

UNIVERSITY OF GLASGOW

Academic Standards Committee - Friday 29 May 2009

Departmental Programmes of Teaching, Learning and Assessment: Report of the Review of Mathematics held on 12 and 13 February 2009

Mrs Catherine Omand, Clerk to the Review Panel

Review Panel:

Professor Andrew Nash	Pro Vice Principal (Convener)
Professor I David Abrahams	University of Manchester (External Subject Specialist)
Professor Nik Ruskuc	University of St Andrews (External Subject Specialist)
Mr Iain Macdonald	Postgraduate Convener, Students' Representative Council
Professor Chris Johnson	Department of Computing Science (Cognate member)
Professor Keith Millar	Senate Assessor on Court
Dr Mary McCulloch	Learning and Teaching Centre
Mrs Catherine Omand	Senate Office (Clerk)
Ms Fiona Dick	Senate Office (Observer)

1. Introduction

- 1.1 The Department of Mathematics is one of four departments within the Faculty of Information and Mathematical Sciences (FIMS).
- 1.2 This was the second internal review of the Department. The first review took place in 2003.
- 1.3 The Self Evaluation Report (SER) was prepared by nine members of staff, including the Head of Department, Head of Learning and Teaching and a representative from each Level. The Student Representatives were sent a copy of the draft SER for comment.
- 1.4 The Review Panel met with the Dean, Professor David Fearn, and with the Head of Department, Professor Peter Kropholler. The Review Panel also met with 33 members of staff, including the Teaching Administrator, the Departmental Secretary, 3 IT support staff, 10 probationary staff, 10 Graduate Teaching Assistants (GTAs) and 18 undergraduate students, representing all levels of the Department's provision. There were no taught post graduate students undertaking any of the PG taught programmes.

2. Background Information

2.1 The Department of Mathematics has 41 academic staff, including the Head of Department, supported by a Teaching Administrator, an Administrator, 4 Secretaries and 3 IT support staff (shared with Statistics). Nineteen GTAs are employed by the Department and 9 MathsBase helpers, of whom, 4 are undergraduate and 5 are postgraduate students. (see 4.6.5)

2.2 Student numbers for 2008-09 were reported as follows:

Students	Headcount	FTE
Level 1	568	273.2
Level 2	773	128.8
Level 3 (Non Honours)	62	10.5
Level 3	76	60.5
Level 4	82	66.5
Level 5	5	4
Science Fundamentals	434	15.88
Level 1 Engineering (Aeronautical)	152	46.4
Level 2 Engineering (Civil and Electrical Engineering)	203	17.26
Undergraduate Total	2355	623.04
Postgraduate Taught	0	0
Postgraduate Research*	30	30

*(for information only - research is not covered by the Review)

2.3 The Review Panel considered the following range of provision offered by the Department:

- MSci single and combined with another subject
- Applied MSc single and combined with another subject
- BSc/MA (Hons) single and combined with another subject
- Applied BSc/MA (Hons) single and combined with another subject
- MA Soc Sci (Hons) combined with a social science subject
- Applied MA Soc Sci (Hons) combined with a social science subject
- BSc Designated degree
- BSc (Hons) Mathematical Sciences in which Mathematics, Statistics and Computing Science are combined in equal measure

Taught MSc programmes in Pure Mathematics and Applied Mathematics were introduced in 2008-09, but there are currently no students.

The Department contributes to the following programmes offered with other departments or other institutions:

- Service teaching for Engineering
- Service teaching for Science Fundamentals
- SMSTC (Scottish Mathematics Sciences Training Consortium)
- The Department also offers many courses at Levels 1, 2 and 3 for students taking an honours programme in another subject or for students taking a Designated degree.

2.4 From 2009, the Department will introduce Pure Mathematics to the present options of single and joint Honours degree programmes in Mathematics and Applied Mathematics, together with a new joint honours programme with Accountancy and Finance. In addition, three-year Honours degree programmes in Pure Mathematics, Mathematics and Applied Mathematics for well qualified students either as a single subject programme or as a joint Honours programme in combination with Statistics will be introduced in 2009-10.

3. Overall aims of the Department's provision and how it supports the University Strategic Plan

3.1 The Review Panel noted the Department's overall aims which were appropriately linked to the University's Strategic Plan and Learning and Teaching Strategy.

4. An Evaluation of the Student Learning Experience

4.1 Aims

The Panel considered the programme aims to be rather generic in nature and lacking in clarity when seeking to distinguish between programmes. The Panel **recommends** that individual programme aims be made more specific.

4.2 Intended Learning Outcomes (ILOs)

The Intended Learning Outcomes (ILOs) of the degree programmes bore strong similarity to each other and it was not clear either how they differed from one another or what were the intended levels of achievement within each programme. The Panel **recommends** that ILOs be made more explicit in demonstrating progression in order to enable students to make informed choices of degree programmes.

