GENERAL GUIDANCE FOR HEADS OF PRACTICAL AND EXAMPLES CLASSES IN THE DEPARTMENT OF PHYSICS

[2010 Edition]

1 INTRODUCTION
This document has been prepared by the Teaching Committee (TC), and is intended as a guide to good practice in the running of practical and examples classes, for all Teaching Staff involved.

2. AIMS AND OBJECTIVE

2.1 Practical Classes
The Department has defined the aims of practical class teaching as:

- to introduce students to and to help them engage with experimental physics;
- to expose students to the role of experiment in the development of physics;
- to teach students how to approach an experimental study;
- to provide practice in using equipment, in gaining manual dexterity and in the handling of real data;
- to reinforce lecture material, where possible.

In all classes this will include:

Developing manipulative and observational skills; gaining experience of new types of apparatus and procedures; planning and recording observations correctly; making proper use of graphs for analysis and presentation of results; using computers in collecting and analyzing data; assessing and analyzing experimental errors correctly; learning how to draw valid conclusions from data; and developing the ability to write clear reports of experimental work.

Some classes will also have the specific aims of developing an understanding of analogue and digital electronics; of experiencing in the laboratory phenomena discussed in current lectures; of working in teams; of communicating and presenting the outcome of research; and, in Part III Project work, learning how to plan an experiment from scratch and how to eventually design and build apparatus.

2.2 Examples Classes
All examples classes involve getting practice in certain skills. Most classes centre on problem-solving, and have the aims of:

- developing and practicing specific problem-solving skills;
- developing ideas introduced in lectures by solving related problems;
- developing power and expertise in approaching and solving previously unseen problems.

Different classes are devoted to different aspects of these aims, such as developing expertise in mathematics or theoretical physics, learning how to programme a computer to tackle a specific problem, or revision of lecture course material.
3 **TEACHING COMMITTEE ORGANISATION**

The TC is responsible for setting the educational objectives of the various classes, and will allocate staff to them. One member of the TC\(^1\) will have special responsibility for the initial identification of class demonstrators, will organize general initial training for the demonstrators and will issue a general Handbook for Demonstrators. He will also provide liaison between the TC and the Overall Heads of Class when required.

4 **THE OVERALL HEAD OF CLASS**

For every class there is an Overall Head of Class (OHC) in general charge, which is charged with the responsibility for both for the management of the class and, in negotiation with the TC, for the teaching strategy. In some classes this job may be shared between two members of staff. The job of OHC requires a willingness to take strong initiatives and considerable determination to make the class a lively centre of effective teaching. In most classes there will also be Day Heads of Class (DHCs), who are in charge of the class on the day of the week concerned.

The OHCs have the following duties.

**Aims and objectives**: To identify, in consultation with the other staff attached to the class and with the teaching committee, clear teaching aims and objectives for their classes.

**Liaison**: In cases where it is relevant, to discuss with lecturers how the class material can best be integrated with content of lectures.

**Development**: To organize and coordinate the development of new teaching methods and materials (experiments, examples, etc) which may be required to achieve the teaching aims.

**Class Manual**: To organize the preparation and distribution of the relevant Class Manual and any other printed material needed by the students, and to revise the Class Manual when this is deemed necessary.

**Coordination**: To co-ordinate the smooth running of the classes, and in particular to allocate DHCs and demonstrators to particular class sessions and to prepare written instructions for both DHCs and demonstrators on the running of the class.

**Training**: to organize training sessions well before the classes start, and to ensure that other staff and demonstrators are thoroughly familiar with the experiments or examples, know what they are expected to do during the sessions, and are ready to pursue the aims of the class with enthusiasm.

**Marking and moderation**: to be responsible to the Head of Department for any class marks transmitted to the Examiners. To ensure that all staff understand thoroughly the scheme of assessment. To set up and administer an appropriate scheme of moderation of marks awarded by DHCs and demonstrators.

**Finance**: to be responsible for class expenditure, and for authorizing demonstrator expenditures. To negotiate with the Teaching Committee over any major non-recurrent expenditures.

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\(^1\) At the date of writing (Oct 2010) this is Dr Richard Saunders, rdes@mrao.cam.ac.uk
**Safety:** To be responsible for class safety procedures, and for carrying out and regularly up-dating safety audits as required by the Departmental Safety Officer.²

**College feedback:** To ensure that Colleges are given early warning of poor performance by students.

The OHC is also expected to act as one of the DHCs.

