New Major Award External Validation Report

Section A

Report of the External Review Panel

Programme Reference Number:	26
Faculty/School(s):	Faculty of Science and Health, ATU Donegal
Department(s):	Department of Life and Physical Sciences, ATU Donegal Department of Computing, ATU Donegal

Details of Programme(s) Reviewed

Title:	Master of Science in BioInformatics
Type of Award:	Master of Science
NFQ (National Framework of Qualifications) Level:	Level 9
ECTS:	90 ECTS Credits
ISCED:	0511 Biology
Duration:	1 year Full time, 2 year part time
Proposed Student Intake:	25 per year
Proposed Start Date:	01 September 2024
Delivery Mode(s):	Full-time, Part-time, Online, Blended

Title:	Postgraduate Diploma in Science in Bioinformatics
Type of Award:	Postgraduate Diploma
NFQ Level:	Level 9
ECTS:	60 ECTS
ISCED:	0511 Biology
Duration:	1 year Full time, 2 year part time
Proposed Student Intake:	25 per year
Proposed Start Date:	01 September 2024
Delivery Mode(s):	Full-time, Part-time, Online, Blended

Title:	Postgraduate Certificate in Bioinformatics
Type of Award:	Postgraduate Certificate
NFQ Level:	Level 9
ECTS:	30 ECTS
ISCED:	0511 Biology
Duration:	1 year Full time, 2 year part time

Proposed Student Intake:	25 per year
Proposed Start Date:	01 September 2024
Delivery Mode(s):	Full-time, Part-time, Online, Blended

Date of Review:	20th December 2023

Review Panel

Role	**Name**	**Title**
Chair	Dr Colette Moloney	Assistant Registrar, South East Technological University (SETU), Ireland.
External Academic Discipline Expert	Dr Vincent Diego	Associate Professor, Human Genetics, School of Medicine Office: Brownsville Campus, BBRHB. UTRGV, Texas, US.
External Academic Discipline Expert	Dr Guillermo Lopez Campos	Senior Lecturer, Queen's University, Belfast, UK
Industry Representative	James Bradford	Head of Bioinformatics, Almac Diagnostic Services, Craigavon, UK
Student Representative	Agni Paul	ATU Galway- Mayo
Recording Secretary	Aodhmar Cadogan	Assistant Registrar, ATU

All external members of the panel have declared that they are independent of ATU (Atlantic Technological University), and all have declared that they have no conflict of interest.

Programme Design Team

The panel met the staff listed below during the review process.

Dr Joanne Gallagher	Head of Faculty of Science and Health, ATU Donegal
Dr Kim McFadden	Head of Department of Life and Physical Sciences, ATU Donegal
Dr Paul Higgins	Programme Development Team, Lecturer, ATU Donegal
Dr Andrew McCloskey	Programme Development team, Lecturer ATU Donegal
Ms Karen Bailey	Lecturer, ATU Donegal
Dr James Connolly	Lecturer, ATU Donegal

Introduction

The proposed MSc in Bioinformatics will meet the current and future demand for professionals in the broad and expanding field of bioinformatics. Upon completion of the programme, graduates will have gained knowledge and training in both bioinformatics, applied bioinformatics and big data analytics skills. They will graduate with in-depth training and skills in data analytics including storage, analysis and interpretation, and the application of computational techniques for data-driven decision-making. Given the programme's focus on core programming competencies enriched with training, graduating students will be work-ready and able to make immediate contributions in their place of employment. Graduates of this programme will be able to apply for highly sought after positions within Ireland's life science sector.

See Appendix for Entry Requirements, Programme Learning Outcomes and Approved Programme Schedule.

