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	For completion by External Examiner:		
Name of External Examiner:	Professor Mark Paul Stevens		
Home Institution / Employer of External Examiner:	The Roslin Institute & Royal (Dick) School of Veterinary Studies, University of Edinburgh		
Programme and / or Modules Covered by this Report	MRes in Biosciences Stages I and II		
Academic Year / Period Covered by this Report:	2017/18	Date of Report:	21.9.2018

Please complete all information in the spaces provided and submit within **six weeks** of the Examining Board.

Please note this form will be published online and should not make any reference to any individual students or members of staff in accordance with the General Data Protection Regulation (2018).

Please note that I submitted an interim report on Stage I of the MRes in Biosciences 2017/18 session on 25 January 2018. Text relating to Stage I from that report is copied below. Text relating to Stage II follows my attendance at the Examination Board meeting on 19.9.2018.

1. Programme Structure (curriculum design, programme structure and level, methods of teaching and learning)

Stage I

Stage I of the MRes in Biosciences instils valuable knowledge and skills that prepare the candidates well for Stage II of the course and future careers in research. Stage I comprises three modules: BIT002 Research Techniques in Biosciences, BIT010 Data Handling in Statistics & Bioinformatics, and BIT011 Key Skills in Research Practice. Within these, diverse teaching and assessment methods are used and learning objectives are clear and logical. The balance of lectures and self-directed learning is appropriate for Masters level study. A practical class in DNA extraction and gene cloning is provided within BIT002 and other opportunities to gain hands-on experience of common research techniques would be welcome. In sessions with the students (an open session of 45 minutes and seven 30 minute interviews), the view was expressed by some that BIT002 was not 'as sold' in terms of the balance of direct exposure to research techniques relative to essays. It is accepted that the number of practical elements will be limited by the time, space and resources available.

Portfolios for BIT002 included a write-up of gene cloning experiments, a News & Views article on CRISPR/Cas9 editing and essays spanning analysis of protein function, ecology stem cells and neuroscience. In my view, the essay questions worked best when candidates were asked

to devise a strategy to apply taught techniques to a problem, rather than simply review an area of science. As noted in my report at this stage last year, the essay to describe the impact of climate change on a biological system may be stronger if focused on how such impact could be studied and quantified. The diversity of topics covered by BIT002 is challenging for candidates that specialised in a narrow discipline at undergraduate level, but also gives a wider perspective of bioscience research. Some students considered essays beyond their area of interest to be a distraction, while others cited the diversity as one of the factors that attracted them to the degree. As an exercise in scientific writing, there is merit in asking candidates to review literature, synthesise ideas and distil key messages in unfamiliar areas. Guidance on further reading and revision sessions are a welcome initiative to support students that may lack background knowledge from their first degree. Concern was expressed by some students regarding the intensity of assessment, with some struggling to meet the deadline for submission of all elements as a portfolio (see section 2). While effective time management is a reasonable expectation at Masters level, consideration could be given to a series of sequential deadlines to ease the pressure on students, assuming that this is compatible with the demands on the course secretary and markers. This may also afford more opportunity for candidates to receive feedback at an earlier stage to allow for iterative improvement, though it is accepted that feedback on early assignments is already provided. With the appointment of a new organiser for BIT002, it would be timely to revisit the key learning outcomes for the module and whether the current lectures and assignments deliver these, including whether any omissions exist or updates are required. Some students indicated that they would prefer to have fewer assessments during BIT002, perhaps selecting from a range of possible essays (e.g. answering 4 of 6). However this risks disengagement from the modules that the candidates find less interesting and runs counter to the aspiration of the course organisers to provide training in a broad range of bioscience, rather than a specific discipline as other MRes options provide. The phasing of some taught components relative to assignments in other modules could be optimised (e.g. candidates were handling sequence data in a bioinformatics assignment before next-generation sequencing methods were taught).

