

External Examiner Report (2018-19 Academic Year)

Name of External Examiner	Gareth Alexander
Name of Programme	BSc Mathematics; MSci Mathematics; MSc in Applied Mathematics

College Induction and Appointment Process:

Did you find the appointment process fit for purpose?	Yes/All
Was the appointment made in a timely manner?	Yes/All
Do you consider that arrangements for the induction day were sufficient?	Yes/All
Did you find the follow information useful?	Yes/All
Did the department provide an effective induction to the programme and the specific requirements of your role?	Yes/All
I found the process to be straightforward and well-organised and did not encounter any problems.	

Programme and Module Information (supplied directly or via a link to an online portal):

Did you receive programme handbooks/specifications (including programme learning outcomes)?	Yes/All
Did you receive syllabus or module descriptors including learning outcomes at module level?	Yes/All
Did you receive details of the assessments?	Yes/All
Did you receive sufficient Information about the programmes/modules in order to fulfil your role?	Yes/All

Departmental Response:

Programme and Curriculum Design:

Please comment on the balance and content of the degree programme(s) in relation to stated learning outcomes:

My overall opinion of the programmes is high; the quality is uniformly excellent and the choice and coverage of topics corresponds to a first rate university education in applied mathematics.

Please comment on the coherence and currency of the programmes and the appropriateness of compulsory modules/units in relation to stated learning outcomes:

The programmes represent a first rate education in applied mathematics. The coverage has good currency and there is also a lot of breathe to the modules that are offered, particularly in the final two years, which provides students with ample choice but appears to also mean that some modules are taken by only a handful of candidates.

Please comment on the suitability of the programme design in relation to the following, where applicable:

- *relevant subject benchmarks,
- *Professional Statutory Regulatory Body (PSRB)
- *Accrediting Body requirements

The programme design is suitable for subject benchmarks and professional and accrediting bodies.

Where applicable, please comment on the relevance and integration of placements (provision at a Placement Provider, for example, undergraduate Year Abroad or Year in Industry; placement activity contributing to delivery of a postgraduate project) to the overall programme and their contribution to the programme learning outcomes:

Programmes are available for students to take a year abroad or in industry. The numbers taking these programmes are smaller, but their provision is good.

Where applicable, please comment on the relevance and integration of any collaborative modules (modules undertaken at other approved UK HEIs) to the overall programme and their contribution to the programme learning outcomes:

Assessment Strategy:

Please comment on the rigour, appropriateness and overall quality of the methods of assessment (including unseen written papers, essay/dissertations, orals, clinical examinations) in relation to the level of study and the intended learning outcomes:

The assessments are of a uniformly high quality and rigorous and present a good test of students' understanding and achievement. This applies to exam papers, final year projects and module coursework.

Please comment on the balance and comparability of assessment methods across modules of the same level:

The assessments were of uniform standard and highly comparable across all modules. In some cases, modules were assessed through coursework rather than exams, but the standard was still the same.

Please comment on the suitability of the overall assessment load for the programme:

The assessment load is directly comparable to that at other institutions I have knowledge of and in my opinion is suitable for the programme.

Departmental Response:

Drafting of Assessments:

Did you receive all of the necessary draft assessments for comment/approval?	Yes/All
Were the nature and level of the tasks appropriate?	Yes/All
Were suitable arrangements in place to consider your comments on the draft assessments?	Yes/All
Did you receive feedback on your comments?	Yes/All
Although most exams were prepared in a uniform style (according to a standard template), there was some variation in the presentation of solutions. I do not see this as any real issue, but it is an area where a template could perhaps be provided and might be particularly useful for new lecturers, or, if solutions are made available to students, explicitly demonstrating uniformity and consistency across modules. The only comment I will make is to encourage that solutions be prepared in latex rather than handwritten and scanned.	

Marking and Moderation (of examination scripts, assessed coursework, dissertation/project reports, etc.)

Did you receive a sufficient number of scripts and other assessed work, including those of first class, distinction, borderline and failed candidates, for scrutiny?	Yes/All
Was the general standard and consistency of marking appropriate?	Yes/All
Was there evidence that assessed work had been moderated internally, either through check marking or second marking?	Yes/All
Were the scripts marked in such a way as to enable you to see the reasons for the award of marks given?	Yes/All

Practical Examinations:

Were satisfactory arrangements made for the conduct of practical examinations?	N/A
Was the general standard and consistency of marking appropriate?	N/A

Oral Examinations:

Were satisfactory arrangements made for the conduct of oral assessments (e.g. presentations, poster presentations, etc...)?	Yes/All
Was the assessment of such work appropriate and consistent?	Yes/All

Please comment on the suitability of marking schemes/criteria and, where appropriate, model answers and the consistency with which these were applied:
The model answers and marking schemes were all good. The only comment I will make is to encourage that solutions be prepared in latex rather than handwritten and scanned.

Please comment on the suitability of procedures for marking and moderation and the consistency with which these were applied:
The procedures for marking and moderation were clear and applied consistently in all exam papers I looked at. These procedures are similar to those at my own institution and provide for robust marking.

Please comment as to whether grade boundaries for the assessments are set at the appropriate level and applied consistency:
Grade boundaries are set at the levels that appear to be standard across the UK higher education sector. They were applied consistently.

Please comment on the extent to which the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with College policies and regulations:
The assessments provide an excellent test of students' understanding and achievement. I believe they are fair and transparent and in line with all current policies and regulations.

Programme Content Which Has Been Delivered and Assessed by Another Institution:

	Placement Activity (e.g. some or all of an undergraduate study abroad plan)	Collaborative Modules (modules undertaken at local partner institutions)
Was it clear in advance of the Board that students under consideration had undertaken content away from the College?	Yes/All	N/A
Were the procedures for incorporating marks obtained by students at another institution clear and consistently applied?	Yes/All	N/A
Was any such provision discussed at the Board of Examiners, particularly in relation to progression/award decisions, overall value and consistency with regards to the programme(s) of study?	Yes/All	N/A

Departmental Response:

Board of Examiners Meeting:

Were you invited to attend the meeting?	Yes/All
Were you able to attend the meeting?	Yes/All
Was the meeting conducted to your satisfaction?	Yes/All
Were you satisfied with the recommendations of the Board of Examiners?	Yes/All

Were arrangements for degree classification (e.g. the scheme for the award of honours [UG] / the scheme for the award of pass, merit or distinction [PG]) are set at the appropriate level and applied consistently?

Arrangements for degree classification were set at the appropriate level and applied consistently.

Were the College procedures governing mitigating circumstances and/or academic misconduct (e.g. plagiarism cases) were considered and applied fairly and equitably to all students?

This year there was a change in the way that mitigating circumstances are handled and although the new conventions were explained to us in detail, the changes caused problems, including regarding what exam boards are supposed to do. In my opinion this was not the fault of the

department. It is good that the university has uniform and coherent procedures, but they should be clear and unambiguous and proactively assist departments (and exam boards) in being able to make the correct decisions for students with mitigating circumstances, and to have confidence that they are doing so. The current procedures had the effect of obfuscating the process and did not ensure that students with mitigation are considered in the best way possible. The board was effectively asked to make decisions on gut and instinct rather than on information. Although this was surely not the intention, it was the outcome. At my own institution, a Mitigating Circumstances panel, which has full access to all details regarding the mitigation, makes a recommendation to the board as to the degree classification the student should receive. I will not make any suggestions for what Imperial should do, but do urge that the procedures become clearer and more helpful.

Was consideration of borderline performances conducted fairly and equitably and in line with College Procedures?

The exam board was conducted in a fair and transparent manner such that all candidates were considered properly and fairly and borderline decisions defended.

If viva voce of potential borderline candidates were used,

Were suitable arrangements made for you to conduct viva voce examinations? **N/A**

Was the purpose of conducting a viva voce examination and the criteria for selecting candidates for a viva voce clear? **N/A**

Departmental Response:

Academic Standards:

Please comment on the appropriateness of the standards set for the awards in relation to the Framework for Higher Education Qualifications, national subject benchmarks and any Professional Statutory and Regulatory Body (PSRB) or accrediting body requirements where relevant:

The standards of the programmes in (Applied) Mathematics are appropriate in relation to the Framework for Higher Education Qualifications, national benchmarks and professional and accrediting bodies. The programme represents a first rate education in applied mathematics.

Please comment on the standards of student performance in the programme(s) or parts of programmes and whether these are comparable with standards achieved by students on similar programmes or parts of programmes in other UK higher education institutions of which you have experience:

The standard of student performance is very high, both in written examinations and in final year project work. The level of modules, the standard of assessment and the standard of student performance is directly comparable to that at my own institution and indicative of Imperial's position as one of the leading UK institutions.

Please comment on the extent to which academic standards and standards of student performance across modules within the programme(s) are comparable:

In my opinion there was a uniform standard, both from the academic side and the student side, in the quality and level of the modules in applied mathematics across the programme(s).

(For External Examiners not in their first year of appointment) - Are the standards of student performance across modules within the programme(s) comparable to those in previous cohorts?

