

UNIVERSITY OF GLASGOW

Academic Standards Committee - Friday 25 May 2012

Periodic Subject Review: Report of the Review of the School of Physics and Astronomy

Mrs Ruth Cole, Clerk to the Review Panel

Review Panel:

Professor Graham Caie	Clerk of Senate and Vice Principal (Convener)
Professor Simon Bates	University of Edinburgh (External Subject Specialist)
Miss Julia Fyfe	Students' Representative Council
Dr Martin Macauley	School of Engineering (Cognate Member)
Professor Adrienne Scullion	Senate Assessor on Court
Dr Jane Mackenzie	Learning and Teaching Centre
Mrs Ruth Cole	Senate Office (Clerk)

1. Introduction

Background Information

- 1.1 The School of Physics and Astronomy is one of seven schools within the College of Science and Engineering which were established at the time of the University restructuring in August 2010. The School replaced a department which incorporated the same two disciplines.
- 1.2 The School currently enjoys a ranking within the UK top 10 for research (RAE 2008).
- 1.3 In October 2011 the School was awarded Champion status by the JUNO project. The project aims to address the under-representation of women in physics at university level, and the School is the first in Scotland to receive this accolade.
- 1.4 The School is located in the Kelvin Building, where the majority of lectures, laboratories, classes and tutorials are delivered. Teaching rooms, as well as high quality telescope equipment, are available at the University Observatory at Acre Road, Summerton. Other teaching is delivered at lecture theatres across the campus, as allocated by Central Room Bookings.
- 1.5 The previous review of Physics and Astronomy was the Departmental Programmes of Teaching, Learning and Assessment (DPTLA) review in 2006.
- 1.6 The self evaluation report (SER) was prepared by the Convenor of Learning & Teaching together with a number of other academic staff. Comments on the draft were invited from all academic and research staff and from undergraduate and postgraduate students.
- 1.7 The Review Panel considered the SER to be clear, comprehensive and reflective, and found within it ample evidence of good practice and innovation.

- 1.8 During the one and a half day visit (13 – 14 February), the Review Panel met with: the College Dean (Learning & Teaching), Professor David Fearn; the Head of School, Professor Andrew Long; and the Convenor of Learning & Teaching, Professor Martin Hendry. The Panel also met with 13 members of staff, 8 demonstrators (4 PhD students, 4 post-doctoral), 4 postgraduate taught students and 7 undergraduate students.
- 1.9 The Review Panel **commends** the School on its constructive engagement with the PSR process, the open and reflective attitude adopted in the SER, the timely provision of all documentation required for the Review, the helpful preparation for the review visit particularly by the Convenor of Learning and Teaching, and the cooperation and the positive attitudes displayed by staff and students in discussions with the Panel during the review visit.
- 1.10 The School has 42 academic teaching staff, of whom three are University Teachers, 70 research staff, 25 technical staff and 18 secretarial, administrative and support staff.

Students	Headcount	FTE
Level 1	628	208
Level 2	259	98
Level 3 - Physics	82	69
Level 4/5 - Physics	98	82
Level 3/4/5 - Astronomy	58	26
Undergraduate Total	1125	483
Postgraduate Taught	14	14
Postgraduate Research*	90	90

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

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

Single honours (BSc, MSci)

Physics

Theoretical Physics

Physics with Astrophysics

Chemical Physics

Chemical Physics with Work Placement (MSci only)

The School/Subject area contributes to the following *combined* degree programmes offered with other Schools/Colleges or other institutions

Combined honours (generally BSc and MSci)

Mathematics/Applied Mathematics/Pure Mathematics and Astronomy

Mathematics/Applied Mathematics/Pure Mathematics and Physics

Astronomy and Physics

Computing Science and Physics

Physics or Astronomy and Arts subject

BSc designated degree programmes

Applied Mathematics and Astronomy

Applied Mathematics and Physics
Astronomy and Mathematics
Astronomy and Physics
Chemical Physics
Mathematics and Physics
Physics
Physics with Astrophysics

The School/Subject area also contributes to the following teaching:

Physics EE1 (B.Eng/M.Eng degrees)
Level 2 Life Sciences (10 credits)
Science Fundamentals 1X and 1Y
Exploring the Cosmos 1 and 2
Introductory Physics: a new 20 credit Level 1 course exclusively for international exchange students (mainly from the US) whose main subject is not Physics.

Postgraduate taught programmes (MSc)

Astrophysics
Theoretical Physics
Physics: Advanced Materials
Physics: Energy and Environment
Physics: Global Security
Physics: Life Sciences

2. Overall aims of the School's provision and how it supports the University Strategic Plan

The SER clearly set out the overall aims of the School's provision. The Review Panel was satisfied that the aims were appropriate, reflecting the need to meet the requirements of the Institute of Physics, while also providing for the broader requirements of students who would ultimately choose not to pursue a career in Physics. The Panel considered the School to have set itself a challenging but achievable set of targets.

3. An Evaluation of the Student Learning Experience

3.1 Aims

3.1.1 The School's provision was closely aligned to subject benchmarking and to the Institute of Physics (IoP) requirements. The most recent full IoP accreditation took place in 2008 and was very positive. The next full review was anticipated in 2014. The curriculum was designed so that accreditation was possible for students completing combined, as well as single, Honours. While the School's recent success in achieving Juno Champion status was not an academic accreditation, it sent an important signal as to the aims and values of the School.

3.1.2 The Review Panel, guided by the views of the External Subject Specialist, **confirms** that the programmes offered by the School remain current and valid in light of developing knowledge in the discipline and practice in its application.

3.2 Intended Learning Outcomes (ILOs)

3.2.1 The Intended Learning Outcomes for programmes and courses were all laid out in the relevant programme and course specifications. The Review Panel

was satisfied that these were well written, appropriate, and well aligned to the assessment provision within each programme and course, with good differentiation between programmes at Masters and Honours levels. The Panel also found clear evidence in the SER that the School appreciated the significance of ILOs. The Review Panel was advised by the Convenor of Learning and Teaching that, in second year, the Head of Year explained to students the nature of study at Honours level, including references to the ILOs for the programmes and the associated graduate attributes. The Institute of Physics had provided useful literature covering similar topics, which the School distributed to its students.

Graduate Attributes

- 3.2.2 The Convenor of Learning and Teaching told the Review Panel that he believed that Physics and Astronomy was in a strong position to embrace graduate attributes. Physics and Astronomy students generally recognised themselves as effective problem solvers who were highly innovative and seekers of efficiencies; they were increasingly being encouraged to think in terms of these and the other graduate attributes that their studies promoted. (The Panel noted strong NSS scores in these areas: 'As a result of the course, I feel confident in tackling unfamiliar problems' - 95%; 'My communication skills have improved' - 83%; 'The course has helped me present myself with confidence' - 82%.)