BIT010 embeds key skills in statistical analysis and bioinformatics that will be of lasting benefit to those pursuing research careers. It is welcome that candidates must pass both the module and mini-projects in statistics and bioinformatics in order to progress to Stage II. The students were complimentary about how the statistics module was taught, and in particular the additional materials provided in advance for those less familiar with R and statistics. Support available from demonstrators was indicated to be good and performance overall in the statistics component was stronger than last year. Less enthusiasm was expressed regarding the teaching of bioinformatics, with those from first degrees in which little (if any) bioinformatics was taught feeling dropped at the deep-end with little preparatory resources via Learning Central. This view was not expressed by all, but greater provision of online material, revision sessions &/or more demonstrators may be helpful. Some students did not receive replies to E-mail and did not find the data clinics useful. It was of some concern that some students claimed to have been advised that they would need to research and apply tools that had not been taught in order to access higher marks beyond a minimal pass. This is balanced against the need for students at Masters level to show greater independence and initiative. The timetable was indicated to be intense, with some finding it hard to retain focus on long days on unfamiliar topics. They may not have appreciated that a gap was inserted relative to the last academic year, where statistics and bioinformatics were taught in a continuous two-week block of intensive teaching. A desire was also expressed for the statistics assignments to provide more diverse examples of real-world datasets. It was agreed that submission of electronic scripts related to the statistics mini-projects should be considered a formal requirement of the assessment.

BIT011 involves preparation of a grant proposal related to the project to be undertaken in Stage II (60% of marks), as well as preparation of abstracts, a lay article for public engagement, an ethics assignment, poster and oral presentation. A new assessed component involving critical evaluation of a manuscript has been included. This is welcome, and demonstrates that the course organisers respond to external input and seek to continually improve their modules. The grant proposal is an excellent initiative as it requires review of pertinent literature, formulation of ideas, hypotheses and objectives, selection of experimental

approaches, and planning (including time management, contingency plans, and where appropriate risk assessments and ethical review). The exercise will be valuable to those pursuing research careers and marshals useful information for the Stage II dissertation. As in previous years, the level of input from supervisors was inconsistent at this stage. Some were attracted to the degree with a specific supervisor and project in mind, while others would have valued more time to explore the interests of academics and potential projects. However, in general the students indicated that they felt well-supported in project selection and writing of the grant proposal. The provision of guidance to supervisors on expectations for meetings and review of drafts (as previously recommended) was helpful. I was unsure if independent assessment of the feasibility of proposed projects was performed again this year, but I continue to feel this will help to ensure that projects pose intellectual and technical challenges at a level consistent with expectations of MRes study. Where variance of 10% or greater in marks for the grant proposal occurred, evidence of moderation now exists and third markers were assigned if agreement could not be reached, with the mean of the closest two marks being taken (as previously recommended). In rare instances, moderation reports were inadequate with a single line of justification. To the credit of the course organisers and Secretary, they were aware of these deficiencies and had chased those involved for improved reports. While a clearer rubric is now available to support markers of the grant proposals, in some cases it could have been clearer how marks were allocated against sections of the proposal, with some only receiving a single overall mark. For candidates planning to undertake Stage II overseas, it will be important to assign a University second supervisor to scrutinise plans and agree a schedule for regular updates.

The candidates evidently find Stage I intense and challenging, but overall their experience was very positive and the workload, for most, was manageable. In most cases, induction was agreed to have gone well and the candidates spoke positively about the support they receive from the course organisers. Without exception, all were enthusiastic about entering the research phase.

Stage II

Stage II offers the candidates the opportunity to undertake original postgraduate research, typically comprising a laboratory-based project of approximately 6 months duration (module BIT014). It is expected that candidates produce a comprehensive dissertation and the module handbook provides clear instructions. Candidates are given a lecture and written guidance to explain Unfair Practice and its consequences. Progress against stated objectives is evaluated at a mid-term review (typically in June) to identify any barriers to progress and changes to objectives. Candidates are required to produce a poster on their research and give an oral presentation (c. 10 minutes and 5 minutes for questions), attended by all other candidates, selected academic staff and the external examiners. Marks for the poster and oral presentation form part of the Stage II assessment (BIT013) and the module instils valuable presentation skills.

- 2. Academic Standards** (comparability with other UK HEIs, achievement of students, any PSRB requirements)

Stage I

I reviewed the research portfolios for the three Stage I modules and was provided with all materials required to assess standards. Overall standards for Stage I appear to be comparable to the previous years I have examined. It is noteworthy that four candidates failed BIT002 and there were many more instances of assignments not being submitted than in previous years. It is unclear if this is a consequence of the pressure this cohort experienced in completing the portfolio, though I am reassured that the organisers gave adequate warning of the workload and an extension to the deadline for portfolio submission was provided. The pass rate for BIT010 and its mini-projects was improved relative to last year. Performance of BIT011 was strong, with all but one candidate meeting the requirements. As in BIT002, it was surprising to find that some assignments had not been completed, albeit with limited impact on overall marks. Some students failed to adhere to stated instructions (both in the handbook and