Departmental Response:

Response to Your Last External Examiner Report:

Did you receive the formal written response to your previous External Examiner report (if applicable)

N/A

Are you satisfied that the issues raised in the previous report have been or are being addressed?

N/A

Departmental Response:

Overview, Recommendations and Good Practice:

Please outline any recommendations or suggestions for enhancement you would like to make with regards to these programme(s):

When we spoke with students at the exam board, the student from the MSc programme raised the slight difficulty that there is in finding a project supervisor, which the students do proactively but can be difficult when they have only just arrived and are not yet familiar with the department. This is potentially something to be aware of and consider.

Examiner comments on how students performed in the exam were somewhat variable. Some had good detail and should be very helpful to students in subsequent years, but others were very terse. I think these comments can be useful to students in preparing for exams and better understanding them and should be written so as to be read. At my own institution, we advertise examiner reports to students as feedback on examinations, which is an effective and good way to think about them. I would therefore encourage those who currently write tersely to do a little less so.

Please outline any examples of good or innovative practice in learning, teaching and assessment you would like to highlight with regards to these programme(s):

I thought the standard was uniformly very good and do not wish to single out any particular module(s) this year.

Please provide an overview of the programme(s) and modules for which you are responsible as External Examiner, particularly in reference to the academic standards of the awards and/or the quality of learning opportunities provided to students:

I am external for applied mathematics and the ancillary modules provided for other departments. Specifically, I looked after the modules M1C, M1A1, M1M2, M3C, M3A29, M3A4, M3A49, M3A50, M4A51, M3A52, M3A6, M3A7, M3N7, M3PA16, M3PA34, and the ancillary modules MPH2, AE3-410, ME3-HMTH, MPC1, MPC2, ME-HSTAT. My overall opinion of these modules is high; the quality is uniformly excellent and the choice and coverage of topics corresponds to a first rate university education in applied mathematics. There is good breadth to the topics that are offered, which provides students with ample choice but it appears to also mean that they are spread thinly, with some modules taken by only a handful of candidates.

I received the exam papers in good time to look at each properly, even though I didn't have to do much beyond giving pedantic comments about punctuation. The exam papers are fair, of high standard and represent a good test of students' understanding and achievement. During my visit for the exam board I also got to see the email exchange between checker and setter and between section editor and setter, which made clear the internal procedure that you follow and the attention that everyone involved pays to producing high quality exams.

During the Thursday lunchtime we had the opportunity to meet and talk with current students and it was particularly good that there was a student from each year of the course. They spoke positively about the course and their interaction with lecturers. There was a general appreciation for the range of modules that are available and the flexibility that there is, even in mixing between pure and applied. The student from the MSc programme raised the slight difficulty that there is in finding a project supervisor, which the students do proactively but can be difficult when they have only just arrived and are not yet familiar with the department. This is potentially something to be aware of and consider.

We spent the Friday morning (before the exam board) looking over final year projects. My immediate opinion was that the marks are high compared to those I award myself in marking final year projects at Warwick, but the amount of effort that has been put in is clearly evident, as is the very high level of achievement by a good number of your students. If the number of students being awarded a first is to become an issue for more careful thought, then the high marks for the project would be the first place to look at. Regardless, I found the projects to be very good and the reports all produced to high standard. In my experience students gain an enormous amount from doing their final year project and it's the individual attention of supervisors that really makes the difference, so I think it is to your credit that so many have done so well.

The exam board itself was conducted in a fair and transparent manner such that all candidates were considered properly and borderline decisions defended. The method for treating borderline cases is similar to that at my own institution, only perhaps marginally less formulaic.

Departmental Response:

Overall Confidence Statements

The degree awarding body is maintaining the threshold academic standards set for its awards in accordance with the FHEQ and relevant Subject Benchmarks Statements.	Yes
The assessment process measures student achievement rigorously and fairly against the intended learning outcomes of the programme and is conducted in line with the College's policies and regulations.	Yes
The academic standards and the achievements of students are comparable with those in other degree awarding bodies of which you have experience.	Yes

Name and Position of Departmental Respondent:	
Date:	

External Examiner Report (2018-19 Academic Year)

Name of External Examiner	Timo Betcke
Name of Programme	MSc Applied Mathematics

Programme and Module Information (supplied directly or via a link to an online portal):

Did you receive programme handbooks/specifications (including programme learning outcomes)?	Most/Usually Yes/Always
Did you receive syllabus or module descriptors including learning outcomes at module level?	Most/Usually Yes/Always
Did you receive details of the assessments?	Yes/All
Did you receive sufficient Information about the programmes/modules in order to fulfil your role?	Yes/All

Departmental Response:

Programme and Curriculum Design:

Please comment on the balance and content of the degree programme(s) in relation to stated learning outcomes:
The Applied Mathematics MSc is a modern, well designed, and well balanced programme, with clearly stated learning outcomes. Nothing to fault here.

Please comment in the coherence and currency of the programmes and the appropriateness of compulsory modules/units in relation to stated learning outcomes:
The programme is coherent with an appropriate selection of modules, in line with the aims of being a world leading MSc programme.
The modules are coherent and provide an in-depth presentation of modern topics in Applied Mathematics.

Please comment on the suitability of the programme design in relation to the following, where applicable:

- *relevant subject benchmarks,
- *Professional Statutory Regulatory Body (PSRB)
- *Accrediting Body requirements

To my knowledge the MSc satisfies all criteria of the relevant boards. In terms of subject benchmarks I would consider it to be one of the leading Applied Maths MSc programmes in the world.

To my knowledge all accreditation requirements are satisfied.

Where applicable, please comment on the relevance and integration of placements (provision at a Placement Provider, for example, undergraduate Year Abroad or Year in Industry; placement activity contributing to delivery of a postgraduate project) to the overall programme and their contribution to the programme learning outcomes:

Not applicable

Where applicable, please comment on the relevance and integration of any collaborative modules (modules undertaken at other approved UK HEIs) to the overall programme and their contribution to the programme learning outcomes:

Not applicable

Assessment Strategy:

Please comment on the rigour, appropriateness and overall quality of the methods of assessment (including unseen written papers, essay/dissertations, orals, clinical examinations) in relation to the level of study and the intended learning outcomes:

The exams are well designed with a difficulty level that reflects Imperial's aims to be one of the world leading institutions.

All assessments are well designed and appropriate to the level of the MSc.

Please comment on the balance and comparability of assessment methods across modules of the same level:

There is generally a good balance of difficulty and assessment levels across the modules in this programme.

Assessments are broadly comparable across modules. I did not see any problematic outliers this year.

Please comment on the suitability of the overall assessment load for the programme:

The assessment load is suitable for this programme and is appropriate for the expected level at an internationally leading university.

Departmental Response:

Drafting of Assessments:

Did you receive all of the necessary draft assessments for comment/approval?	Yes/All
Were the nature and level of the tasks appropriate?	Yes/All
Were suitable arrangements in place to consider your comments on the draft assessments?	Yes/All
Did you receive feedback on your comments?	Yes/All

Marking and Moderation (of examination scripts, assessed coursework, dissertation/project reports, etc.)

Did you receive a sufficient number of scripts and other assessed work, including those of first class, distinction, borderline and failed candidates, for scrutiny?	Yes/All
Was the general standard and consistency of marking appropriate?	Yes/All
Was there evidence that assessed work had been moderated internally, either through check marking or second marking?	Yes/All
Were the scripts marked in such a way as to enable you to see the reasons for the award of marks given?	Yes/All

Practical Examinations:

Were satisfactory arrangements made for the conduct of practical examinations?	N/A
Was the general standard and consistency of marking appropriate?	N/A

Oral Examinations:

Were satisfactory arrangements made for the conduct of oral assessments (e.g. presentations, poster presentations, etc...)?	Yes/All
Was the assessment of such work appropriate and consistent?	Yes/All

Please comment on the suitability of marking schemes/criteria and, where appropriate, model answers and the consistency with which these were applied:
The marking schemes were generally of high quality with little feedback to the examiners necessary. There was nothing to fault this year.

Please comment on the suitability of procedures for marking and moderation and the consistency with which these were applied:
The Mathematics Department at Imperial has well established and consistent procedures that ensure a high level of the programme.
The procedures are well established and consistent across the modules and with respect to previous year.

Please comment as to whether grade boundaries for the assessments are set at the appropriate level and applied consistency:
Grade boundaries were appropriate and consistently applied.
They are set at appropriate level as demonstrated by the well balanced outcomes of the students.

Please comment on the extent to which the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with College policies and regulations:
As already noted in previous years the Imperial Applied Maths MSc has very well established assessment procedures, which ensure an internationally leading level of quality. To my knowledge all College policies are respected.
All of the assessment outcomes seemed to be well balanced and in line with what I would expect with an MSc at this level.

