ULSTER UNIVERSITY

REPORT OF A MEETING OF THE REVALIDATION PANEL UNIT 16D: COMPUTING (UG) (ME)

3 May 2018

PANEL:

Professor Brian Murphy, Director of Access, Digital and Distributed Learning, Ulster University [Chair]

Ms Susannah McCall, Associate Head of School of Applied Social and Policy Sciences, Ulster University

Professor Andrew Crampton, Associate Dean for Teaching and Learning, Department of Informatics, University of Huddersfield

Dr Mark Lee, Senior Lecturer, School of Computer Science, University of Birmingham

Professor Leslie Smith, Professor of Computing, Computing Science and Mathematics, University of Stirling

REVALIDATION UNIT CO-ORDINATOR:

Mrs Mairin Nicell, School of Computing, Engineering and Intelligent Systems, Ulster University

IN ATTENDANCE:

Mrs Andrea Garland, Academic Policy and Standards Officer, Academic Office, Ulster University

Mrs Ayla Guarino, Academic Policy and Standards Officer, Academic Office, Ulster University

1   INTRODUCTION/BACKGROUND

The Panel met to consider the following provision:

- BEng Hons Electronics and Embedded Systems [proposed new title] (with CertHE and AB exit awards) (FT [with DPP/DPP(I)/DIAS] /PT) [currently: BEng Hons Computer Engineering]
- BSc Hons Computer Science (Software Systems Development) (with CertHE and AB exit awards in Computer Science) (FT [with DPP/DPP(I)/DIAS] /PT)
- BSc Hons Information Technologies (with CertHE and AB exit awards) (FT [with DPP/DPP(I)/DIAS] /PT)
- Undergraduate Honours Subject: Computer Science (Single Hons with CertHE and AB exit awards) (FT [with DPP/DPP(I)/DIAS] /PT) / Computing (Minor) (FT/PT)

New Proposal

- BEng Hons Artificial Intelligence (with CertHE and AB exit awards) (FT [with DPP/DPP(I)/DIAS] /PT)

The School of Computing, Engineering and Intelligent Systems (SCEIS) is based entirely at the Magee campus. The School was formed in 2017 from a merger of the existing School of Computing and Intelligent Systems and the Centre for Engineering and Renewable Energies. The School has core teaching competencies in the areas of Computer Science, Electronics, Engineering and IT and offers undergraduate degree courses in these areas. The School also participates in the suite of modular undergraduate courses on the campus by providing a Computing Minor. The Computing Minor is offered in combination with Business, Advertising and Irish.

The courses are technically and intellectually challenging, giving students opportunities to develop the knowledge, skills and confidence to gain fulfilling employment in the computing industry. There is some overlap in the provision with certain modules contributing to a number of courses particularly in the first two years of a course. The provision is accredited by the British Computer Society (BCS).

As part of its strategic plan, the Faculty is committed to extending its MaSN activity in Magee and align its undergraduate provision directly with research activity. The new BEng Hons Artificial Intelligence will sit directly alongside the work of the Cognitive Analytics Research Lab (CARL), and will be informed by the emerging work of the ongoing and developing research within this area. The BEng Hons Artificial Intelligence is a combination of exiting modules, shared with the Computer Science and Engineering courses, and new specialised AI modules.

2   DOCUMENTATION

The Panel received the following documentation:

- Agenda and programme of the meeting
- Guidelines for evaluation and revalidation panels
- QAA subject benchmark statement for Computing (February 2016)
- External examiners' reports for the last two years
- Preliminary comments from panel members
- Revalidation documentation

3   MEETING WITH SENIOR MANAGEMENT TEAM

The Panel met with Professor Liam Maguire, Executive Dean of the Faculty of Computing, Engineering and the Built Environment; Dr Michaela Keenan, Associate Dean (Education); Dr Michaela Black, Head of School of Computing, Engineering and Intelligent Systems; Dr Jim Harkin, Associate Head of School and Mrs Mairin Nicell, Revalidation Unit Coordinator.

3.1   Context of Provision

The Panel asked the senior staff to elaborate on how the provision sits within the strategic plans and priorities of the University and the Faculty. The Executive Dean described Ulster University's Strategic Plan 5&50, and how the programme aligns with its four areas of focus (civic contribution, academic excellence, global vision and operational excellence), highlighting high student retention rate and academic excellence of the staff. The senior staff referred to the BSc Hons Computer Science course as their flagship course,

describing low attrition rate, excellence of the staff and strength in recruitment due to the employability opportunities it offered on completion.