4.3 Assessment, Feedback and Achievement

4.3.1 The Review Panel was pleased to note that following a 2003 Review recommendation, the Department had introduced a Level 3 course in Writing and Presenting Mathematics without summative assessment by examination, and at honours levels, special forms of assessment for project work and seminar presentations contribute to summative assessment. However, apart from these, at all levels, assessment is predominantly by in-course class tests and end of course examinations. The Panel **recommends** that the Department continues to investigate possible alternatives for assessment of student learning, particularly in tutorial, seminar and project activities, allowing for formative as well as

summative scrutiny of and feedback on student ability, including transferable generic skills, in the belief that such beneficial enhancements to the student learning experience will offset the additional burden on staff. In addition, the Panel suggests further consideration is given to credit rating for transferable generic skills.

- 4.3.2 From the description given in the SER and at the meeting with the Head of Department, the Review Panel noted that the Department continues to use a scaled marking system and then maps marks on to the University Code of Assessment (CoA) grading scheme. Following the 2003 Review, concern was expressed that at senior honours level, the scaled system could have a large impact on the relatively small number of students and a recommendation was made that the Department should consider introducing a transparent and standardised marking system, particularly at honours levels. This has been largely overtaken by the introduction of the University-wide CoA in 2003 but the Department has not fully adopted it. While percentage marking and mapping on to the grade scale is permissible in entirely numerically based examinations and course work assessments, it is **recommended** that the Department fully adopts the Code of Assessment for non-numerical forms of assessment. At the meeting with the undergraduate students, only one was aware of the CoA and this was from documentation in another Department. The Panel **recommends** that the Department gives explicit information to students and staff about the University Code of Assessment and the departmental marking and scaling system and makes clear to students and staff the method of assessment to be applied to each piece of assessed work.
- 4.3.3 The Review Panel was pleased to be informed about the development and operation of the Department's robust on-line examination preparation system, permitting full participation in terms of submission of draft questions, scrutiny and feedback from departmental staff and external examiners, and **commends** this as evidence of **good practice**.
- 4.3.4 At the meeting with undergraduate students, concern was expressed about their perceived workload commitment in the Level 4 15-credit project and about varying degrees of supervision and feedback depending on the member of staff involved. The Panel **recommends** that guidelines are established with recommendations about average workload, information on procedure, the role of the supervisor and what level of supervision and feedback may be expected, and that this information be included in the relevant course/programme handbook.
- 4.3.5 The panel was pleased to discover that the Department had explained to the undergraduate students the role of the student representative, how representatives were elected and that training was offered and encouraged by the Students' Representative Council (SRC). Names of representatives were publicised during lectures. Although course representatives were active, levels of representation and subsequent feedback were variable. The Panel encourages the Department to continue to foster student participation within the Department through the work of course representatives as described in the recently published University and SRC Joint Code of Practice on Student Representation. [Link to University web page can be found at: http://senate.gla.ac.uk/qa/studentrep/cop/CoP_2008.pdf]
- 4.3.6 The Panel met with 10 Graduate Teaching Assistants (GTAs) and was most impressed by their enthusiasm for mathematics, for the Department

and for the University. The GTAs delivered tutorials and acted as demonstrators. Support provided for new GTAs included a generic three hour training course and a one hour video. Previously, new GTAs met with more experienced GTAs for useful practical induction but this had not taken place at the beginning of the current session. Feedback on GTA performance was limited to general comments contained in student responses to annual course monitoring questionnaires. The GTAs who met with the Panel indicated a desire for staff review of their teaching performance and periodic meetings with staff to receive feedback and discuss problems. They also recognised the benefit of opportunities for continuing professional development (CPD) through attendance at meetings for junior teaching staff and other means of training and development. The Panel **recommends** that GTAs are offered staff review of and feedback on their teaching performance and more specific feedback from their students. In addition the Panel **recommends** that the Department, possibly in conjunction with the Faculty, considers founding a GTA forum to assist in their training and development as teachers.

- 4.3.7 The Panel **commends** the Department for the 6-day turnaround of marked homework to Level 1 students. The students who met with the Panel confirmed that they found this to be helpful but indicated that they would also find it beneficial if feedback from the class test could be returned more promptly. Level 3 and 4 students were concerned that they only received one grade for the whole year and would welcome a breakdown of individual components. The Panel agreed with the student view and proposes that the Department give consideration to these issues.