Programme Content Which Has Been Delivered and Assessed by Another Institution:

	Placement Activity (e.g. some or all of an undergraduate study abroad plan)	Collaborative Modules (modules undertaken at local partner institutions)
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Was it clear in advance of the Board that students under consideration had undertaken content away from the College?	N/A	N/A
Were the procedures for incorporating marks obtained by students at another institution clear and consistently applied?	N/A	N/A
Was any such provision discussed at the Board of Examiners, particularly in relation to progression/award decisions, overall value and consistency with regards to the programme(s) of study?	N/A	N/A

Departmental Response:

Board of Examiners Meeting:

Were you invited to attend the meeting?	Yes/All
Were you able to attend the meeting?	Yes/All
Was the meeting conducted to your satisfaction?	Yes/All
Were you satisfied with the recommendations of the Board of Examiners?	Yes/All
I was very pleased with the Exam Board procedures this year. The pre-board discussion was focused and swift with well reasoned recommendations for borderline candidates that needed little adjustment. The main exam board meeting was very focused, speedy and extremely well organised. I was impressed how efficiently the exam board meeting was organised this year. There was a new exam board leader. But he held the meeting very efficiently with the right level of discussions.	

Were arrangements for degree classification (e.g. the scheme for the award of honours [UG] / the scheme for the award of pass, merit or distinction [PG]) are set at the appropriate level and applied consistently?

Yes. We had a pre-board discussion for borderline cases. This was very effective and we suggested only minor changes. Overall, a very well designed process.

Were the College procedures governing mitigating circumstances and/or academic misconduct (e.g. plagiarism cases) were considered and applied fairly and equitably to all students?

Yes.

Was consideration of borderline performances conducted fairly and equitably and in line with College Procedures?

Yes. See above.

If viva voce of potential borderline candidates were used,

Were suitable arrangements made for you to conduct viva voce examinations?	N/A
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Was the purpose of conducting a viva voce examination and the criteria for selecting candidates for a viva voce clear?	N/A
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Departmental Response:

Academic Standards:

Please comment on the appropriateness of the standards set for the awards in relation to the Framework for Higher Education Qualifications, national subject benchmarks and any Professional Statutory and Regulatory Body (PSRB) or accrediting body requirements where relevant:

To my knowledge the standards set for the awards follow all requirements of the relevant bodies.

Please comment on the standards of student performance in the programme(s) or parts of programmes and whether these are comparable with standards achieved by students on similar programmes or parts of programmes in other UK higher education institutions of which you have experience:

The Applied Maths MSc programme at Imperial accepts very high quality students. They are generally of very high level, well beyond the level at most UK Institutions. This was visible again this year in the generally high standard of the exams and the final thesis. I would rate the standards at this MSc well beyond the standard at most other UK higher education institutions. The MSc is a good example for an outstanding programme this is among the world leaders.

Please comment on the extent to which academic standards and standards of student performance across modules within the programme(s) are comparable:

Student performances across modules are well comparable. The assessment procedure guarantees that student performs is generally well comparable.

(For External Examiners not in their first year of appointment) - Are the standards of student performance across modules within the programme(s) comparable to those in previous cohorts?

Yes. Definitely. The MSc programme retains a high quality across years.

Departmental Response:

Response to Your Last External Examiner Report:

Did you receive the formal written response to your previous External Examiner report (if applicable)	Yes/All
Are you satisfied that the issues raised in the previous report have been or are being addressed?	Yes/All
I was pleased to see that the high level of the Applied Mathematics MSc continues.	

Departmental Response:

Overview, Recommendations and Good Practice:

Please outline any recommendations or suggestions for enhancement you would like to make with regards to these programme(s):
There is little to recommend right now. The programme is overall very well balanced. It obviously always makes sense to think about how current research topics can be included in the curriculum also outside the scope of the MSc thesis. Please keep up the great work in this MSc. It is a wonderful programme.

Please outline any examples of good or innovative practice in learning, teaching and assessment you would like to highlight with regards to these programme(s):
I am always impressed by the breadth and high level of the MSc thesis topics, which many projects that have the potential for publications.
There is nothing in particular I wish to highlight this year as the strengths of the programme comes from the overall balance of the various modules.

Please provide an overview of the programme(s) and modules for which you are responsible as External Examiner, particularly in reference to the academic standards of the awards and/or the quality of learning opportunities provided to students:
My background is in numerics and I was mainly responsible for PDE/numeric type modules. These are of very high standard.

I am responsible for the numerical components. I especially like to highlight the modules in scientific computation and finite element methods, which are close to my own research. The level of these is very high and produces students that are fit for PhD research at internationally leading institutions.

The Imperial MSc is well regarded across the world and any student who passes this MSc has a wealth of career opportunities.

Departmental Response:

Final Exit Report:

Please provide an overview of your term of office, including:

- *any changes in standards of student performance over time
- *major developments in the provision during your tenure
- *the implementation of any recommendations for enhancement
- * any other matters you consider appropriate

The general quality of the MSc was consistent over the time of my tenure with very little to fault. I remember one instance, where there were problems at the board meeting where rules were unclear. But I commented on these and this seems to have been rectified. The next year the board meeting was again of very high quality and board meetings have improved in quality over my tenure.

I applaud the introduction over my tenure of more project type components and the careful introduction of practical modules in the MSc.

As stated above, given the high level of the students it makes sense to think about how to introduce more current research topics beyond the MSc thesis. Students are at a high level and would well cope with more modern research topics. Also modern developments with respect to Data Science topics might be carefully introduced in the future in the curriculum.

But overall I trust that the programme will continue on its high level in years to come.

Departmental Response:

Overall Confidence Statements

The degree awarding body is maintaining the threshold academic standards set for its awards in accordance with the FHEQ and relevant Subject Benchmarks Statements.	Yes
The assessment process measures student achievement rigorously and fairly against the intended learning outcomes of the programme and is conducted in line with the College's policies and regulations.	Yes

The academic standards and the achievements of students are comparable with those in other degree awarding bodies of which you have experience.	Yes

Name and Position of Departmental Respondent:	
Date:	

External Examiner Report (2018-19 Academic Year)

Name of External Examiner	Anthony Carbery
Name of Programme	MSc Pure Mathematics

Programme and Module Information (supplied directly or via a link to an online portal):

Did you receive programme handbooks/specifications (including programme learning outcomes)?	Yes/All
Did you receive syllabus or module descriptors including learning outcomes at module level?	Yes/All
Did you receive details of the assessments?	Yes/All
Did you receive sufficient Information about the programmes/modules in order to fulfil your role?	Yes/All
N/A	

Departmental Response:

Programme and Curriculum Design:

Please comment on the balance and content of the degree programme(s) in relation to stated learning outcomes:
This is all fine.

Please comment in the coherence and currency of the programmes and the appropriateness of compulsory modules/units in relation to stated learning outcomes:
This is also fine.

Please comment on the suitability of the programme design in relation to the following, where applicable: *relevant subject benchmarks, *Professional Statutory Regulatory Body (PSRB) *Accrediting Body requirements
N/A

Where applicable, please comment on the relevance and integration of placements (provision at a Placement Provider, for example, undergraduate Year Abroad or Year in Industry; placement activity contributing to delivery of a postgraduate project) to the overall programme and their contribution to the programme learning outcomes:

N/A

Where applicable, please comment on the relevance and integration of any collaborative modules (modules undertaken at other approved UK HEIs) to the overall programme and their contribution to the programme learning outcomes:

N/A

Assessment Strategy:

Please comment on the rigour, appropriateness and overall quality of the methods of assessment (including unseen written papers, essay/dissertations, orals, clinical examinations) in relation to the level of study and the intended learning outcomes:

Courses were discussed in my examiner's report for the undergraduate programme.

"This is generally to be commended. Some of the exam papers this year were a little less demanding than in the past."

The arrangements in place for marking and moderation of project work worked very well this year. I was particularly impressed with the level of effort which went into the moderation process to ensure a fair playing field across the board for project assessment.

Once again, some of the arguments made by a small number of project markers for the marks they were proposing were somewhat lacking in detail; nevertheless even in such cases I was convinced that the marks proposed were appropriate.

Please comment on the balance and comparability of assessment methods across modules of the same level:

This is fine.

Please comment on the suitability of the overall assessment load for the programme:

This is also fine.

Departmental Response:

Drafting of Assessments:

Did you receive all of the necessary draft assessments for comment/approval?	Yes/All
Were the nature and level of the tasks appropriate?	Yes/All
Were suitable arrangements in place to consider your comments on the draft assessments?	Yes/All
Did you receive feedback on your comments?	Most/Usually
See undergraduate report. Once again a somewhat patchy response under (iv). <i>“Staff input into closing the feedback loop of confidence (beginning with my comments on the papers) was again a bit patchy.</i> <i>Well-considered comments (by exam markers) for students are particularly helpful and feed into a virtuous circle.</i> <i>A couple of papers I had identified as being rather hard in my feedback; it turned out that the exam mark statistics in these cases bore out my remarks. (Interestingly, these same papers were identified by the students we met as having been regarded as excessively hard.) Had my initial comments been acted upon this might have been avoided to some extent.</i> <i>One paper was prepared with extreme haste and unfortunately a couple of typos survived into the final draft which the students sat. Taking care and time to prepare exams is essential. Further thought might be given to ensure that Mastery questions are designed with the same purpose across different modules.”</i>	

Marking and Moderation (of examination scripts, assessed coursework, dissertation/project reports, etc.)