verbally) to submit both electronic and hard copies of assignments for the BIT011 portfolio. It was agreed that adequate instruction had been provided and that those assignments not received in the required format(s) will receive a zero mark. For most, the impact on module marks will be negligible and a substantial portion of the cohort can still access Merit and Distinction grades following the dissertation, having achieved >55% or >65% for Stage I respectively. Overall, academic standards are comparable with another Masters degree course I have examined, and at my own institution. The difference in quality of work in Pass, Merit and Distinction categories was clear, and almost always supported by detailed annotation on the paper portfolio or electronic assignments in TurnItIn. No instances of Unfair Practice were found in the sample examined and it was welcome to learn that candidates had taken an additional module on research integrity.

Stage II

Academic standards for the MRes dissertation (BIT014) and associated poster and oral presentations (BIT013) were appropriate relative to expectations at Master's level and academic standards in my organisation, and others for which I have examined. In order to achieve a Merit grade, candidates are required to have obtained at least 55% in Stage I, 60% for the dissertation and 60% overall. To achieve a Distinction grade, candidates are required to have obtained at least 65% in Stage I, 70% for the dissertation and 70% overall. This rewards consistent strong performance and is appropriate to ensure that students apply themselves fully to the taught components. The number of candidates obtaining Pass, Merit and Distinction grades this academic year is similar to previous years and assessment procedures, grade descriptors and marking have been generally consistent during this time (see section 3).

3. The Assessment Process (enabling achievement of aims and learning outcomes; stretch of assessment; comparability of standards between modules of the same level)

Stage I

Clear criteria for allocation of marks were provided, with a detailed rubric in most cases, and there was welcome evidence of moderation (and third marking where required) for key exercises such as the mini-projects and grant proposal. The course is administered very professionally and mitigating circumstances and extensions were given full consideration at the Examination Board before marks were agreed. The Secretary for the programme is to be commended for her hard work in managing administration of the programme and the demands of students. Marks were transcribed accurately from assignments into spreadsheets in all instances I examined. Robust procedures are in place for identifying Unfair Practice, in particular by analysis of similarity in assignments submitted via TurnItIn. The Stage I Examination Board meeting was conducted professionally and in accordance with established procedures.

Stage II

A clear rubric is provided to supervisors and additional markers to evaluate dissertations for evidence of knowledge & understanding; analysis & evaluation of data; synthesis & critical analysis; presentation (including figures, tables, referencing); and the level of achievement. Additionally, supervisors are able to provide a mark (which contributes 25% of the total mark for the module) reflecting on personal management & diligence; initiative, independence & originality; and technical ability (both practical & analytical). In my view, the contribution of the supervisors mark for effort in the laboratory to the overall module mark (and thus Stage II and the MRes overall) is excessive. It is important for supervisors to provide a commentary on the performance of candidates during the laboratory phase, but the course organisers and Registry should reflect on whether the magnitude of the contribution is appropriate, recognising that in other organisations it is closer to 10-15% and that for MRes dissertations at some organisations review is fully independent of the supervisor and is conducted by internal and external examiners. A significant issue was identified with one marker that acted

as supervisor to two students and co-supervisor to a further two students, where the reports on the dissertation and laboratory performance were near identical. These reports provided insufficient student-specific critique to justify the marks allocated and should, in my view, either be revised or disregarded. Guidance on expectations of markers should be re-issued at the time material is sent for assessment, if this is not already routine.

4. Examination of Master's Dissertations (sample of dissertations received, appropriateness of marking schemes, standard of internal marking, classification of awards)

I was sent all dissertations and agreed with the other external examiner to assess ten of these. The dissertations were selected partly as they aligned with my research expertise, but I also took a sample of diverse topics outside my field. I was provided with all the information required to evaluate the dissertations, the assessment process, and academic standards. I drafted marks relative to the rubric and blind to the assessments of the supervisor and additional markers. My marks were generally within 10% of others. The use of third markers where variance between the supervisor and second marker exceeded 10% (with selection of the two lower marks), is welcome.

During review, I identified a significant issue involving dissertations from four candidates and alerted the course organisers by E-mail on 7 September. The dissertations displayed a high degree of sharing of data and images. In each of the theses, these shared findings were presented in two separate results chapters. Different presentation formats were used for the shared data in some cases. Text describing findings, discussion and avenues for future work appeared distinct, as subsequently confirmed by the Unfair Practice Coordinator. Despite evident data sharing, some candidates had signed the declaration that the work presented was their own, unless explicitly indicated otherwise. The text and figure legends for shared data did not attribute credit to others. A robust process was followed to interview each student individually with an agreed set of questions, and to obtain input from a supervisor/co-supervisor involved. A written report was produced, shared with myself and escalated to the relevant individuals overseeing postgraduate research and Unfair Practice. I am fully satisfied with the conduct of this investigation, and the issues were discussed by the internal Examination Board on 17.9.18 (the minutes of which I have viewed). The other external examiner and I met with the four students concerned as a group on 18.9.18.

The mark sheets for the four dissertations completed by the supervisor, second marker (and third marker of 2 of the 4 theses in question) did not indicate that data sharing had occurred, despite the obvious similarity of the results chapters. This, taken together with near identical reports from one marker, made it impossible for me to discern how credit for the research reported had been attributed to the individual students in question. This is unacceptable practice and could be profoundly disadvantageous or advantageous to the students, depending on the extent to which individuals contributed to the shared datasets. The issues received substantial discussion at the Examination Board meeting on 19.9.2018. The potential for plagiarism &/or collusion were carefully considered and weighed against the advice apparently issued to the students by the supervisor, and thus the extent to which the candidates could be considered responsible for infringement of regulations and subject to penalty.

It was agreed at the Examination Board meeting that marks for the dissertations could not be allowed to stand, as the specific contributions of each candidate were opaque from the dissertations and inadequate student-specific critique had been provided to justify mark allocation by the supervisor/co-supervisor linking all four candidates. The Examination Board took advice from the Unfair Practice Coordinator, who indicated that the likely outcomes of investigating Unfair Practice were binary (formal warning but no further action, or reduce the marks to zero with potential for reassessment but with a cap of 50% marks). Inaction would be unacceptable given the issues raised, and capping risked being unfair to candidates who may have been directed to act in a specific way. It was therefore agreed that the Exam Board Chair would explore whether the theses could be revised and revaluated as if a first submission owing to potential failings on the part of the School, with the marks to be decided

by entirely independent markers. An alternative route for reassessment using senate regulation 10.13 was identified as a viable option. Plans to de-brief the students were discussed and agreed. I am content that all relevant issues and regulations were given full consideration, and that the guiding principles of adhering to University regulations and fairness to candidates were applied. I wish to be kept informed of the options available, actions taken and final outcome, and am willing to review dissertations and mark sheets again if required.

I consider it important that lessons are learned and processes are applied to prevent any future occurrence of data sharing. Candidates and their supervisors must be reminded of the expectation that Master's level research reflects independent and original research, and that where findings involve input from others this is fully and transparently acknowledged to allow the specific contributions of the candidate to be evaluated. I advise that in future no projects involving significant joint working are allowed. The processes for reviewing project proposals and progress should be reviewed and reinforced accordingly. Indeed, it may be appropriate to review objectives and outputs at 6-8 weeks into projects rather than (or in addition to) the mid-term review to identify concerns early and enable remedial action. I am fully content that my concerns were taken seriously, investigated appropriately and that satisfactory actions have been taken at all stages since.

I am also content that robust processes are in place to record and consider extenuating circumstances. Extensions were agreed where appropriate, and where candidates requested that the Examination Board consider extenuating circumstances, these were discussed confidentially and fairly. The other external examiner and I were asked by two candidates to ensure that their work was not unfairly marked as a consequence of providing material to their supervisor to review late, and for receiving feedback at the deadline with limited time to act. Had they requested an extension I am confident that one would have been granted, and I am content that the students were treated fairly relative to the requests for consideration of extenuating circumstances received.

5. Year-on-Year Comments

[Previous External Examiner Reports are available from the Cardiff University Website [here](#).]

Stage I

Performance in this academic year is broadly comparable to that in the 2016/17 session at this Stage, with the exception of the higher number failing BIT002 and lack of compliance in submission of all portfolio components in BIT002 and BIT011. Compared to last year, fewer candidates will be required to re-submit the BIT010 statistics mini-project in order to progress. In two instances, candidates did not achieve marks required to progress to Stage II, however I was reassured that extensions were provided where appropriate, mitigating circumstances were considered and that procedures for consideration of appeals are in place. I am grateful to the course organisers for addressing remarks I made in the 2016/17 session and am fully satisfied with the institutional response to my last Annual Report.