4.4 *Curriculum Design, Development and Content*

- 4.4.1 The Review Panel found the multiplicity of courses and degree pathways somewhat confusing and questioned whether this caused similar difficulty for both applicants and continuing students. The Panel questioned whether the new programmes might not have adequate uptake by students and was concerned that they could adversely affect staff workload. The Head of Department assured the Panel that the introduction of the new degree programmes better reflected the research interests of staff and would not increase workload or involve additional resourcing. The main issue was timetabling. From a marketing perspective, it was hoped that the new programmes would attract more students, in particular, to the Honours degree programme in Pure Mathematics, as few institutions offered such a programme. The accelerated degree programmes would attract more able home and international students. The Panel **recommends** that the Department conducts an overview survey of its entire provision of courses and programmes with a view to streamlining and where possible reducing the number, in order to target resources and reduce staff workload, especially at Levels 1 and 4. The third year non-honours courses should also be critically reviewed. In addition, a rolling timetable for regular and systematic course and programme review should be established.
- 4.4.2 The Review Panel noted the relatively small numbers of students in the Level 3 and 4 courses and questioned the practical and economic efficiency of running so many courses. The Head of Department explained that courses did not necessarily run every year and that course

provision would be reviewed with the introduction of the new Honours Programme. The Panel **recommends** monitoring student demand and closure of consistently unpopular Level 3 and 4 courses.

- 4.4.3 At the meetings with the Head of Department and Staff, assurance was sought regarding the attractiveness of the MSci and the new MSc programmes and the Department's evidence of their marketability. The Department's view was that there was a market for these programmes, as student numbers on similar programmes elsewhere had proved their popularity for both UK and international students. Although there was no clarity about eventual numbers it was hoped that the number of students entering the MSci programme would rise to 10 in the next two to three years and that similar numbers would come into the MSc programmes. The Panel **recommends** that academic members of the Department be appointed to actively participate in postgraduate student recruitment in cooperation with the Recruitment, Admissions and Participation Service (RAPS) and the International and Postgraduate Service (IPS), in order to identify viable student markets and foster applicant interest.
- 4.4.4 The Head of Department confirmed that from a strategic point of view, the departmental vision was to offer an even balance between Applied Mathematics and Pure Mathematics. Applied Mathematics had been strengthened over the last 6 years and there was a risk that the strength of this discipline could be at the expense of Pure Mathematics, especially as it was easier to obtain funding and recruit Research Fellows for Applied Mathematics. The Panel supports the Department's intention to monitor the balance between Applied and Pure Mathematics to ensure the vitality of both branches.

4.5 *Student Recruitment*

- 4.5.1 The Panel was concerned that the quality of undergraduate student intake in respect of competence in the fundamentals of mathematics had necessitated the development of several initiatives to support significant numbers of weaker students. Furthermore, there was concern regarding the additional workload for staff and the knock-on effect on students who needed to make up ground during their first year and possibly their second. The Panel asked whether raising the entry tariff would be beneficial but the Head of Department advised that grade achievement in school leaving examinations did not guarantee ability to demonstrate and practise mathematical skills. By contrast, at the meeting with the undergraduate students, able students felt that Level 1, and to some extent Level 2, were too easy, particularly for some students coming from outside of the UK. The Panel pointed out that the accelerated degree route could remedy this, although some students who might have benefited from it stated that they preferred to commence from Level 1 as there was a perception that they would miss out on the more social side of student experience.

4.6 *Student Progression, Retention and Support*

Student Progression

- 4.6.1 The Panel acknowledged the Department's recognition that a retention issue existed and was sympathetic to the challenges that this presented in balancing resources while seeking to address the diverse range of student ability. At Level 1, several initiatives had been introduced to

support and retain mathematically weaker students, yet there was also a responsibility to satisfy the demands of the more able students. Supportive and remedial arrangements represented a substantial effort to enable students to reach an appropriate level and, regrettably, such support was now regarded as integral to the programme. The Panel also reflected on the somewhat complicated course and programme structure as possibly having a negative impact on student progression, and considered that for Levels 1 to 3 a simpler pathway with flexible exit and entry routes might be more viable. The Head of Department assured the Panel that the revised Honours programme would be more streamlined and economies would be made to enhance efficiency.