Did you receive a sufficient number of scripts and other assessed work, including those of first class, distinction, borderline and failed candidates, for scrutiny?	Yes/All
Was the general standard and consistency of marking appropriate?	Yes/All
Was there evidence that assessed work had been moderated internally, either through check marking or second marking?	Yes/All
Were the scripts marked in such a way as to enable you to see the reasons for the award of marks given?	Most/Usually
For courses, please see my undergraduate report. For project work, please see a response earlier in the form. <i>“My hesitation here relates to project marking and moderation; the main exam diet was handled thoroughly and professionally. I was impressed that when a relatively inexperienced marker made an incorrect judgement call on one exam question, this was detected early and appropriate steps were taken to ensure remarking before any adverse consequences ensued.”</i>	

Practical Examinations:

Were satisfactory arrangements made for the conduct of practical examinations?	N/A
Was the general standard and consistency of marking appropriate?	N/A

Oral Examinations:

Were satisfactory arrangements made for the conduct of oral assessments (e.g. presentations, poster presentations, etc...)?	N/A
Was the assessment of such work appropriate and consistent?	N/A

Please comment on the suitability of marking schemes/criteria and, where appropriate, model answers and the consistency with which these were applied:
See undergraduate report.
<i>“With a small number of exceptions these were of very good or exemplary standard.”</i>

Please comment on the suitability of procedures for marking and moderation and the consistency with which these were applied:
For courses, see undergraduate report. For projects, see above.

Please comment as to whether grade boundaries for the assessments are set at the appropriate level and applied consistency:
This is all fine.

Please comment on the extent to which the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with College policies and regulations:
This too is fine.

Programme Content Which Has Been Delivered and Assessed by Another Institution:

	Placement Activity (e.g. some or all of an undergraduate study abroad plan)	Collaborative Modules (modules undertaken at local partner institutions)
Was it clear in advance of the Board that students under consideration had undertaken content away from the College?	N/A	N/A
Were the procedures for incorporating marks obtained by students at another institution clear and consistently applied?	N/A	N/A
Was any such provision discussed at the Board of Examiners, particularly in relation to progression/award decisions, overall value and consistency with regards to the programme(s) of study?	N/A	N/A

Departmental Response:

Board of Examiners Meeting:

Were you invited to attend the meeting?	Yes/All
Were you able to attend the meeting?	No/None
Was the meeting conducted to your satisfaction?	N/A
Were you satisfied with the recommendations of the Board of Examiners?	Yes/All
N/A.	

Were arrangements for degree classification (e.g. the scheme for the award of honours [UG] / the scheme for the award of pass, merit or distinction [PG]) are set at the appropriate level and applied consistently?

Yes, this was carried out with great care.

Were the College procedures governing mitigating circumstances and/or academic misconduct (e.g. plagiarism cases) were considered and applied fairly and equitably to all students?

N/A

Was consideration of borderline performances conducted fairly and equitably and in line with College Procedures?	
Yes. I was heavily involved in this remotely in advance of the examiner's meeting which I could not attend. I looked in detail at nine of the projects under consideration, including those of all the borderline candidates, and in each case I was convinced that the proposed awards were the correct ones.	
If viva voce of potential borderline candidates were used,	
Were suitable arrangements made for you to conduct viva voce examinations?	N/A
Was the purpose of conducting a viva voce examination and the criteria for selecting candidates for a viva voce clear?	N/A

Departmental Response:

Academic Standards:

Please comment on the appropriateness of the standards set for the awards in relation to the Framework for Higher Education Qualifications, national subject benchmarks and any Professional Statutory and Regulatory Body (PSRB) or accrediting body requirements where relevant:
This is fine.

Please comment on the standards of student performance in the programme(s) or parts of programmes and whether these are comparable with standards achieved by students on similar programmes or parts of programmes in other UK higher education institutions of which you have experience:
Some of the project work this year was absolutely outstanding. I cannot imagine that any other institution would be able to significantly outclass the best work I saw this year. And overall, the standards at Imperial continue to be very high in comparison with other top 10 institutions.

Please comment on the extent to which academic standards and standards of student performance across modules within the programme(s) are comparable:
This is fine.

(For External Examiners not in their first year of appointment) - Are the standards of student performance across modules within the programme(s) comparable to those in previous cohorts?
Yes. I think that the project work was overall of slightly higher standard than last year, bringing it back into line with the previous year's levels.

Departmental Response:

Response to Your Last External Examiner Report:

Did you receive the formal written response to your previous External Examiner report (if applicable)	Yes/All
Are you satisfied that the issues raised in the previous report have been or are being addressed?	Most/Usually
It would be good if the "lazy markers" who don't provide detailed arguments for the marks they have given could be persuaded to do so.	

Departmental Response:

Overview, Recommendations and Good Practice:

Please outline any recommendations or suggestions for enhancement you would like to make with regards to these programme(s):
No specific suggestions.

Please outline any examples of good or innovative practice in learning, teaching and assessment you would like to highlight with regards to these programme(s):
N/A.

Please provide an overview of the programme(s) and modules for which you are responsible as External Examiner, particularly in reference to the academic standards of the awards and/or the quality of learning opportunities provided to students:
I hold the MSc at Imperial in extremely high regard.

Departmental Response:

Final Exit Report:

Please provide an overview of your term of office, including: *any changes in standards of student performance over time *major developments in the provision during your tenure *the implementation of any recommendations for enhancement
--

* any other matters you consider appropriate

When one is operating a programme which is running at a very high level, the danger is that standards may slip. I'm delighted to say that at Imperial this has not happened over the last four years, and the MSc is as robust as it was when I first examined it. Many congratulations to its directors and management team.

Departmental Response:

Overall Confidence Statements

The degree awarding body is maintaining the threshold academic standards set for its awards in accordance with the FHEQ and relevant Subject Benchmarks Statements.	Yes
The assessment process measures student achievement rigorously and fairly against the intended learning outcomes of the programme and is conducted in line with the College's policies and regulations.	Yes
The academic standards and the achievements of students are comparable with those in other degree awarding bodies of which you have experience.	Yes

Name and Position of Departmental Respondent:	
Date:	

External Examiner Report (2018-19 Academic Year)

Name of External Examiner	Gavin Esler
Name of Programme	MRes Mathematics of Planet Earth

Programme and Module Information (supplied directly or via a link to an online portal):

Did you receive programme handbooks/specifications (including programme learning outcomes)?	Yes/All
Did you receive syllabus or module descriptors including learning outcomes at module level?	Yes/All
Did you receive details of the assessments?	Yes/All
Did you receive sufficient Information about the programmes/modules in order to fulfil your role?	Yes/All
None	

Departmental Response:

Programme and Curriculum Design:

Please comment on the balance and content of the degree programme(s) in relation to stated learning outcomes:
The content and syllabus of the taught component of the MRes course is wholly successful in meeting the intended learning outcomes (e.g. "Acquire foundations in analysis and solution on a computer of partial differential equations, statistical techniques for inference and data assimilation, deterministic and stochastic techniques for taking a systems view of earth systems and processes" and "Gain an appreciation for the key processes in the earth system and their role in climate.") As far as balance is concerned, one comment is that a lot of attention is given to the mathematical foundations of probability theory, perhaps at the expense of more practical topics in e.g. data assimilation. Whether this emphasis on theory is too much is a debatable point, as a rigorous foundation will be extremely helpful for students accessing probability heavy research topics, and it is also appropriate that the subject is taught in line with the research interests of staff.

Please comment in the coherence and currency of the programmes and the appropriateness of compulsory modules/units in relation to stated learning outcomes:

My view is that each of the four taught MRes modules are coherent and contribute towards the students gaining fundamental understanding in line with the learning outcomes.

Please comment on the suitability of the programme design in relation to the following, where applicable:

- *relevant subject benchmarks,
- *Professional Statutory Regulatory Body (PSRB)
- *Accrediting Body requirements

Not applicable

Where applicable, please comment on the relevance and integration of placements (provision at a Placement Provider, for example, undergraduate Year Abroad or Year in Industry; placement activity contributing to delivery of a postgraduate project) to the overall programme and their contribution to the programme learning outcomes:

Not applicable

Where applicable, please comment on the relevance and integration of any collaborative modules (modules undertaken at other approved UK HEIs) to the overall programme and their contribution to the programme learning outcomes:

Not applicable

Assessment Strategy:

Please comment on the rigour, appropriateness and overall quality of the methods of assessment (including unseen written papers, essay/dissertations, orals, clinical examinations) in relation to the level of study and the intended learning outcomes:

The four taught MRes courses are assessed by examination, coursework and project work. I found the quality and level of rigour of the examinations to be high in all cases, and certainly appropriate to the MRes level.

A slight concern I had last year, over the rather high weighting given to the coursework component in some of the modules, was addressed in response to my previous comments. The coursework is generally of high quality and appropriate, and the balance of formative versus summative material is now more appropriate.