3.3 *Assessment, Feedback and Achievement*

Assessment

- 3.3.1 The SER clearly set out the various forms of assessments used, including a good range of formative assessments. Institute of Physics requirements determined much of the subject matter to be assessed and this was done using a mix of end-of-course examinations, coursework, and project and practical work. In recent years, assessment at Levels 1 and 2 had been revised, with the introduction of more continuous assessment.

Code of Assessment

- 3.3.2 The School followed the requirements of the Code of Assessment, and while much assessment was marked in percentage terms, appropriate conversion of marks to the grades of Schedule A was carried out. The Head of School referred to the fact that External Examiners often questioned the benefit of this process for a School such as Physics and Astronomy.
- 3.3.3 The Review Panel was concerned to see that current Astronomy programme documentation referred to the following: Schedule C (which was abolished at the start of the 2011-12 session); requirements to be fulfilled before students would be permitted to take a degree examination (which would constitute a no longer permitted 'class ticket' system); and an examination whose duration exceeded that permitted by the Code. The Convenor of Learning and Teaching assured the Panel that these were errors in the handbooks which did not in fact reflect practice in the School, and that in all these respects the School did comply fully with the terms of the Code. The Panel **recommends** that the School carefully check all course and programme documentation to ensure that the content is both consistent with the Code of Assessment and reflects School practice.

Penalties for late submission of coursework

- 3.3.4 The Review Panel also noted that in Astronomy programme documentation there were statements regarding penalties for the late submission of coursework which appeared to be at divergence with the terms of the Code. The Code's provisions on late penalties required that the mark for coursework

be reduced by two secondary bands for each working day by which the work was submitted late, to a maximum of five working days. Programme documentation stated that marks would be reduced by 10% for each day that the work was late, up to a maximum of 10 days. The Convenor of Learning and Teaching explained that the School did comply with the Code's general provisions in relation to reduction of the grade to be awarded to a piece of coursework; however, the statements in question referred to cases where a number of sub-components contributing to an element of coursework were submitted over a period of time and the School believed that it was not possible to apply the general (non-linear) penalty to the mark for such work. The Panel noted that there was no guidance in the Code as to how a meaningful penalty should be applied at this sub-component level, and that this was presumably an issue for several areas of the University. The Panel **recommends** that Senate Office produce guidance on how penalties for the late submission of coursework should operate where several sub-components contribute to an overall coursework mark.

Assessment above Levels 1 and 2

- 3.3.5 While there had been recent moves away from the traditional reliance on end-of-course examinations at Levels 1 and 2, the Review Panel noted that at Honours there was still only limited continuous assessment. The SER referred to on-going discussions regarding the possible introduction of more continuous assessment at Honours and Masters, which would bring the School's assessment more in line with most other Physics departments in the UK. This issue had been explored by a working party of the Teaching Committee and discussed informally with students and with the SSLC, and it had been decided to pilot some continuous assessment on a small number of courses at Honours.
- 3.3.6 Staff who met with the Review Panel were aware that piloting of continuous assessment needed to be handled carefully. There was some concern that current students were displaying weaker problem-solving skills than historically had been the case, which suggested that there would indeed be advantages to introducing summative problems. The introduction of coursework also meant that the issue of plagiarism would need to be addressed carefully.
- 3.3.7 Postgraduate students told the Review Panel that they would prefer not to have all summative assessment at the end of the session in the form of exams (students had between six and eight exams in the spring diet, and they spoke of the difficulty of learning all the necessary material rather than being able to concentrate on applying their knowledge to on-going problem solving); some of the postgraduate students were taking courses which included elements of continuous assessment and the Panel heard that this had meant that a number of deadlines had fallen just before Christmas. Honours students who met with the Review Panel also spoke about facing a heavy burden of examinations in the spring diet, with most stating that they would prefer to have this alleviated with some continuous assessment during the year. They acknowledged that submission deadlines for coursework could clash with those for project reports; they also recognised that there was some value in the greater 'distillation time' for knowledge if it were tested in an end-of-course exam.
- 3.3.8 The Review Panel learned that a new Honours course, *Energy and Environment* included coursework (a report) weighted at 30% of the course's assessment, and the feedback from students had been good. Undergraduate students who met with the Panel also spoke positively about other forms of assessment, where it was available (e.g. an assessed presentation of results from a seminar project).

3.3.9 The view expressed by staff who met with the Panel was that a continuous assessment component worth 30% of the overall assessment was probably the optimum, as this still permitted end of course examinations of one and a half hours' duration. At the time of the review visit, firm proposals to the Teaching Committee were imminent on the piloting of further continuous assessment in Honours. The Panel noted that this would inevitably bring with it an additional marking burden for staff.

3.3.10 The Review Panel **commends** the School's measured consideration of how to amend its assessment practices and encourages it to move forward with its proposals for increasing continuous assessment in courses at Honours and Masters level, and to consider other forms of assessment, with careful evaluation of the impact – on staff and on students – of the changes.

Scheduling of assessment

3.3.11 Undergraduate students who met with the Review Panel noted that there were occasional clashes of deadlines (e.g. a class test taking place on the same day that a lab report was due to be submitted: the students reported having neglected preparation for the class test as it did not contribute towards their course result). They also referred to occasional clashes of deadlines from different subject areas (e.g. class tests in Maths and in Physics on the same day). Staff explained to the Panel that they were working to achieve better coordination between the School and the subject areas of Mathematics and Chemistry in order to minimise such clashes in the future.

Oral exams

3.3.12 There was an on-going discussion in the University concerning oral examinations, particularly in relation to determining the final Honours classification to be awarded to students whose results placed them in one of the discretionary zones. The School had in the past made some use of oral examinations, but the Head of School had reflected on this practice, particularly with respect to the fact that students had no prior experience of such exams. His view was that, if oral exams were no longer permitted, the School would be content to accept this.

Feedback on Assessment

3.3.13 The Review Panel noted that NSS scores in relation to feedback were not as strong as the scores obtained in other sections of the survey. (Positive responses recorded as follows: 'Feedback on my work has been prompt' - 56% (2010), 61% (2011); 'I have received detailed comments on my work' - 54% (2010), 61% (2011); 'Feedback on my work has helped me clarify things I did not understand' - 65% (2010), 77% (2011)). The Panel noted that the figures showed marked improvement between 2010 and 2011, but they still fell below the institutional benchmark of 80%.

3.3.14 Postgraduate students who met with the Review Panel discussed the issue of feedback. They referred to formative feedback given at supervision meetings: they were given problem sheets for which they were subsequently provided with solutions. In the absence of on-going summative assessment this gave them an indication of whether they were managing to keep up with the work.

