

TLAC Internal Review

Department of Mathematics

Departmental Statement

Review Date: 10 February 2011

Introduction

The previous TLAC Internal Review of the Mathematics Department took place in January 2006. Since then, there have been substantial changes in the department, resulting most notably in the provision of two new degree courses.

The MSc in Financial Mathematics had its first intake of students in 2008. This is a specialist degree, beginning with a 2-week pre-session course. Since the previous review, the department has recruited a number of faculty in this field, partly so as to form a coherent research group but also to enable the successful delivery of this degree programme. The degree also makes use of related expertise in the Department of Finance and the Department of Statistics. This new MSc sits alongside the now well-established MSc in Applicable Mathematics. The cores of the two degrees are clearly distinguished, with several key courses on the (premium-fee) MSc Financial Mathematics exclusive to students on that degree.

A new BSc degree in Mathematics *with* Economics has been launched this session. The content of this degree is roughly three-quarters Mathematics and one-quarter Economics, and it is designed to appeal to students whose primary interest is Mathematics. This degree has a common first year with the existing BSc Mathematics and Economics degree, enabling easy transfer between the two after one year. The introduction of this degree, which was encouraged in the previous TLAC review, has not involved extra student numbers: numbers previously allocated to the Mathematics and Economics degree have been split between the two degrees.

The introduction of the new degrees has required the provision of a number of new courses. At postgraduate level, there are new half-unit courses in

- *The Mathematics of the Black and Scholes Theory,*
- *The Foundations of Interest Rate, Foreign Exchange and Credit Risk Theory,*
- *Computational Methods in Finance,*
- *Preferences, Optimal Portfolio Choice, and Equilibrium,*
- *Stochastic Analysis,* and
- *Search Games.*

All but the last of these were designed for the MSc Financial Mathematics, although some are open to students from all degrees, including the MSc Applicable Mathematics.

At undergraduate level, there are new half-unit courses in

- *Discrete Mathematics,*
- *Algebra and Number Theory,*
- *Complex Analysis,* and
- *Graph Theory.*

These courses cover topics that form important parts of mathematics, but had not found a place within the set of courses offered as part of the Mathematics and Economics degree.

There have also been a number of changes to the 3rd year of the BSc Mathematics and Economics degree. It was noted by an external examiner that it was possible for a student to graduate from this degree without taking any MA3xx course (although they have always had to take an EC3xx course): we agreed this was undesirable, and amended the regulations specifically to eliminate this possibility. More recently, the structure of the 3rd year was significantly altered as an outcome of the review of the degree. The course *EC319 Mathematical Economics* was previously the sole compulsory course in the final year, but its title and content were substantially amended, to the extent that it no longer made sense for this course to be compulsory: in place of the compulsory paper, students now choose from a range of mathematically oriented EC3xx courses. At the same time, we introduced more flexibility in the choice of other 3rd year options. Our students were consulted throughout the process, and, indeed, welcomed the changes.

Since the previous review, we have also extended the provision of Extra Example Sessions to all of our first-year courses. These are optional sessions, designed to provide extra background and additional examples to supplement the lectures (but not to include new material). Extra Examples Sessions began in MA100, and proved useful and popular, so now similar sessions are also held for MA103 and MA107. There is a much smaller group taking MA110, and the extra hour on this course takes the form of a “help session”. So students have a total of four contact hours per week in all first year courses (though the fourth hour is optional).

Finally, the department has become engaged in taught course provision for MPhil/PhD students. We are part of two London-based consortia delivering teaching to research students: the *London Taught Course Centre* and the *London Graduate School in Mathematical Finance*. Members of the department teach courses for these two consortia as part of their departmental teaching load.

The previous review found the department in the middle of a period of significant planned growth. This growth is presumably near its end – the department has nearly trebled in size since 2000 – and we now have a broad range of degrees in keeping with our position as a mathematics department within a social science institution. In terms of student numbers, undergraduate teaching remains our main activity, but we are now also fully engaged with postgraduate teaching and training.

Following this growth, our administrative arrangements have also changed. Previously, course and curriculum review were treated as the business of a full meeting of the department; now the department has established a Teaching Committee, which meets more regularly, to handle these processes on its behalf.