I looked at all of the MRes dissertations and read some in detail. These were rigorously completed, generally well-written (taking into account the experience level of the students), and overall I was very impressed. Many of them would not look out of place as a chapter or two of a PhD.

Please comment on the balance and comparability of assessment methods across modules of the same level:

The exam assessments of the four MRes courses are well-balanced and the difficulty level is comparable.

Please comment on the suitability of the overall assessment load for the programme:

The overall assessment load seems entirely appropriate. In fact, I am impressed that the students were able to complete both their MRes courses and such high quality dissertations in the time available to them.

Departmental Response:

Drafting of Assessments:

Did you receive all of the necessary draft assessments for comment/approval?	Yes/All
Were the nature and level of the tasks appropriate?	Yes/All
Were suitable arrangements in place to consider your comments on the draft assessments?	Yes/All
Did you receive feedback on your comments?	Yes/All
Nothing to add.	

Marking and Moderation (of examination scripts, assessed coursework, dissertation/project reports, etc.)

Did you receive a sufficient number of scripts and other assessed work, including those of first class, distinction, borderline and failed candidates, for scrutiny?	Yes/All
Was the general standard and consistency of marking appropriate?	Yes/All
Was there evidence that assessed work had been moderated internally, either through check marking or second marking?	Yes/All
Were the scripts marked in such a way as to enable you to see the reasons for the award of marks given?	Yes/All
Sample exam scripts and coursework were made available at the exam board meeting, from which I was able to verify that appropriate marking and moderation had taken place.	
The dissertations had all been marked by two examiners, and their separate reports were made available to me.	

Practical Examinations:

Were satisfactory arrangements made for the conduct of practical examinations?	N/A
Was the general standard and consistency of marking appropriate?	N/A
Not applicable	

Oral Examinations:

Were satisfactory arrangements made for the conduct of oral assessments (e.g. presentations, poster presentations, etc...)?	N/A
Was the assessment of such work appropriate and consistent?	N/A
Not applicable	

Please comment on the suitability of marking schemes/criteria and, where appropriate, model answers and the consistency with which these were applied:
Exam assessments were sent to me with model answers and mark schemes on which I was able to comment. In general, these were highly satisfactory.

Please comment on the suitability of procedures for marking and moderation and the consistency with which these were applied:
The marking and moderation procedures were in line with my expectations (based on my own department and on other institutions where I have been an external).

Please comment as to whether grade boundaries for the assessments are set at the appropriate level and applied consistency:
The grade boundaries are appropriate, based on examination of sample examination scripts and coursework which were made available to me, and comparing these with the norms I have observed at other MSc-level programmes on similar topics at comparable institutions.

Please comment on the extent to which the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with College policies and regulations:
The assessment process is rigorous and in line with the College policies and regulations as I understand them.

Programme Content Which Has Been Delivered and Assessed by Another Institution:

	Placement Activity (e.g. some or all of	Collaborative Modules (modules
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	an undergraduate study abroad plan)	undertaken at local partner institutions)
Was it clear in advance of the Board that students under consideration had undertaken content away from the College?	N/A	Yes/All
Were the procedures for incorporating marks obtained by students at another institution clear and consistently applied?	N/A	Yes/All
Was any such provision discussed at the Board of Examiners, particularly in relation to progression/award decisions, overall value and consistency with regards to the programme(s) of study?	N/A	Yes/All
Comments on the above: The mathematics of planet earth programme is delivered as a joint programme with the University of Reading. Lectures are undertaken in both institutions, with students present at both campuses with video link widely used. My impression is that this joint delivery aspect works successfully.		

Departmental Response:

Board of Examiners Meeting:

Were you invited to attend the meeting?	Yes/All
Were you able to attend the meeting?	Yes/All
Was the meeting conducted to your satisfaction?	Yes/All
Were you satisfied with the recommendations of the Board of Examiners?	Yes/All
None	

Were arrangements for degree classification (e.g. the scheme for the award of honours [UG] / the scheme for the award of pass, merit or distinction [PG]) are set at the appropriate level and applied consistently?

I found the exam board meeting to be professional and business-like. All of the issues raised relating to assessment methods and moderation were treated seriously and discussed at length, with the examiners present contributing useful ideas for mitigating problems. The award of MRes degrees was uncontroversial, and the few borderline cases were dealt with transparently according to established procedure.

Were the College procedures governing mitigating circumstances and/or academic misconduct (e.g. plagiarism cases) were considered and applied fairly and equitably to all students?

Yes.

Was consideration of borderline performances conducted fairly and equitably and in line with College Procedures?

Yes, as stated above the College policies were stated explicitly and followed.

If viva voce of potential borderline candidates were used,

Were suitable arrangements made for you to conduct viva voce examinations?

N/A

Was the purpose of conducting a viva voce examination and the criteria for selecting candidates for a viva voce clear?

N/A

Departmental Response:

Academic Standards:

Please comment on the appropriateness of the standards set for the awards in relation to the Framework for Higher Education Qualifications, national subject benchmarks and any Professional Statutory and Regulatory Body (PSRB) or accrediting body requirements where relevant:

The standards set for the award seem to me to be appropriate to the national subject benchmark.

Please comment on the standards of student performance in the programme(s) or parts of programmes and whether these are comparable with standards achieved by students on similar programmes or parts of programmes in other UK higher education institutions of which you have experience:

Based on the primarily on the high quality of the students' dissertations, and secondarily on their exam performance, the MRes standards exceed those I have encountered on comparable MSc programmes at other institutions. This may be partly due to the excellent students attracted by the mathematics of planet earth CDT, but the teaching staff and project supervisors on the programme clearly deserve much of the credit too.

Please comment on the extent to which academic standards and standards of student performance across modules within the programme(s) are comparable:

There are no serious problems with varying standards across the four taught modules.

(For External Examiners not in their first year of appointment) - Are the standards of student performance across modules within the programme(s) comparable to those in previous cohorts?

Yes - standards are comparable - I noticed no overall change in the student performance compared to last year.

Departmental Response:

Response to Your Last External Examiner Report:

Did you receive the formal written response to your previous External Examiner report (if applicable)	Yes/All
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Are you satisfied that the issues raised in the previous report have been or are being addressed?	Yes/All
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None

Departmental Response:

Overview, Recommendations and Good Practice:

Please outline any recommendations or suggestions for enhancement you would like to make with regards to these programme(s):

I have no suggestions for enhancement because, sadly, 2018-19 is the final year of the programme.

Please outline any examples of good or innovative practice in learning, teaching and assessment you would like to highlight with regards to these programme(s):

There is much to admire on the MRes programme, e.g.

- * Excellent quality project supervision (evidenced by the MRes theses)
- * Good use of remote learning technology, to coordinate the programme between institutions
- * An excellent and original curriculum spanning the gap from rigorous mathematical development on the one hand to practical atmospheric, oceanic and climate science on the other

Please provide an overview of the programme(s) and modules for which you are responsible as External Examiner, particularly in reference to the academic standards of the awards and/or the quality of learning opportunities provided to students:

The Mathematics of Planet Earth MRes programme has been highly successful in laying an excellent foundation for two cohorts (that I have seen - others before no doubt) of students to

succeed at PhD level, at the important multi-disciplinary boundary between mathematics and the geophysical sciences.

Departmental Response:

Overall Confidence Statements

The degree awarding body is maintaining the threshold academic standards set for its awards in accordance with the FHEQ and relevant Subject Benchmarks Statements.	Yes
The assessment process measures student achievement rigorously and fairly against the intended learning outcomes of the programme and is conducted in line with the College's policies and regulations.	Yes
The academic standards and the achievements of students are comparable with those in other degree awarding bodies of which you have experience.	Yes

Name and Position of Departmental Respondent:	
Date:	

External Examiner Report (2018-19 Academic Year)

Name of External Examiner	Jim Griffin
Name of Programme	MSc Statistics

Programme and Module Information (supplied directly or via a link to an online portal):

Did you receive programme handbooks/specifications (including programme learning outcomes)?	Yes/All
Did you receive syllabus or module descriptors including learning outcomes at module level?	Yes/All
Did you receive details of the assessments?	Yes/All
Did you receive sufficient Information about the programmes/modules in order to fulfil your role?	Yes/All

Departmental Response:

Programme and Curriculum Design:

Please comment on the balance and content of the degree programme(s) in relation to stated learning outcomes:
The programme is well-balanced and covers material on theoretical, methodological and applied statistics. The wide-range of options available allow students to specialise in a particular area of statistics after having completed a core set of modules.

Please comment in the coherence and currency of the programmes and the appropriateness of compulsory modules/units in relation to stated learning outcomes:
The programme builds on a core set of modules which are mostly covered in the autumn term followed by more optional (and specialised) modules in the spring term. This provides a coherence to the programme and aligns the programme with the learning outcomes. The core modules cover standard material in statistics and are similar to core modules in other MSc programmes in the UK. The programme is up-to-date with modules in modern areas such as data science/machine learning, financial statistics and bioinformatics.