Rationale for Programme(s)

Bioinformatics is now a core methodology in several biological industry domains including, but not limited to, the biopharmaceutical, pharmaceutical services, agriculture, and food sectors. Bioinformatics tools and techniques are not only crucial for leading edge research, development, and innovation within these sectors but are also frequently used for technical problem solving, laboratory data management, and laboratory data interpretation. In addition, public healthcare services in the United Kingdom are already conducting whole genome sequencing and are incorporating these data into patient medical records to enhance prevention, diagnosis, and treatment. The Irish Health Services Executive announced a similar initiative at the end of 2022. Predictions indicate that the global bioinformatics market will increase significantly in the coming years. This projected growth will be constrained by shortages in the computational and analytical skills required to use these data. Big data and analytics skills are already established skills shortages in Ireland and Europe. Although bioinformatics skills are closely aligned with those of the big data domains, they require unique competencies not typically included in computer science, informatics, and data analytics training. The extent of biological knowledge required, the use of domain-centric databases, and the atypical format of biological data itself requires domain-specific training in bioinformatics. There is clear space for additional training offerings in bioinformatics on the island of Ireland, particularly those offering flexible and online learning options, this programme seeks to fill that gap.

Validation Criteria

ATU's Developing and Validating New Taught Programmes Policy specifies that new programmes must comply with the following criteria for validation:

1. The programme aims and learning outcomes are clear and aligned with the proposed award title.
   The course proposal meets this criteria.

2. The rationale for the programme is well informed and justified.

The aim of the programme indicates that students are work ready for this rapidly changing and evolving area. The programme is supported by sufficient expertise and links to the industrial and public sector organisations currently engaged in this area.
The course proposal meets this criterion.

3. The design of the programme is suitably structured and fit for purpose.
The panel discussed with the programmes team the opportunities for full time students to complete the programmes over two years or the opportunity to take the programmes on a part time basis over two years. They also discussed how students entering the programme from the alternate discipline area of Science or Computing will be scaffolded through their learning. The structure of the programme is designed to bring a student from a low baseline of knowledge in the alternative discipline to a high level of knowledge over the course of the programme.
The course proposal meets this criterion.

4. The design of the programme ensures that students can successfully achieve the Programme Learning Outcomes.
The structure and content of the modules was discussed in detail. In general, the content was found to be very appropriate to an award at Master level in the area of bioinformatics, some minor suggestions to syllabi are made in the recommendations 1-4 below. The delivery will be a mixture of synchronous and asynchronous activities. There will be some workshop activities that students will be encouraged to attend in person, however these will be available online and recorded for those not able to travel.
See Recommendations 1,2,3 and 4.
The course proposal meets this criterion.

5. The teaching, learning and assessment strategy is well planned and appropriate for the discipline area and type of award.
Examples of assessment methods to deter the use of artificial intelligence generative tools were discussed, such as the use of unique and individual data sets for each student in the design of an assessment and engagement of the student in a critique of the output from artificial intelligence generative tools. The use of Python and R programming languages were discussed. While they may not be explicitly named in the modules, this is to provide for future developments and innovations in this area, they will be used in the immediate roll out of the programme.
The course proposal meets this criterion.

6. Assessment techniques are fair, valid, reliable, consistent and a credible measure of the academic standard attained by students.
In the DATASC901 Data Analysis with R module, the repeat assessment strategy currently does not take cognisance of the case where one person within the group has failed and may require an alternative tailored repeat assessment to cover all the learning outcomes. The articulation and management of the group assessment is not defined clearly enough.

The Dissertation module was discussed at length including the staff resourcing of the project academic supervisor, the engagement and links into industry and public medical institutions for project proposals and mentoring. The dissertation is very valuable to potential employers to show the depth and competence of the graduate and is a demonstration of a graduate's technical abilities.
See recommendation 5, 6 and 7 below.
The course proposal meets this criterion.

7. The planned resources, including staff, physical, online, library and student supports, sufficiently support the teaching, learning and assessment strategy for the programme.
See recommendation 8 below.
The course proposal meets this criterion.

