HERIOT-WATT UNIVERSITY

REPORT OF THE ACADEMIC REVIEW TEAM

ACADEMIC REVIEW OF: Actuarial, Mathematics and Statistics

DATE: 30 November and 1 December 2015

LOCATION: Earl Mountbatten Building, Room 1.70

1. INTRODUCTION

An Academic Review of the Actuarial, Mathematics and Statistics took place on 30 November and 1 December 2015 by a Team comprising:

**Review Team:**
- Prof Isabelle Perez, School of Management and Languages (Chair)
- Dr Rink van Dijke, School of Energy, Geoscience, Infrastructure and Society
- Prof Frank Ball, Nottingham University
- Dr Shane Whelan, University College of Dublin
- Mr Rahul Singh, School of Management and Languages (UG)
- Mr Mahdi Kapateh, School of Energy, Geoscience and Infrastructure (PGR)

**Review Advisors/Observers**
- Ms Helen Crosby, Quality Assurance Manager
- Ms Denise McCaig, Heriot-Watt University Students Union
- Dr Ian Glen, Quality Enhancement Officer (meeting 8)
- Mrs Lindsey Hall, Quality and External Partnerships Admin Assistant

2. REVIEW TEAM JUDGEMENT

Upon conclusion of the review, the Team reached the following judgements:

2.1. The Review Team confirmed that the review objectives were being met and that the Discipline’s programmes were re-approved for on-going delivery.

2.2. The Review Team confirmed that the Discipline Team has in place effective and robust arrangements for securing and managing: academic standards; programme quality; the quality and enhancement of the student learning experience. These arrangements are likely to continue to be effective in the future.

2.3. The Review Team confirmed that the Discipline Team has in place effective arrangements to manage the operation and enhancement of the Discipline's programmes, in line with the School's strategic objectives, which are being implemented at the programme level.

3. GOOD PRACTICE AND POSITIVE FEEDBACK

3.1. It was apparent that processes for mentoring and communicating with students were effective. The approachability of staff, response time to email requests, and the ease by which information was accessed, was commented upon favourably by all taught students.

3.2. Both Undergraduate and Postgraduate Taught students viewed positively the opportunity to gain exemptions from professional actuarial examinations. For Undergraduate programmes, it was noted that Heriot-Watt is one of the few Universities that offers exemptions from eight of the Profession’s Core Technical subjects.
3.3. Students were unanimous in their view of the tutorials, citing them as important mechanisms for gauging their academic development. The Review Team noted the fact that tutorials are delivered, as standard practice, for Postgraduate Taught and Undergraduate programmes, at all stages.

3.4. The provision of pre-sessional materials to Postgraduate Taught students was viewed positively by the Review Team and found to be extremely useful to students in advance of commencing their programme of study.

3.5. It was noted that new staff were introduced to their mentor before their arrival at the University and taking up their post within the Department.

3.6. The Postgraduate Taught students had a good knowledge of the challenges facing the Actuarial Profession. This awareness was gained through lectures, additional reading, and engagement with the Students’ Actuarial Society.

3.7. There was evidence of a robust Postgraduate Research student annual review process, including formal annual reports and vivas, and, for resolution of under-performance, the development of a clearly defined action plan.

3.8. Positive comments were received from students with regard to the regular update of materials on VISION and innovative online forums.

3.9. Feedback following surveys were communicated to students during Undergraduate and Postgraduate Taught Student/Staff Liaison Committee meetings.

3.10. The Review Team recognised recent innovations, for example: introduction of new industrial placements within BSc Actuarial Science; development of new MSc programmes; introduction of case studies into the MSc programmes.
4. **FORMAL RECOMMENDATIONS FOR ACTION**

4.1. Building on engagement with University-led initiatives such as the graduate attributes, the Department should continue to review the opportunities by which students are exposed to transferable skills as part of the Undergraduate programmes, and assessment thereof.

5. **OTHER RECOMMENDATIONS FOR CONSIDERATION**

5.1. The Department should continue, through processes of review, to explore ways by which the content of the curriculum can improve the transition experience between stages 2 and 3.

5.2. The Department should ensure the consistent provision and communication of coursework assessment criteria across all courses, including those involving industrial placements.

5.3. The Department should review the PGR student representation process to clarify mechanisms by which PGR students may engage at the School level.