Please comment on the suitability of the programme design in relation to the following, where applicable:

- *relevant subject benchmarks,
- *Professional Statutory Regulatory Body (PSRB)
- *Accrediting Body requirements

The programme has many standard features which align the programme with both subject benchmarks and the requirements for accreditation by the Royal Statistical Society (RSS). The optional modules cover material falls within the "advanced topics" described by the RSS as suitable for an MSc Statistics programme.

Where applicable, please comment on the relevance and integration of placements (provision at a Placement Provider, for example, undergraduate Year Abroad or Year in Industry; placement activity contributing to delivery of a postgraduate project) to the overall programme and their contribution to the programme learning outcomes:

N/A

Where applicable, please comment on the relevance and integration of any collaborative modules (modules undertaken at other approved UK HEIs) to the overall programme and their contribution to the programme learning outcomes:

N/A

Assessment Strategy:

Please comment on the rigour, appropriateness and overall quality of the methods of assessment (including unseen written papers, essay/dissertations, orals, clinical examinations) in relation to the level of study and the intended learning outcomes:

Students see a range of assessment methods covering written examinations, a substantial amount of in-course assessment, and a dissertation which has an oral element. The quality of the assessments is high. They include material to tests understanding of key concepts as well as material to discriminate between the highest performing students. The material and level is appropriate for an MSc Statistics programme.

Please comment on the balance and comparability of assessment methods across modules of the same level:

The programme has two main types of module: written exam with a coursework component and a completely coursework-based component. The assessments are largely comparable across these types of models with the coursework including challenging material.

Please comment on the suitability of the overall assessment load for the programme:

The overall assessment is appropriate for an MSc programme.

Departmental Response:

Drafting of Assessments:

Did you receive all of the necessary draft assessments for comment/approval?	Yes/All
Were the nature and level of the tasks appropriate?	Yes/All
Were suitable arrangements in place to consider your comments on the draft assessments?	Yes/All
Did you receive feedback on your comments?	Yes/All
The on-line system for examination allows me to interact with exam setters directly and easily which I believe leads to better examinations.	

Marking and Moderation (of examination scripts, assessed coursework, dissertation/project reports, etc.)

Did you receive a sufficient number of scripts and other assessed work, including those of first class, distinction, borderline and failed candidates, for scrutiny?	Yes/All
Was the general standard and consistency of marking appropriate?	Yes/All
Was there evidence that assessed work had been moderated internally, either through check marking or second marking?	Yes/All
Were the scripts marked in such a way as to enable you to see the reasons for the award of marks given?	Yes/All
The use of a committee to moderate dissertation marking is a good idea.	

Practical Examinations:

Were satisfactory arrangements made for the conduct of practical examinations?	N/A
Was the general standard and consistency of marking appropriate?	Yes/All

Oral Examinations:

Were satisfactory arrangements made for the conduct of oral assessments (e.g. presentations, poster presentations, etc...)?	Yes/All
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Was the assessment of such work appropriate and consistent?	Yes/All

Please comment on the suitability of marking schemes/criteria and, where appropriate, model answers and the consistency with which these were applied:
The marking scheme is sensible and appropriate for assessment in statistics. The scheme was applied consistently.

Please comment on the suitability of procedures for marking and moderation and the consistency with which these were applied:
The procedures were suitable and were applied across all modules. Particular care is taken with the consistency of marking of dissertations.

Please comment as to whether grade boundaries for the assessments are set at the appropriate level and applied consistency:
Grade boundaries are appropriate and are applied consistently.

Please comment on the extent to which the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with College policies and regulations:
The assessment process involves a range of tasks which test different parts of the learning outcomes of the programme. There are clear expectations for in-course assessments and clearly written examination papers. The structure of the in-course assessments and written examinations allows clear discrimination between students who show different abilities. Care is taken to ensure that assessment is conducted in line with Imperial College regulations.

Programme Content Which Has Been Delivered and Assessed by Another Institution:

	Placement Activity (e.g. some or all of an undergraduate study abroad plan)	Collaborative Modules (modules undertaken at local partner institutions)
Was it clear in advance of the Board that students under consideration had undertaken content away from the College?	N/A	N/A
Were the procedures for incorporating marks obtained by students at another institution clear and consistently applied?	N/A	N/A
Was any such provision discussed at the Board of Examiners, particularly in relation to progression/award decisions, overall value and	N/A	N/A

consistency with regards to the programme(s) of study?		
To my knowledge, no content was provided by external providers.		

Departmental Response:

Board of Examiners Meeting:

Were you invited to attend the meeting?	Yes/All
Were you able to attend the meeting?	Yes/All
Was the meeting conducted to your satisfaction?	Yes/All
Were you satisfied with the recommendations of the Board of Examiners?	Yes/All
The examination board meeting was conducted in an efficient and collegial way.	

Were arrangements for degree classification (e.g. the scheme for the award of honours [UG] / the scheme for the award of pass, merit or distinction [PG]) are set at the appropriate level and applied consistently?
Yes, the degree classification boundaries were set at appropriate level and applied consistently across all students.

Were the College procedures governing mitigating circumstances and/or academic misconduct (e.g. plagiarism cases) were considered and applied fairly and equitably to all students?
Yes

Was consideration of borderline performances conducted fairly and equitably and in line with College Procedures?	
Yes	
If viva voce of potential borderline candidates were used,	
Were suitable arrangements made for you to conduct viva voce examinations?	
Was the purpose of conducting a viva voce examination and the criteria for selecting candidates for a viva voce clear?	

Departmental Response:

Academic Standards:

Please comment on the appropriateness of the standards set for the awards in relation to the Framework for Higher Education Qualifications, national subject benchmarks and any Professional Statutory and Regulatory Body (PSRB) or accrediting body requirements where relevant:

The Royal Statistical Society is the relevant accrediting body for this programme. They have developed an outline syllabus which builds on the relevant subject benchmarks. This programme is in-line with that structure which includes core components on probability and mathematical statistics. The optional modules are also in-line with the RSS structure. The material covered and the standards expected of subjects to achieve different awards are also consistent with subject marks and RSS expectations.

Please comment on the standards of student performance in the programme(s) or parts of programmes and whether these are comparable with standards achieved by students on similar programmes or parts of programmes in other UK higher education institutions of which you have experience:

The structure of MSc statistics programmes is quite consistent across different HEI. The standard expected in this programme are comparable to those expected at other HEI.

Please comment on the extent to which academic standards and standards of student performance across modules within the programme(s) are comparable:

The academic standards across different modules are comparable and there are clear expectations about what is expected. Student performance is comparable across the modules in the programme.

(For External Examiners not in their first year of appointment) - Are the standards of student performance across modules within the programme(s) comparable to those in previous cohorts?

Yes

Departmental Response:

Response to Your Last External Examiner Report:

Did you receive the formal written response to your previous External Examiner report (if applicable)	Yes/All
Are you satisfied that the issues raised in the previous report have been or are being addressed?	Yes/All

Departmental Response:

Overview, Recommendations and Good Practice:

Please outline any recommendations or suggestions for enhancement you would like to make with regards to these programme(s):

The programme is well run and some difficult issues (such as comparability of coursework only modules and coursework plus written examination modules and consistency of marking of dissertations) have clearly been thought through. The further development of streams is an interesting idea and a good way to bring structure to student learning. I do not have any specific recommendations.

Please outline any examples of good or innovative practice in learning, teaching and assessment you would like to highlight with regards to these programme(s):

An impressive number of optional modules involve cutting-edge, advanced statistical methods. Some students are able to produce an excellent MSc dissertations which is a credit to the supervision system within the programme.

Please provide an overview of the programme(s) and modules for which you are responsible as External Examiner, particularly in reference to the academic standards of the awards and/or the quality of learning opportunities provided to students:

The programme is divided into core and optional modules. The core modules cover the main concepts in probability and mathematical statistics. These are challenging modules covering difficult material. As these modules are examined in January, students often show a greater variability of achievement than in modules examined in May/June. This is usual in MSc Statistics programmes where the learning is partly cumulative. Optional modules cover a wide-range of topics including applied statistics, machine learning, finance, biostatistics, and further mathematical statistics. These are modules are well-structured and cover cutting edge topics. This is an important aspect of modern MSc Statistic programmes where advances in computation and modelling are rapidly taken up by industry and academia. These are particularly important learning opportunity for students. The project/dissertation module offers students a wide-range of topics from theoretical statistics and applied probability to applied statistics and machine learning. These also offer students access to deeper understanding of new ideas in statistics or an opportunity to work on a substantial application of statistics to a practical problem. This is again an excellent learning opportunity offer to students.

