeks before the end of the semester. These should be passed out to the students, picked up, and taken to the department office by someone other than the instructor (such as another TA). The instructor should not be in the room during the evaluation. These completed evaluations are then given to the Department Head, who may call the TA in for a discussion concerning the student comments. They will be given to the TA after the grades are turned in.

VII. COMPUTER FACILITIES

Our newer labs use the PASCO Data Studio software running on IBM PC's. More information on each can be obtained from the Instructional Support Coordinator. Each TA who is in charge of a lab that uses these should take the time to familiarize himself/herself with the computers and software so that unnecessary problems can be avoided.

You should report problems with the computer equipment or software immediately to the Instructional Support Coordinator in Room 207, phone 646-4906 or Mr. James Greis in GN263. Please include the errant behavior in the report in order to allow for quicker diagnosis and repair.

APPENDIX A: INSTRUCTIONAL SUPPORT APPARATUS

1. LABORATORY ROOMS

Room 104: PHYS 110G and 120G
Room 108: PHYS 212L/216L
Room 132: PHYS 315L
Room 142: PHYS208/209
Room 204: PHYS 217L
Room 206: PHYS 211L/213L/215L
Room 265: PHYS 370 and 471
Various rooms: PHYS475/575

2. APPARATUS STORAGE

The storage plan for the department includes the use of rooms 142, 205, and 231 for the storage of apparatus used in support of the lectures and instructional labs. We make every effort to keep the storage areas between the labs on each floor free of apparatus that is not specifically designated to be used in support of the undergraduate labs.

3. APPARATUS MAINTENANCE

Damaged or broken (or otherwise non-functional) equipment must be reported to the Instructional Support Coordinator (Room 207).

4. KEYS AND ACCESS

A key for admission to the storerooms and laboratories will be checked out from Ms. Reina Clark by each TA for the semester. You should return the key to Ms. Clark when your duties as a TA are completed.

5. REPLACEMENT APPARATUS

Toward the end of each semester, each TA should consider his experience with the instructional labs and prepare recommendations for improvement of apparatus and/or facilities. These recommendations can be submitted informally, but in writing, to your faculty supervisor or the Instructional Support Coordinator in Room 207.