8. The programme facilitates lifelong learning for a diverse student population by setting out appropriate entry requirements and opportunities for access, transfer, and progression.
As the programmes will be delivered online in the first instance, this programme clearly supports potential for lifelong learning. It is expected that the student contact hours for a full time programme would be greater than for an online programme, however the same hours were used for all modules of delivery. If all activities can be carried out online, then the programme could be considered as fully online rather than blended. The requirement of the student to attend a campus should be explicit in advance of entry to the programme.
See condition 1.
The course proposal meets this criterion.

9. There is demand for potential graduates from the programme.
The panel agreed there is a clearly identified need for graduates in this area.
The course proposal meets this criterion.

10. The learning environment and mode of delivery are consistent with the needs of the intended students of the programme and accessible and appropriate support services for students have been provided for.
The course proposal meets this criterion.

Findings

Overall Finding

Validated without changes	
Validated subject to condition(s) and/or recommendation(s)	**X**
Rejected	

Reason for Overall Finding

Overall, the Panel is supportive of what they consider to be a very strong programme proposal. The Panel consider: that the programme concept is valid; that the rationale for the programme is solidly grounded and well-researched; that there will be a demand for the programme and for its graduates; that the programme will meet genuine education and training needs; that the programme is highly relevant in the contemporary environment and it will be a valuable contribution to the enhancement of the capacity and skills shortages in the area of bioinformatics
The Panel recommend approval of the proposed programme subject to the condition and recommendations outlined below.

Commendations

The Validation Panel advises Academic Council of the following commendations.

1. The high quality, detail and thoroughness of the submission documentation

2. The Panel commend the programme team for their initiative in collaborating with the medical and biotechnology industry to develop and bring forward the proposal.
3. The open and constructive nature of their engagement with the panel

Conditions

The Validation Panel advises Academic Council that subject to satisfying the condition detailed below, the panel is satisfied that the proposed programme(s) meets the validation criteria as set out in Atlantic Technological University's Developing and Validating New Programmes Policy.

1. Review the FT/PT hourly student contact for the online modes of delivery and ensure they align with the ATU norms and intended delivery for all proposed modes of delivery. Ensure the hours set out in the approved programme schedules align with the description of the delivery and quantum of hours in the individual modules.

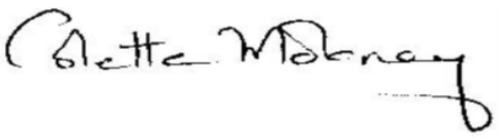
Recommendations

The panel advises Academic Council that the Programme Development Team and/or the Department should take cognisance of the recommendation(s) outlined below.

1. Consider including the topic of Proteomics, in the Genome Biology module or other module.
2. Consider merging the delivery of all the topic Phylogenetics together into one module, rather than being spread across a number of modules as currently proposed.
3. Consider the inclusion of the topic of ROC Curve analysis in the Data Analysis with R module or other module.
4. Consider the inclusion of the topic Network Biology in a module.
5. DATASC901 Data Analysis with R module: In regard to the Group project in this module, the panel recommend there is some individual contribution clearly identified and quantified within the final submission. Provide more information on the articulation and management of the group assessment.
6. DISSSC902 Research Dissertation Module, the selection of projects offered to the class should include projects identified by industrial partners and assessed in conjunction with academic supervisors. Clarify the nature of the 2 hour contact indicated in the teaching and learning strategy and whether this is direct student contact or group supported learning.
7. Specify more clearly in DISSSC902 Research Dissertation Module any other support that is available to students in research methods in addition to the 2 day workshop already proposed. The team are advised to keep this under review to ensure the current workshop is sufficient to meet the needs of students to prepare for the research dissertation.
8. The documentation would include a concrete commitment to the staffing requirement for project supervision in terms of the number of Full time and Part time staff who are committed.

Report Approval

This report has been agreed by the review panel and is signed on their behalf by the chairperson.

Signed:  Name: Dr Colette Moloney Validation Panel Chair	Date: 12 January 2024