3.2 Industry-Informed Curriculum

The Panel was informed that the BEng Hons Artificial Intelligence programme had been informed by industry needs and feedback from key stakeholders in addition to the recent focus on this expanding cutting edge field by the UK government. The senior staff reassured the Panel that there are resources in place to accommodate increase in student numbers while maintaining the quality of the provision.

The senior staff advised that the BEng Hons Electronics and Embedded Systems was also informed by discussion with employers and the skill sets required have been embedded into the course curriculum.

3.3 Widening Access

The Panel queried how specific challenges such as gender imbalance, attracting low income families and widening access were addressed. The Team explained that the University's induction week would assist with the transition from secondary school to University. In addition, the provision would offer extended induction, small group tutorials with focus on math and programming, as well as a peer mentoring scheme with final year students working with small groups of first year students. The senior staff felt this would not only benefit the students but also help alert them to students who may require additional support. The Panel was assured that this system will expand as the student numbers grow.

The senior staff advised that a bridging programme for students who are accepted with 25-30 UCAS points below of the entrance criteria would be delivered. In addition, they would accommodate the great numbers of commuter students, who need to live at home, through their timetabling.

3.4 Placement

As placement is compulsory, the Panel enquired how places would be guaranteed for all students. The senior staff explained that a placement coordinator and a grade 5 support staff develop and maintain links with industry. The Panel noted that awareness of placement would be raised with the students from day one of year one. Initially, students would be asked to self-evaluate their skill sets and the team would adjust each module to develop students' skills accordingly, focusing on 'soft' skill sets, such as group work and presentations.

The senior staff explained that the provision incorporated two modules in Semester 1, Year 1, which include an employability topic. Both modules begin the employability journey for the students and by the end of the first year all students would have a CV which they would be encouraged to update over time. During the first semester, representatives from industry would be invited to present to students relevant placement opportunities. All courses include the compulsory Professional Development module in Year 2, Semester 1, designed to continue on from the foundation laid in Year 1. Colleagues from the Career Development Centre actively participate in the delivery of the module, specifically in the preparation of CVs, elevator pitches and interview techniques in preparation for placement

applications. Mock interviews would also be conducted as well as video interviews to align with changing recruiting practices.

The senior staff described Ulster University's use of the online system 'Recruit' to assist with making online placement applications, explaining that this system also enables staff to monitor progress and offer support to students when required.

3.5 BEng Hons Artificial Intelligence Provision

The senior staff responded to the Panel's query regarding the use of BEng in the name of the Artificial Intelligence provision, explaining that the BEng award was deemed to be more suitable than the BSc given the mathematics content of the programme. In addition, it was the School's view that the BEng award would be more attractive to international partners.

The Panel was advised that the facility to offer an Integrated Masters is available but this has been put on hold but for economic reasons.

3.6 Resources and Staffing

The senior staff highlighted that some new posts will be advertised in 2018-19, including one new electrical lecturer and five computing science lecturers.

The Panel queried if mentorship is offered to new staff members and PhD students. The senior staff explained that new staff would have a reduced teaching load of one module a year, and would get a mentor of a similar speciality. In addition, there would be part time teachers, some of whom left on the Voluntary Severance Scheme and are now employed as recognised teachers, which would be crucial as the school moved into a new sabbatical strategy. The senior staff added that team moderation sessions also provide new members of staff with a learning opportunity. In addition, all new members of staff are required to complete the Postgraduate Certificate in Higher Education Practice.

3.7 Student experience of part-time students

The senior staff assured the Panel that the student experience of the part-time students, although small in numbers, would be taken into consideration, and where possible, the School's timetable coordinators would plan for all teaching to be carried out in a single day. This would include lectures, tutorials, and practical sessions, although this may depend on the size of the cohort.

3.8 Tutor Re-assessment

The Panel suggested that the Team should consider embedding tutor re-assessment into the programme, feeling that providing feedback and opportunity to re-submit improves attainment and assists students in acquiring skills they can implement in the future, thus improving performance.

3.9 Classification

The panel noted that although currently the overall Honours classification of successful candidates is based on the assessment results from Level 6 modules, there is presently a consultation with students about using both level 5 and 6 in this process.

4 MEETING WITH STUDENTS

The Panel met with a group of eight students from different year groups across a range of the provision.

The Chair welcomed the students noting that they are an important part of the quality assurance process, helping in assessing the quality of their experiences and to identify areas where improvement can be made. It was noted through a show of hands that of the eight students only two had a parent who had been to university. This was evidence of the contribution the course was making to social mobility in the region.