5.4. The Department should clearly communicate to all PGR students the availability of funding for attending conferences, including overseas events.

5.5. The Department should continue to develop the provision of programming skills (particularly ‘R’) within the degree programmes, across all levels. The Review Team agreed with the priority of identifying modes of better embedding ‘R’ or other programming languages within the Undergraduate curriculum.

5.6. The Review Team recommends consistency in the provision of pre-sessional materials across Postgraduate Taught programmes.

5.7. The Department should explore opportunities for accreditation of appropriate programmes by the Royal Statistical Society.

6. **REVIEW TEAM’S COMMENTARY**

6.1. **GENERAL**

Following consideration of the Review documentation and discussions with students and staff during the review meetings, the team was able to confirm satisfaction with the quality and standards of the programmes as well as the quality of the student learning experience. Many examples of good practice at local Departmental level, rather than within the broader framework of School level systems and procedures, emerged from the discussions.

6.2. **STUDENT LEARNING EXPERIENCE**

6.2.1. **Induction**

All students viewed events for induction to the Department as informative and enjoyable, with informal introductions to fellow students and staff members mentioned in particular.

Postgraduate Research (PGR) students indicated that communication of procedures was mainly done verbally by supervisors; there was little (or no) awareness of written procedures or the PGR Student Code of Practice.

6.2.2. **Pre-sessional materials**

The Department provides pre-sessional materials and booklists for some of its Postgraduate Taught programmes. Discussions with students indicated that they found
this material helpful but they would like to have received more, and that it was not provided for all programmes.

Staff explained that such material was provided for the MSc in Actuarial Science, because the programme has a diverse intake, but its provision was less important for the MSc in Actuarial Management as students enrolling on that programme have a stronger mathematical background. The Review Team recommends that the Department is consistent in its provision of pre-sessional materials and booklists across all of its MSc programmes.

The Department provides excellent pre-sessional material to second and third year direct entrants into its Undergraduate programmes. In particular, Chinese students entering the third year of the BSc in Actuarial Science under an articulation agreement have small gaps in their mathematical knowledge, so staff from Edinburgh visit their campus to give appropriate pre-sessional courses.

6.2.3. Mentoring

The Review Team noted the excellent provision for mentoring at both the Undergraduate and Postgraduate Taught level, with the openness and approachability of staff being highlighted as the main contributor to its success. Students felt that they are able to approach their mentor with issues and UG students expressed satisfaction with the regular mentor meetings. Students also expressed their satisfaction with the quick response to emails by staff, as well as information provided, by staff and through the VLE and website. New staff indicated that they had not all completed mentorship training before being assigned mentees. It was felt that while the skills required to mentor students are primarily gained through experience, the Review Team’s view is that all new staff should be required to undertake mentor training prior to being assigned mentees. It can however attest to the strength and quality of the Department, the enthusiasm and vested interest that staff have in their students which allow them to deliver great support and advice to their mentees even without formal training in this area.

6.2.4. Teaching and Learning Support

i. VISION

The Review Team noted and confirmed the minimum standard for VISION as stated in the Department’s self-reflection. Students were exceptionally pleased with their learning resources which were readily available on VISION, as well as the continuous updates of teaching material and use of the announcement facility to update students on admin/teaching issues. While this minimum standard has been adequately met, students commented upon the variance amongst the use of VISION, with some utilising the facility as more of a repository while others use more ‘advanced’ features of VISION to engage students such as the creation of forums to discuss course content and workshop/tutorial problems. Lecturers were also commended on using technologies outside VISION such as “Socrative”. The Department is encouraged to build upon this good practice for making better use of certain VISION facilities to better engage students.

ii. Programming Skills

The students expressed a lack of confidence and understanding of the ‘R’ programming software and a desire to have more in-depth knowledge. Discussions with students and staff confirmed that lectures/tutorials were aimed at providing students with the principle of programming in general. As programming is a skill that is commonly sought in industry, it is recommended that there is consideration as to how more in-depth teaching of programming skills might be embedded within the Undergraduate curriculum. Additionally, the Department may wish to explore the possibility of introducing students to MOOCs, provided by Microsoft via EdX, which are free of charge.
iii. **Transition/Progression**