Stage II

The proportions of dissertations awarded Pass, Merit or Distinction grades was comparable to previous years, and the marks were generally well supported by specific feedback. The conduct of the Examination Board, and of course organisers in resolving issues raised, was professional and responsive. It is pleasing to see that actions suggested in previous years have been implemented and the course continues to be a beacon of good practice in many areas. The course secretary produces minutes to a very high standard and does an exemplary job of collating course materials, marks and spreadsheets. She often works under time pressure and is to be commended for enabling the smooth running of the programme.

6. Preparation for the role of External Examiner (for new External Examiners only) (appropriateness of briefing provided by the programme team and supporting information, visits to School, ability to meet with students, arrangements for accessing work to review)

Not applicable.

7. Noteworthy Practice and Enhancement (good and innovative practice in learning, teaching and assessment; opportunities for enhancement of learning opportunities)

Stage I

Many examples of good practice exist and I applaud the course and module organisers for the significant effort expended in Stage I. On sampling a subset of the BIT011 portfolios it was obvious that coursework was richly annotated by ██████████, with clear allocation and justification of marks and constructive feedback. While I was not able to review all marked assignments on Learning Central in the time available, there was welcome use of comment boxes on electronic assignments to provide feedback. It was evident that the students greatly value this engagement, and they spoke positively about the effort expended by the module organisers and their ability to resolve problems. It was helpful to receive minutes of the Internal Exam Board meeting that preceded my visit, which noted issues raised by module coordinators and suggested appropriate actions. It was evident from this and the conduct of module organisers throughout that they care about the quality of teaching, standards and student experience.

Stage II

The other external examiner and I met with all students following their oral presentations. Generally their experience of Stage II, and of the programme as a whole, had been positive. Suggestions for enhancement have been made above.

8. Appointment Overview (for retiring External Examiners only) (significant changes in standards, programme/discipline developments, implementation of recommendations, further areas of work)

Not applicable.

9. Annual Report Checklist

Please include appropriate comments within Sections 1-7 above for any answer of 'No'.

		Yes (Y)	No (N)	N/A (N/A)
Programme/Course information				
9.1	Did you receive sufficient information about the Programme and its contents, learning outcomes and assessments?	Y		
9.2	Were you asked to comment on any changes to the assessment of the Programme?		N	
Commenting on draft examination question papers				
9.3	Were you asked to approve all examination papers contributing to the final award?		N	
9.4	Were the nature, spread and level of the questions appropriate?			N/A
9.5	Were suitable arrangements made to consider your comments?			N/A
Examination scripts				
9.6	Did you receive a sufficient number of scripts to be able to assess whether the internal marking and classifications were appropriate and consistent?			N/A
9.7	Was the general standard and consistency of marking appropriate?			N/A
9.8	Were the scripts marked in such a way as to enable you to see the reasons for the award of given marks?			N/A
9.9	Were you satisfied with the standard and consistency of marking applied by the internal examiners?			N/A
9.10	In your judgement, did you have the opportunity to examine a sufficient cross-section of candidates' work contributing to the final assessment?			N/A
Coursework and practical assessments				
9.11	Was the choice of subjects for coursework and / or practical assessments appropriate?	Y		
9.12	Were you afforded access to an appropriate sample of coursework and / or practical assessments?	Y		
9.13	Was the method and general standard of assessment appropriate?	Y		
9.14	Is sufficient feedback provided to students on their assessed work?	Y		
Clinical examinations (if applicable)				
9.15	Were satisfactory arrangements made for the conduct of clinical assessments?			N/A
Sampling of work				
9.16	Were you afforded sufficient time to consider samples of assessed work?	Y		
Examining board meeting				
9.17	Were you able to attend the Examining Board meeting?	Y		

9.18	Was the Examining Board conducted properly, in accordance with established procedures and to your satisfaction?	Y		
9.19	Cardiff University recognises the productive contribution of External Examiners to the assessment process and, in particular, to the work of the Examining Board. Have you had adequate opportunities to discuss the Programme and any outstanding concerns with the Examining Board or its officers?	Y		
Joint examining board meeting (if applicable)				
9.20	Did you attend a Composite Examining Board, i.e. one convened to consider the award of Joint Honours degrees?			N/A
9.21	If so, were you made aware of the procedures and conventions for the award of Joint Honours degrees?			N/A
9.22	Was the Composite Examining Board conducted according to its rules?			N/A

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externalexaminers@cardiff.ac.uk

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