SCHOOL OF MATHEMATICAL SCIENCES: Learning and Teaching Strategy 2006-09

For TAUGHT COURSES we follow the ten heads of the College Learning and Teaching Strategy 2006-2009.

1. Learning, teaching and assessment:

As a result of their mathematical training, our graduates should all be equipped (1) to appreciate exactness in reasoning and (2) to analyse problems and look methodically for solutions. These are both things that are taught by a programme as a whole, not by individual modules. As a School we aim to ensure that our students get the full benefit of these aspects of all our programmes.

We believe there is a role for highly motivated staff to help develop the critical powers of small groups of students where this can have real effect.

We will encourage students to accept responsibility through no-compromise Essential Mathematical Skills test that they must pass in first year. We will consider the extension of this concept to other modules where similar methods might be suitable. This could include some midterm tests, but it will need careful planning. We will continue to offer a range of projects modules; these can form a useful exercise in independent study.

We very much welcome the regular feedback of coursework marks to the students through their e-mail accounts, and we will encourage all lecturers to be prompt in putting coursework marks onto the departmental database (SID).

We are cautious about the suggestion in the College strategy that students should become 'autonomous learners'. Certainly as student numbers grow, there are pressures on the College to devise schedules that are economical with staff time. We accept this need, and at least senior members of the School will be reviewing our activities with this in mind. But the inevitable result that students are left with more personal responsibility for their learning is not necessarily a good thing for their education. Non-attendance at lectures and safety nets for weaker students will continue to be on our policy agenda, but we don't claim to know the right answers to these old problems.

Most of our undergraduate students are unlikely to be studying mathematics to any significant extent after they leave us, so that it would be inappropriate to gear the bulk of our teaching towards those who will. At the same time, those students who will continue as mathematicians help to set the mathematical standards which our modules should meet, and we continue to resist pressures for dumbing down. This tension is likely to be with us for several years to come; we hope we can use it as a stimulus.

However MSc courses (and 4th year MSci courses) are designed with a different objective from UG courses: they give professional training for mathematicians, statisticians and astronomers who in their careers are likely to make use of the advanced material they are taught in these courses.

2. Curriculum development and review:

We plan to enhance the quality of our study programmes by concentrating on the programmes and modules that are popular with students and discontinuing those which attract only a few students.

We intend to maintain the accreditation of our statistics programmes by the Royal Statistical Society.

In exams and formal tests we recognise the need to monitor for exam offences; we will collaborate with the College exam offences committee as the need arises. Our markers will continue to be requested to let us know of any cases of inappropriate copying between students in homework, so that when necessary we can step in to penalise, reprimand or advise. Students who have writing assignments will be given advice on acceptable ways of using other people's material.

We believe that the development of modules is one of our chief strengths. We can document how we bring original scholarship and research into our courses (for example by textbooks written, or through creation of new 3rd year BSc or 4th year MSci modules). We note the danger that in a research-led department we may concentrate too much on the scholarship and not enough on the needs of our students.

3. Quality enhancement and assurance:

We will ensure that both modules and programmes are reviewed with appropriate regularity by the Teaching and Learning Committee in conjunction with Research Directors.

We will continue to distribute questionnaires to students on all taught courses, and invite lecturers to respond to issues raised. There should be feedback (even if only that all is well) to the classes concerned, and to the Student-Staff Liaison Committee. The Director of
Undergraduate Studies will review all questionnaire responses and report to the Head of School. We will continue our end-of-degree questionnaires. We also welcome initiatives towards web-based questionnaires, which could improve the take-up rate.

The School will aim to make best use of the College's quality assurance procedures for approving new academic programmes; though in the immediate future our priority is rather to cut down on programmes that involve a disproportionate effort in recruitment, teaching and administration, in order to lessen the bureaucratic burden that these programmes impose.

The School will continue to use peer observation of teaching as a tool of dissemination of good practice and enhancement of the quality of teaching and student learning.

4. Skills and employability:

We will review our teaching of basic study skills to students in their first year.

We continue to believe that our students should emerge from their degrees with basic skills of calculation (which should have been learned at school but often weren't). Our

teaching and testing of Essential Mathematical Skills in first year imposes inflexible standards which the students are required to meet before they progress to second year; the students can retake until they pass, and there is a slight penalty for taking too many attempts. We believe that this style is an appropriate preparation for the world of work where obstacles have to be overcome and delay is penalised.