Departmental Response:

Overall Confidence Statements

The degree awarding body is maintaining the threshold academic standards set for its awards in accordance with the FHEQ and relevant Subject Benchmarks Statements.	Yes
The assessment process measures student achievement rigorously and fairly against the intended learning outcomes of the programme and is conducted in line with the College's policies and regulations.	Yes
The academic standards and the achievements of students are comparable with those in other degree awarding bodies of which you have experience.	Yes

Name and Position of Departmental Respondent:	
Date:	

External Examiner Report (2018-19 Academic Year)

Name of External Examiner	Mark Kambites
Name of Programme	MSc in Pure Mathematics

Programme and Module Information (supplied directly or via a link to an online portal):

Did you receive programme handbooks/specifications (including programme learning outcomes)?	Yes/All
Did you receive syllabus or module descriptors including learning outcomes at module level?	Yes/All
Did you receive details of the assessments?	Yes/All
Did you receive sufficient Information about the programmes/modules in order to fulfil your role?	Yes/All

Departmental Response:

Programme and Curriculum Design:

Please comment on the balance and content of the degree programme(s) in relation to stated learning outcomes:
The programme has a good selection of modules and a wide choice of possible dissertation topics. This allows the students to tailor their studies well to their particular backgrounds and interests, which is entirely appropriate for a programme at this level in pure mathematics.

Please comment in the coherence and currency of the programmes and the appropriateness of compulsory modules/units in relation to stated learning outcomes:
The programme is as coherent as a MSc in Pure Mathematics could reasonably be expected to be. There are (I believe) no compulsory modules apart from the dissertation, but this is as it needs to be, to accommodate an intake who inevitably have different backgrounds.

Please comment on the suitability of the programme design in relation to the following, where applicable: *relevant subject benchmarks, *Professional Statutory Regulatory Body (PSRB)
--

*Accrediting Body requirements

Insofar as I know only applicable thing here is the QAA MSOR subject benchmark. I believe the programme design is entirely suitable in relation to this.

Where applicable, please comment on the relevance and integration of placements (provision at a Placement Provider, for example, undergraduate Year Abroad or Year in Industry; placement activity contributing to delivery of a postgraduate project) to the overall programme and their contribution to the programme learning outcomes:

N/A

Where applicable, please comment on the relevance and integration of any collaborative modules (modules undertaken at other approved UK HEIs) to the overall programme and their contribution to the programme learning outcomes:

N/A

Assessment Strategy:

Please comment on the rigour, appropriateness and overall quality of the methods of assessment (including unseen written papers, essay/dissertations, orals, clinical examinations) in relation to the level of study and the intended learning outcomes:

The assessment methods are standard for this type of programme and as such entirely appropriate. The level of rigour and difficulty also seems to be appropriate for the level.

Please comment on the balance and comparability of assessment methods across modules of the same level:

The methods used for different modules (aside from the dissertation) are broadly similar. There are often differences in the difficulty of different exams, but the scaling system is generally effective in adjusting for this and ensuring good comparability of final marks.

Please comment on the suitability of the overall assessment load for the programme:

The assessment load is fairly standard for a programme of this nature, and I am not aware of any problems with it.

Departmental Response:

Drafting of Assessments:

Did you receive all of the necessary draft assessments for comment/approval?	Yes/All
Were the nature and level of the tasks appropriate?	Yes/All
Were suitable arrangements in place to consider your comments on the draft assessments?	Yes/All
Did you receive feedback on your comments?	Yes/All

Marking and Moderation (of examination scripts, assessed coursework, dissertation/project reports, etc.)

Did you receive a sufficient number of scripts and other assessed work, including those of first class, distinction, borderline and failed candidates, for scrutiny?	Yes/All
Was the general standard and consistency of marking appropriate?	Yes/All
Was there evidence that assessed work had been moderated internally, either through check marking or second marking?	Yes/All
Were the scripts marked in such a way as to enable you to see the reasons for the award of marks given?	Yes/All

Practical Examinations:

Were satisfactory arrangements made for the conduct of practical examinations?	N/A
Was the general standard and consistency of marking appropriate?	N/A

Oral Examinations:

Were satisfactory arrangements made for the conduct of oral assessments (e.g. presentations, poster presentations, etc...)?	Most/Usually
Was the assessment of such work appropriate and consistent?	Most/Usually
I know that oral examinations form a small part of the examination for dissertations, but on reflection, I realise I know much less about how they are conducted than I do about how written work is marked. While I have no reason to believe there are any problems in this area, it might be nice in future to receive slightly more detailed information about how orals work and how marks for them are arrived at.	

Please comment on the suitability of marking schemes/criteria and, where appropriate, model answers and the consistency with which these were applied:

Marking schemes are entirely appropriate, and seem to be applied consistently.

Please comment on the suitability of procedures for marking and moderation and the consistency with which these were applied:

The procedures for marking and moderation are generally suitable, and from what I have seen were consistently and diligently applied.

Please comment as to whether grade boundaries for the assessments are set at the appropriate level and applied consistency:

Grade boundaries are appropriate and consistently applied.

Please comment on the extent to which the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with College policies and regulations:

The processes are fair and rigorous. I do not have an encyclopaedic knowledge of College policies and regulations, but staff involved seem to understand them and take applying them seriously, so I have no reason to doubt that they are adhered to.

Programme Content Which Has Been Delivered and Assessed by Another Institution:

	Placement Activity (e.g. some or all of an undergraduate study abroad plan)	Collaborative Modules (modules undertaken at local partner institutions)
Was it clear in advance of the Board that students under consideration had undertaken content away from the College?	N/A	N/A
Were the procedures for incorporating marks obtained by students at another institution clear and consistently applied?	N/A	N/A
Was any such provision discussed at the Board of Examiners, particularly in relation to progression/award decisions, overall value and consistency with regards to the programme(s) of study?	N/A	N/A

Departmental Response:

Board of Examiners Meeting:

Were you invited to attend the meeting?	Yes/All
Were you able to attend the meeting?	Yes/All
Was the meeting conducted to your satisfaction?	Yes/All
Were you satisfied with the recommendations of the Board of Examiners?	Yes/All

Were arrangements for degree classification (e.g. the scheme for the award of honours [UG] / the scheme for the award of pass, merit or distinction [PG]) are set at the appropriate level and applied consistently?

Yes.

Were the College procedures governing mitigating circumstances and/or academic misconduct (e.g. plagiarism cases) were considered and applied fairly and equitably to all students?

Yes.

Was consideration of borderline performances conducted fairly and equitably and in line with College Procedures?

Yes.

If viva voce of potential borderline candidates were used,

Were suitable arrangements made for you to conduct viva voce examinations?

N/A

Was the purpose of conducting a viva voce examination and the criteria for selecting candidates for a viva voce clear?

N/A

Departmental Response:

Academic Standards:

Please comment on the appropriateness of the standards set for the awards in relation to the Framework for Higher Education Qualifications, national subject benchmarks and any Professional Statutory and Regulatory Body (PSRB) or accrediting body requirements where relevant:

I believe the standards are appropriate.

Please comment on the standards of student performance in the programme(s) or parts of programmes and whether these are comparable with standards achieved by students on similar programmes or parts of programmes in other UK higher education institutions of which you have experience:

The standards of student performance compare favourably with similar programmes in other HEIs of which I have experience.

Please comment on the extent to which academic standards and standards of student performance across modules within the programme(s) are comparable:

The scaling system is generally used effectively to ensure comparability of standards.

(For External Examiners not in their first year of appointment) - Are the standards of student performance across modules within the programme(s) comparable to those in previous cohorts?

Yes.

Departmental Response:

Response to Your Last External Examiner Report:

Did you receive the formal written response to your previous External Examiner report (if applicable)	Yes/All
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Are you satisfied that the issues raised in the previous report have been or are being addressed?	Yes/All
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Departmental Response:

Overview, Recommendations and Good Practice:

Please outline any recommendations or suggestions for enhancement you would like to make with regards to these programme(s):

I believe this programme is working well and currently have no particular recommendations or suggestions.

Please outline any examples of good or innovative practice in learning, teaching and assessment you would like to highlight with regards to these programme(s):

The programme is a fine example of a traditional MSc programme in pure mathematics. The main focus seems to be on high quality pedagogy using largely traditional methods (rather than innovation for its own sake), which I think is entirely appropriate for the nature of the programme and needs of the students who have chosen to study it.

Please provide an overview of the programme(s) and modules for which you are responsible as External Examiner, particularly in reference to the academic standards of the awards and/or the quality of learning opportunities provided to students:

All relevant issues are covered above.

Departmental Response:

Overall Confidence Statements

The degree awarding body is maintaining the threshold academic standards set for its awards in accordance with the FHEQ and relevant Subject Benchmarks Statements.

Yes

The assessment process measures student achievement rigorously and fairly against the intended learning outcomes of the programme and is conducted in line with the College's policies and regulations.

Yes

The academic standards and the achievements of students are comparable with those in other degree awarding bodies of which you have experience.

Yes

Name and Position of Departmental Respondent:

Date:

External Examiner Report (2018-19 Academic Year)

Name of External Examiner	Ionica Emilian Parau
Name of Programme	BSc in Mathematics

Programme and Module Information (supplied directly or via a link to an online portal):

Did you receive programme handbooks/specifications (including programme learning outcomes)?	Yes/All
Did you receive syllabus or module descriptors including learning outcomes at module level?	Yes/All
Did you receive details of the assessments?	Yes/All
Did you receive sufficient Information about the programmes/modules in order to fulfil your role?	Yes/All

Departmental Response:

Programme and Curriculum Design:

Please comment on the balance and content of the degree programme(s) in relation to stated learning outcomes:
The BSc/MSci Mathematics programmes are balanced, with content covering most of the Pure, Applied, Statistics and Computational areas, ensuring the achievement of learning outcomes.

