

**UNIVERSITY OF GLASGOW**

**Academic Standards Committee - Friday 19 October 2007**

**Departmental Programmes of Teaching, Learning and Assessment: Report  
from the Review of the Department of Aerospace Engineering held on 10  
May 2007**

**Mrs Amber Marquez-Higgins, Clerk to the Review Panel**

**Panel Members:**

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|---------------------------|--|
| Professor Robin Leake     | Vice-Principal, Physical Sciences and Engineering<br>[Convener]        |
| Dr Peter Barrington       | External Subject Specialist, Kingston University                       |
| Dr Martin Macauley        | Senate Assessor on Court   |
| Dr John Howell            | Member of Cognate Department [Department of<br>Mechanical Engineering] |
| Professor Bob Matthew     | Learning and Teaching Centre   |
| Mrs Amber Marquez-Higgins | Senate Office [Clerk]  |
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**A. Introduction**

- A.1 The Department of Aerospace Engineering is one of four departments which form the Faculty of Engineering. The Department benefits from being the only aerospace engineering department in Scotland and most students are recruited from within Scotland. The Department is responsible for around 320 undergraduates, 19 postgraduate research students, 11 postgraduate taught students, 1 postgraduate research assistant and 7 post-doctoral research assistants. The Department is located in the James Watt (South) building and has a research annex at Acre Road, Glasgow.
- A.2 The Department currently has 17 academic, 1 research technologist, 7 technical, and 3 Management, Professional and Administrative staff. The Department also shares a pool of 4 IT support staff with the Department of Mechanical Engineering.
- A.3 In February 2001, the Department was subject to an internal review. The Review Panel recognised the Department's considerable strengths and highlighted a number of areas of good practice, whilst also recommending improvements that could be made in some aspects of the Department's operation. In the 2001 RAE the Department was awarded a Grade 4.
- A.4 The Department's Self-Evaluation Report (SER), which was written by the Head of Department, Dr Douglas Thomson, was welcomed by the Panel. It identified the strengths of the programmes but also highlighted areas of concern or for development. The Panel noted that the students who met with the Panel had not seen the SER.
- A.5 The Panel met with the Head of Department, Dr Douglas Thomson and the Chair of the Departmental Teaching Committee, Dr Eric Gillies, the Dean of Engineering, Professor John Hancock and the Dean-elect, Professor Frank Coton. The Panel also met with staff who had

prominent roles in teaching and learning provision (7), probationary members of staff (3), and Graduate Teaching Assistants (GTAs) (2). The Panel also met with eight Postgraduate Taught students, who were predominately international students, and fourteen Undergraduate students drawn from all levels of the Department's provision. The Panel noted that only one student from the B.Eng in Avionics programme was able to attend the meeting. The Panel also received written comments from a final year M.Eng. (Industrial) student, who had recently completed an industrial placement.

A.6 The Review Panel considered the following range of provision offered by the Department:

- M.Eng. (Standard) in Aeronautical Engineering\*
- M.Eng. (European) in Aeronautical Engineering\*
- M.Eng. (Industrial) in Aeronautical Engineering\*
- M.Eng\*/B. Eng/B.Sc. in Avionics
- B.Eng/B.Sc. in Aeronautical Engineering
- M.Sc. in Space Mission Analysis and Design
- M.Sc. in Aerospace Engineering and Management
- Advanced Postgraduate Diploma in Aeronautical Engineering

\* indicates those programmes that are accredited

A.6 At the time of the Review there were no students on the Advanced Postgraduate Diploma in Aeronautical Engineering or the M.Sc. in Aerospace Engineering and Management, which had been introduced in 2006. It was noted that the Department was seeking to further expand its postgraduate taught provision.

A.7 The five-year M.Eng degrees were introduced by the Department in 1999 in response to the Engineering Council's SARTOR (Standards And Routes TO Registration) initiative which specified that only M.Eng degrees could be accredited within its member institutions. SARTOR has now been superseded by UK-SPEC. UK-SPEC is the standard for recognition of professional engineers and professional engineering technicians in the UK. The standard is published by the Engineering Council UK (ECUK) on behalf of the engineering profession. The M.Eng degrees in Aeronautical Engineering are accredited by the Institute of Mechanical Engineers and the Royal Aeronautical Society. The M.Eng in Avionics is accredited by The Royal Aeronautical Society. The B.Eng degrees are recognised by the institutions as a contribution towards the educational requirements for chartered status. The Department's accreditation is valid up to the 2008 intake.

## **B. Overall aims of the Department's provision**

B.1 The SER stated that the Departments undergraduate teaching provision enabled students to obtain the skills and knowledge necessary to pursue a career in aeronautical engineering and avionics. The aims of the postgraduate teaching provision were broadly similar to the undergraduate aims but also provided students with higher level skill which allowed them to move directly into specialised areas of industry or to undertake PhD studies,

B.2 The Panel considered these statements to be appropriate and that they met the aims of the degree programmes in respect of learning and teaching.