The Panel asked the students what they most enjoyed about their programme. Some of the students expressed satisfaction in regards to placement opportunities and commented on the positive interactions they have with the lecturers. Others commented on the benefits of the peer mentoring scheme. The students commented on the helpfulness and passion of their lecturers and particularly how they enjoyed the experience of flipped learning.

4.1 Diversity of Student Body

Regarding the Panel's query about the diversity of the student body, the students replied that there are very small numbers of international students. However, they felt that this was in line with the population of Northern Ireland. The female students assured the Panel that the gender imbalance of the student cohort has not impacted them negatively. Most felt it was an advantage as it enabled them to stand out in a positive way.

4.2 Student Representation

The Panel asked if the students were given an opportunity to raise any issues they had with the programme or other related matters and if these were addressed. The Panel noted that Staff/Student Consultative Committee meetings took place at least once during the semester. The two student representatives at the meeting assured the Panel they felt heard in the Consultative Committee meetings and were treated as equals to the staff members. The students welcomed the opportunity of having student representatives they could approach and advised the Panel that any issues identified filtered through to the Course Team and have been addressed quickly.

4.3 Peer Mentoring Scheme

The students responded positively to the Panel's query regarding the peer mentoring scheme. Some had personal experience as mentors to first year students. They felt this was an enriching experience which also helped in enhancing their employability portfolio. All students in the meeting felt the scheme was helpful had benefited them greatly as first year students. The students assured the Panel that mentors were provided with support and training prior to commencing their mentoring.

4.4 Assessment

The Panel asked the students about the methods of assessment used and the assessment workload they experienced. The students explained that although the assessment load was at times high, they felt that the combination of both coursework and exams was positive and reassuring. The students confirmed that guidance provided was

clear and feedback was mostly timely and developmental, although some felt that they would benefit from feed forward feedback which is not always provided.

4.5 E-Learning

The Panel asked about students' experience using the University's Virtual Learning Environment, Blackboard. The students appreciated having access to the content online, and access to the system from home was regarded as helpful. The students expressed appreciation that some of the material, such as videos and PowerPoint presentation, was uploaded and made accessible in advance of the lectures, feeling that this was specifically important for students with special educational needs. The Flipped Classroom feature was also discussed in a positive light.

4.6 Placement

The Panel enquired about the placement process and noted that the students did not feel they were well prepared. The students felt that they would have benefited from further encouragement to get involved in such initiatives as 'GitHub' and Hackathons and stated that they would like to see such practices integrated into their learning. Students felt that they were not well prepared for interviews and found it hard to articulate their skills. The mock interviews held were viewed as not helpful by the students, as was the Professional Development module.

4.7 Final Year Project

The Panel enquired about the process involved in identifying a project in final year. The students explained that they were assigned an advisor and were encouraged to come up with their own project ideas. However, the students mentioned that a resource with topic ideas was offered in addition to being encouraged to use their placement or employment experience in the final year project. Students felt the project had advanced their skills and felt more specialised in their field. In response to a question from the Panel, the students advised that the project could be undertaken in conjunction with their placement provider.

4.8 Suggestions for Change

The Panel asked the students what they would like to change in the programme. Some of the students discussed encouragement at the University level to become involved in collaborative initiatives such as Hackathons. Most agreed that the preparation for placement year be moved from first to the second year. The students also stated that they were not aware of research staff were carrying out and would welcome a more obvious link between teaching and research

The Panel thanked the students for their engagement and wished them well in their studies and future career.

5   MEETING WITH COURSE TEAMS

The provision was discussed in detail with the Subject Team.

5.1 Curriculum Design Principles

The Panel asked the Course Team to outline how they had taken cognisance of the new curriculum design principles in reviewing the provision. The Team advised that being aware of the planned changes and taking into consideration the size of the Unit, they decided early on, in November 2016, to seek advice from both ADDL and CHERP and had attended curriculum design workshops. The Team assured the Panel that a lot of time was devoted to engaging with the new principles, considering such things as learning outcomes, assessment loads and moderation of coursework when designing the various modules. In terms of the curriculum design of this programme, members of the course team had discussed which modules would be suitable for each level of study, taking into account the skills and qualities sought by employers.

5.2 Assessment and Feedback

The Panel expressed concern that some modules have more than the recommended two items of assessments. The Team explained that although they have fully engaged with the curriculum design principles, following discussions with the support team and students it was felt that students would benefit from the 'scaffolding approach' where part of the assessment was being conducted during lab time. This would encourage both further engagement with the lab and enhance employability as it provides further lab experience and assist in building the students' portfolio. Following a long process of reflection, discussion on how to manage the assessment portfolio has been carried out and supported at Faculty level.