Retention

- 4.6.2 From the SER and as noted in 4.6.1 above, it was evident that the Department recognised retention as an issue and had introduced various techniques to address this. Staff recognised that apart from lower than desirable foundations in mathematics, school leavers were not adapting well to recommended university study patterns. The undergraduate students confirmed that many did not spend the recommended minimum hours in private study in order to master the subject material and enhance their learning. The Panel **recommends** that the Department makes renewed efforts to make new students aware of the necessary set of study skills that require to be developed during the transition from school to university and that these can only be achieved if disciplined daily study habits are developed early on.
- 4.6.3 During discussion with Undergraduate Students, the more senior students present suggested that the Department should use its most inspirational teachers in Level 1 classes in order to enhance enthusiasm amongst students as early as possible. Moreover, following discussion with the (GTAs), the Panel concluded that it would be of benefit if they could be more involved with Level 1 teaching as their enthusiasm for the subject and relative closeness to new students might encourage more of them to continue with mathematics. [See Recommendation at 4.6.9]
- 4.6.4 The Panel expressed concern that the success or otherwise of the student support initiatives introduced by the Department were not being monitored and measured. The Panel **recommends** that the Department liaises with RAPS and the Faculty in order to accurately monitor figures for the recruitment, admission and retention of students within the Department, particularly in respect of their mathematical ability on entry and subsequent performance at Levels 1 and 2, in order to more meaningfully assess the success of the support initiatives developed by the Department (MathsBase and PAL) and also the University-wide initiative (NUMBER).

Support

- 4.6.5 The Panel **commends** the Department for putting in place mechanisms to support the mathematically less well prepared students in their first year, in particular, NUMBER, MathsBase and Peer Assisted Learning (PAL). At the meeting with the undergraduate students, it was apparent that students valued these forms of support as they recognised that, from their own experience, senior students would have a better understanding of how less well equipped students might struggle early on.

4.6.6 The Panel perceived that third and fourth year students were treated somewhat more favourably than those in first and second years, for although there was good academic support for students in their early years, a greater degree of social contact to engender a sense of belonging would be beneficial. However, the Panel recognised that the large numbers of first and second year students present difficulties in increasing the sense of community but nevertheless suggests that the Department considers ways of increasing first and second year student engagement with the Department.

Skills Test

4.6.7 In 2007-08 the Department introduced an on-line Skills Test for all Level 1 mathematics students. The primary purpose of the Test was to enhance the student learning experience by increasing competence in mathematics. It focused on basic mathematical skills learned at school and was designed to enable students to improve these skills early on in their university career by identifying areas of weakness. The Test was a zero-credit course and students can take it as often as they wished but must pass it to gain eligibility for admission to Level 2. Success in the Test under invigilation was recorded on the student's transcript. Students failing the Test are recommended to take advantage of the support mechanisms described above (4.6.5). At the meeting with the Undergraduate Students, they expressed uncertainty as to the reasons for the introduction of the Test and indicated their rather negative view of it. They perceived it as an unnecessary hurdle rather than a supportive measure. While the Panel is broadly supportive of the Department's initiative because of its concerns about the level of mathematical skills at entry, the Panel was of the opinion that the Department should redouble its efforts to explain to students and staff the reasons for the Skills Test and for the requirement for its successful completion prior to entry to Level 2 mathematics courses and to give consideration to the possibility of its incorporation in Level 1 courses.

Contact Hours

4.6.8 The Panel **commends** the Department for its provision of open door office hours for 3 hours per week per member of staff, when students can consult staff, although at the meeting with the Undergraduate Students, it became apparent that the office hours were not greatly used; not all staff participated and of those who did, some were regarded as more approachable than others. Level 3 and 4 students explained that because of greater opportunities for interaction with teaching staff, they were more likely to discuss course-related issues with staff outwith lectures and office hours. Students were aware that they should contact their Adviser of Studies to discuss personal matters. The Panel **recommends** that the Department reviews the present uptake by students of open office hours and other advisory and support mechanisms with a view to streamlining the opportunities for students to consult staff in order to maximise potential benefit to students and economy of staff time.

Tutorials

4.6.9 At the meeting with the Undergraduate Students, the Panel heard positive comments on the curriculum and tutorial support but rather more criticism of the large size of tutorial groups in Level 1. At the meeting with the (GTAs), they reported that contact with Level 1 and 2 students tended

to be anonymous due to the large groups and their having to alternate between groups, but that there was more interaction at Levels 3 and 4 when tutorial groups were smaller. The Panel **recommends** that the Department reverts to small group tutorials at Level 1, with one tutor per group per semester in the 2009-10 Session.

Disability support

4.6.10 From the SER, the Panel was impressed with the Department's provision of support for students with temporary and long term disabilities and was pleased to know that an accessible toilet for disabled people has been created within the Mathematics Building. However, at the meeting with the Undergraduate Students, the Panel was concerned to hear of unresolved difficulties due to lecture theatre noise experienced by a student with a hearing impairment. The Panel was uncertain about departmental arrangements for supporting students with disabilities but at the meeting with Key Staff was reassured to know that the Teaching Administrator acts as the departmental Disability Coordinator in liaison with the Student Disability Service and departmental academic staff. The Panel suggests that consideration be given to the appointment of a senior member of the academic staff to assist the Teaching Administrator in resolving situations where there is difficulty in fulfilling disability requirements and recommendations.

Bursaries and prizes

4.6.11 The Panel was impressed by the number and range of departmental bursaries and prizes, and would encourage the Department to maximise publicity about their existence to promote competitive enthusiasm amongst students in the Department.

4.7 The Quality of Learning Opportunities

4.7.1 The Panel discussed with Key Staff the relatively limited range of teaching modes employed and in particular the widespread practice of "chalk and talk" lectures. While the Panel was persuaded that this method of teaching was effective for mathematics, nevertheless, it agreed this could lend itself to reduced engagement with the class and limit audience involvement, and therefore the Panel **recommends** that as part of the enhancement process, lecturing styles should be monitored, perhaps videoed, but definitely peer-reviewed, in order to provide staff with feedback on their technique and any recommendations for change.

MOODLE

4.7.2 The Panel was surprised at the absence in the SER of detailed reference to the use of MOODLE by the Department. At the meeting with Key Staff, it was clear that its use by individual staff is variable and some members indicated that they found using MOODLE difficult while others expressed reluctance to use it for prior uploading of lecture notes in case it led to poor attendance at lectures. The Undergraduate Students reported to the Panel that they use the MOODLE notice board when seeking information but that they would like to see wider use of MOODLE for communication and for educational purposes. However, they explained that although not all lecture notes appeared on MOODLE, those that did were often uploaded too late to be of practical help. Furthermore, they were concerned that some lecture notes placed on MOODLE contained errors, to the detriment of study. The Panel **recommends** that the

Department organises MOODLE training for staff and that it is increasingly used for administrative communication and for uploading of supporting material for lectures and tutorial classes, with care taken to ensure accuracy of detail.

4.8 *Resources for Learning and Teaching*

Physical Resources

- 4.8.1 A conducted tour of the Department's accommodation in the Mathematics and Boyd Orr buildings demonstrated the range of teaching and supporting facilities. The Panel **commends** the Department's provision of a library, study space and common room, although, understandably, use of the latter is restricted to honours students, research students and staff.
- 4.8.2 Although some staff would prefer the computing laboratories to be based in the Mathematics building, the facilities available in the Boyd Orr building appeared to be of a high standard and the Technical Staff did not feel isolated as they continued to have a base within the Mathematics building.
- 4.8.3 At every meeting, staff and students were unanimous in their support for maintaining traditional "chalk and talk" blackboard teaching and recognised this as the most appropriate method for communicating and learning mathematical knowledge. There was a strong preference for large area black/green boards over white boards and the Panel was given visual proof of the arguments put forward. The Panel was aware of the 2003 Review recommendation for a move away from chalk boards but was persuaded of the strength of argument in favour of their retention for mathematics teaching. However, the Panel was aware of the hazards of chalk dust to people with respiratory conditions and potential to damage electronic equipment, now frequently installed adjacent to chalk boards, and **recommends** that a more robust system of regular board cleaning and removal of chalk dust be instituted to minimise its detrimental effects, and that additional protection of electronic equipment be provided, where the latter is close to frequently used chalk boards.
- 4.8.4 The SER referred to the Department's insistence on chalk boards as creating difficulties over room availability via the centrally managed booking system. While accepting that the ideal of dedicated teaching rooms equipped with the preferred black/green boards was no longer a possibility, the Panel would encourage the Department to engage in continuing dialogue with the Manager of the Central Room Bookings (CRB) service to ensure adequate provision of the most suitable teaching rooms.

Staffing

- 4.8.5 The Panel noted that several key staff retirements were imminent and recognised the need for good succession planning for both teaching and administrative responsibilities. The Panel **commends** present practice whereby less experienced staff shadow senior colleagues and extending the advisory load to all staff. The Panel **recommends** the proleptic appointment of more junior staff to shadow colleagues currently responsible for administration of learning and teaching and supervision of student support initiatives, to facilitate smooth handovers and continuity of practice. The Panel further **recommends** that this process would be

enhanced if responsibility for day-to-day management of aspects of learning and teaching (eg timetabling, office hours and other advisory opportunities, disability compliance) be devolved to the Head of Learning and Teaching.

- 4.8.6 At the meeting with the Probationary Staff, the Panel noted some dissatisfaction with teaching topic allocations, and the potential for a split amongst Staff between 'Pure' who had well defined teaching allied to expertise and 'Applied' who were expected to teach across a broader range. The Panel proposes that the departmental Learning and Teaching Committee liaise with Programme Leaders to ensure appropriately focused and balanced teaching allocations for Probationary Staff. Level 1 and 2 teaching should be shared equally between 'Pure' and 'Applied' Staff and the opportunity to develop more advanced teaching expertise should be given in Level 3 and 4 courses. The Panel **recommends** that the Department demonstrates its commitment to Probationary Staff by their representative inclusion on departmental committees, especially the Learning and Teaching, IT and Research Committees.
- 4.8.7 At the meeting with the Head of Department, advice was sought with regard to the role of Research-only staff who traditionally, did not participate in teaching. The Panel **recommends** maximising the teaching potential within the Department by providing holders of Advanced Research Fellowships with the opportunity to contribute their expertise to the teaching at all levels and thereby gain valuable career-enhancing experience.
- 4.8.8 At the meeting with Key Staff, the Panel noted that a number of administrative duties were undertaken by academic staff which normally was undertaken by administrative and secretarial staff. However, this was necessary due to the current level of administrative/secretarial support within the Department. It was noted that there were further resource implications if student numbers increased.
- 4.8.9 From the SER and from the meeting with Probationary Staff, it was evident that there was criticism over the lack of specificity of the New Lecturer and Teacher Programme and its overall suitability for the training of teachers of mathematics. There was greater enthusiasm for a course offered by the University of Birmingham which was subject-specific for mathematics teaching. Staff were reassured that the Learning and Teaching Centre (L&TC) was aware of the concerns expressed and revision of the programme would include more discipline-specific issues. The Panel suggests that there be follow up discussion with colleagues in the L&TC in order to contribute departmental thinking about enhancement of the NLTP with particular focus on science-orientated topics, possibly front-loading the programme with contributions from experienced staff in the Department and from other science-based disciplines. In addition, the Department should consider the relative merits of the mathematics-based course delivered by Birmingham University but should view the NLTP as first priority for Probationary Staff.

Course Handbooks and material

- 4.8.10 The Panel regarded the departmental Guides for Students and Advisers, especially the progression pathways, as over-complicated. There was concern that students relied on Advisers to explain progression pathways and due to the complexity of the system could possibly receive inadequate or misleading advice. The Panel **recommends** that the

Department thoroughly reviews and revises all departmental information and instructional literature and web-based materials for students and staff use (especially Advisers), to ensure clarity and user-friendliness, especially in respect of course choice and career pathways.

5. Maintaining the Standards of Awards

The reduction in the number of First Class degrees awarded and the consequent increase in the number of lower classifications gave the Panel some cause for concern. At the meeting with the Head of Department, it was confirmed that some students were struggling to develop mathematical abilities which had prompted the introduction of the Skills Test, which was designed to ensure that students had the necessary mathematical skills to enable their progression.

6. Assuring and Enhancing the Quality of the Students' Learning Experience

- 6.1 The Panel was pleased to note the strength and breadth of the Department's research interests and the alignment of teaching with the research interests and expertise of Staff. The Department is **commended** for its efforts to identify summer projects for interested and suitably qualified students, and to secure external funding for these. In addition, the departmental library, with its stock of up to date key texts, provides students who are willing to read, ample material to further their interests in recent mathematical research.
- 6.2 The Undergraduate Students expressed the view that there was very limited benefit to be gained from the transferable skills aspects of the courses and indicated that they were unaware of Personal Development Planning (PDP). The Panel **recommends** that the Department engages more closely with the Faculty development of Employability and PDP initiatives and that relevant information is given to students together with departmental endorsement of the importance of Employability and PDP.
- 6.3 At the meeting with Key Staff, the Panel discussed the possibility of introducing work-based learning, with short placements or year-out work experience for students on the MSci programme. Bursaries from industry might also be available for postgraduate student projects and the Panel encourages the Department to discuss such possibilities with colleagues in the Science faculties already involved with industrial placements, and with the Director of the Careers Service.
- 6.4 From its reading of the SER and supporting documentation, and from the meetings during the Review visit, the Panel considered that there could be greater departmental engagement with the Scottish Funding Council's Quality Enhancement Framework, especially in relation to its emphasis on student partnership. While the Department has existing arrangements for obtaining feedback from students and consults with them through the Staff-Student Liaison Committee, the Panel considered that further development of these processes to enhance the role of students in the life of the Department is required. The Panel therefore **recommends**

that the Department participates more actively with the Quality Enhancement agenda at institutional and national levels for the enhancement of the student experience, including assessment, student support, internationalisation, employability, PDP and MOODLE, and at the departmental level, consults with its students in order to offer and encourage greater student participation and partnership in learning and teaching management and planning.

- 6.5 At the outset of the Review visit, the Panel expressed disappointment to the Head of Department that the SER contained few references to the 2003 Review and how its recommendations had enhanced or influenced the Department in the intervening years. A number of these were discussed during the course of the Review and the Head of Department also provided the Panel with a helpful update on follow-up of the 2003 recommendations. The Panel **recommends** that the Department adopts a more robust approach to the recommendations from the present Review in order to demonstrate objectively by a written minute, or similar, how it has responded to them and can reflect on how changes and developments have benefited or otherwise influenced the well-being of the Department, its Staff and its Students.