Seeking Student Opinion

We have well-functioning SSLCs: one for the undergraduate degrees, one for the two MScs, and a separate small meeting for the MPhil/PhD students. These constitute the primary route for the department to seek student feedback on its activities. For the

most part, student concerns as expressed at these meetings relate to elements of taught course provision; where appropriate, points raised are followed up.

There are other mechanisms, formal and informal, for soliciting student opinions. We use questionnaires to gather student opinion when we conduct reviews of individual courses: our experience is that these attract a much better response when they are conducted as paper-based surveys by the lecturer during the course, rather than as electronic surveys. In the Summer Term, the SSLC meeting is replaced by a lunch for all the student representatives, and this is often a useful occasion to gather feedback of a more general nature. In 2006 and 2009, the Departmental Manager organised focus groups of MSc students to discuss particular aspects of the (then new) MSc degrees. Individual members of staff also get informal feedback from students at meetings with their advisees, and if appropriate pass this on to the relevant member of staff or administrator. Finally, we receive useful additional information about student opinion via the TLAC reviews. Overall, we are confident that we do get a range of student views, at least about what students see as the most important aspects of what we do.

We highlight two cases where we adjusted teaching arrangements in response to feedback from students. The first relates to the course MA407 *Algorithms and Computation*, which is the only compulsory taught course on the MSc Applicable Mathematics. Originally, this was designed as a standard half-unit course taught entirely in Michaelmas Term. It became apparent that students with limited prior experience in programming were finding the course more challenging than we had anticipated. We responded by: (i) laying on extra help sessions specifically for Java programming, (ii) having one two-hour class each week, attended by all students, instead of splitting the students into two class groups for one hour a week each, and (iii) restructuring the course over two terms to allow time for the material to be assimilated.

As a second example, in 2007, the Departmental Manager consulted all MSc students on behalf of the department regarding a change to the assessment method for the course MA416. Initially, this course was intended to have 25% assessed coursework and 75% exam-based assessment. MA417 was being developed at this time, and when it was agreed that MA417 should have 50% coursework it was decided that in future MA416 should have no coursework element. The students registered on the course at the time were asked whether they too would prefer a mixture of assessed coursework and examination on MA416, or 100% examination. All who responded were in favour of moving immediately to 100% examination.

Tutorial and Supervisory Arrangements

Undergraduates

Each member of the department acts as Academic Adviser to about 20 BSc or MSc students. The allocation of undergraduate students to advisers is carried out by our very experienced Undergraduate Course Co-ordinator, with the support of the Departmental Tutor. Usually a student is kept with the same adviser from one year to the next whenever possible: we find that relationships between students and advisers are more beneficial if they develop over several years, and that students are often more comfortable seeking help from a member of staff whom they have known since their arrival. Sometimes, e.g., when an adviser is on leave, it is necessary for a

student to be allocated to another adviser: our aim is that a student should have no more than two advisers during their time in the department.

The department holds a series of orientation events for students on its two undergraduate degrees. The initial session, early in the orientation week, consists of an introduction from the Departmental Tutor and others, followed by a social event whose primary purpose is for students on the degrees to meet each other: the students' mentors, and representatives of the Maths & Stats Society, also attend the event. There is a second session later in the week, where students are alerted to the significantly different approach to the development of mathematics as a subject at university level, advised about the need to manage their own timetable, including the allocation of time to review lectures and to prepare for classes, and informed of various support systems within LSE. We run further orientation seminars throughout the first term; these include sessions on study skills, and on careers, as well as talks from former students.

First-year students are allocated to their advisers before the orientation meeting for the degree, and an appointment is made for them during the orientation week, often in the afternoon after the introduction to the department.

Our aim is for advisers to see first-year students at least three times during their first term, including this introductory meeting. Emails are sent by the Undergraduate Course Co-ordinator to all students, reminding/informing them that it is time for them to see their adviser. Our experience is that most students do respond to this email, and/or to specific invitations from their adviser.

All members of staff keep regular office hours during term time, usually two hours a week beginning and ending on half-hours. The normal arrangement is that these office hours are open both to advisees and to students on taught courses. Advisees are encouraged to make appointments by email if office hours are too busy or fall at an awkward time. This system seems to work well.