## C. Undergraduate and Taught-Postgraduate Provision

### C.1 Aims

- C.1.1 The SER stated ‘Aeronautical engineering is an advanced engineering discipline concerned with the theory, design, manufacture and testing of flight vehicles – ranging from fixed wing aircraft, rotary wing aircraft to spacecraft. It involves a diverse range of subjects including aerodynamics, propulsion, structures and materials, dynamics and control, and instrumentation and testing’. The SER also stated ‘the Avionics degree presents the unique fusion of aeronautical and electrical engineering concepts. This blending of engineering disciplines provides a basis for the development of professional engineering graduates that have a broad multi-disciplinary knowledge base that could be applied to aerospace and other related industries’.
- C.1.2 The Panel found that the Department’s overall aims for the programmes and specific aims for individual courses aligned to the benchmark statement and were included in student handbooks. However, the Panel noted that the programmes currently emphasised technical depth but believed that consideration should be given to increasing the breadth of provision particularly because many of the graduates did not pursue careers in the aerospace industry and also because of the expectation of the subject benchmark statement that MEng graduates would have knowledge and understanding of management and business practices. In exploring this with the Head of Department and the Chair of the Departmental Teaching Committee, the Panel was told that although some courses were quite specialised, some of the key principles could be applied to other areas. There might also be scope to add breadth through optional courses from the Departments of Computing Science and Mechanical Engineering; options had proven popular with students in the past. Dr Gillies also commented that the Department was looking to introduce generic skills into the undergraduate programmes, and that the new programme that would replace the Avionic degree programme would have greater breadth. While recognising that meeting professional body requirements might place some constraints on design of the curriculum, the Panel **recommends** that the Department investigate the inclusion of optional courses to increase the breadth of provision and address the expectation of the subject benchmark statement.

### C.2 Intended Learning Outcomes (ILOs)

- C.2.1 The Panel noted that each course offered by the Department had specific ILOs, and that it was normal practice to include these in the relevant Degree Programme handbook. Undergraduate and Postgraduate students demonstrated an awareness of the course descriptors and ILOs.
- C.2.2 The Panel found it difficult, however, to see where the various learning outcomes in UK-SPEC were delivered and assessed in relation to the programme specifications and it was likely that the Department would need to demonstrate this for accreditation purposes. In the meeting with the Head of Department and the Chair of the Departmental Teaching Committee, the Panel was told that there was no documentation of the mapping but each course leader had checked the provision against the UK-SPEC. It was noted that there were some areas where it might be difficult to map the programme outcomes to the UK-SPEC because of the University’s requirement that ILOs can be assessed as this placed restrictions in the language that could be used in writing the ILOs. The Review Panel suggests that a mapping exercise between the UK-SPEC and programme intended learning outcomes should be done prior to the next accreditation visit in order to show how the UK-SPEC learning outcomes were delivered and assessed.

### C.3 Assessment

- C.3.1 The SER stated that course assessment was generally carried out by a combination of coursework assignments, laboratory classes and formal examinations.

- C.3.2 The Panel noted from the SER that there was a heavy emphasis on examinations, particularly in the first two years of the undergraduate programme (see also comments of PGT student below). Key staff explained that many courses also included an element of coursework and that the proportion of coursework had increased over the years but students complained because of the increase in workload. The inclusion of coursework also resulted in increased workloads for staff.
- C.3.3 The Panel noted from the supporting documentation that a number of Level 1 and 2 courses had consistently poor grade profiles. It also noted from the SER that the delivery of individual courses was monitored by an Annual Course Monitoring Committee, whose role included monitoring grade profiles. It was, however, unclear to the Panel from the minutes of the Annual Course Monitoring Committee what action it took when poor grade profiles occurred. The Head of the Department informed the Panel that any course with a pass rate (grades A-D) of below 75% was also discussed at the Exam Board, and that the Department had investigated reasons for this, but no clear or consistent explanation had been found. The Review Panel **recommends** that the Department continues to monitor, investigate and take action in relation to courses with poor rates given the subsequent impact on Level 1 to Level 2 progression rates and overall retention rates. The Review Panel also **recommends** that the Department make it more transparent what its procedures are for monitoring and investigating poor grade profiles and what action has been taken as a result.
- C.3.4 In the meeting with the Postgraduate Taught (PGT) students, the Panel was told that assessment in the MSc in Space Mission Analysis and Design relied on examinations; at Postgraduate level they had expected, and would welcome, a broader range of assessment methods, for example project presentations, report writing, etc. In exploring this with staff, the Panel was told that the current PGT students had raised the issue with them but that it had not been a problem with previous cohorts. The assessment method adopted was largely a result of the intensive 2-week blocks of teaching for courses in Semester 1 (see Section C6.1 also), which made it difficult to incorporate coursework. The Panel was told that some of the Semester 1 teaching had moved to 4-week blocks. In the meeting involving the Dean and Dean-elect it was, however, acknowledged that it would be important to address the concerns raised by the PGT students. The Review Panel **recommends** that the assessment methods employed in the MSc in Space Mission Analysis and Design programme be broadened so that there is less reliance on examinations and that more varied assessment methods appropriate to postgraduate study are employed.
- C.3.5 The Panel noted from the SER that assessment practice in the Department was based on the University's Code of Assessment. The SER highlighted concerns raised by the current External Examiner about the Code of Assessment and the difficulties in interpreting the grading scale. The Panel noted that these had been discussed with the staff in the Department at length and had been resolved. It was also noted from the SER that it was often difficult for industrial markers to understand the scale when marking placement reports which created difficulties for the Department. The Panel was informed by staff, that in order to tackle these difficulties, the Department had a system of double marking and internally moderating placement reports to ensure that academic standards were maintained, and that no student was disadvantaged.
- C.3.6 The undergraduate students who met with the Panel commented that they felt that they received limited feedback on assessed work, and that the timing was often too late for them to benefit from such feedback and improve their performance during the academic year. They also said that they would particularly welcome feedback on technical report writing. Key staff informed the Panel that the department was uncertain as to what assessments they were required to retain for the External Examiner and, therefore, what could be returned to provide feedback to students. The Review Panel **recommends** that the mechanism for providing student feedback on assessed work be reviewed to ensure that work is returned and feedback provided within timescales that support student learning and not be held back from students unnecessarily.