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5 **DAY HEADS OF CLASS**

Day Heads of Class are expected to be briefed by the Overall Head of Class on the aims and organization of the class and their duties. The DHC must be an effective and lively organizer and teacher. In all classes, DHC’s will be expected to undertake the following duties.

**Familiarisation**

DHCs will be expected to spend some time doing the experiments or working through the examples themselves prior to the classes. Each DHC must understand what the objectives of the class are, and be determined to be proactive in attaining them.

**Briefings**

In most classes, the pace on a given day will be set by briefings and postmortems, at various stages, given either to the whole class by the DHC, or by demonstrators to smaller groups of students. The liveliness and effectiveness of the class will depend very much on these briefings, and the DHC will be responsible for ensuring that they are carefully prepared and carried out effectively.

**Accessibility**

The DHC and other Staff Members must be visible and approachable for the whole of the teaching period. It is permissible to be absent for a short period for a lunch or tea break, but for safety reasons, when this happens an effective deputy, who understands clearly that he or she is responsible for safety, must be present *in lieu.*

**Proactive teaching**

Each DHC must set an example by spending a substantial part of the session talking with students individually, helping them and generating enthusiasm.

**Supervision of demonstrators**

See below.

**Equipment**

Nothing saps morale more than equipment which does not work. All DHCs must be proactive in removing damaged equipment from the class and getting it repaired by the assistants in the class.

**Marking and moderation**

It is up to the DHC to ensure that whatever marking takes place in his or her class is done accurately and fairly, according to the plan set up by the OHC. There must be a well-controlled scheme for moderating marking by demonstrators.

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² At the date of writing (Oct 2010) this is Dr Jane Blunt, fjb27@phy.cam.ac.uk
Safety
The DHC is responsible for class safety on the day concerned, and must brief students clearly on any safety issues relevant to the day’s class.

Progress records
In classes which are assessed for credit in Tripos, the DHC is responsible for ensuring that appropriate records are kept accurately, and for reporting in good time to Colleges, through the OHC, students who are not making satisfactory progress.

Development
DHCs should take an active interest in the development of the class, and may be asked, for instance, to take charge of a particular experiment, to develop new experiments or new examples, or to revise parts of the Class Manual.

If you are not sure about how these duties should be interpreted in your particular class, consult your OHC.

6 DEMONSTRATORS
Demonstrators are usually research students, and they receive a modest payment for their work in the classes. They will have received some initial training in teaching styles and assessment. Some of them will inevitably be inexperienced, and they will certainly need further instruction in the operation of the class concerned. The following points should be noted:

Training
There must be a training session before the class starts at which demonstrators practice the experiments or examples which the students will do. Their work should be carefully marked, with clear feedback. They must also be trained in exactly what is expected of them during the class sessions, and in how to interact with the students. They must be instructed exactly in whatever assessment system is used in the class.

Team spirit
The success of the class depends on the class demonstrators, and it is up to the DHC to ensure that they are properly trained and to get them working as a lively team; with inexperienced demonstrators this may not be easy. It is absolutely essential that the whole team makes frequent and friendly contact with the students, and that everyone is active in instruction. Every student must be encouraged.

Supervision
Demonstrators must be firmly supervised. Proper timekeeping is important. Trained substitutes must be arranged if absence is inevitable. The need to be always accessible to students and proactive in teaching must be emphasized, but is perhaps best demonstrated by example. DHCs must be ready to correct unhelpful attitudes: demonstrators must be friendly and encouraging to all students, and free of gender or other bias.

Assessment
If demonstrators assess work, it is important that they also provide effective feedback by writing comments on the work. Low or high marks should be explained. Assessment by demonstrators must be effectively moderated by teaching staff.
7 CLASS ASSISTANTS
The class assistants will usually have the following duties.

Equipment
To make sure that the required equipment is available in the right quantities, to organize repairs and order replacements or new equipment when required. To check the safety of equipment under the guidance of the safety officer. To safeguard and keep safely any dangerous materials needed for the classes.

Tidiness
To ensure that the classrooms and laboratories used for any classes are clean, tidy and safe.

Administration
To (usually) deal with accounts, and maintain formal records of marks.

Harry Druiff is in overall charge of the class assistants and concerned with their career development. Please be sure to discuss with him such things as assistants’ work loads, training, difficulties, or any particularly good work.

Last revised
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