It is part of the duties of the academic adviser to write reference letters for students assigned to them. Most students in the department will also have been taught in class by other members of staff, who will also be willing to write references for them. Where this is not the case, the Departmental Tutor provides a reference on behalf of the department, using one of a small number of standard formats, sometimes supplemented by the opinions of class teachers.

Our impression is that the tutorial system works well enough in the vast majority of cases. At various times, we have opened discussions of tutorial matters at SSLC meetings, but we found that students have little to say on the topic. There are, every year, a number of students who become disengaged from their courses and also from the tutorial system; such cases often only come to light in the aftermath of failures on exams. It is unsafe to rely on all individual advisers taking the same approach in dealing with such cases, so the Undergraduate Course Co-ordinator identifies students with poor attendance records centrally, and brings them to the attention of the Departmental Tutor, who sees the student, warns them of the likely consequences of continuing to miss classes, and discusses the possibility of barring them from exams.

The Department also supports the Mathematics and Statistics Society; for instance, we have been able to secure a large teaching room for the society's popular homework help sessions throughout the year. The Undergraduate Course Co-ordinator also books rooms in Summer Term for revision sessions for all our undergraduate students to make use of – the feedback from our students about this has been very positive.

MSc Students

Students on the MSc Financial Mathematics arrive in the second week of September for an intensive two-week pre-session course. They have an orientation meeting and an introduction from the Programme Director and others, followed by a social event.

Students on the MSc Applicable Mathematics also have an orientation meeting of a similar nature, followed by a social event to which the Financial Mathematics students are also invited.

For each MSc degree, a few members of staff who teach on the degree also act as Academic Advisers to students on the degree, so each of these staff has 6-8 MSc students among their advisees. Allocation of students to advisers is done at the start of the year, and students are informed of their adviser at the orientation meeting.

The main roles of the Academic Adviser include: advising students on their choice of courses, discussing progress and any problems that the student may be experiencing, and often writing reference letters for the student. In cases where there are problems, the Programme Director is almost always informed and consulted at an early stage. At key points in the year, the MSc Administrator emails all students reminding them to meet with their adviser.

We also organise events and activities specifically aimed at graduate students. For instance, this session, the Department organised a visit to Cumberland Lodge for its MSc students. The take-up was a little disappointing due to a clash with a deadline for job applications, but those who went appreciated the variety of talks, and the opportunity to get to know each other better. We have also organised and funded, this year and last, a series of evening lectures by Dr Oliver Brockhaus, a financial professional who is a Visiting Senior Fellow in the Department, aimed at graduate students in the Department. These are proving very popular.

One particular area which was of great concern to the department when setting up the MSc in Applicable Mathematics was dissertation supervision, in particular over the summer. Since the launch of the MSc, we have become more rigorous in setting out our expectations of what written work students should produce, and when, and also managing the students' expectations in terms of meeting with their supervisor. A timetable is set out in the document "Instructions and Guidelines for the Dissertation in Applicable Mathematics" available from the MA498 Moodle page.

Students and dissertation supervisors are expected to have a number of meetings in the course of the year, and supervisors are required to give students details of the extent to which they are available over the summer. The requirement for students to hand in an Initial Report, an Interim Report, and a Draft Dissertation give both

students and supervisors a framework to monitor student progress, and also to organise how and when to meet.

Almost all students produce dissertations that meet the requirements, and in each year the best dissertations have been truly excellent, so our conclusion is that the process of dissertation supervision works well.

Students on the MSc Financial Mathematics do not take a dissertation unit, although they do submit a substantial piece of coursework for the course MA417 *Computational Methods in Finance*, worth 50% of the final mark: this coursework includes both well-prescribed and open-ended elements, to enable students to demonstrate a range of skills, including programming, technical analysis and exposition.

MPhil/PhD Students

It is important for research students in mathematics to meet with their supervisors on a regular basis, and indeed supervisors normally aim to meet their students every week during term time.

We conduct a twice-yearly monitoring exercise for research students, asking them and their supervisors for comments on progress. One question we ask concerns the number of meetings between student and supervisor, and the student's views on whether this was satisfactory: the answer is invariably yes.

All research students are allocated a second supervisor, usually after one term's study. In some cases, either initially or later, a student may be jointly supervised by two members of staff. In the case where there is a second supervisor, their role varies considerably: it is not generally expected that the second supervisor should be able to act as a substitute supervisor in the absence of the lead supervisor, although they are expected to be available to offer general advice. The department is conducting a review of the PhD programme at present, as part of its regular 5-yearly cycle of reviews.

Assessment, support for assessment, and feedback

Summative assessment

At undergraduate level, all courses in the department are assessed by a formal examination at the end of the year. A number of our MSc courses have a coursework component, mostly with a value of 10% or 20% of the final grade. The two courses where programming skills are assessed have a larger coursework component: MA407 *Algorithms and Computation* has two pieces of coursework worth a total of 30%, and MA417 *Computational Methods in Finance* has a coursework element worth 50% of the final grade.

We do not publish formal assessment criteria for examinations at the level of an individual course. However, we do provide a link to a passage in the subject benchmark statement for Mathematics, Statistics and Operational Research setting out the levels of student attainment required to pass a course at undergraduate level, and to get a first class mark. This is a well-considered passage, and we would find it hard to improve upon it. No such statement exists for MSc students, but there is a

benchmark statement regarding 4-year MMath degrees which can be used to supplement the statement for undergraduates.

While we are happy to provide formal assessment criteria on a department-wide basis, we do not believe that they are of great help to students wishing to know what is required in order to pass their examinations. To that end, we provide information in two different forms. First and most important, we provide weekly feedback on student homework. The style of exam questions is different from that of homework questions, but the content and level is not: the grades and comments on homework allow students to understand how the work they submit compares with the standard required in the exam. To aid this understanding, we use a common grading scheme across the department, based on VG/G/S/P rather than a numerical system, and ensure that teachers and students are clear on the meaning and use of these grades. Second, we provide and publicise a webpage (http://www2.lse.ac.uk/maths/Courses/Exam_guidance.aspx) informing students about how exams are graded, and what the examiner expects from them. A great deal of specific guidance regarding individual courses is given during the year, especially at revision lectures.

We intend to provide an extra resource for students from this year, in the form of a mocked-up sample attempt at an exam question in one or two of our courses, together with information on how such an answer would be graded, with explanations. We hope to have this in place (via the webpage above) in time for the Review.

We do provide information on assessment criteria for assessed coursework, especially where, as in MA407 and MA417, the nature of the coursework differs from an “extended homework”. It is left to the individual lecturer to determine what is appropriate in terms of information for students.

Full information on criteria for assessing MSc dissertations is given in the handbook for the MSc Applicable Mathematics. In practice, we find that students often do have only a limited understanding of how their dissertations will be assessed, and it is extremely important to inform them about what examiners will be looking for.

The dissertations are double-blind marked; we find that marks given by the two examiners are usually close, and in the cases where there is a difference of opinion there is no difficulty in assigning an agreed mark. The first examiner will have expertise in the specific material in the dissertation, and will be aware of the student’s progress towards writing the dissertation, while the second examiner will typically not be a specialist in the topic; there have been clear cases where the difference in marks between the two examiners can be attributed directly to their two different perspectives. After the marks have been agreed, there is a meeting of the examiners where the dissertation marks as a whole are discussed, in an attempt to ensure consistency across the unit. These meetings are useful exchanges of views, and other opinions have occasionally proved valuable in resolving differences of opinion between the two examiners.

We believe our processes are robust and fair, and we are supported in that view by external examiners, at both undergraduate and postgraduate level. For example, Dr James McKee of Royal Holloway said, regarding our undergraduate examinations in

2010: "...the internal marking was done thoroughly and consistently. I had full confidence in the accuracy of the final marks, and in the reasonableness of the scaling used for individual courses," and also "The method of assessment, by examination at the end of the year, is entirely appropriate for mathematicians: one gains a snapshot of their final level of accomplishment, rather than a history of the steps taken to reach that level." Professor Saul Jacka of the University of Warwick, the external examiner for the MSc Financial Mathematics, said in 2009: "The examination process seemed to be carried out scrupulously. Examiners were painstaking in their attention to individual scripts and the consideration of borderlines ... Judging by the performance of the majority of the students, the teaching must have been of a very high quality."

Formative assessment

Students on undergraduate Mathematics courses are set weekly homework exercises. These exercises are compulsory: they are marked and graded, and feedback is given on the work, in written form and/or by covering questions in class. This is an essential part of the process of enabling students to learn how to do mathematics.

Students are given a grade on each piece of homework submitted. We use the grades VG/G/S/P, as on the class registers at LSE For You. We explain our grading system at <http://www2.lse.ac.uk/maths/Courses/Grading.aspx>, emphasising that this is an assessment of the work handed in, not a prediction of examination performance. We expect teachers to write comments on student work, especially when the student has had problems with an exercise that will not be covered in detail in class.

We have used this system for many years, and our belief is that it does give students an accurate reflection of how they are doing, although we emphasise that the grades are only impressions of the particular piece of work submitted. Students receiving lower grades are alerted that they need to improve.

Most MSc courses follow the same model, with weekly, or near-weekly, homeworks that we expect to be handed in. At Masters level, lecturers are given a freer rein to determine how best to give students feedback on their performance.

Once again, the MSc dissertation needs special mention: various preliminary versions are required by specified deadlines, and students are given feedback by their supervisors on these versions. Full details can be found in our document 'Instructions and Guidelines for the Dissertation in Applicable Mathematics'.

Diagnostic Test / Maths Quiz

We have discontinued the Diagnostic Test that we used to carry out at orientation, despite the positive comments at the previous Review. We had various reasons for this: for one thing, administering a test as part of the orientation experience was found to be at odds with the recommendations of the School's review of induction/orientation.

For another, we were making only very limited use of the results, compared to the cost of the exercise in time for staff and students. The main aim of the test was to give students an immediate re-introduction to mathematical thinking; this is accomplished, we hope, just as well by giving the students much the same questions in the form of a "Maths Quiz", which this year was discussed during the second

orientation session, and used to highlight some differences between university and school mathematics. A secondary aim was to test how well students' actual attainment at entry matches our expectations: we found that this was not changing much over the several-year period that we had run the Test, and so the gain from running the exercise annually was minimal. (In any case, in order to inform the design of first-year curricula, it would not suffice to measure the attainment of students in the Mathematics Department alone.)

Advisers had been given the results of the Test for their advisees, and most advisers had looked over some questions with their students at the tutorial meeting in the middle of Michaelmas Term, but had found that the results of the Test had already been superseded by more reliable indicators of student progress from classes. We commissioned a small project comparing the results of the Test with actual exam results, and discovered that there was some correlation, but that the Test results could not be used as a reliable predictor of exam performance.

Support for assessment

The department issues two handbooks that are of relevance here. One is the Class Teaching Handbook, given to everyone who teaches for the department, setting out what is expected of lecturers and of class teachers. The other is our departmental Examination Procedures document (additional to the School's document), setting out in detail our examination processes.

For small courses with a single class group, the lecturer also takes the class, and can control the amount of marking they commit themselves to. For large lecture courses, there may be many class teachers, and we are very conscious of the need to keep the marking load proportionate. The following system has evolved, and is now in use (with variations) on most of our large courses. Lecturers instruct students which questions they need to hand in, and then further instruct the teachers that they only need to mark certain questions carefully; other questions are either marked cursorily or not at all. The questions to be marked are chosen to cover the range of topics, in particular including those questions known to cause problems. Students get full written answers to other questions, typically via the course Moodle page. There are other courses (in particular, courses in abstract mathematics) where this approach is less appropriate, and we expect teachers to spend more time marking: we are pleased that there is now a clear mechanism allowing us to pay teachers on such courses for this extra time.

Double-blind marking of examinations is not the disciplinary norm in mathematics, and the department has a long-standing formal opt-out from double-blind marking in all its courses, with the exception of the dissertation. The nature of the subject means that, once a very detailed marking scheme has been produced, grading is fairly mechanical, and carrying this out once suffices to give an accurate assessment of scripts. Where marking is carried out by several examiners, we divide the work "by question" rather than "by script" to ensure that the assessment is carried out evenly. In all cases, we utilise a second marker to undertake an independent check of the scripts to ensure that all have been fully and properly marked. Our procedures are documented in full in our "Examination Procedures" document, mentioned above.

Balancing assessment load across the department is important, since our courses vary dramatically in size. The general principle is that members of staff get approximately the same number of “script hours” (counting 3 per script on a full-unit course and 2 on a half-unit), with minor adjustments made to take into account individual circumstances.

We also comment here on the allocation of dissertation supervisors to students on the MSc Applicable Mathematics, although the main part of the workload here is not strictly assessment. The first step of the process is to determine which members of staff are available for dissertation supervision: this is a matter for the Head of Department and the person concerned, as part of the overall balancing of workloads. The process of allocating MSc Applicable Mathematics students to dissertation supervisors is not completely formal, but in practice works well: students approach supervisors whose projects interest them, and supervisors are only allowed to turn students down if they are overloaded. Our experience is that students who engage with the process from the beginning invariably do end up with a project they are comfortable with, although some who do not start to approach supervisors until close to the deadline have less choice.

Feedback

Various issues connected with feedback are discussed above; in this section, we concentrate on the department’s actions in response to the School’s revised policies and recommendations on feedback.

One policy change is that we are required to provide feedback on all summative assessment other than examinations and dissertations. For us, this means the assessed coursework that forms part of some MSc courses. We have not formally provided feedback up to now – although of course we have given feedback on all other homework assignments – but we will do this in all cases this year. In most cases, we expect that the feedback will take the form of a set of answers to the questions set, as well as some brief comments on the aggregated student performance on individual questions.

Another change is the move towards providing some feedback on examination performance, with an experimental phase this session covering one first-year course. We have decided to trial this on the course *MA100 Mathematical Methods*, which is appropriate because the failure rate on this course has become a cause for concern. In fact, several members of the department have extensive experience with this method of feedback, as it has been used for courses on the University of London external programme for many years. Our experience suggests that this requirement need not be too onerous, and is likely to be of some value.

With regard to the further recommendations of good practice regarding feedback in the Academic Board paper, we make the following remarks.

- We are endeavouring to use the word “feedback” more often, in particular as regards the marking of student homework.
- Our practice of setting and marking weekly homework seems to accomplish many of the same goals as the suggested “assessment exercises” and “mock exams”. Exam questions are normally longer than homework exercises, but their level is comparable.

- We have taken note of the comment on legibility of written feedback.
- Orientation sessions for undergraduates this year included information on how to go about learning mathematics, and how and where to seek help.

The Accuracy of Published Information

We begin this section with a brief overview of what information the department makes available to its students before they arrive and once they are here.

General information

Before arrival, all our new students are provided with comprehensive ‘new arrivals’ information. Our undergraduate students are sent an email inviting them to the departmental orientation session, and pointing them to various relevant pages set up specially on our website. We also send out a sheet of review exercises related to the course MA100. MSc students are sent: a welcome letter, information about orientation, course guides and programme regulations, a term outline and a map. MSc Financial Mathematics students are also sent details of the pre-session course. MSc Applicable Mathematics students are sent some additional information about learning the programming language Java for their compulsory course MA407, along with a few simple exercises to be attempted pre-arrival. At the departmental orientation meetings, students are given a printed copy of the handbook for their degree.

General information is provided via the department’s webpages. We host electronic copies of the handbooks for each degree, and copies of documents on option choices provided for rising 2nd and 3rd year undergraduates, as well as links to both internal and external pages giving information on study skills.

Course materials

Information and materials relating to individual courses is provided through Moodle. Previously, such information was provided via a Course Materials webpage for each course, but it is now School policy that all course materials should be placed on Moodle, and we are complying with this. The transition to Moodle took place gradually until this year, when it became departmental policy to use Moodle wherever possible; now every course in the Department has an active Moodle page. The extent of provision via printed material and via Moodle varies from course to course. For most courses, but not all, lecture notes or outlines are provided. In large courses, lecture notes and exercises are printed and handed out to students, while other documents such as course summaries, past exams and solutions, and answers to exercises appear only on the Moodle page. In smaller courses, there is more variation of practice. Lecture notes and exercises may be produced as one document at the beginning of the course, or may be provided out as the course progresses, depending on the lecturer’s preferences. Where the lecturer uses materials such as printed slides during the lecture, these are often made available via Moodle as well. On several large courses, students are thus provided with: printed lecture notes or study guides, videos of the lectures, and scanned or downloaded copies of the slides used in lectures. Some members of the department have experienced a few problems with the transition to Moodle, but by and large the system works, and it is easy to see from the participant numbers and frequency of access that it is heavily used by students.