The Panel was advised that in order to ensure a balanced assessment distribution each module coordinator would fill in an assessment template, which would then be coordinated at a school level. If bottle necks happened as a result, then the schedule would be revised as needed. Once finalised, lecturers would need to notify of any changes made to any submission deadline. The Team also described the successful final year team moderation pilot, which would be rolled out to all year groups during the first week of the semester, to review workload requirements on the students.

Tutor re-assessment was raised again by the Panel, to which the Team responded that this was done in many cases on an informal basis, but agreed this would be beneficial and welcomed the possibility of exploring this at University level.

In response to the Panel's query regarding feedback, the Team explained that developmental and forward feedback would be problematic in classes with large numbers. The Panel noted that there are a range of useful tools on Blackboard Learn which would be used, such as audio feedback in addition to annotation and offering open sessions in which students can attend with queries and request feedback. On practical work, informative feedback would be offered. In this case, over a 7 week period, informative feedback is offered, providing guidance on the process as opposed to the solution itself. The Team confirmed, in response to the Panel query about Rubric Feedback, that they would be looking at making that available on Blackboard Learn, in addition to personalised comments.

5.3 Consistency Across Modules

More information was sought on how the Team achieve consistency between the various modules. The Team explained how learning outcomes were discussed in detail in the

planning of the provision, clarifying what students should aspire to achieve as they progress from one year to the next. The modules were then designed to ensure they would achieve the desired learning outcomes, building on the knowledge and skills year on year. The Panel enquired how an indicative level of effort translated into programming assessments and the Team advised that they had been provided with a workload equivalence table which provided guidance.

5.4 Placement

In response to the Panel's query regarding the Student Placement procedure, the Team reiterated the process the Senior Team described (refer 3.5) adding that from week three of first year students are exposed to various competitive placement options by company representatives from the surrounding area. In addition to this valuable industrial exposure, the Team explained that students' aspirations are raised by inviting various guest lectures, which in turn raises both the level of student engagement and placement application numbers.

The team discussed the benefits of the online 'Recruit' system, both in regards to promoting the various opportunities that are available and to monitoring students' activity, offering further assistance where required.

The Panel noted that for the vast majority of students the placement year is taken locally. However, a minority of 5% would go to other places in the UK or further afield (US or Japan).

5.5 Retention and Student Support

The Panel requested further information regarding the provision's retention rates. The Team informed the Panel that it has the lowest attrition in the faculty. In 2016-17 there was only 8.4% attrition in year 1, further reduced to 4.9% in 2017-18. Students who chose to move to other programmes are fully supported. The team described the various steps that are taken to ensure these high retention rates, such as peer mentoring, attendance monitoring, and offering small group tutorials throughout the first year in both mathematics and programming.

The Team described in detail the systems in place, such as GEL, for monitoring attendance explaining that attendance is noted for all lectures and tutorials to identify students who need targeted attention, adding that in the future Ulster will be moving into a more consistent system of students' self-logging.

The Team stated that modules are examined to identify ones which may have an impact on attrition, for reasons such as high failure rates, and are then addressed accordingly. This will be used in addition to the Blackboard Predict tool which is being rolled out and will assist in identifying students who are at risk of failing a module or programme.

In response to the Panel query, the Team explained that support is provided in courses in which students experience high levels of anxiety.

5.6 Workload Model

The Panel expressed concern regarding the staff's workload in light of the School's large cohort. The Team assured the Panel that cooperation and a team approach both in

assessment and teaching helps manage this large size. The workload model in place consults the staff and ensures overall balance.

5.7 Changing Pedagogy

The Team described new creative methods and techniques of support offered to students, such as the flipped classrooms feature, peer mentoring schemes, use of the University's virtual learning environment and more creative support provisions in class. One specific example included the use of the coloured cup approach in class – red, amber and green, so student can indicate when they require further support. Another method used was interactive quizzes with rewards, which received positive feedback from students. Collation of email queries and discussion in class to benefit everyone were mentioned, as well as raffle tickets offered to particularly engaged students, to further encourage engagement. Also mentioned was the use of various tools in Blackboard Lean to encourage group learning and support, such as the Wiki tool, which is a collaborative tool that allows students to create and contribute to one or more pages of course related materials.

5.8 Admission

The Panel expressed concern regarding the initial mathematics level of some of the students allowed on the programme, as A level in Mathematics or Computer Science is not a prerequisite. The team explained that they cannot require an A level in these subjects as a prerequisite as this would dramatically reduce the number of applications for the provision. To bridge the possible gaps in these subjects, during induction week all students undergo an assessment using a questionnaire which in turn informs the team on where specific focus and support needs to be provided. Students holding A level in Mathematics or Computer Science are encouraged to peer support. The Panel expressed further concern regarding the Artificial Intelligence students, noting that the syllabus may not support the learning outcomes required for the Artificial Intelligence programme. The Team assured the Panel that the mathematics taught in Mathematics for Engineering modules is sufficient for the Artificial Intelligence requirements – and that specific Artificial Intelligence modules will further focus on the skills required.