We accept that at the end of their degree courses, all our students should be able to express mathematical ideas both orally and in writing, using appropriate styles for addressing other mathematicians and for communicating with non-mathematicians. Though we accept this need, it has to be a long-term goal; very few mathematics departments anywhere in the world have achieved it. We will support those modules which work towards this, including those which have a written mini-project component (such as Logic I and Sampling, Surveys and Simulation, and Cryptography). We will continue to work with College initiatives on `writing in the disciplines'.

5. Networks and alliances:

The School has no alliances with other institutions. We have no objections in principle, but we know of no such alliances whose benefit would compensate for the time taken up - both by staff and by students - in supporting the collaboration. We have on occasion allowed our students to take modules at other colleges (in fact at MSc level this is not unusual), and we have sometimes arranged for project students to consult colleagues outside the College; of course we will continue these arrangements as and when appropriate.

6. Learning resources:

We value the support we have from the College Library, though mathematics taught courses make less use of the Library than some other subjects. It is our policy that all lecturers should bear in mind the need to get suitable course textbooks into the Library.

We will ensure, so far as it is in our power, that where the students need to use software in taught courses, the current versions will be available to them.

Inevitably the main responsibility for providing teaching resources for our students rests with the College centrally. The single most important aspect for us is the provision of lecture rooms of suitable size with good acoustics, and with blackboards or whiteboards of adequate size and quality, and overhead projectors and data projectors. We accept a responsibility to press for these requirements to be met.

7. Support and recognition for staff:

A widespread view in the School is that seminars and the like on teaching methods are most likely to be helpful if they are aimed at mathematics teaching in particular, or even at more specific areas like statistics. For this reason we welcome the emphasis in the College's Postgraduate Certificate in Academic Practice on training in teaching the candidate's own subject.

We accept the statement of our most recent TQA assessment that `There is a need for wider adoption of teaching and learning activities which engender more interactive learning'.

The School hopes to nominate a candidate for the Drapers' Prize for Teaching Quality and Development each year - though we have normally been guided by our students in these nominations, so that some initiative rests with the students. The School will also be supportive of any staff who wish to submit for Drapers' Prizes in Development of Learning and Teaching. (Several past or present members of the School have won these awards.)

8. Support for students:

We accept the need to ensure high progression rates, particularly from year 1 to year 2. For this we will continue our practice of small class support in both learning and testing, for students who are found to need this.

We will continue to review our system of academic advisers, to ensure that all advisers understand their responsibilities and act on them.

We will keep under review our departmental guidelines for markers and for exercise class helpers, and make sure that the markers and helpers know where to find these guidelines on the web. At the beginning of each semester, new markers will be offered help and advice on marking.

The School's policy is that students who are mathematically weak should be given help to enable them to pass suitable modules, both for their own benefit and to support our progression rates.

Our Undergraduate Handbook gives students guidelines on the amount of time they should expect to spend working for their degrees. In some first year classes we monitor attendance; as noted above, this is a question that we will keep under review given the common experience of low attendance.

As a School we value mutual courtesy, respect and cooperation between staff and students. We believe the School provides a pleasant personal environment for our students, and we accept the need to maintain that.

9. E-learning:

Our use of e-resources is governed by three aims: (1) to use electronics where it enables us to teach better, (2) to introduce students to ways in which modern mathematics can exploit computers, (3) to equip all our students for a world where basic computer skills will become steadily more essential. At the same time we have to bear in mind that a significant number of our students opted for Mathematics rather than Computer Science precisely because they prefer mathematics to electronics; so for us the use of computers can never be its own justification.

Thus for example it will continue to be School policy that every taught module will have an associated web page giving basic information such as exercise schedules. Also we will continue to remind lecturers (where the students haven't already done!) of the possibilities for putting exercises and other material on the web. But we will continue to leave it to the discretion of individual lecturers whether they put up lecture notes on the web.

Introductory modules on computational mathematics will continue to be in the core of all our single honour undergraduate programmes.

10. Learning at a distance:

At present we have no plans to introduce distance learning into our teaching.

For RESEARCH SUPERVISION we recognise the needs:

- to set up all research students with suitable supervisors;
- to train all research students in basic skills (such as research writing, mathematical typesetting, use of libraries, how to submit for publication, etc.);
- to review research student progress annually according to a schedule agreed by the School;
- to ensure that problems between student and supervisor can be taken up and dealt with appropriately;
- to provide a supportive and intellectually stimulating environment for the students.

We are part of a consortium of universities in the London region which has submitted a proposal to EPSRC for a London Taught Course Centre for 1st year MPhil/PhD research students in the Mathematical Sciences. The courses offered by this Centre are intended to equip our Mathematical Sciences research students with a broad background in recent developments in the subject.