3.3.15 The undergraduates who met with the Review Panel referred to generic feedback that they received on laboratory reports and said that they would have liked to have had more detail about where they had gone wrong or how a good piece of work could have been improved. They acknowledged that as they progressed through the years, the level of detail in feedback on laboratory work increased. Staff acknowledged that lab books were often marked with only a minimum of comment, but noted that Demonstrators were available to

provide further feedback if students felt they needed it. Demonstrators who met with the Panel confirmed that they were instructed to give little comment on lab reports, and that they were allocated just one and a half hours to mark all the books from a Physics laboratory session. The Astronomy Demonstrators had three hours to mark lab books, and observed that this difference probably reflected the greater student numbers in Physics. Undergraduates felt that they received more detailed feedback from Astronomy than from Physics. However, they commented positively on the pattern of handing in work and then receiving feedback on it the following week at a tutorial.

3.3.16 The Review Panel asked staff whether there was a School policy for the return of feedback. Staff confirmed that while they aimed to comply with the University's norm of three weeks, it was sometimes not possible to do this (e.g. one member of staff marking 60 Astronomy lab reports); however, in many cases they considerably bettered the three week benchmark (for instance where work was returned at tutorials the week following submission). Staff advised the Panel that the School was a participant in the 'Writing for Excellence' project, so the aim was to provide feedback on writing skills as well as on the more technical aspects of the work.

3.3.17 In discussions between staff and the Review Panel it was agreed that part of the challenge on the issue of feedback was to communicate clearly to students that 'feedback' could come in a variety of formats and that it would be provided in a variety of ways, some fairly informal and personal, and some more structured or general to a class as a whole. The NSS scores suggested that there was a need to manage students' expectations in relation to the time taken to provide feedback on submitted work and on what the nature of that feedback would be. Staff felt that there was a constructive on-going dialogue with students on this issue (e.g. at the staff-student meetings). The Convenor of Learning and Teaching told the Panel that it had been suggested that a guide/calendar could be compiled setting out to students the various forms of feedback and indicating when these would be provided. The Panel **recommends** that work is taken forward on preparing such a guide, to be incorporated in course documentation.

3.4 *Curriculum Design, Development and Content*

3.4.1 The Review Panel was interested to learn that the School of Physics and Astronomy was represented on a number of bodies concerned with the future direction of the Physics and Astronomy curriculum, such as the SQA, the Institute of Physics, the Scottish Science Advisory Council, and the Curriculum for Excellence. The Head of School and Convenor of Learning and Teaching spoke about the importance of these connections in influencing the School's thinking on the development of its curriculum. The Scottish Government was currently scrutinising the relationship between the sixth school year and the first year at University, and profound changes for the School might result from any major decisions made in this regard. There were concerns that if the first year at University came under pressure, it could make entry to Astronomy more problematic. The Convenor of Learning and Teaching noted that he had been involved in moves to bring more Astronomy into the curriculum at Higher and Advanced Higher levels. The Review Panel **commends** the School's proactive approach in keeping abreast of, and contributing to, developments in the external environment in relation to the Physics and Astronomy curriculum.

3.4.2 It was evident to the Review Panel that the strength of the School's research greatly enhanced the curriculum. This was particularly the case in the diverse opportunities for project work available at Honours and PGT level.

- 3.4.3 The Review Panel heard that the combination of the introduction of a College structure, involvement with SUPA (see paragraph 3.4.7 below) and the drive to further expand PGT provision was likely to lead to increasing inter-disciplinarity in the School in the coming years.
- 3.4.4 The Review Panel saw a willingness in the School to engage students in discussions about the development of the curriculum, with a student representative recently having joined the Teaching Committee.

Undergraduate curriculum

- 3.4.5 The School staff were strong defenders of the traditional four year Bachelors degree, with students entering a broad first year in which they studied three main subjects. The Convenor of Learning and Teaching spoke about the importance of Mathematics for Physics, and noted that MyCampus now flagged Maths, Physics and Astronomy as a recommended combination for first year students. The Convenor of Learning and Teaching also spoke about the benefits of being located in the same College as Maths, as the College Learning and Teaching Committee provided a forum through which the School of Physics and Astronomy could raise issues in relation to Maths requirements for its own curriculum.
- 3.4.6 The Review Panel was interested to learn about courses that had been introduced recently. *Physics Education and Communication in Schools* was a new Honours course that involved student placements in schools. While this was seen as an appropriate course for students considering the possibility of a career in teaching, it was hoped that it would have a broader appeal. There were only two students on the course in the current session, but the Convenor of Learning and Teaching noted that it was a 10 credit course, which may have dissuaded some. As this was the first year for the course, it was hoped that numbers might increase in the future. The Panel wondered whether the administrative burden associated with the course was onerous, but the Convenor of Learning and Teaching explained that the School routinely had extensive contact with schools and the course was a natural extension of those contacts.

SUPA

- 3.4.7 The School of Physics and Astronomy was part of the Scottish Universities Physics Alliance (SUPA), a research pooling initiative. Some shared teaching was delivered through the Alliance, using video conference facilities. This was established at postgraduate level and staff expressed the hope that teaching at other levels could be expanded in the future, with a view towards broadening and rationalising teaching provision. Postgraduate students discussed the SUPA lectures with the Panel, considering them to be very comprehensive and enjoyable though often highly technical. Glasgow students did not meet students from the other SUPA institutions. While the point was made that watching a lecture on-line was not as effective as being present in the lecture venue, some felt that there was great benefit in being able to stop and review the lectures. There were tutorial groups and continuous assessment linked with the on-line lectures.

PGT provision

- 3.4.8 The SER highlighted the introduction of taught postgraduate Masters provision since the previous review in 2006, with 14 students now taking one of six 12-month programmes, and there were plans for continued expansion. Much of the PGT provision had grown from existing Masters level provision in the undergraduate curriculum (MSci programmes), and in some instances the PGT cohort were taught alongside the Honours cohort. The Review Panel wondered what issues this presented, in terms of the different capabilities of the groups.

The Convenor of Learning and Teaching's view was that there had as yet been no issues in this regard and that the current PGT cohort appeared to be academically strong. The Panel's view was that while PGT numbers were low, and PGT students academically strong, it was unlikely that shared teaching would present any problems. However, if PGT numbers were to continue to increase, perhaps encompassing a wider range of abilities and backgrounds, there might be more of an issue in terms of the amount of support the different cohorts required. In discussion with the Panel, PGT students referred to the fact that there were undergraduate students in some of their classes. They did not see this as a problem; while they did not particularly mix with the undergraduates they felt that this probably arose from the fact that they did not have many classes in common rather than that there was any significant segregation of the different groups.

Prior knowledge/experience of PGT students

- 3.4.9 One issue raised at the Review Panel's meeting with PGT students was that students were being accepted on to Physics and Astronomy programmes with qualifications from other disciplines. This meant that basic grounding could be lacking and raised questions as to how any additional required support was provided. Reference was also made to what the students perceived in some cases to be a lack of basic computer programming skills: at PGT level it was important to have reasonable fluency in programming in order to be able to undertake the necessary research, particularly for Theoretical Physics. The Panel also heard comments from Demonstrators on the range of background knowledge possessed by PGT students who they were supporting, and the difficulties caused when knowledge or skills that were required in connection with undertaking a project were lacking. The SER referred to a careful process of considering the backgrounds of new entrants. The Review Panel noted that as PGT student numbers were expected to grow, it would become increasingly important that the School should be able to identify quickly whether there were significant gaps in the students' academic backgrounds, in order that this should be managed in an ordered way, whether by self-directed study or by additional staff support. The Panel **recommends** that the School consider how best to put in place the necessary diagnostic measures to address this.

Computing

- 3.4.10 The issue of skills in programming was raised again in the Review Panel's meeting with undergraduate students: while some teaching in programming was delivered at Level 2, timetable constraints meant that this was not available to all students. The undergraduates suggested that a component of programming could be integrated into the core teaching. They acknowledged that at higher levels they would be expected to familiarise themselves with different languages, but their view was that some additional grounding in this area would be beneficial. This issue was discussed at the Panel's meeting with staff. Staff reflected on the fact that computing had differing prominence in different branches of Physics and Astronomy. The Convenor of Learning and Teaching noted that one of the courses being proposed for the introduction of an element of continuous assessment was *Numerical Methods* (Level 4) and that it might be possible to incorporate an element of programming here. The Review Panel **recommends** that the School investigate the feasibility of incorporating some additional basic programming into the undergraduate curriculum, in order to prepare students better with computing skills required throughout their programmes of study.

Internationalisation

- 3.4.11 The SER referred to the low numbers of Glasgow University students who studied abroad in the course of their degree. Staff expressed concerns about the difficulty of satisfying Institute of Physics accreditation, and noted that if students studied abroad pre-Honours, there would be an issue regarding the standard required for entry to Honours. Undergraduate students who met with the Review Panel did not appear to have given, or to be giving, serious consideration to studying abroad. One mentioned the possibility of going abroad following graduation. The Panel formed a view of Honours students simply being settled in Glasgow, and at the same time there being a feeling that it would be too soon to go abroad during second year.
- 3.4.12 Staff who met with the Review Panel noted that there was an increasing number of students applying to study abroad but that they generally wished to go to English speaking institutions. One student who had recently been abroad in third year had taken some third year courses on his return to Glasgow. The various arrangements had proved somewhat complicated to put in place but it was a precedent that it should now be possible for other students to follow.
- 3.4.13 Staff expressed the view that the School was successful in attracting and then hosting students from abroad. Visiting students appeared to integrate well with the classes and particularly to appreciate the opportunities for project work while in Glasgow. The School was beginning to receive students visiting from North America for one semester. There was also an increasing number of students coming from Europe for the whole of their undergraduate degree.
- 3.4.14 The College Dean of Learning and Teaching advised the Review Panel that an analysis of recent College applications to study abroad had shown that approximately half had been rejected on the basis that the students were not strong enough academically. The Head of School noted that many institutions were placing less emphasis on study abroad years in favour of semi-formal schemes. Some universities which formerly offered 'Physics with a year abroad' no longer did so.
- 3.4.15 The Review Panel noted the School's strong research links with some institutions in mainland Europe and the fact that the School had identified these as a possible means of promoting other exchanges such as summer projects.
- 3.4.16 The Review Panel was sympathetic to the limitations placed on the School by accreditation requirements. However, the Panel **recommends** that the School investigate options for further enhancing and promoting opportunities for study abroad, cognisant of the fact that study abroad is not intended to mirror the learning available at Glasgow, and that concerns about issues such as requirements for entry to Honours should be solvable.

3.5 *Student Recruitment*

General recruitment activities

- 3.5.1 The Review Panel noted that the School supported a range of activities broadly linked with recruitment: these involved community engagement and activity within schools. The Convenor of Learning and Teaching spoke to the Panel about the duty that the School believed it had to educate the general public about scientific matters. At the time of the last University subject review there had been concern over the difficulty of recruiting sufficient students. Now this was less of a problem and the focus had shifted to retention. However, there was still work to be done in increasing the quality of applicants and widening the School's intake. Beyond staff activities in relation to outreach and

recruitment, some undergraduate and postgraduate students were now involved as STEM (Science, Technology, Engineering and Mathematics) Network ambassadors, and the School saw the new *Physics Education and Communication* course as another example of engagement with schools which had a range of potential benefits, including raising awareness for recruitment. The Review Panel **commends** the School's emphasis on a broad range of activities associated with recruitment and general awareness raising, at a time when there are pressures on staff to engage in other activities that have tangible and more immediate financial results.

Undergraduate recruitment

- 3.5.2 The undergraduate students who met with the Review Panel came to Glasgow from a range of backgrounds. Some had been influenced by league tables, and some had been persuaded to apply at the Open Day by the evident friendliness of the staff and current students, the excellent facilities available in the School and the nature of the University campus.

Postgraduate recruitment

- 3.5.3 The Review Panel explored with the postgraduate students the reasons for their having chosen to come to Glasgow. Some of these reasons were personal but the students also spoke about their awareness of the research groups that were active within the School, and about how they had received early indications from staff that they would be supported in pursuing work in particular areas that were of interest to them.

3.6 *Student Progression, Retention and Support*

Retention

- 3.6.1 At the end of second year students made their commitment to Physics and Astronomy by entering Honours, or for those who had not achieved the Honours entry requirements, by pursuing a designated degree route. The Convenor of Learning and Teaching advised the Review Panel that from the beginning of third year onwards there was little drop-out. There was still some flexibility within the School, as students on the designated degree programmes studied the same curriculum as those in Honours, and if the former performed strongly at the end of third year, there was still an option to move to the Honours programme. One aspect of the School's success in achieving JUNO Champion status was its work in encouraging Physicists to stay in the discipline. In this regard, the Panel noted the following contributing factors: the Convenor of Learning Support role, small group supervisions (see paragraph 3.7.3 below), the evident emphasis on building a sense of community within the School and the accessibility of staff to students (discussed at paragraph 3.6.2 below).

Support

- 3.6.2 The Review Panel was struck by the very strong NSS scores achieved in the area of student support: the Panel noted the positive responses to the following questions: I have been able to contact staff when I have needed to - 100%; staff are good at explaining things - 98%; I have received sufficient advice and support with my studies - 86%. These strong scores were consistent with comments made by the students who met with the Panel. Postgraduate students spoke about the supportive attitude of staff, and their perception that staff cared about what they were teaching and were always ready to discuss the material with students. The students' experience was that staff were willing to meet with them or to provide support by e-mail. The PGT students also spoke about the sense of community within the School. They suggested that in part this might be due to the small numbers. In spite of the fact that between

them they were studying a large number of courses and there was not a great deal of overlap in the time they were in classes together, the sense of community prevailed. They felt integrated into the School as a whole, finding the staff very friendly and welcoming. Those who met with the Panel also belonged to the student societies, Astrosoc and Physoc.

- 3.6.3 Undergraduate students who met with the Review Panel gave a similar account of a very supportive community within the School, referring to the approachability of staff and their willingness to help with problems and integrate students into the School. The undergraduates mentioned as contributing factors Astrosoc and Physoc, guest lectures which were open to all, and the fact that they were invited to participate in the School's outreach work, including open days. They noted that students were expected to pursue such opportunities for themselves but that if they did, staff were fully supportive; they felt that there was a two-way relationship with the staff, that if they showed a willingness to get involved, staff would do whatever they could to assist them. In contrast, there did not seem to be a strong link with advisors of studies, but there was no evidence that this was problematic given that students seemed readily able to access the support that they needed.
- 3.6.4 The Review Panel **commends** the School for the supportive community that it has created, through which students are supported in their learning and encouraged to pursue individual interests and opportunities.

Employability / Careers

- 3.6.5 The Review Panel heard from PGT students that they had received helpful guidance on CV writing. The students reported that the majority of their cohort was hoping to carry on to study for a PhD. They told the Panel that there was limited formal input in terms of careers guidance but that they felt able to get good advice from their supervisors and other staff. They referred to the big commitment associated with undertaking a Masters degree and the fact that this meant they were all highly motivated to find out about what careers would be open to them. They had all found staff in the School to be helpful in advising and assisting with applications for PhD places and funding.
- 3.6.6 Undergraduate students who met with the Review Panel reported that information on careers was introduced at the beginning of their third year and that talks were given by representatives from a number of different fields of employment (industry, teaching, and academia). The students mentioned that staff encouraged them to consider summer placements. In fourth year they were able to attend the careers fair and they received support during supervision sessions in relation to preparing CVs. A careers officer was also available for consultation. The students referred to the fact that the structure of their degree was flexible, in that at the end of third year there was the potential to move between different streams of the Physics and Astronomy degrees. Depending on the career choice of the student in question the four or the five year degree might be more appropriate. Again the students commended staff for their assistance in helping them understand the different routes available. At the Panel's meeting with key staff, it was mentioned that the research councils were currently considering the various routes, but the view of the School was still that the strongest students should be encouraged to pursue the five year MSci, and that as competition for PhD places increased, this degree placed students in a position of strength.

3.7 The Quality of Learning Opportunities

- 3.7.1 The students who met with the Review Panel expressed satisfaction with the quality of their learning opportunities and their experiences as students of Physics and Astronomy. The enthusiasm for their subject was evident. The

Panel noted that in the 2011, 2010 and 2009 National Student Surveys, the positive responses to the statement 'Overall I am satisfied with the quality of the course' were 93%, 91% and 100% respectively.

3.7.2 The Review Panel was interested to hear the PGT students speak about the flexibility that the School offered for students to pursue their own particular research interests. The students wondered whether this flexibility arose from relatively small student numbers and whether the situation would be the same if there were twice as many PGT students in the School. The students also spoke about how staff were supportive in thinking beyond the PGT programme itself, to helping them make a start on possible work for a PhD. On entry, the PGT students had all received advice about what courses they could take, depending on what they had previously studied. For those who had not studied previously at Glasgow this sometimes appeared to amount to inflexibility, but the students accepted in retrospect that the advice they had been given was good. There was some disappointment at not being able to study courses that were presented in alternate years and while some students were able to take courses from other Schools, timetable constraints limited the extent to which this was possible. The students noted that registration through MyCampus had been frustrating, in contrast with the personal assistance that staff in the School had offered.

Undergraduate supervision meetings

3.7.3 The Review Panel noted that small group supervisions took place once every two weeks from second year onwards. The Panel **commends** the School on this practice. However, some undergraduates felt that the effectiveness of the supervision sessions was diminished because they were not linked directly to the materials covered in lecture courses. There was a variety of different practice: some tutors set out the programme of study for the group supervisions while others invited topics and problems to be suggested by the students. In Astronomy there tended to be an identified theme to be studied in the supervisions. Staff who met with the Panel noted that with the large number of specialised courses in Honours, it would not be possible to offer supervisions covering all topics, and that the supervision meetings tended to concentrate on core topics.

3.7.4 At the Review Panel's meeting with staff it was noted that as student numbers were increasing, the numbers in the small group supervisions were also starting to increase, moving from 5/6 to 7.

Lectures

3.7.5 The undergraduate students discussed with the Review Panel the usefulness of lectures. They reflected on the fact that some lecturers provided materials in advance of the lectures while some did not issue supporting materials until afterwards. The students were unanimous in the view that having materials available in advance made for a much more valuable learning experience, in that they could add their own notes as necessary and concentrate on what was being said. Contrary to what they believed to be the view of some staff, they did not think that the issuing of materials in advance would lead to a reduction in lecture attendance. On the whole, the undergraduate students found lecturers clear and engaging. The Review Panel noted that the School rotated the staff lecturing on a particular course and this helped keep delivery fresh. It was also noted that – again as a result of increasing student numbers – the 9.00 am lecture for Physics 1 was now being repeated at 1.00 pm.

3.8 Resources for Learning and Teaching

Staffing

- 3.8.1 Throughout the review documentation and in the Review Panel's various meetings in the School, there were many references to the increasing student numbers. The Panel's attention was also drawn to the fact that the School had lost one technician and another member of staff who had provided media support. It was clear to the Panel that these factors together were placing a strain on the ability of the School to maintain its high standards of learning and teaching. It was also noted that a reduction in the future number of PhD students (and thus the potential number of Demonstrators) was anticipated and that there had been 105 applications for PGT places for session 2012-13. The School was responding to these pressures, for instance by introducing more self-directed formative assessment, by increasing the number of students in supervision groups, and by repeating lectures (as noted at paragraph 3.7.5 above). In recognition of the key role played by technicians in the successful delivery of laboratory-based teaching, the Panel **recommends** that the College consider approving the recruitment of a technician to replace the technician lost in 2010.
- 3.8.2 The College Dean of Learning and Teaching advised the Review Panel that there was a common theme in the Science subject areas of Schools seeking some stability in undergraduate numbers; work was on-going with the Recruitment and International Office to try to achieve this. Applications were now considered in terms of which subject was being applied for, and the number of places offered was carefully monitored.
- 3.8.3 The Head of School and Convenor of Learning and Teaching advised the Review Panel that they were aware of the potential additional work burdens associated with increasing PGT student numbers. A working party had considered this issue and the conclusion was that with current staffing levels the School could accommodate 30 PGT students, but that 60 would certainly be problematic. The hope of the School was that in time, with appropriate staffing levels in place, it would be possible to accommodate more than 30 PGT students. Supervision of projects was the single most significant issue. The Head of School noted that supervision of project work was also an issue at undergraduate level, given the increase in numbers.

Workload model

- 3.8.4 The School had operated its own workload model since 2004. This covered teaching and administration loads. Staff who met with the Review Panel appeared to be comfortable with the operation of the model. It was anticipated that a University-wide workload model, to be operated on-line, would be introduced in the near future.

Teaching Administration

- 3.8.5 The Review Panel noted that there were currently no designated teaching administrators within the School. The Dean of Learning and Teaching explained to the Panel that the former Physical Sciences Faculty areas did not have designated teaching administration. However, this was an issue that was currently under discussion between the College and its Schools, exploring how such administration might be introduced without compromising the necessary administrative support for research. There were clear potential benefits of

introducing designated teaching administration: freeing academic time from routine administration, and providing a point of contact with the College through which good practice could be disseminated. The Panel **recommends** that the School continue to engage in dialogue with the College to consider the case for the introduction of dedicated teaching administration.

University Teachers

- 3.8.6 The School had three University Teachers and it was evident to the Review Panel that they played a crucial role in maintaining the emphasis on enhancing learning and teaching in the School and acting as a 'nucleation site' for future developments.
- 3.8.7 There was some discussion regarding the career paths for University Teachers. With their time allocated solely to teaching and to administration it was difficult for them to satisfy the scholarship criterion required for promotion. The University Teachers spoke about the fact that they were supported through the Performance and Development Review process, and that there was potential for some of their innovative work in teaching to be developed with a view to satisfying the scholarship requirements. However, in the face of increasing student numbers it was particularly difficult for the staff to find the time to focus on this. The Review Panel acknowledged that this was a University-wide issue. The Panel **recommends** that the School consider how best University Teachers can be supported in their career development and given time and opportunity to develop the scholarship that is a requirement for promotion.

Demonstrators

- 3.8.8 The Review Panel met with eight demonstrators, four of whom were PhD students, and four post-doctoral researchers. The Demonstrators reported that their teaching load was generally slightly higher than they would have liked, but they spoke about the increasing student numbers and indicated that they felt they were carrying 'their share' of the load and that they took on this extra work for collegiate reasons. The importance of achieving the correct balance between teaching and research was acknowledged by staff at their meeting with the Panel. The Demonstrators described to the Panel a number of different patterns of work, and some became involved as demonstrators earlier than others (e.g. if they had studied as an undergraduate at Glasgow). They felt that some of their colleagues carried lighter teaching loads, though it was not clear to them why this was the case, whether it was personal preference or because they were deemed to be unsuitable as teachers. Staff acknowledged that there was some variation in workload for Demonstrators but indicated that this largely reflected factors such as periods of absence while undertaking research abroad. It was clear to the Panel that the Demonstrators had great commitment and loyalty to the School, but there was a risk of this being undermined by a lack of transparency in the way that responsibilities were allocated.
- 3.8.9 The Demonstrators considered that while their teaching duties were sometimes quite high, there was only a minimal impact on their research work, and they were always encouraged to attend conferences, even if this meant having to rearrange their teaching duties. There was some discussion with the Review Panel about whether their contribution was valued, whether it 'counted' in terms of career advancement, or whether ultimately the only thing that mattered was research. The Convenor of Learning and Teaching commented that the Demonstrators were indeed highly valued and that the School had recently successfully resisted moves to pay Demonstrators a minimum wage. The Demonstrators spoke of being unsure about how they were performing. They received some feedback but this was not always contextualised and sometimes did not refer specifically to their contribution.

3.8.10 The PhD students who acted as Demonstrators confirmed that they had attended the centrally provided training and completed lab-specific sessions, to familiarise themselves with experiments. Staff who met with the Review Panel noted that investigations were underway into the possibility of developing pan-Scotland training for Demonstrators through SUPA.

3.8.11 The Demonstrators described the range of marking duties that they undertook. The PhD students carried out marking associated with the labs that they supported. At the other end of the marking spectrum, post-doctoral fellows were marking substantial reports arising from 10 week lab projects. Staff confirmed that some sampling of demonstrators' marking was undertaken and that the relevant class head supervised and moderated as necessary. The post-doctoral fellows described their involvement in other aspects of Physics and Astronomy teaching, which included lecturing and the setting and marking of examinations. They were paired with an academic who supported them in this work.

Conclusion on Demonstrators

3.8.12 The Review Panel was impressed by the commitment and maturity of approach displayed by the Demonstrators. It was clear to the Panel that in the face of increasing student numbers in Physics and Astronomy, the Demonstrators played a key role in supporting the learning and teaching of the School. The Panel noted the apparent lack of transparency in the allocation of teaching duties, and was concerned to hear the Demonstrators' view that they did not receive sufficient feedback on their performance. This was disappointing in view of the fact that one of the recommendations arising from the subject review in 2006 was that the School should 'devise a means of providing regular feedback to the demonstrators/supervisors on their performance, in order to encourage good practice'. The Panel therefore **recommends** that the School implement a transparent scheme of allocation of Demonstrators' duties, and a system of providing formal feedback on their performance.

Probationary Staff

3.8.13 The Review Panel met with three staff who were either probationary staff or who had recently completed their probationary period. They commented positively on the well structured support they had received. They had found the training provided by the Learning and Teaching Centre very valuable in the first year but the second year had been less helpful. They appreciated knowing that the Learning and Teaching Centre was there to provide on-going advice and assistance. Support – both formal and informal – within the School had been very good, particularly in terms of balancing the different aspects of their work. There had been a phased increase in their teaching workload, and they appreciated having teaching duties allocated to one semester, leaving them with the opportunity to concentrate on research at other times. They also felt that they would be supported in considering their next career steps. They commented that they appreciated the opportunity to become involved at an early stage in curriculum development and the staff-student liaison committee. However, they stated that they felt unaware of activities outwith the School, and that they were keen to be involved in more cross-College work; they suggested the introduction of a cross-College poster event in order to raise awareness of work going on in different Schools. The Panel **recommends** that the College consider ways of promoting cross-College interaction particularly between early career and other new-to-Glasgow staff.

Conclusion on staffing

3.8.14 The Review Panel **commends** the School for its very strong sense of collegiality, which appeared to be shared by all the different groups of staff who spoke with the Panel. Staff spoke of being supported in their career development, in the balancing of the different elements of their work and in their sense of belonging to the School. There was clear loyalty from the staff and a sense of sharing together the challenges faced by the School.

Physical resources

3.8.15 The SER described the broad range of facilities available to the School. Lectures took place in different locations across the University, with lecture venues sometimes changing on a daily basis. Staff noted that this was not ideal in terms of encouraging in the students a sense of identity within the School. The allocation of teaching rooms outwith the Kelvin Building also inhibited staff from carrying out demonstrations that required the set-up of equipment.