7. Summary of Perceived Strengths and Areas for Improvement in Learning and Teaching

Key Strengths

- Provision of high quality teaching at all levels, by staff who are committed to their students and enthusiastic in their teaching
- Alignment of departmental research interests with undergraduate teaching
- Excellent support initiatives for students aimed at enhancing the students' learning experience and encouraging retention of students less well prepared to study mathematics
- Highly motivated, supportive Graduate Teaching Assistants willing to contribute expertise and enthusiasm to the Department
- The 6-day turn-around period on homework for First Year students
- On-line examination preparation system
- Dedicated accommodation in respect of the departmental library, study space and common room
- Shadowing of senior staff by more junior staff

Areas to be improved or enhanced

- An overall review of the Department's provision of programmes and courses and student demand with a view to streamlining
- Closer alignment of teaching topics with staff expertise in pure or applied mathematics
- Student retention

- Recruitment of students from home and overseas to PGT programmes
- A review of all departmental information, instructional material and web-based literature to ensure clarity and user-friendliness for students and staff
- The clarification of programme aims and intended learning outcomes
- Communication of reasons for the Skills Test and other support initiatives, with close monitoring and measurement of their benefits
- Probationary Staff and student representation on appropriate departmental committees
- Enhanced mentoring and support of GTAs
- Smaller sized tutorial groups at Levels 1 and 2

Conclusions and recommendations

Conclusions

The Review Panel commends the Department on the overall scope and quality of its provision, and for its conscientious approach to student support and its efforts to encourage students in their enjoyment of mathematics and to improve retention of students in their early years. Despite the number of recommendations, the Panel was impressed with the level of commitment displayed by staff and students.

Recommendations

The recommendations interspersed in the preceding report are summarised below. The recommendations have been cross-referenced to the paragraphs to which they refer in the text of the report. They are grouped by the areas for improvement/enhancement and are ranked in order of priority.

The 2003 review recommendations should be further reviewed in the light of the present recommendations and both sets used to inform process and practice during the next inter-review period.

Recommendations

Curriculum

Recommendation 1

The Panel **recommends** that the Department conducts an overview survey of its entire provision of courses and programmes with a view to streamlining and where possible reducing the number, in order to target resources and reduce staff workload, especially at Levels 1 and 4. The third year non-honours courses should also be critically reviewed. In addition, a rolling timetable for regular and systematic course and programme review should be established. (Paragraph 4.4.1)

For the attention of: The Head of Department

Recommendation 2

The Panel **recommends** monitoring student demand and closure of consistently unpopular Level 3 and 4 courses. (Paragraph 4.4.2)

For the attention of: The Head of Department

Recommendation 3

The Panel **recommends** that individual programme aims and ILOs be made more explicit in demonstrating progression in order to enable students to make informed choices of degree programmes. (Paragraphs 4.1 and 4.2)

For the attention of: The Head of Department

Assessment

Recommendation 4

The Panel **recommends** that the Department fully adopts the Code of Assessment for non-numerical forms of assessment and that the Department gives explicit information to students and staff about the University Code of Assessment and the departmental marking and scaling system and makes clear to students and staff the method of assessment to be applied to each piece of assessed work. (Paragraph 4.3.2)

For the attention of: The Head of Department

Recommendation 5

The Panel **recommends** that the Department continues to investigate possible alternatives for assessment of student learning, particularly in tutorial, seminar and project activities, allowing for formative as well as summative scrutiny of and feedback on student ability, including transferable generic skills, in the belief that the benefits of such enhancements to the student learning experience will offset the additional burden on staff. (Paragraph 4.3.1)

For the attention of: The Head of Department

Feedback

Recommendation 6

The Panel **recommends** that guidelines are established with recommendations about average workload, information on procedure, the role of the supervisor and what level of supervision and feedback may be expected, and that this information be included in the relevant course/programme handbook. (Paragraph 4.3.4)

For the attention of: The Head of Department

Recommendation 7

The Panel **recommends** that GTAs are offered staff review of and feedback on their teaching performance and more specific feedback from their students. In addition the Panel **recommends** that the Department, possibly in conjunction with the Faculty, considers founding a GTA forum to assist in their training and development as teachers (Paragraph 4.3.6)

For the attention of: The Head of Department and the Dean

Support

Recommendation 8

The Panel **recommends** that the Department reverts to small group tutorials at Levels 1 and 2, with one tutor per group per semester in Session 2009-10. (Paragraph 4.6.9)