The department deliberately makes no policy statement regarding what course materials have to be provided to students, or whether recordings of lectures need to be produced. Videoing of lectures is popular with students, but our experience is that it often leads to low attendance at lectures, and to student complaints on the occasions when the video recording fails for some reason. There are also sound pedagogical arguments against providing extensive materials, and we support lecturers who choose not to provide detailed lecture notes, or written answers to exercises, or solutions to examination questions, for instance. Indeed, it is departmental policy to provide model answers to at most three past examination papers in each course: the reason for this is to discourage students from believing that the route to success in exams is intensive learning based entirely on past papers.

Accuracy and consistency of information

We produce annual versions of five handbooks, four for the various degrees and one for all teachers in the department. Each handbook is updated carefully each session, with involvement of the relevant member of the administrative team, the academic responsible for the programme, the Departmental Manager, and others as necessary. The main aim of the updating each year is to ensure that the information remains accurate, both as regards regulation and information. In line with School policy, the handbooks give links to information on the School's website rather than reproduce that information, to ensure currency. For instance, we avoid putting a copy of the degree regulations in the handbooks, as these may fall out of date very quickly. We have not felt it necessary to involve students, or occasional teachers, in the editing of the handbooks.

Our belief is that it is even more important to maintain accurate information and links on the webpages, as these are more likely to be consulted by students on a regular basis.

We have recently constructed a Moodle page for the two BSc degrees (<http://moodle.lse.ac.uk/course/view.php?id=2863>), where many relevant documents are collected in one place for the convenience of students (and staff). Work is also underway to create a similar Moodle page for our two MSc degrees, but is still in its early stages: <http://moodle.lse.ac.uk/course/view.php?id=2417>.

The Role of GTAs and Guest Teachers in Departmental Teaching

The department's largest course, MA100 Mathematical Methods, is a full unit course with over 530 registered students divided into 40 class groups. There are six other courses with more than 100 students registered (MA103, MA107, MA200, MA201, MA203, MA300/301) and four more with more than one class group (MA207, MA208, MA209, MA210). We employ a large number of class teachers, and it is crucial to us that they do a good job.

The majority of these classes are taught by well-qualified and highly experienced Guest Teachers, most of whom we have been lucky enough to have had teaching for us for a number of years. Almost all of these Guest Teachers have a PhD in a mathematical discipline, and many have significant experience of teaching and/or additional teaching qualifications. (Some of these teach for other departments as well, and in some cases their total hours approaches that of full-time employment.) Our

own MPhil/PhD students are normally offered the opportunity to teach classes, usually between 2 and 4 class teaching (contact) hours per week. In order to teach for us, all teachers, whether a student with us or a Guest Teacher, must satisfy the Part-Time Teaching Tutor that their communication and presentation skills are adequate by passing an interview, and they are also obliged to take the LSE training course. We use the term “guest teacher” in what follows as a generic term for non-faculty class teachers, since this is a better description in the majority of cases.

All class teachers (except those with extensive teaching experience at university level) are required to attend the School’s training course before they may teach for us. The department contributes a subject-specific element to this course, namely a session on “marking student work”, which in part plays the role of a departmental induction for guest teachers.

The responsibilities of guest teachers (and other teachers in the department) are set out in our Class Teaching Handbook. In practice, course conveners typically meet with the teachers at the beginning of term, and then mostly correspond with the teachers by email. On the large courses in particular, course conveners give quite detailed instructions on what to mark and how to grade. During the year, there is not normally a need for formal meetings with experienced class teachers, but course conveners are likely to meet several times with newer class teachers. We do not normally expect guest teachers to attend lectures.