3.8.16 The Review Panel enjoyed a tour of the Physics laboratories, which had been refurbished since the previous subject review in 2006. The Panel was impressed with the nature of the laboratories: they were pleasant and bright, and were flexible as to the use of space. Staff reported that they had participated fully in the discussions leading up to the refurbishment and were very satisfied with the outcome. The Panel was pleased to note the practice described in the SER of devolving budgets to the laboratory heads.

3.8.17 The SER drew attention to the pressing need for refurbishment at the Observatory. The teaching space currently only accommodated classes of 20 while Honours class sizes had now grown to 25. This had a direct impact on the teaching activities and urgently required to be addressed. The College had prioritised this work and at the time of the review visit the indications were that the work was to be scheduled by Estates and Buildings for summer 2012 or 2013. The Panel **recommends** that the School carefully consider its requirements for enhancing the learning and teaching environment at the Observatory and maintains close contact with Estates and Buildings with a view to achieving a successful refurbishment project similar to that achieved in the Kelvin Building Physics laboratories.

3.8.18 The 2006 subject review of Physics and Astronomy had included a recommendation that 'initial investigations be undertaken immediately into making the student Common Room and the IT suite accessible to students with disabilities'. Access had now been afforded to a computing cluster in the Kelvin Building but the Panel was disappointed to note that the common room was still inaccessible to wheelchair users. The SER described various attempts that had been made to address this issue but none had come to fruition, one of the main difficulties being the 60 year-old lift which was not amenable to upgrade. It was also noted that the Observatory was inaccessible to wheelchair users. The Panel therefore **recommends** that Estates and Buildings address these two pressing issues regarding accessibility for staff and students of the School.

3.8.19 The postgraduate students who met with the Review Panel reported satisfaction with the facilities available in the School. They had access to hot-desking rooms and were provided with laptops and specialist software that they needed for their projects. The undergraduate students had access to quiet study rooms in the Kelvin Building though not all students appeared to be aware of this. It was also noted that students were permitted to use the laboratories for quiet study if they were not in use.

4. Maintaining the Standards of Awards

Benchmarking and Accreditation

- 4.1 As noted elsewhere in this report, the School carefully observed the requirements of the Institute of Physics accreditation and subject benchmarking.

External Examiners

- 4.2 The Review Panel noted the External Examiners' reports to be almost entirely positive, with assessment grounded in rigorous processes applying to the preparation and checking of assessment materials, and to the marking and the confirmation of results.

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

- 5.1 The Review Panel was satisfied that the School had appropriate and comprehensive Quality Assurance procedures in place and found evidence that the policies were applied effectively. The Panel also concluded that there was a strong culture of enhancing the student experience within the School. In this regard the Panel noted the following initiatives: the reinstatement of peer observation of teaching; 'Frontiers of Physics' lectures in Level 1 which introduced students to some of the School's current high-profile and internationally significant research; the introduction of Experimental Design Exercises in Physics 1, through which students are given autonomy to determine the nature of their own laboratory work, and assess the work of other students; and opportunities offered to students to carry out research projects in vacation periods.

- 5.2 The Review Panel was pleased to note recent University accolades awarded to staff from the School (e.g. Physics 1 Teaching Team - Teaching Excellence Award 2008-09; Dr Peter Sneddon - 'Prizes for Excellent Teachers' – best teacher in the College of Science and Engineering, 2011).

- 5.3 The Review Panel **commends** the School on its use of working parties with carefully defined remits to consider specific issues, such as the impact of increasing class sizes and the development of students' problem solving skills.

Staff-Student Liaison Committee

- 5.4 The Convenor of Learning and Teaching spoke to the Review Panel about the operation of the staff-student liaison committee. He highlighted the input of the student representatives, and noted that progress on matters raised at previous meetings was carefully monitored. The Panel found that the SSLC minutes reflected this. The undergraduate students expressed to the Panel the view that the SSLC provided an effective forum for raising issues connected with their studies. The Convenor of Learning and Teaching's view was that while the SSLC had an important formal role to play, informal feedback mechanisms were also encouraged and proved effective within the School. For example, events held by the student societies provided good opportunities for receiving input from students. The Panel was pleased to note that the School also invited feedback from recent graduates.

Student feedback

- 5.5 Undergraduate students who met with the Review Panel expressed some frustration at course questionnaires that they were asked to complete. They said that sometimes the questions were not relevant to the particular course,

and they wished to have more opportunities to provide open responses. The SER referred to the limited usefulness of student questionnaire returns in distinguishing between different courses and noted the difficulties associated with students being asked to complete a large number of questionnaires. The Panel **recommends** that the School consider a range of means of eliciting meaningful feedback from students as recommended in the University's Code of Practice on Obtaining and Responding to Feedback from Student http://www.gla.ac.uk/media/media_107529_en.pdf (e.g. using focus groups or mid-course questionnaires).

Innovation in Learning and Teaching

- 5.6 The Review Panel **commends** the on-going engagement of staff from the School with the Learning and Teaching Centre and the School's strong record of applications to the Learning and Teaching Development Fund. However, at their meeting with the Panel, staff expressed frustration at the limitation of the LTDF in not providing money for the purchase of equipment or to fund PhD students. The Panel's view was that the case for funding PhD students should be explored with the School's management, given the increased income generated by larger student numbers. Checking of the LTDF criteria also clarified that equipment could be purchased from the fund if such equipment was ancillary to a bid. The College's Dean of Learning and Teaching advised the Panel that there was a College Strategic Fund which supported developments in learning and teaching if they had the potential for broad implementation, and this might also support the purchase of specific equipment. The Head of School referred to School funds that could be applied to developments in teaching, and acknowledged that this had not been widely publicised in the recent past. The Panel **recommends** that the School produces, and publicises to its staff, an overview of the various funds available to support the enhancement of teaching, covering School, College, University and external sources.

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

Strengths

- A comprehensive range of accredited undergraduate programmes in Physics and Astronomy which provide flexibility for the School's students.
- The measured and successful introduction of postgraduate teaching utilising existing Masters level provision.
- Strong sense of collegiality shared by staff and students.
- Measures such as NSS results, IoP Juno status, and University prizes reflecting the commitment of staff to providing a supportive learning environment.
- Outward facing philosophy and activities: leading to a dynamic curriculum and enabling effective student recruitment.
- A strong culture of teaching enhancement.
- Teaching linkages with the School's internationally rated research.

Weakness

- Accommodation that is not fit for purpose: teaching facilities at the Observatory that can no longer accommodate student numbers; and facilities at both the Observatory and the Kelvin Building that are not accessible to wheelchair users.
- The strain on teaching caused by a combination of factors: e.g. loss of support staff, growth in student numbers, the introduction of new PGT programmes, the potential reduction in numbers available to act as Demonstrators.

Conclusion

The School of Physics and Astronomy provides a supportive and progressive learning environment that is enriched by strength in research and by a broad engagement with the external environment. The School's success in recruitment and its ambitions for continued growth are bringing challenges which the School is embracing, and which now require careful utilisation of resources and continued support from the College.

Commendations

The Review Panel commends the School on the following, which are listed in order of appearance in this report:

Commendation 1

The Review Panel commends the School on its constructive engagement with the PSR process, the open and reflective approach adopted in the SER, the timely provision of all documentation required for the Review, the helpful preparation for the review visit particularly by the Convenor of Learning and Teaching, and the cooperation and the positive attitudes displayed by staff and students in discussions with the Panel during the review visit. [para 1.9]

Commendation 2

The Review Panel **commends** the School's measured consideration of how to amend its assessment practices, and encourages it to move forward with its proposals for increasing continuous assessment in courses at Honours and Masters level, and to consider other forms of assessment, with careful evaluation of the impact – on staff and on students – of the changes. [para 3.3.10]

Commendation 3

The Review Panel **commends** the School's proactive approach in keeping abreast of, and contributing to, developments in the external environment in relation to the Physics and Astronomy curriculum. [para 3.4.1]

Commendation 4

The Review Panel **commends** the School's emphasis on a broad range of activities associated with recruitment and general awareness raising, at a time when there are pressures on staff to engage in other activities that have tangible and more immediate financial results. [para 3.5.1]

Commendation 5

The Review Panel **commends** the School for the supportive community that it has created, through which students are supported in their learning and encouraged to pursue individual interests and opportunities. [para 3.6.4]

Commendation 6

The Review Panel **commends** the School on its provision of fortnightly small group supervisions from Level 2 onwards. [para 3.7.3]

Commendation 7

The Review Panel **commends** the School on its use of working parties with carefully defined remits to consider specific issues, such as the impact of increasing class sizes and the development of students' problem solving skills. [para 5.3]

Commendation 8

The Review Panel **commends** the on-going engagement of staff from the School with the Learning and Teaching Centre and the School's strong record of applications to the Learning and Teaching Development Fund. [para 5.6]

Recommendations

A number of recommendations have been made, many of which concern areas that the School had itself highlighted for further development prior to the review or in the SER.

The recommendations have been cross-referenced to the paragraphs in the text of the report to which they refer. They are listed in order of priority.

Recommendation 1

The Panel **recommends** that the School carefully consider its requirements for enhancing the learning and teaching environment at the Observatory and maintains close contact with Estates and Buildings with a view to achieving as quickly as possible a successful refurbishment project similar to that achieved in the Kelvin Building Physics laboratories. *[para 3.8.17]*

For the attention of: **Head of School**

For information: **Estates and Buildings**

Recommendation 2

The Panel **recommends** that Estates and Buildings address two pressing issues regarding accessibility for disabled students and staff of the School: access to the Common Room in the Kelvin Building (as recommended in the 2006 DPTLA); and access to the University Observatory. *[para 3.8.18]*

For the attention of: **Estates and Buildings**

For information: **Head of School**

Recommendation 3

In recognition of the key role played by technicians in the successful delivery of laboratory-based teaching, the Panel **recommends** that the College consider approving the recruitment of a technician to replace the technician lost in 2010. *[para 3.8.1]*

For the attention of: **Head of College**

For information: **Head of School**

Recommendation 4

The Panel **recommends** that the School continue to engage in dialogue with the College to consider the case for the introduction of dedicated teaching administration. *[para 3.8.5]*

For the attention of: **Head of School**

For information: **Head of College**

Recommendation 5

The Panel **recommends** that the School implement a transparent scheme for the allocation of Demonstrators' duties, and a system of providing formal feedback on their performance, the latter as previously recommended in the 2006 DPTLA review. *[para 3.8.12]*

For the attention of: **Head of School**

Recommendation 6

In the face of anticipated continued growth in the number of PGT students - with differing undergraduate backgrounds - the Panel **recommends** that the School consider how best to put in place the necessary diagnostic measures to identify whether there are significant gaps in incoming students' knowledge and skills, in order that these should be managed in an ordered way, whether by self-directed study or by additional staff support. [para 3.4.9]

For the attention of: **Head of School**

Recommendation 7

The Panel **recommends** that work is taken forward on the suggested production of an assessment guide/calendar, to be incorporated into course documentation, which would show students the various forms of feedback on assessment that they can expect to receive and the schedule for receiving such feedback. [para 3.3.17]

For the attention of: **Head of School**

Recommendation 8

The Panel **recommends** that the School produces, and publicises to its staff, an overview of the various funds available to support the enhancement of teaching, covering School, College, University and external sources. [para 5.6]

For the attention of: **Head of School**

Recommendation 9

The Review Panel **recommends** that the School investigate the feasibility of incorporating some additional basic programming into the undergraduate curriculum, in order to prepare students better with computing skills required throughout their programmes of study. [para 3.4.10]

For the attention of: **Head of School**

Recommendation 10

The Panel **recommends** that the School consider how best University Teachers can be supported in their career development and given time and opportunity to develop the scholarship that is a requirement for promotion. [para 3.8.7]

For the attention of: **Head of School**

Recommendation 11

While sympathetic to the limitations placed on the School by accreditation requirements, the Panel **recommends** that the School investigate options for further enhancing and promoting opportunities for study abroad, cognisant of the fact that study abroad is not intended to mirror the learning available at Glasgow, and that concerns about issues such as requirements for entry to Honours should be solvable. [para 3.4.16]

For the attention of: **Head of School**

Recommendation 12

The Panel **recommends** that the College consider ways of promoting cross-College interaction particularly between early career and other new-to-Glasgow staff, one suggestion for this being a cross-College poster event. *[para 3.8.13]*

For the attention of: **Head of College**

For information: **Head of School**

Recommendation 13

In view of comments regarding questionnaire fatigue, the Panel **recommends** that the School consider a range of means of eliciting meaningful feedback from students as recommended in the University's Code of Practice on Obtaining and Responding to Feedback from Students - http://www.gla.ac.uk/media/media_107529_en.pdf (e.g. using focus groups or mid-course questionnaires). *[para 5.5]*

For the attention of: **Head of School**

Recommendation 14

The Panel **recommends** that the School carefully check all course and programme documentation to ensure that the content is both consistent with the Code of Assessment and reflects School practice. *[para 3.3.3]*

For the attention of: **Head of School**

Recommendation 15

The Panel **recommends** that Senate Office produce guidance on how penalties for the late submission of coursework should operate where several sub-components contribute to an overall coursework mark. *[para 3.3.4]*

For the attention of: **Senate Office**