For the attention of: The Head of Department

Recommendation 9

The Panel **recommends** that the Department makes renewed efforts to make new students aware of the necessary set of study skills that require to be developed during the transition from school to university and that these can only be achieved if disciplined daily study habits are developed early on. (Paragraph 4.6.2)

For the attention of: The Head of Department

Recommendation 10

The Panel **recommends** that the Department thoroughly reviews and revises all departmental information and instructional literature and web-based materials for student and staff use (especially Advisers) to ensure clarity and user-friendliness, especially in respect of course choice and career pathways. (Paragraph 4.8.10)

For the attention of: The Head of Department

Recommendation 11

The Panel **recommends** that the Department reviews the present uptake by students of open office hours and other advisory and support mechanisms with

a view to streamlining the opportunities for students to consult staff in order to maximise potential benefit to students and economy of staff time. (Paragraph 4.6.8)

For the attention of: The Head of Department

Recommendation 12

The Panel **recommends** that the Department engages more closely with the Faculty development of Employability and PDP initiatives and that relevant information is given to students together with departmental endorsement of the importance of Employability and PDP. (Paragraph 6.2)

For the attention of: The Head of Department

Recruitment and Retention

Recommendation 13

The Panel **recommends** that academic members of the Department be appointed to actively participate in postgraduate student recruitment in cooperation with the Recruitment, Admissions and Participation Service (RAPS) and the International and Postgraduate Service (IPS), in order to identify viable student markets and foster applicant interest. (Paragraph 4.4.3)

For the attention of: The Head of Department, the Director of RAPS and the Director of IPS

Recommendation 14

The Panel **recommends** that the Department liaises with RAPS and the Faculty in order to accurately monitor figures for the recruitment, admission and retention of students within the Department, particularly in respect of their mathematical ability on entry and subsequent performance at Levels 1 and 2, in order to more meaningfully assess the success of the support initiatives developed by the Department (MathsBase and PAL) and also the University-wide initiative (NUMBER). (Paragraph 4.6.4)

For the attention of: The Head of Department, the Director of RAPS and the Director of IPS

Learning Resources

Staffing

Recommendation 15

The Panel **recommends** proleptic appointment of more junior staff to shadow colleagues currently responsible for administration of learning and teaching and supervising student support mechanisms to facilitate smooth handovers and continuity of practice. The Panel further **recommends** that this process would be enhanced if responsibility for day-to-day management of aspects of learning and teaching (eg timetabling, office hours and other advisory opportunities, disability compliance) be devolved to the Head of Learning and Teaching. (Paragraph 4.8.5)

For the attention of: The Head of Department

Recommendation 16

The Panel **recommends** that the Department demonstrates its commitment to probationary staff by their representative inclusion on departmental committees, especially the Learning and Teaching Committee, IT and Research Committees. (Paragraph 4.8.6)

For the attention of: The Head of Department

Recommendation 17

The Panel **recommends** maximising the teaching potential within the Department by providing holders of advanced research fellowships with the opportunity to contribute to the teaching and thereby gain valuable career-building experience. (Paragraph 4.8.7)

For the attention of: The Head of Department

Recommendation 18

The Panel **recommends** that as part of the enhancement process, lecturing styles should be monitored, perhaps videoed, but definitely peer-reviewed, in order to provide staff with feedback on their technique and any recommendations for change. (Paragraph 4.7.1)

For the attention of: The Head of Department

Recommendation 19

The Panel **recommends** that the Department organises MOODLE training for staff and that it is increasingly used for administrative communication and for uploading of supporting material for lectures and tutorial classes, with care taken to ensure accuracy of detail. (Paragraph 4.7.2)

For the attention of: The Head of Department

Physical resources

Recommendation 20

The Panel **recommends** that a more robust system of regular board cleaning and removal of chalk dust be instituted to minimise its detrimental effects, and that additional protection of electronic equipment be provided, where the latter is close to frequently used chalk boards. (Paragraph 4.8.3)

For the attention of: The Head of Department

Enhancement

Recommendation 21

The Panel **recommends** that the Department engages more fully with the quality enhancement agenda at institutional and national levels for the enhancement of the student experience, including assessment, student

support, internationalisation, employability, PDP and MOODLE and at the departmental level, consults with its students in order to offer and encourage greater student participation and partnership in learning and teaching management and planning. (Paragraph 6.4)

For the attention of: The Head of Department

Recommendation 22

The Panel **recommends** that the Department adopts a more robust approach to the recommendations from the present Review in order to demonstrate objectively by a written minute, or similar, how it has responded to them and can reflect on how changes and developments have benefited or otherwise influenced the well-being of the Department, its Staff and its Students. (Paragraph 6.5)

For the attention of: The Head of Department