- C.3.7 Undergraduate students told the Panel that they felt that the examinations timetable often grouped exams closely together. For example, Level 2 students had had nine exams in an eight-day period. The Head of Department informed the Panel that the Registry did consult on the draft timetable but that requests for changes were often not met. He said that a return to holding exams in the evenings would help reduce timetabling constraints. The Head of Department also commented that the scheduling of exams had an influence on exam results; evidence showed that exams held later in the timetable had a poorer grade profile. While recognising that the Registry does consult on the draft examinations timetable, the Review Panel **recommends** that the Registry, where possible, try to accommodate departments' requested changes to the examination timetable so that exams are held within a reasonable time frame and do not put excessive pressure on students. The Panel also **recommends** that the Head of Registry and Clerk of Senate consider holding more exams in the evenings to allow for some increased flexibility in the scheduling of exams.
- C.3.8 Concerns had been raised in the SER about the accuracy of student records held by the Registry, but, following discussions with key staff, the Panel was told that this was no longer an issue since the introduction of WebSurf.

#### *C.4 Curriculum Design and Content*

- C.4.1 The SER stated that the Department offered a very solid and well found core of aeronautical and avionics courses during the first three years of study and that a key strength in Levels 4 and 5 was the range of specialised subjects available to students, from flight testing to experimental aerodynamics and from aircraft handling qualities to industrial aerodynamics. In addition, the nature and content of individual projects on offer to students was of a very high standard, due to the diverse research interests of the Departmental staff and their industrial contacts. The Panel was impressed by the range of courses and programmes offered by the department. The external subject specialist considered the 5-year MEng as a particular strength of the Scottish HE system.
- C.4.2 The Panel noted from the SER that the programmes were designed to meet the educational needs of professional Aerospace engineers. The curriculum for each programme was largely determined by professional bodies to meet accreditation requirements, and only a few electives were offered. The course content was reviewed regularly, and any changes were made through the appropriate committees. Each year course heads were asked to update course folders for any changes made (eg minor syllabus changes, updating course notes or reading lists). These folders were used for handover purposes where a new member of staff assumed responsibility for a course or where cover was needed at short notice. The Panel noted that some of the course names could reflect the content of the courses more accurately, and suggested that these should be reviewed. It was also noted that some of the information provided on the website was out of date and the Panel **recommends** that the departmental website, which is a key resource for students, be updated on a regular basis to ensure that information is current and accurate.
- C.4.3 The Panel learned from the SER and from its discussions with staff and students of the progress made with mathematics teaching by increasing the relevance to aerospace and the improvements in the mathematics course grade profiles. Staff commented on the difficulty facing the Department as the grades students obtained in school often did not reflect their ability and they could struggle with the subject once at University. To address this, the Department had worked closely with the Mathematics Department which provided service teaching to increase the relevance to aerospace and additional tutorials were offered. Discussions were also underway regarding had diagnostic testing in order to assess how students' core skills had changed so that changes could be made to courses if needed. During the meeting with undergraduate students, it was clear to the Panel that students in the junior years had benefited from these changes as they were more positive than senior students about their experiences of mathematics teaching. The undergraduate students also commented that they would welcome further embedding of mathematics in courses, with the use of examples relating to aerospace engineering, as they felt this would help them in later years. The Panel **commends** the Department on the steps it has

taken to increase the relevance of mathematics teaching for students and in the improvements in grade profiles.

- C.4.4 Undergraduate students told the Panel that they felt they had a higher workload than students studying on degree programmes in other Faculties. The SER indicated that the Department had taken steps to reduce credit loading in the first three years of the Aerospace Engineering degree from 140 to 120 credits (the latter being the University norm) mainly by removing repeated material. It was noted, however, that the credit loading of Levels 1 and 2 of the Avionics programme was 130 credits. The Panel was concerned about the teaching load for a group of students that already appeared to be struggling. Staff informed the Panel that a new degree programme in Aerospace Systems, which would replace the Avionics programme, was going through the approval process with a proposed first intake for 2008. The new programme would have a load of 120 credits in each year and would have broader coverage and a focussed systems theme rather than electronics hardware.
- C.4.5 The Panel explored the concept of a general first year for engineering students with Head of Department and Dean. The Dean informed Panel members that the Faculty had been considering the proposal of a general first year, in part due to the introduction of the Foundation Certificate in Engineering by the Glasgow International College. Upon successful completion of the Foundation programme students would be guaranteed admission to the second year of undergraduate study in the Faculty of Engineering. It was considered that a more general first year would offer students more flexibility although it was the view that students normally seemed clear on which branch of engineering they wished to study. It was also noted that Dean was in discussion with the Faculties of Physical Sciences and Information and Mathematical Sciences about the first year curriculum. The Review Panel **encourages** the Faculty to continue to investigate the possibility of a general first year to allow greater flexibility for students to transfer between programmes. Further discussions with the Faculties of Physical & Mathematical and Information Sciences over possible common courses are strongly encouraged.
- C.4.6 It was noted that the Department had an Industrial Liaison Committee which provided significant industrial input to its programmes. It was, however, often difficult for industry representatives to attend committees meetings due to work commitments. The Head of Department told the Panel that by increasing the number of industrial representatives he was hoping that attendance might improve. The feedback the Department received from industrial representatives was helpful; for example, they were asked to review the content of industrial focussed courses and had been consulted on the new Aerospace Systems programme since the outset. The Department also received direct feedback (informal but regular) from employers of graduates on both course content and on students on placement.
- C.4.7 The written comments received from the undergraduate student on an industrial placement were extremely positive stating that it was very beneficial and a highly valuable experience.

## *C.5 Student Recruitment, Support and Progression*

### C.5.1 Student Recruitment

C.5.1.1 It was noted that the Department recruited around 90 students each year and had recently increased the entry requirements. The student population was mainly from Scotland, therefore, most students entered with Higher grades. The Department was active in promoting itself and participated in the University Open Day. The Head of Department hoped that the replacement of the Avionic Degree programme with the new Aerospace Systems programme in 2008 would help to increase the quality and number of students, although it was recognised that they might attract students away from the Aerospace programme. The Panel supported the Department's aim to gain a closer working relationship with Recruitment, Admissions and Participation Services, particularly in light of the new programme soon to be offered.

C.5.1.2 Undergraduate students found that the promotional information available was informative and accurate. Postgraduate students said they had found out about the programmes via the website, and also found the information available clear and accurate about expectations of the programme.

C.5.1.3 It was noted from the SER that the Department felt that there was a lack of specialist support within the University in preparing publicity materials for promoting teaching and research. This had led to staff producing material in-house.

## C.5.2 Student Support

C.5.2.1 Both undergraduate and postgraduate students commented that they felt well supported by staff and were positive about their experience of teaching in the Department.

C.5.2.2 It was noted from the SER that all undergraduate students had an Adviser of Studies. The Aeronautical students stayed with the same Adviser of Studies for the first three years of the programme and in Levels 4 and 5 students moved to an Honours Adviser of Studies. Avionics students stayed with the same Adviser of Studies for their entire degree programme. This system was put in place to help build a cohort identity, the lack of which had been recognised as a problem in the past.

C.5.2.3 The Department had introduced a student mentoring pilot in 2006-07 for undergraduate students. The mentoring scheme involved Level 4 and 5 students mentoring a small group of Level 1 students. Undergraduate students commented that it was often the stronger students who took part, but they thought the scheme was advantageous to those who had participated, and were very supportive of the scheme continuing. The Review Panel commends the Department on the introduction of the pilot mentoring scheme for undergraduate students and **recommends** that the Department continue with the mentoring scheme and that it be made compulsory for all undergraduate students.

## C.5.3 Student Progression

C.5.3.1 The SER indicated that progression requirements for undergraduate degrees were outlined in the student handbook, and by the Adviser of Studies at the first meeting with students. The Panel noted from the SER that retention in the early years of the degree programmes was an issue. In discussions, staff told the Panel that students often found the transition from school teaching to teaching at University difficult to cope with. It was clear to the Panel what action the Department was taking to address these transition problems, and to help the students adjust to the change in teaching style. During discussions with undergraduate students, this was also highlighted as an area where difficulties were experienced. The students felt that there was a large gap between school and University, and that schools did very little to prepare them for this transition.

C.5.3.2 The Head of Department reported that, at Open Day, the Department now made it much clearer to potential students that the Department's programmes were theoretical rather than practical in nature (schools often advised pupils that they were the latter) and would involve a lot of mathematics. As a consequence, the Department had noted a marked difference in the nature of the students entering the degree programmes.

C.5.3.3 The SER identified that most of the Department's retention issues were related to first year and so this is where most attention had been focussed. As noted in Section C.3, the Panel was also concerned about the number of Level 1 and 2 courses that had poor grade profiles. The Panel, therefore, explored the issue of progression, and the steps the Department was taking to address student retention. The Head of Department told the Panel of a number of initiatives that had been introduced which included:

- The introduction of a 'design and build' element early in Level 1 to help with student motivation and to encourage a cohort identity;

- Making mathematics teaching more relevant and embedding it in other courses;
- The inclusion of group work in Level 1 to further help with developing a cohort identity.
- The pilot mentoring scheme.

C.5.3.4 The Head of Department indicated that these initiatives had helped in retaining students but would not help those students who had chosen the wrong subject of study (who often transferred to other degree programmes) or were not prepared to put in the necessary hours of study and left. Undergraduate students who met with the Panel were strongly of the opinion that students needed to be prepared to work hard once at University and that a small number of students were not prepared to put in the effort required. Undergraduate students also commented that motivation amongst students could be a problem and said that they would like to see more departmental involvement in external competitions to boost student interest and motivation. The SER stated that the Department was also keen to be involved in UK and international student competitions. The Panel **encourages** the Department to consider such involvement, particularly given student interest.

C.5.3.5 The Dean of Engineering acknowledged that student retention was a Faculty-wide problem, but highlighted a number of Faculty initiatives such as a buddying/mentoring scheme and an element of group work in Level 1 courses. In addition, an early warning system was being developed, funded by Learning and Teaching Development Fund, which would involve monitoring of attendance at lectures and laboratories, which was seen as a priority in identifying weaker students.

C.5.3.6 The Review Panel observed that one of the University's priorities for the Learning & Teaching Strategy was student retention. While recognising the steps taken by Department and other Faculty initiatives to address retention, the Panel was, nevertheless, of the view that the Department would need to do more if it was to achieve the performance indicators for student retention in the Learning & Teaching Strategy. Consequently, and building on previous initiatives, the Review Panel **recommends** that the Department reviews the operation of the first year of the Aerospace Engineering programme to identify further opportunities to improve progression and student retention. This should include looking at how the Department might better support the student transition from school to University. The Panel observes that the development and introduction of the new Aerospace Systems degree programme will provide an opportunity to address the operation of its first year and retention issues encountered with the Avionics degree.

## C.6 *The Effectiveness of Provision*

### C.6.1 Learning and Teaching

C.6.1.1 The SER stated that the Department used a traditional (chalk and talk) approach to delivering lectures at both undergraduate and postgraduate level. The Department supported lectures with the use of printed notes, where necessary, that could either be collected at the lecture or from the Undergraduate Office. Undergraduate students commented that, overall, lectures were good but that it would be beneficial to have some variation in the teaching style and more interaction in the lectures.

C.6.1.2 The Panel noted from the SER that the Department's teaching was underpinned by research and, where possible, teaching duties were allocated on the basis of research expertise. Undergraduate students said that a key strength of the teaching was its link to the research of the Department plus they appreciated access to experimental laboratories which were used for research and teaching purposes.

C.6.1.3 It was noted that a number of courses used design tasks and projects which enabled the students to develop their design skills and to experience different computer software. Undergraduate students said they particularly enjoyed this aspect of the programme and felt that



this could be developed further so that projects had a linear path and progressed from one year to the next, building on the work done in the previous year. Undergraduates also commented that they were not aware of journals and their role in supporting research until the later years and proposed that it would be better to have a grounding in these in the earlier years of the programmes. The Panel encourages the Department to consider these suggestions.

C.6.1.4 PGT students informed the Panel that the MSc Space Mission and Design programme was taught in two-week blocks, and that the exams were held at the end of each semester. The students were generally dissatisfied with teaching in such concentrated periods as they had to take in a large amount of information and had limited time to read around the subject. The Panel was told by staff that teaching was organised in this way as it was more convenient for staff, and to take advantage of some joint teaching with Honours students. It was also noted that some of the courses had now moved to teaching over a four-week period. The Panel was concerned, nevertheless, that this approach to teaching was not necessarily facilitating student learning. The Panel observed that other approaches might be more appropriate and that students did not always need to be taught to learn. The Review Panel **recommends** that the approach to teaching on the MSc Programme in Space Mission Analysis and Design be reviewed so that it better supports student learning and that it is appropriate to postgraduate level study, whilst recognising the logic of incorporating appropriate Honours modules into MScs .

C.6.1.5 The SER indicated that relatively few students attended the tutorial classes, and of those who did relatively few prepared for them or obtained benefit from tutorial classes. Staff were, therefore, often de-motivated and unwilling to expand the provision of tutorial classes. In discussing this with undergraduate students, part of the problem appeared to be the timing of tutorials, particularly in relation to lectures. An example was given of a lectures finishing at 12 noon on a Friday and a tutorial being held at 3pm. Students said they tended to go home after the lecture. Undergraduate students also commented that some of the international General Teaching Assistants (GTAs) could be difficult to understand during tutorials as English was not their first language. The GTAs indicated that they would welcome more guidance from academic staff on whether to be passive or proactive in engaging undergraduate students in tutorials, recognising that they were adults. The GTAs also identified that a more proactive approach might be needed with students in Levels 1 and 2. The Review Panel **recommends** that the Department: explore with undergraduate students ways to improve attendance at tutorials; consider English language ability when recruiting international GTAs; provide GTAs with guidance on the approach to be taken during tutorials to student engagement and participation.

## C.6.2 Resources and their Deployment

### *C.6.2.1 Staffing*

(i) The Head of Department told the Panel that a workload model was used in the Department, based on the Faculty model, and that it was well established and comprehensive. He advised that, in the interests of transparency, the information had been given to all staff. This had led to staff concerns, which often resulted from misunderstanding the formulae used. The biggest challenges were achieving equity and meeting reasonable requests (eg, for research leave, the development of a new course, etc).

(ii) The Panel welcomed the Department's approach to the use of research to underpin teaching, and understood the difficulties faced when trying to balance research and teaching duties. The Panel noted that the number of sabbaticals and fellowships taken over the last six years was high. The Head of Department advised the Panel that managing cover for absences during sabbaticals was challenging but funding was generally available for temporary staff. The funding was frequently from industrial sources, and often benefited the Department in the longer term.

(iii) The Panel explored with the Head of Department how negative student feedback in relation to the quality of teaching was dealt with. The Head of Department acknowledged that this could be difficult but he tried to address this through the Performance and Development Review process. With the probationary requirements and mentoring for new academics, the Head of Department expected that such problems were less likely to occur in the future. The Head of the Teaching Committee told the Panel that he had planned to introduce peer review of teaching for staff, which he would undertake, but these plans had had to be shelved because of the lack of time. The Panel advised the Head of Department that the Learning and Teaching Centre could also provide support and guidance to help improve teaching performance.. The Review Panel **recommends** that the Head of Department approaches the Learning and Teaching Centre for support and guidance in addressing staff performance and development issues in relation to learning, teaching and assessment.

(iv) During the meeting with GTA staff, no concerns were raised with the Panel, and the GTAs felt well supported by the Department (but see C6.1 above). The Panel spoke with probationary staff who also felt well supported, and had been given feedback on progress and on any areas that needed attention.

(v) The SER raised concerns about the administrative staffing levels within the Department. The Head of Department highlighted staffing problems with the Undergraduate Office; the staffing complement had been reduced from two to one secretary and this had resulted in a reduction in the service offered to staff and students. The Panel **encourages** the Head of Department to continue to pursue this Faculty resource matter with the Dean.

(vi) The Panel noted and supported the Department's practice of inviting guest lecturers from industry to give specialist lectures on practical applications in industry.

#### *C.6.2.2 Teaching Resources*

(i) At the time of the review, the Department was located in the upper half of the James Watt Building, which it shared with Mechanical Engineering, the Print Unit and the James Watt Nanofabrication Facility. The Department also had a research annex situated at the West of Scotland Science Park (Acre Road) where two large wind tunnels and flight vehicles were located.

(ii) The Head of Department informed the Panel that the Department's strategic plans were constrained by a lack of space, and that they had hoped to purchase a flight simulator but lacked the necessary space for the equipment. More recent pressures in Aerospace had been compounded by increasing staff and student numbers. The Panel, however, noted from the SER that laboratory space was limited, and that there was a conflict for use between teaching and research. As noted previously, undergraduate and postgraduate students benefited from the use of research equipment in their laboratory classes.

(iii) The Panel heard from the Dean that space allocation within the James Watt Building, and between the Aerospace and Mechanical Engineering Departments, had been an issue for a number of years and that a solution was not easy. The Estates Strategy indicated that the Department would move to another location in 2010/2012. Meantime, the Review Panel **recommends** that further discussions are held between the Heads of Department for Aerospace Engineering and Mechanical Engineering to explore improved use of the overall space allocation between the two departments so that the plans of the Department of Aerospace Engineering might be realised in the short term.

(iv) The SER reported that the Department currently had approximately 60 PCs available for student use. During the meeting with undergraduate students, they expressed the view that some of the computers were recycled around the department and were outdated. They

felt that it would be more beneficial and convenient to have access to either a wireless network, or network points as the majority of students had their own lap-top computer and could gain faster access this way. The Review Panel **recommends** that the Department considers the provision of desktop space for students to gain access to IT services either via a wireless network, or via network points. The space currently occupied by older PCs might be released to meet some of the teaching space issues identified earlier.

(v) The SER highlighted that there had been limited use of Moodle in the Department and the Panel noted from discussions that the Department did not have a clear plan or departmental policy for developing its use. Some staff did not appear to be aware of its potential to enhance learning and teaching. The Panel was told by academic staff that they had attempted to introduce Moodle for Level 1 and 2 students in 2005-06 but had been unable to obtain support from the Learning and Teaching Centre so plans had been shelved. Undergraduate students said that they would welcome greater use of Moodle. Whilst acknowledging past barriers to development, the Review Panel **recommends** that the Department identifies a 'champion' to progress the development and rollout of Moodle within the Department, with relevant support and guidance from the Learning and Teaching Centre.

### *C.6.2.3 Learning Resources*

(i) The Department used industry based software to support teaching, mainly MATLAB, which was often used to support projects or design tasks. Undergraduate students said they welcomed the use of the software, but said that they sometimes lacked the necessary skills to use the software to complete projects and could spend a large amount of time teaching themselves. Access to the computers on which the software was installed was also limited, as the clusters were either used for lectures or closed after 5pm. Undergraduate students commented that they could purchase the software individually, but felt that it was rather expensive (£50) and asked if an extension of the University's site licence for use on the student's individual laptops would be possible. The Review Panel **recommends** that the Department looks into the possibility of acquiring a MATLAB Licence for use off-campus by students.

(ii) The Panel also noted that some of software which was used by the Department was not the most up to date or of industry-standard. The Head of Departmental commented that they used the most up to date possible, but often the cost of purchasing the software was an issue. Staff claimed the students, however, did benefit from and enjoyed the software programmes taught which were often linked back to research undertaken in the Department.