The Undergraduate students on the BSc in Actuarial Science programme reported that stages 3 and 4 were considerably more demanding than stages 1 and 2, with many experiencing a challenge in the transition from stage 2 to 3. There was recognition by the staff of this issue, and the Review Team was satisfied that the student experience in this regard was being monitored. It might be the case that there are now more students than there were in the past choosing to enter at stage 1, although they are eligible to enter at stage 2. If so, this would suggest that the curriculum at stage 1, and perhaps at stage 2 also, could be developed to introduce some of the concepts that students find difficult later in the degree. The Review Team recommends that staff continue to monitor the situation and attempt to smooth the transition between stages 2 and 3.

iv. **Transferable Skills and Graduate Attributes**

The Undergraduate students were satisfied that there were sufficient options in the programme for those deciding not to pursue an actuarial career, and they were aware of the value of the degree in pursuing other careers.

The programmes offered in the Department prepare students for professional examinations and pre-identified career paths. In order to equip students with the skills/attributes necessary to adapt to a broader range of working environments as well as further study, it is recommended, for example, that syllabi could be broadened to supplement the current skill and product-based activities with some content and process-based learning opportunities.

This was confirmed during discussions with students who stated, for example, that “the PDP course in year 1 was the only time when I had to do a presentation”. The two core questions framing the enhancement workshop led to interesting discussions among staff about potential learning and teaching activities and approaches that could feed into a plan of action to achieve this goal.

v. **Conferences and Training**

Postgraduate research (PGR) students reported a well-defined individual development plan for dissemination of research results, such as journal publications and conference attendance. They indicated some awareness of funding opportunities, mainly for attendance of training conferences held in the UK. Moreover, a higher level of funding seems to be available to students sponsored by the Actuarial Research Centre (ARC) than to students on University funded scholarships. Staff supervising PGR students indicated that funding for conference attendance is also available for the latter category of students.

vi. **Actuarial Profession and Engagement with Societies**

The MSc students in both the Actuarial Science and Actuarial Management programmes had knowledge of the key challenges facing the Actuarial Profession and Actuarial Science. The engagement with such issues was partly from lecturers illustrating principles with topical examples but also partly from the active Students’ Actuarial Society at Heriot-Watt. The Review Team noted the support and engagement that the staff of the Department gives to the Students’ Actuarial Society, and its links with the Faculty of Actuaries Student Society (FASS) and the actuarial profession in Edinburgh. This clearly added to the student experience and preparedness for a career as an actuary.
6.2.5. Quality of Teaching

i. Induction and Support for New Staff

The Review Team noted the positive comments made by newly appointed staff in connection with induction and support mechanisms in the Department. In particular, new staff mentioned the benefits of the one-to-one level communication with their allocated mentor during the initial phase of employment. Whilst these arrangements clearly make new staff feel welcome and allow them to integrate fully and quickly in the Department, there does not appear to be any broader induction programme such as is offered by some HWU Schools to familiarise new staff with the School or even University wide policies and procedures that will impact on their work.

Probationary arrangements for new staff were clarified to the satisfaction of the Review Team. Newly appointed staff have access to the Postgraduate Certificate in Academic Practice (PGCAP) programme. Whilst some elements of PGCAP were considered to be particularly useful, comments were also fed back regarding the lack of discipline-specific components within the training programme.

The Review Team gained the impression that there was some pressure felt with regard to teaching workload - along with mentoring and supervision duties - and the impact in terms of the reduction of allocated research time (this was mentioned on occasions across all categories of staff).

6.2.6. Assessment

Discussions with both Undergraduate and Postgraduate Taught students indicated that whilst for some courses they are given clear guidelines and assessment criteria for project-based assessed coursework that is not the case for all courses. Subsequent discussions with staff suggested that the provision of such guidelines is currently down to the lecturer but that the School is developing a policy on moderation and assessment of coursework. The Department has recently launched two programmes with a Diploma in Industrial Training that includes work placements. The person responsible for overseeing these placements is currently on secondment. The Department has considered carefully the monitoring and assessment of such placements but has yet to formulate an associated policy. It is essential that this is done and students are notified accordingly before they embark on these placements.

The provision of formative assessment and feedback on both assessed and unassessed coursework varies across courses. All courses have tutorials and the students found these to be very helpful. Undergraduate students reported that one project-based course had feedback with marks and comments on VISION and said that students would like it for all courses.

Postgraduate Taught students reported that they did not receive individual feedback on formative assessment and that they would like more opportunities to hand in work for marking and comment. The Review Team felt it would be beneficial if the Department had a policy on the provision of such feedback for its courses.