We have a system of observation of guest teachers. A class conducted by a new guest teacher is observed by a member of staff in about Week 6 of their first term’s teaching. Thereafter, guest teachers are observed again in their second year of teaching, and every two years thereafter. Observations may include inspection of the marking and grading of the teacher. We also conduct a small-scale survey of student opinion regarding the teaching of *new* guest teachers, in Week 7 of their first term, ahead of the School survey, to get quick feedback regarding potential problems.

Once or twice a year, we hold a lunchtime meeting (similar in format to an SSLC meeting) where all guest teachers are invited to discuss any issues that they or the Department wish to raise.

The department pays guest teachers for all sessions they are expected to attend: this includes the training sessions, the meetings with course conveners, and the lunchtime meeting, as well as specific amounts for class preparation, office hours, and homework marking. Guest teachers in the Mathematics Department have ended up being paid markedly more than under the previous system, which reflects and rewards the work they are expected to do. On the other hand, this represents a significantly increased call on the department’s MSL budget compared to previous years.

Appendix – Update on Implementation Report following TLAC Review in 2005-6 session

The Department met with the Assistant Registrar (TQARO) to discuss the action taken following our TLAC review in the 2005-06 session. The following provides updated information on the further action we have taken since submission of our initial response in August 2006, and our implementation report in 2007.

The paragraph numbers refer to the TLAC review report, which has not been reproduced here.

Paragraph 16

On reviewing promotional material. We reviewed our prospectus entries, looking in particular at the entry for the BSc Mathematics and Economics programme and how the quantitative nature of the programme could be more clearly conveyed. We ensured that clarity was provided on this issue, and that we do stress the quantitative nature of the degree at open days.

The programme structure has been revised in several ways since the TLAC review took place, which should go some way to alleviating any sense that there is insufficient flexibility within the programme. A broader range of optional courses than has been previously permissible is now offered.

On the possibility of introducing a BSc Mathematics with Economics programme. We have now introduced this degree programme, and the first cohort (currently 25 students) started the degree this session.

Paragraph 17

On linkages between courses across the undergraduate degree programme. After the Review, we discussed this several times in the Department as well as at a Staff Student Liaison Committee meeting. We gave thought to how we might better inform students already on the programme about the connections between the different courses, to give them a greater understanding of the importance of certain topics. As a result, we have been offering a specific session for first year undergraduate students within the orientation programme, which includes talks from some recent graduates of the Department, who discuss their experience of the degree, and the ways in which the programme as a whole, and particular courses, have helped in their further study or careers.

Paragraph 18

The issue of equipping students on our undergraduate degrees with transferable skills in presentation and writing has been addressed in part by the introduction of LSE100 as a compulsory part of student studies. Moreover, as our undergraduate students take a combined programme with Economics, it is likely that they are asked to do more writing than students on single-honours mathematics degrees are.

Paragraph 19

It was a matter of some concern to us to ensure that the introduction of the MSc Financial Mathematics did not detract from the MSc Applicable Mathematics. In the event, the number of applications to Applicable Mathematics has continued to rise after the introduction of the new MSc, while Financial Mathematics attracted a large

volume of applications. The Applicable Mathematics students also benefit from the opportunity to take some courses that were introduced primarily for the MSc Financial Mathematics programme.

Paragraph 21

The Department was relatively successful in gaining approval for developments that led to additional resources through the School's DDP exercise, and we have appointed additional staff members as a result.

Paragraph 26

As mentioned elsewhere, the diagnostic test has now been discontinued.

Paragraph 33

We have not introduced a pre-sessional JAVA course but we have integrated extra support in this area into one of the core courses (see elsewhere). Although this is a half unit course, teaching of it is now spread over two terms to provide students with a gentler introduction, and weekly Java support classes are given throughout Michaelmas and Lent terms, in addition to the standard teaching.

Paragraph 40

We can confirm we are continuing with peer observation of our class teaching, and we continue to conduct our own survey to highlight any concerns over the quality of class teaching.

Paragraph 48

Since the previous review, we gained the use of a large open-plan area for research student study space. In practice, this has meant that each student has their own desk and PC to use, as the space is much larger than we had before. Discussions at SSLC meetings confirm that the space is appropriate for the needs of research students.