## **D The Maintenance of Standards of Awards**

D.1 The Panel was confident that the Department was operating effective measures to maintain the standards of awards. As indicated in the SER, and throughout discussions with staff and students, the Department operates robust assessment procedures, responds to external examiners' comments and accreditation reports where necessary, and reacts to changes in grade profiles. As indicated in Section C.3 above, the Panel is recommending further investigation into the reasons for poor pass marks.

## **E. The Maintenance and Assurance of Quality**

E.1 The Panel noted that the Department operated a Staff Student Liaison Committee (SSLC) which was chaired by the Head of Department. The Panel thought this could lead to a conflict of interest and wondered if it might be more appropriate for, say, the Head of Teaching to Chair

the SSLC so that the Head of Department was one step removed. The Head of Department told the Panel that he had been reviewing the operation of the SSLC, including the chairmanship, and wished to make it more student-driven.

- E.2 Undergraduate students explained that, while their attendance at SSLC meetings could be low, they considered that their views were listened to. However, the effectiveness of reporting back on any action resulting from their comments was variable. The Review Panel **recommends** that the Department review the appropriateness of the Head of Department chairing the Staff Student Liaison Committee, and that students are informed of post meeting actions taken in response to comments made or reasons given where action is not possible to help close the feedback loop.
- E.3 The Panel had received Annual Course Monitoring reports as part of the supporting documentation and had noted from the SER that the delivery of individual courses was monitored by an Annual Course Monitoring Committee, which looked at grade profiles, distributions, and student questionnaires. As noted in Section C.5.3 it was unclear to the Panel what action was instigated by the Annual Course Monitoring Committee and has recommended that the Department make it more transparent what its procedures are for monitoring and investigating poor grade profiles and what action has been taken as a result. This will include the role of the Annual Course Monitoring Committee.

## **F. Enhancing the Student Learning Experience**

- F.1 The Review Panel considered the student learning experience to be very positive, and attributed that to the quality of the support and teaching provided by staff. The students at both the undergraduate and postgraduate meetings endorsed this.
- F.2 Undergraduate and PGT students commented that the information provided by the Department via the open day, website, course handbooks, etc, had prepared them well for what to expect in the courses.
- F.3 The Department has strong industrial links which it uses to enhance the student learning experience through a range of opportunities such as placements, industrial visits and lectures from practising engineers.
- F.4 The research environment that existed in the Department offered students the opportunity to use state of the art equipment and software, and to contribute to major research efforts through final year projects.
- F.5 Students on the MSc in Space Mission Analysis and Design considered that the teaching structure and assessment methods employed were not fully conducive to supporting student learning.
- F.6 Undergraduate students would welcome more timely feedback on assessed work so that they could learn from this and improve their performance.
- F.7 The Panel noted that there was limited mention in the SER about the enhancement themes currently being taken forward in the University. During discussions with undergraduate students, the Review Panel briefly enquired about Personal Development Planning and Employability, which were two key enhancement themes that the University was pushing forward. The students showed an awareness of these themes.

## **G. Summary of Key Strengths and Areas to be Improved or Enhanced in relation to Learning and Teaching and Conclusions and Recommendations**

### *Key Strengths*

- The steps taken to increase the relevance of mathematics teaching for students and in the improvements in grade profiles. (**commendation**)
- The practice of research-led approach to teaching throughout the undergraduate and postgraduate programmes as attested to by students. (**commendation**)
- The very positive student learning experience, attributed to the quality of the support and teaching provided by staff.
- The research environment which exists in the Department offers students the opportunity to use state of the art equipment and software, and to contribute to major research efforts through final year projects.
- The range of specialised subjects available to students in Levels 4 and 5
- The Department's strong industrial links.

### *Areas to be improved or enhanced*

Retention rates for undergraduate programmes, and particularly poor grade profiles for some Level 1 and 2 courses and student progression from Year 1 to 2

Expansion of the approaches to teaching and assessment to better facilitate student learning, particularly at Postgraduate level

Feedback to students on assessed pieces of work

Feedback to students about the actions taken in response to the Staff Student Liaison Committee

Exploit the potential of Moodle to enhance learning and teaching

The provision of additional space for teaching laboratories and research, where possible

### *Conclusions and Recommendations*

#### Conclusion

The Review Panel commends the Department on the overall quality of its provision, its maintenance of standards and for its conscientious approach to the student experience and to research-led teaching. The Panel was pleased that the meetings with staff and students showed a positive atmosphere. The Panel is, however, concerned about student retention and the challenges the Department has experienced. The Panel acknowledges that steps have been taken to address student retention but was of the view that more action is needed, particularly given that it is a priority of University's Learning & Teaching Strategy. The Department also needs to review its approaches to teaching and assessment in relation to its main postgraduate taught (PGT) programme, and should bear these factors in mind when taking forward its plans to expand its portfolio of PGT programmes.

#### Recommendations

The recommendations interspersed in the proceeding report and summarised below are made in the spirit of encouragement to the Department to continue to evolve and develop the student experience. The recommendations below are ranked in order of priority and have been cross-referenced to the paragraphs in the text of the report to which they refer.

*Recommendation 1:*

The Review Panel **recommends** that the Department reviews the operation of the first year of the Aerospace Engineering programme to identify further opportunities to improve progression and student retention. This should include looking at how the Department might better support the student transition from school to University. The Panel observes that the development and introduction of the new Aerospace Systems degree programme will provide an opportunity to address the operation of its first year and any retention issues encountered with the Avionics degree. Such developments must be made in conjunction with the Dean's intentions to establish a common first year of teaching [*Paragraph C.5.3.6*]

**For the attention of:** The Head of Department

*Recommendation 2:*

The Review Panel **recommends** that the Department:

- (i) continues to monitor, investigate and take action in relation to courses with poor pass rates given the subsequent impact on Level 1 to Level 2 progression rates and overall retention rates.
- (ii) make it more transparent what its procedures are for monitoring and investigating poor grade profiles and what action has been taken as a result. [*Paragraph C.3.3*]

**For the attention of:** The Head of Department

*Recommendation 3:*

The Review Panel **recommends** that the Department continue with the mentoring scheme and that it be made compulsory for all undergraduate students. [*Paragraph C.5.2.3*]

**For the attention of:** The Head of Department

*Recommendation 4:*

The Review Panel **recommends** that the mechanism for providing student feedback on assessed work be reviewed to ensure that work is returned and feedback provided within timescales that support student learning and not be held back from students unnecessarily. [*Paragraph C.3.6*]

**For the attention of:** The Head of Department

*Recommendation 5:*

The Review Panel **recommends** that the approach to teaching on the MSc Programme in Space Mission Analysis and Design be reviewed so that it better supports student learning and that it is appropriate to postgraduate level study, whilst recognising the logic of incorporating appropriate Honours modules into MScs. [*Paragraph C.6.1.4*]

**For the attention of:** The Head of Department

*Recommendation 6:*

The Review Panel **recommends** that the assessment methods employed in the MSc in Space Mission Analysis and Design programme be broadened so that there is less reliance on examinations and that more varied assessment methods appropriate to postgraduate study are employed. [*Paragraph C.3.4*]

**For the attention of:** The Head of Department

*Recommendation 7:*

The Review Panel **recommends** that the Department: explore with undergraduate students ways to improve attendance at tutorials; consider English language ability when recruiting international GTAs; provide GTAs with guidance on the approach to be taken during tutorials to student engagement and participation. [Paragraph C.6.1.5]

**For the attention of:** The Head of Department

*Recommendation 8:*

The Review Panel **recommends** that the Department identifies a 'champion' to progress the development and rollout of Moodle within the Department, with relevant support and guidance from the Learning and Teaching Centre. . [Paragraph C.6.2.2(v)]

**For the attention of:** The Head of Department

Director of the Learning and Teaching Centre

*Recommendation 9:*

The Review Panel **recommends** that the Department review the appropriateness of the Head of Department chairing the Staff Student Liaison Committee, and that students are informed of post meeting actions taken in response to comments made or reasons given where action is not possible, to help close the feedback loop.. [Paragraph E.2]

**For the attention of:** The Head of Department

*Recommendation 10:*

The Review Panel **recommends** that further discussions are held between the Heads of Department for Aerospace Engineering and Mechanical Engineering to explore improved use of the overall space allocation between the two departments so that the plans of the Department of Aerospace Engineering might be realised in the short term. [Paragraph C.6.2.2(iii)]

**For the attention of:** The Head of Department

Head of the Department of Mechanical Engineering

*Recommendation 11:*

The Review Panel **recommends** that the Department investigate the inclusion of optional courses to increase the breadth of provision and address the expectation of the subject benchmark statement. [Paragraph C.1.2]

**For the attention of:** The Head of Department

*Recommendation 12:*

The Review Panel **recommends** that the Head of Department approaches the Learning and Teaching Centre for support and guidance in addressing staff performance and development issues in relation to learning, teaching and assessment. [Paragraph C.6.2.1(iii)]

**For the attention of:** The Head of Department

*Recommendation 13:*

While recognising that the Registry does consult on the draft examinations timetable, the Review Panel **recommends** that the Registry, where possible, try to accommodate departments'

requested changes to the examination timetable so that exams are held within a reasonable time frame that does not put excessive pressure on students. The Panel also **recommends** that the Head of Registry and Clerk of Senate consider holding more exams in the evenings to allow for some increased flexibility in the scheduling of exams. *[Paragraph C.3]*

**For the attention of:** The Head of the Registry  
Clerk of Senate

*Recommendation 14:*

The Review Panel **recommends** that the Department considers the provision of desktop space for students to gain access to IT services either via a wireless network, or via network points. *[Paragraph C.6.2.2 (iv)]*

**For the attention of:** The Head of Department

*Recommendation 15:*

The Review Panel **recommends** that the departmental website, which is a key resource for students, be updated on a regular basis to ensure that information is current and accurate. *[Paragraph C.4.2]*

**For the attention of:** The Head of Department

*Recommendation 16:*

The Review **Panel recommends** that the Department looks into the possibility of acquiring a MATLAB Licence for use off-campus by students. *[Paragraph C.6.2.3.]*

**For the attention of:** The Head of Department

*Prepared by: Janet Fleming, Senate Office*

*Last modified on: Tuesday 25 September 2007*