5.9. Marketing

The Team advised that consideration was being given as to how recruitment of students from Donegal, who were strong in maths and science, could be increased. The team added that currently they conduct most of the recruitment themselves, and suggested that it would be beneficial if recruitment was conducted not by staff but centrally within the University.

5.10 Industry-Informed Curriculum

The Panel commended the Team for developing an Artificial Intelligence undergraduate Course. The Team reiterated the creation of the provision in light of national and local industry demands (refer 3.2), specifically highlighting that the content of the modules was also tailored around industry needs, providing the example of the introduction of NLP (Natural Language Processing). The Team explained that this demand is also a reassurance regarding placement opportunities for the AI students.

The Team advised that the BEng Hons Electronics and Embedded Systems was also informed by discussion with employers and the skill sets required have been embedded into the course curriculum.

5.11 Teaching / Research Link

The Panel was of the view that, particularly in the case of an Artificial Intelligence degree, it was important to link research and teaching. The Team stated that consideration was being given to organising a programme of industry and lecture talks, alternating between the two.

The Panel reported that the students with whom they had met had stated that they would welcome more information about staff's research and opportunities to visit the research facilities.

5.12 Supervision of Projects

The Panel reported that the students did not appear to understand how their project supervisors were allocated. The Team explained that the Electronics and Embedded Systems and the Artificial Intelligence students would be allocated supervisors who were subject experts but that Computer Science students would not necessarily be allocated a supervisor with expertise in their project topic, in which case they would be linked with PhD students with expertise in the area.

The Team acknowledged that students who were not allocated a supervisor with expertise in their project topic might be less inclined to pursue PhD study. In order to mitigate this, a session for those considering PhD study would be held each year.

In response to the Panel's query regarding the undertaking of an industrial-based project, the Team stated that students were encouraged to think about their projects during their placement as in the past projects linked to placements had proved very beneficial. Approximately 20% of students completed this type of project each year and those who did generally performed well. The Team advised that students were also encouraged to undertake projects in connection with the Science Shop or a charity.

6   CONCLUSIONS

The Panel commended the team on the following aspects evident from the validation:

- The resources and learning environments available to students, such as the on-site research facilities, the new estate, the virtual and physical learning spaces, and the investment in specialist academic staff;

- The consultation process used to inform the revision of the course, including excellent employer engagement and partnership with students;

- The team ethos, organisation and management in the development of new provision, including: team teaching, curriculum redesign, and workload models;

- Outstanding widening access and outreach activities;

- The excellent outcomes and student perception of the peer-mentoring scheme for students (PASS).

The Panel agreed to recommend to the Academic Standards and Quality Enhancement Committee that the programme be approved for a period of five years (intakes 2018/19 to 2022/23 inclusive) subject to the conditions and recommendations of the Panel being addressed and a satisfactory response and a revised submission being forwarded to the Academic Office **by 21 June 2018** for approval by the Chair of the Panel.

Conditions

i) That the most recent version of the programme specification and an updated set of module specifications be issued for final Panel verification; that the revised version addresses module content and consistency (extent of reading lists and description of content) and compliance with the Curriculum Design Principles; and that the revised sections of the document are clearly marked for the attention of the Panel.

ii) That a rationale is provided in response to the Curriculum Design Principles for those modules which deviate from the 20-credit norm.

iii) That a rationale is provided for ASQEC approval on the expected maximum and minimum cohort sizes for each programme to be viable for the Magee context and resources.

iv) That matters of detail and clarification as identified in the notes by Academic Office to the Panel are addressed.

Recommendations

i) That both Artificial Intelligence modules be reviewed with regard to sufficiency and internal coherence of content, and with a view to designing in adaptability to this rapidly changing field;

ii) That both Mathematics for Engineering modules are reviewed to ensure the syllabus supports the learning outcomes required for the Artificial Intelligence programme;

iii) That the Associate Dean for Education consider exploring at University level the potential for tutor re-assessment of coursework across the provision;

iv) That the School consult with students on their perceptions of preparedness for placement, with a view to improving the reliability of the system and assurance on student engagement.

7   APPRECIATION

The Chair thanked the Panel members and, in particular, the external members, for their valuable contribution to the revalidation process.

Ref: AGu/panelreport/21/5/18