The Department has excellent arrangements for providing feedback to students on Semester 1 examinations. The arrangements for giving feedback on Semester 2 examinations are less comprehensive, owing to timing constraints, and the Review Team felt that the Department might explore ways of enhancing feedback for Semester 2 examinations.
6.2.7. **Student Feedback Opportunities**

Student feedback on courses is mainly collected through paper-based questionnaires at the end of each semester, tailored to each course, and processed by the Course Leaders. Feedback from the questionnaires is passed by the Course Leaders to the appropriate Board of Studies. The students indicated that responses and actions resulting from the feedback were verbally communicated to them via student-staff meetings. Although this process is not explained in advance to the students, they appear to be happy with the feedback arrangements. Although the VISION course surveys are also issued to the students at the end of each semester, there is a perception that these are less effective than the paper-based questionnaires.

Although a representation system existed, it was noted that the PGR students were not very engaged with the process; the Review Team acknowledges that this might be due to the fact that the students do not feel the need to raise issues. However, the students may feel benefit from being engaged with the School and University-wide representation systems. Students should be aware of points of contact for support outwith the Department, as well as within the School, so that students have options other than raising issues directly within the Department. Informal student/staff meetings with flexible arrangements may be of benefit and worth considering. Additionally, the Department should consider how PGR students might be encouraged to engage in the wider PGR community, providing opportunities to network and further develop their interpersonal skills.

6.3. **ACADEMIC STANDARDS AND QUALITY**

The Review Team was made aware of processes by which academic standards are monitored and maintained. A formal moderation process is in place for all examinations and the Department informed of plans to develop a policy for the consistent moderation of coursework assessment.

6.4. **QUALITY ENHANCEMENT**

All challenges reflected in the recommendations contained in this report were recorded in the reflective analysis document and consistently raised during the review discussions with staff. There is awareness, in the Department, not only of specific areas where there is room for enhancement but also of what needs to be done (e.g. amendments to programmes) as part of a plan of action going forward.

This was particularly evident during the enhancement workshop which focused on two core questions addressed to participants on the best ways to firstly equip students with skills of confidence and independence through their learning, and secondly to raise student awareness of contextual knowledge, such as societal factors and challenges, that impact on the AMS professions. The two core questions were clearly delineated by means of a series of sub-questions put to four groups of five participants each. As a result, the discussions held within the groups yielded a number of constructive suggestions, including potential responses to both core questions at the same time. These were noted and will form the basis of the Department's enhancement plan.

6.4.1. **Programme Innovation**

The Review Team noted the recent innovation in the programmes offered by the Department. At Undergraduate level, some students on the BSc in Actuarial Science are enabled or allowed to go on work placement in the last two of years. The development of work placements for Undergraduate students, though time-consuming for staff, opens the possibility that the BSc in Actuarial Science and Diploma in Industrial Training could apply and be accredited for the exemption from the Actuarial Profession’s CA1 examination (and possibly even CA3), making it the only University in the UK enabled to offer the CA1 exemption at Undergraduate level. There are also student exchange agreements in place for Undergraduates with the University of Melbourne and the University of Waterloo, a study abroad agreement with the University of St Thomas (US) and articulation
arrangements with three Chinese universities. At graduate level, the Department introduced the MSc in Actuarial Management in 2011, the MSc in Actuarial Science and Management in 2015, and developed other MSc programmes in risk and finance, one in association with the University of Edinburgh. The suite of MSc programmes in risk, finance and actuarial science offer considerable choice to graduate students.

6.4.2. **PGR Community**

There are regular School wide social events, as well as seminars for PGR students, which are viewed as positive. However, PGR students in topics around Actuarial Mathematics appear to have supervisors from this Department only. Given also that the PGR student population is relatively small (currently PGR student to staff ratio is slightly below 1), the Department could consider taking on more students that are jointly supervised with staff in other departments of the School, or beyond. This would encourage integration of the PGR student body with the rest of the school.

6.4.3. **Accreditation of programmes**

The Review Team encouraged the Department to apply to the Royal Statistical Society for accreditation of appropriate Undergraduate and Postgraduate Taught programmes. Such accreditation might be of particular benefit to graduates who pursue a career as a statistician rather than in the actuarial profession.