Please comment in the coherence and currency of the programmes and the appropriateness of compulsory modules/units in relation to stated learning outcomes:
The compulsory core modules in the first two years are coherent and are a good basis for the optional modules in the last year(s). They are adequate and similar to other BSc/MSci programmes in the country.

Please comment on the suitability of the programme design in relation to the following, where applicable: *relevant subject benchmarks, *Professional Statutory Regulatory Body (PSRB) *Accrediting Body requirements
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The programme design follows the Maths subject benchmarks.

Where applicable, please comment on the relevance and integration of placements (provision at a Placement Provider, for example, undergraduate Year Abroad or Year in Industry; placement activity contributing to delivery of a postgraduate project) to the overall programme and their contribution to the programme learning outcomes:

The Year Abroad is very valuable and offer an excellent contribution to the overall Mathematical education of students.

Where applicable, please comment on the relevance and integration of any collaborative modules (modules undertaken at other approved UK HEIs) to the overall programme and their contribution to the programme learning outcomes:

N/A

Assessment Strategy:

Please comment on the rigour, appropriateness and overall quality of the methods of assessment (including unseen written papers, essay/dissertations, orals, clinical examinations) in relation to the level of study and the intended learning outcomes:

The methods of assessment (written examination, coursework, projects) are appropriate and rigorous.

Please comment on the balance and comparability of assessment methods across modules of the same level:

As in the previous years, the assessment methods were comparable (exams, CW or projects) and of similar standard overall for the modules of the same level.

Please comment on the suitability of the overall assessment load for the programme:

The overall assessment load for the programme is suitable for this type of programs in Mathematics.

Departmental Response:

Drafting of Assessments:

Did you receive all of the necessary draft assessments for comment/approval?

Yes/All

Were the nature and level of the tasks appropriate?	Yes/All
Were suitable arrangements in place to consider your comments on the draft assessments?	Yes/All
Did you receive feedback on your comments?	Yes/All
I have received the draft assessment well in advance and I had the opportunity to comment on them. At the meeting before the exam I could see that the lecturers have acted upon my comments.	

Marking and Moderation (of examination scripts, assessed coursework, dissertation/project reports, etc.)

Did you receive a sufficient number of scripts and other assessed work, including those of first class, distinction, borderline and failed candidates, for scrutiny?	Yes/All
Was the general standard and consistency of marking appropriate?	Yes/All
Was there evidence that assessed work had been moderated internally, either through check marking or second marking?	Yes/All
Were the scripts marked in such a way as to enable you to see the reasons for the award of marks given?	Yes/All
The dissertation/projects have been marked independently by two markers. The moderation panel then decided the final mark, paying special attention to the cases where the difference between two markers was significant. The fact that the two markers didn't have to agree a mark between them, and the moderation panel saw the raw marks of them is very positive. On the exam scripts, the marks have been checked by a second person.	

Practical Examinations:

Were satisfactory arrangements made for the conduct of practical examinations?	N/A
Was the general standard and consistency of marking appropriate?	N/A

Oral Examinations:

Were satisfactory arrangements made for the conduct of oral assessments (e.g. presentations, poster presentations, etc...)?	Yes/All
Was the assessment of such work appropriate and consistent?	Yes/All

Please comment on the suitability of marking schemes/criteria and, where appropriate, model answers and the consistency with which these were applied:

The marking schemes and the model answers were suitable and they were applied consistently.

Please comment on the suitability of procedures for marking and moderation and the consistency with which these were applied:

The marking and moderation was done in a consistent way across the modules.

Please comment as to whether grade boundaries for the assessments are set at the appropriate level and applied consistency:

The grade boundaries were at the appropriate level in most cases, with the help of PTEM system. The Internal Exam Board had overseen this process with very good results.

Please comment on the extent to which the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with College policies and regulations:

The assessment process is well designed and they fulfil very well the job of measuring the student achievement.

Programme Content Which Has Been Delivered and Assessed by Another Institution:

	Placement Activity (e.g. some or all of an undergraduate study abroad plan)	Collaborative Modules (modules undertaken at local partner institutions)
Was it clear in advance of the Board that students under consideration had undertaken content away from the College?	Yes/All	N/A
Were the procedures for incorporating marks obtained by students at another institution clear and consistently applied?	Yes/All	N/A
Was any such provision discussed at the Board of Examiners, particularly in relation to progression/award decisions, overall value and consistency with regards to the programme(s) of study?	Yes/All	N/A

Departmental Response:

Board of Examiners Meeting:

Were you invited to attend the meeting?	Yes/All
Were you able to attend the meeting?	Yes/All
Was the meeting conducted to your satisfaction?	Yes/All
Were you satisfied with the recommendations of the Board of Examiners?	Yes/All
The exam board meetings were conducted very professionally, giving us all the information we needed in reaching decisions.	

Were arrangements for degree classification (e.g. the scheme for the award of honours [UG] / the scheme for the award of pass, merit or distinction [PG]) are set at the appropriate level and applied consistently?
Yes, the arrangements for degree classification are set a the right level and were applied consistently.

Were the College procedures governing mitigating circumstances and/or academic misconduct (e.g. plagiarism cases) were considered and applied fairly and equitably to all students?
The change in the report of mitigating circumstances for various students, by removing the level of severity (0,1,2 from before) made the work of the Exam Board more difficult in reaching decisions.

Was consideration of borderline performances conducted fairly and equitably and in line with College Procedures?	
As in the previous years, the borderline candidates were considered in great detail, with External looking in great detail at their exam scripts and projects. They were treated fairly and equitably. As mentioned before, the change in regulation for mitigating circumstances made the discussion of some borderline cases more complicated than before.	
If viva voce of potential borderline candidates were used,	
Were suitable arrangements made for you to conduct viva voce examinations?	N/A
Was the purpose of conducting a viva voce examination and the criteria for selecting candidates for a viva voce clear?	N/A

<u>Departmental Response:</u>

Academic Standards:

Please comment on the appropriateness of the standards set for the awards in relation to the Framework for Higher Education Qualifications, national subject benchmarks and any Professional Statutory and Regulatory Body (PSRB) or accrediting body requirements where relevant:

The standards are appropriate for BSc/MSc in Mathematics, as defined on the QAA Benchmarks for Mathematics.

Please comment on the standards of student performance in the programme(s) or parts of programmes and whether these are comparable with standards achieved by students on similar programmes or parts of programmes in other UK higher education institutions of which you have experience:

The standards of student performance at Imperial College London are very high and they compare favourably with standards at different Universities in UK.

Please comment on the extent to which academic standards and standards of student performance across modules within the programme(s) are comparable:

There are some modules where students performed better than anticipated, and some where the results were poorer. However, the PTEM scaling removed most of these differences, so overall the student marks on the modules were comparable.

(For External Examiners not in their first year of appointment) - Are the standards of student performance across modules within the programme(s) comparable to those in previous cohorts?

Yes, they are.

Departmental Response:

Response to Your Last External Examiner Report:

Did you receive the formal written response to your previous External Examiner report (if applicable)	Yes/All
Are you satisfied that the issues raised in the previous report have been or are being addressed?	Yes/All

Again, the communication with Imperial College in relation to the Exams papers was excellent. The Board of Examiners was very well organised. The lunch with students before the Exam Board revealed that they are quite happy with how the programme and the modules are run at ICL. They appreciated the tutorials with lecturers and with peer students from higher years.

Departmental Response:

Overview, Recommendations and Good Practice:

Please outline any recommendations or suggestions for enhancement you would like to make with regards to these programme(s):

The programme seems to be running smoothly, so no suggested changes.

Please outline any examples of good or innovative practice in learning, teaching and assessment you would like to highlight with regards to these programme(s):

The diversity of optional modules in Year 3 and 4 is a very strong point of the programme. Also, the diversity of the dissertation/projects topics which is offered in Year 4 in Pure/Applied/Statistics is very valuable.

Please provide an overview of the programme(s) and modules for which you are responsible as External Examiner, particularly in reference to the academic standards of the awards and/or the quality of learning opportunities provided to students:

The 3rd/4th year Applied modules which are in my area of responsibility offer plenty of opportunities for students to have a very good introduction in diverse areas of Applied Mathematics. Overall, the BSc or MSci in Mathematics at ICL are of high academic standard.

Departmental Response:

Overall Confidence Statements

The degree awarding body is maintaining the threshold academic standards set for its awards in accordance with the FHEQ and relevant Subject Benchmarks Statements.

Yes

The assessment process measures student achievement rigorously and fairly against the intended learning outcomes of the programme and is conducted in line with the College's policies and regulations.

Yes

The academic standards and the achievements of students are comparable with those in other degree awarding bodies of which you have experience.

Yes

Name and Position of Departmental Respondent:

Date: