

The University of Leeds

EXTERNAL EXAMINER'S REPORT

ACADEMIC YEAR: 2015– 2016

Part A: General Information

Subject area and awards being examined

Faculty / School of:	Mathematics	
Subject(s):	<i>Applied Mathematics</i>	
Programme(s) / Module(s):	BS-MATH MMBS-MATH BS-MATH-ST BS-MATH&STAT MMBS-MA&ST BS-BLGY&MATH BS-MATH&MUSC BS-MNGT&MATH BS-ECON&MATH BS-ACMATH BS-MATH/FIN GDP-FIN&AC	BSc Mathematics MMath, BSc Mathematics BSc Mathematical Studies BSc Mathematics & Statistics MMath, BSc Mathematics & Statistics BSc Biology & Mathematics BSc Mathematics & Music BSc Management & Mathematics BSc Economics & Mathematics BSc Actuarial Mathematics BSc Mathematics with Finance Graduate Diploma Financial & Actuarial Mathematics
	<i>Plus all International and Industrial variants of these programmes</i>	
Awards (e.g. BA/BSc/MSc etc):	BSc, MMath, BSc and Graduate Diploma	

Name and home Institution / affiliation of Examiner

Completed report

The completed report should be attached to an e-mail and sent as soon as possible, and no later than six weeks after the relevant meeting of the Board of Examiners, to exexadmin@leeds.ac.uk.

Alternatively you can post your report to: **Head of Quality Assurance**
Room 12:81, EC Stoner Building
The University of Leeds, Leeds LS2 9JT

Part B: Comments for the Institution on the Examination Process and Standards

Matters for Urgent Attention

If there are any areas which you think require urgent attention before the programme is offered again please note them in this box

None.

Only applicable in first year of appointment

Were you provided with copies of previous relevant External Examiners' reports and the response of the School to these?

n/a

For Examiners completing their term of appointment

Please comment on your experience of the programme(s) over the period of your appointment, remarking in particular on changes from year to year and the progressive development and enhancement of the learning and teaching provision, on standards achieved, on marking and assessment and the procedures of the School

n/a

Standards

- 1. Please indicate the extent to which the programme Aims and Intended Learning Outcomes (ILOs) were commensurate with the level of the award**
 - *The appropriateness of the Intended Learning Outcomes for the programme(s)/modules and of the structure and content of the programme(s);*
 - *The extent to which standards are appropriate for the award or award element under consideration.*

Learning outcomes were appropriate to the level of award for all modules I was asked to look at, and standards are appropriate for a UK university mathematics programme.

- 2. Did the Aims and ILOs meet the expectations of the national subject benchmark (where relevant)?**
 - *The comparability of the programme(s) with similar programme(s) at other institutions and against national benchmarks and the Framework for Higher Education Qualifications.*

Yes. The standard of those modules I looked at, I found to be comparable to those at other UK institutions.

- 3. Please comment on the assessment methods and the appropriateness of these to the ILOs**
 - *The design and structure of the assessment methods, and the arrangements for the marking of modules and the classification of awards;*
 - *The quality of teaching, learning and assessment methods that may be indicated by student performance.*

The assessment is mainly by examination, as is appropriate for university mathematics, with a small project component. The examination levels and student performance indicate that the teaching and learning methods are of good quality.

- 4. Were students given adequate opportunity to demonstrate their achievement of the Aims and ILOs?**
 - *The academic standards demonstrated by the students and, where possible, their performance in relation to students on comparable courses;*
 - *The strengths and weaknesses of the students as a cohort.*

Yes. All examined modules contained some unseen material enabling students to demonstrate a genuine understanding of the ILOs.

- 5. For Examiners responsible for programmes that include clinical practice components, please comment on the learning and assessment of practice components of the curriculum**

n/a

- 6. Please comment on the nature and effectiveness of enhancements to the programme(s) and modules since the previous year**

It would be particularly helpful if you could also identify areas of good practice which are worthy of wider dissemination.

The overall programme has been strengthened and made more rigorous by the discontinuation of the MATH3000 module, which I felt allowed too many marks for 'soft' non-mathematical skills. The second year modules I looked at also seemed to be more uniform in breadth and quality compared to last year.

- 7. Please comment on the influence of research on the curriculum and learning and teaching**

This may include examples of curriculum design informed by current research in the subject; practice informed by research; students undertaking research.

It is clear that the research interests of staff strongly influence course structure at the higher levels, and there are a number of courses, particularly at level 5, that prepare students well for independent study at a higher level (e.g. PhD level).

- 8. Where the programme forms part of an Integrated PhD, please comment on the appropriateness of the programme as training for a PhD**

n/a

For Examiners involved in mentoring arrangements

- 9. If you have acted as a mentor to a new External Examiner or have received mentor support please comment here on the arrangements**

n/a

The Examination/Assessment Process

10. The University and its Schools provide guidance for External Examiners as to their roles, powers and responsibilities. Please indicate whether this material was sufficient for you to act effectively as an External Examiner.

Whether External Examiners have sufficient access to the material needed to make the required judgements and whether they are encouraged to request additional information.

Yes, sufficient material was promptly provided.

11. Did you receive appropriate documentation relating to the programmes and/or parts of programmes for which you have responsibility, e.g. programme specifications or module handbooks, marking criteria?

The coherence of the policies and procedures relating to External Examiners and whether they match the explicit roles they are asked to perform.

Yes.

12. Were you provided with all draft examination papers/assessments? Was the nature and level of the questions appropriate? If not, were suitable arrangements made to consider your comments?

Yes. Such comments that I made on examinations were responded to / taken into account by the examiners in a prompt fashion.

13. Was sufficient assessed / examined work made available to enable you to have confidence in your evaluation of the standard of student work? Were the scripts clearly marked/annotated?

Yes.

14. Was the choice of subjects for dissertations appropriate? Was the method and standard of assessment appropriate?

The mathematical projects I looked at were of an appropriate standard and were well-conceived.

15. Were the administrative arrangements satisfactory for the whole process, including the operation of the Board of Examiners? Were you able to attend the meeting? Were you satisfied with the recommendations of the Board?

Yes. The examinations process was administered very efficiently by all of the relevant staff at Leeds. The meeting, which I attended, was chaired with great efficiency and I was satisfied with the recommendations of the board.

16. Were appropriate procedures in place to give due consideration to mitigating circumstances and medical evidence?

Yes. Detailed evidence of mitigating circumstances was made available to the external examiners.

Other comments

Please use this box if you wish to make any further comments not covered elsewhere on the form

This year there was considerable debate between the examinations officers and the externals over whether marks should be 'signed off' by externals before the examination meeting, as has been the practice over the last several years. I was pleased that this issue was aired, and I hope that a satisfactory arrangement can be reached for next year that will allow examiners some flexibility if they subsequently find that a module has not been marked to their satisfaction.

<<>>

**Response to the Applied Mathematics External Examiner's Report
on Undergraduate Programmes in Mathematics, 2015/16**

We thank <<>> for <> work as an external examiner throughout this academic year, and particularly <> contributions at the Board of Examiners meeting in June. We are grateful for <> broad and positive comments on the standard of our programmes, the efficiency of our exams operation and the quality of staff teaching. We are pleased that <> finds the new final year projects to be an improvement on the previous scheme.

At the end of his report, <<>> raises administrative questions relating to the ordering of various components of the marks approval process. We have looked again at the way this operates, and after some internal discussion, have produced a new timetable that has been agreed by the External Examiners. We hope that this new approach will provide <<>>, and the other External Examiners, with assurance that they are able to raise any concerns they may have at the appropriate juncture.

<<>>

Head of School of Mathematics

October 2016

The University of Leeds
EXTERNAL EXAMINER'S REPORT
ACADEMIC YEAR: 2015– 2016

Part A: General Information**Subject area and awards being examined**

Faculty / School of:	Mathematics	
Subject(s):	<i>Applied Mathematics</i>	
Programme(s) / Module(s):	BS-MATH MMBS-MATH BS-MATH-ST BS-MATH&STAT MMBS-MA&ST BS-BLGY&MATH BS-MATH&MUSC BS-MNGT&MATH BS-ECON&MATH BS-ACMATH BS-MATH/FIN GDP-MATH GDP-FIN&AC	BSc Mathematics MMath, BSc Mathematics BSc Mathematical Studies BSc Mathematics & Statistics MMath, BSc Mathematics & Statistics BSc Biology & Mathematics BSc Mathematics & Music BSc Management & Mathematics BSc Economics & Mathematics BSc Actuarial Mathematics BSc Mathematics with Finance Graduate Diploma Mathematics Graduate Diploma Financial & Actuarial Mathematics
	<i>Plus all International and Industrial variants of these programmes</i>	
Awards (e.g. BA/BSc/MSc etc):	BSc, MMath, BSc and Graduate Diploma	

Name and home Institution / affiliation of Examiner**Completed report**

The completed report should be attached to an e-mail and sent as soon as possible, and no later than six weeks after the relevant meeting of the Board of Examiners, to exexadmin@leeds.ac.uk.

Alternatively you can post your report to: **Head of Quality Assurance**
Room 12:81, EC Stoner Building
The University of Leeds, Leeds LS2 9JT

Part B: Comments for the Institution on the Examination Process and Standards**Matters for Urgent Attention**

If there are any areas which you think require urgent attention before the programme is offered again please note them in this box

Given the substantial scaling for MATH3723 and MATH3723, the comments on the scaling, and the discussions on the courses, I think action in line with my comments below is necessary.

Only applicable in first year of appointment

Were you provided with copies of previous relevant External Examiners' reports and the response of the School to these?

Yes

For Examiners completing their term of appointment

Please comment on your experience of the programme(s) over the period of your appointment, remarking in particular on changes from year to year and the progressive development and enhancement of the learning and teaching provision, on standards achieved, on marking and assessment and the procedures of the School

Standards

1. **Please indicate the extent to which the programme Aims and Intended Learning Outcomes (ILOs) were commensurate with the level of the award**
 - *The appropriateness of the Intended Learning Outcomes for the programme(s)/modules and of the structure and content of the programme(s);*
 - *The extent to which standards are appropriate for the award or award element under consideration.*

In general, the programme is good, with a nice range of topics available for students.

The aims and standard are generally appropriate. The majority of examination papers seemed fair.
2. **Did the Aims and ILOs meet the expectations of the national subject benchmark (where relevant)?**
 - *The comparability of the programme(s) with similar programme(s) at other institutions and against national benchmarks and the Framework for Higher Education Qualifications.*

The national subject benchmarks are met. The standards are reasonable, as I am aware of other institutions which use second year examinations with a first section of simple questions. My own department, <<>>, does not currently do so.
3. **Please comment on the assessment methods and the appropriateness of these to the ILOs**
 - *The design and structure of the assessment methods, and the arrangements for the marking of modules and the classification of awards;*
 - *The quality of teaching, learning and assessment methods that may be indicated by student performance.*

Choosing four out of five questions in third year exams, and one compulsory question and a choice of three out of four questions for master's exams is appropriate.

I was rather surprised to find simple questions used for about 40% of marks in the second year exams, a structure which tends to focus on minimal achievement. Some of the hints provided in exam papers implied low expectations of students.
4. **Were students given adequate opportunity to demonstrate their achievement of the Aims and ILOs?**
 - *The academic standards demonstrated by the students and, where possible, their performance in relation to students on comparable courses;*
 - *The strengths and weaknesses of the students as a cohort.*

The range of examinations allowed students the opportunity to demonstrate their achievement
5. **For Examiners responsible for programmes that include clinical practice components, please comment on the learning and assessment of practice components of the curriculum**

N/A
6. **Please comment on the nature and effectiveness of enhancements to the programme(s) and modules since the previous year**

It would be particularly helpful if you could also identify areas of good practice which are worthy of wider dissemination.

My predecessor commented on delays in preparation of exams; there was no problem with that this year.
7. **Please comment on the influence of research on the curriculum and learning and teaching**

This may include examples of curriculum design informed by current research in the subject; practice informed by research; students undertaking research.

In statistics, an effective method to use research is through use of examples in lectures. As mathematics is a linear subject, it is not straightforward for current research to be sufficiently simplified to be accessible to undergraduates, and hence to be explicitly included.
8. **Where the programme forms part of an Integrated PhD, please comment on the appropriateness of the programme as training for a PhD**

N/A

For Examiners involved in mentoring arrangements

9. **If you have acted as a mentor to a new External Examiner or have received mentor support please comment here on the arrangements**

The organisation of material for borderline students was excellent.

The Examination/Assessment Process

10. **The University and its Schools provide guidance for External Examiners as to their roles, powers and responsibilities. Please indicate whether this material was sufficient for you to act effectively as an External Examiner.**

Whether External Examiners have sufficient access to the material needed to make the required judgements and whether they are encouraged to request additional information.

The material was sufficient.

11. Did you receive appropriate documentation relating to the programmes and/or parts of programmes for which you have responsibility, e.g. programme specifications or module handbooks, marking criteria?
The coherence of the policies and procedures relating to External Examiners and whether they match the explicit roles they are asked to perform.

Yes

12. Were you provided with all draft examination papers/assessments? Was the nature and level of the questions appropriate? If not, were suitable arrangements made to consider your comments?

Yes. Some questions for second year examinations focussed on short answers; while this is not unknown in mathematics degrees, it is a reflection of the lower standards of A-level mathematics feeding through to university level. Yes, suitable arrangements were made to consider my comments.

13. Was sufficient assessed / examined work made available to enable you to have confidence in your evaluation of the standard of student work? Were the scripts clearly marked/annotated?

No.

1) I was very surprised to be asked to sign off final marks before having seen scripts. I only signed after seeing the borderline sets of scripts.

2) I am concerned that scaling is too frequent and local. I would not wish to see the same modules scaled up each year.

3) There is no sign that scripts have been checked. At the exam board, we were told that the front of scripts were initialled by the checker, who might be a PhD student. I suggest that the School of Mathematics consider the approach used by several universities: Scripts are marked in red ink, with marks in the form '2/4', '3/3' circled for each section, and the total mark for the question '14/20' given. All of these marks are to be written in the left margin. Each page should be checked and ticked in green ink. A summary sheet for the examiner, moderator and checker to sign might be helpful. The summary could include a seven number summary of marks, the distribution of marks across classes, and the reason for any scaling given. For example, there might be a minor scaling of 39 to 40 after examining scripts and deciding that those at 39 have demonstrated sufficient knowledge to pass.

14. Was the choice of subjects for dissertations appropriate? Was the method and standard of assessment appropriate?

N/A

15. Were the administrative arrangements satisfactory for the whole process, including the operation of the Board of Examiners? Were you able to attend the meeting? Were you satisfied with the recommendations of the Board?

The organisation by <<>>, <<>> and <<>> of the whole process, including the two days in the School of Mathematics was very efficient. They were very helpful and efficient.

16. Were appropriate procedures in place to give due consideration to mitigating circumstances and medical evidence?

Yes

Other comments

Please use this box if you wish to make any further comments not covered elsewhere on the form

MATH372301: Statistical Theory.

The questions were more exercises in mathematics than statistical theory. The first two questions used unusual parametrisations for no good reason. I was bewildered by the second question which used an estimator for which no motivation was given. The third and fifth questions on Bayesian statistics read as if the lecturer was not really confident of the material. As the students chose the other three questions as far as they could, it seems that the teaching on Bayesian approaches was not very effective. It is also noticeable how few students took this module, which is a core topic for statistics. It was not clear why several students have zero for their course work.

MATH3733 and MATH3723

I am concerned by the extreme scaling for MATH3733 and MATH3723. I think the lecturer should have intensive training in English, both written and spoken, including voice coaching. I would also suggest some hours of instruction in teaching, with *several cycles* of observation, discussion, rehearsal of the next lecture, followed by observation. The material provided, including exercise sheets, example solutions and the textbook recommended and use of exercise classes. Perhaps comparison with MATH3714, which seems to run effectively, would be useful.

First year MATH1715, 1725: Introduction to Probability and Statistics

For Probability and Statistics, I would not expect to see major changes in the lectures or classes. The lecturer should focus on effective teaching of this core module. Large upward scaling gives the wrong message to students.

<<>>

**Response to the Statistics External Examiner's Report
on Undergraduate Programmes in Mathematics, 2015/16**

We thank <<>> for <> work as an external examiner throughout this academic year, and for <> contributions at the Board of Examiners meeting in June. We are grateful for <> broad and positive comments on the standard of our programme, and the efficiency of the exams operation.

<<>> comments on the content of some of the second year exams, suggesting that there are low expectations of students. The intention behind the exam structure, providing 40% of the marks on short questions, is to ensure that students have adequate opportunity to demonstrate a pass-level understanding of the examination; likewise, hints are intended to enable students to demonstrate the appropriate point of understanding by obviating unexaminable points of understanding. We continue to welcome <> comments on our exam papers at the stage where they undergo scrutiny.

<<>> also raises the administrative question of signing off module marks. We have discussed this internally and produced a revised timetable for External Examiner visits, which we hope will assure <<>>, and the other External Examiners, that they can raise any concerns they have at an appropriate stage.

In respect of modules that are repeatedly scaled, we have taken action by informing relevant Heads of Department and asking them to advise staff appropriately.

The issue of examination script annotation was discussed at a recent School TSEC. The approach <<>> describes is broadly the one that we instruct lecturers to follow. We agreed that we would strongly remind lecturers of the importance of ensuring that marks are clearly noted, and that each script is signed off explicitly by the transcription checker.

We note <<>> comments on individual modules. We always seek to deal with points about exams that are raised at the stage when they are undergoing scrutiny. Regarding training and staff development, a number of our staff have undertaken voice coaching and other training in the past and have found it a benefit. Our Head of School, Director of Student Education, and Quality Enhancement Officer are meeting with individual lecturers to come up with a mentoring plan to address the problems highlighted.

We agree that first year probability and statistics provision needs to provide a solid grounding in this important area of mathematics. As <<>> may be aware, it is currently in a transitional period as we move towards a more modern approach; hopefully the teething problems will be ironed out this year, and the changes will result in an improved understanding of probability and statistics for our students throughout their degrees.

<<>>

Head of School of Mathematics

October 2016

The University of Leeds
EXTERNAL EXAMINER'S REPORT
ACADEMIC YEAR: 2015– 2016

Part A: General Information**Subject area and awards being examined**

Faculty / School of:

Mathematics

Subject(s):

Pure Mathematics

Programme(s) / Module(s):

BS-MATH	BSc Mathematics
MMBS-MATH	MMath, BSc Mathematics
BS-MATH-ST	BSc Mathematical Studies
BS-MATH&STAT	BSc Mathematics & Statistics
MMBS-MA&ST	MMath, BSc Mathematics & Statistics
BS-BLGY&MATH	BSc Biology & Mathematics
BS-MATH&MUSC	BSc Mathematics & Music
BS-MNGT&MATH	BSc Management & Mathematics
BS-ECON&MATH	BSc Economics & Mathematics
BS-ACMATH	BSc Actuarial Mathematics
BS-MATH/FIN	BSc Mathematics with Finance
GDP-MATH	Graduate Diploma Mathematics

Plus all International and Industrial variants of these programmes

Awards (e.g. BA/BSc/MSc etc):

BSc, MMath, BSc and Graduate Diploma

Name and home Institution / affiliation of Examiner**Completed report**

The completed report should be attached to an e-mail and sent as soon as possible, and no later than six weeks after the relevant meeting of the Board of Examiners, to exexadmin@leeds.ac.uk.

Alternatively you can post your report to:

Head of Quality Assurance
Room 12:81, EC Stoner Building
The University of Leeds, Leeds LS2 9JT

Part B: Comments for the Institution on the Examination Process and Standards**Matters for Urgent Attention**

If there are any areas which you think require urgent attention before the programme is offered again please note them in this box

There are no urgent matters.

Only applicable in first year of appointment

Were you provided with copies of previous relevant External Examiners' reports and the response of the School to these?

Yes, where they were available.

For Examiners completing their term of appointment

Please comment on your experience of the programme(s) over the period of your appointment, remarking in particular on changes from year to year and the progressive development and enhancement of the learning and teaching provision, on standards achieved, on marking and assessment and the procedures of the School

Standards

- 1. Please indicate the extent to which the programme Aims and Intended Learning Outcomes (ILOs) were commensurate with the level of the award**
 - *The appropriateness of the Intended Learning Outcomes for the programme(s)/modules and of the structure and content of the programme(s);*
 - *The extent to which standards are appropriate for the award or award element under consideration.*

The content of the programme is appropriate for the intended learning outcomes. The standards set were in line with the awards given.

- 2. Did the Aims and ILOs meet the expectations of the national subject benchmark (where relevant)?**
 - *The comparability of the programme(s) with similar programme(s) at other institutions and against national benchmarks and the Framework for Higher Education Qualifications.*

The programme is similar to other such programmes across the UK.

- 3. Please comment on the assessment methods and the appropriateness of these to the ILOs**
 - *The design and structure of the assessment methods, and the arrangements for the marking of modules and the classification of awards;*
 - *The quality of teaching, learning and assessment methods that may be indicated by student performance.*

The assessment arrangements, teaching methods are sensible for assessing pure mathematics.

- 4. Were students given adequate opportunity to demonstrate their achievement of the Aims and ILOs?**
 - *The academic standards demonstrated by the students and, where possible, their performance in relation to students on comparable courses;*
 - *The strengths and weaknesses of the students as a cohort.*

The students were given good opportunities to demonstrate their understanding of the subject and to show what they had learnt. They performed as well as other students on similar programmes.

- 5. For Examiners responsible for programmes that include clinical practice components, please comment on the learning and assessment of practice components of the curriculum**

- 6. Please comment on the nature and effectiveness of enhancements to the programme(s) and modules since the previous year**

It would be particularly helpful if you could also identify areas of good practice which are worthy of wider dissemination.

- 7. Please comment on the influence of research on the curriculum and learning and teaching**

This may include examples of curriculum design informed by current research in the subject; practice informed by research; students undertaking research.

The research of the members of staff could be deduced from the examinations I assessed. It is clear that the teaching in Leeds is research led. This is particularly transparent in the final year projects.

- 8. Where the programme forms part of an Integrated PhD, please comment on the appropriateness of the programme as training for a PhD**

For Examiners involved in mentoring arrangements

- 9. If you have acted as a mentor to a new External Examiner or have received mentor support please comment here on the arrangements**

The Examination/Assessment Process

10. The University and its Schools provide guidance for External Examiners as to their roles, powers and responsibilities. Please indicate whether this material was sufficient for you to act effectively as an External Examiner.

Whether External Examiners have sufficient access to the material needed to make the required judgements and whether they are encouraged to request additional information.

My role was very clearly explained.

11. Did you receive appropriate documentation relating to the programmes and/or parts of programmes for which you have responsibility, e.g. programme specifications or module handbooks, marking criteria?

The coherence of the policies and procedures relating to External Examiners and whether they match the explicit roles they are asked to perform.

The documentation was appropriate.

12. Were you provided with all draft examination papers/assessments? Was the nature and level of the questions appropriate? If not, were suitable arrangements made to consider your comments?

Yes

13. Was sufficient assessed / examined work made available to enable you to have confidence in your evaluation of the standard of student work? Were the scripts clearly marked/annotated?

Yes, but the other roles we had to perform gave me limited opportunity to inspect the marked scripts.

14. Was the choice of subjects for dissertations appropriate? Was the method and standard of assessment appropriate?

Yes to both questions

15. Were the administrative arrangements satisfactory for the whole process, including the operation of the Board of Examiners? Were you able to attend the meeting? Were you satisfied with the recommendations of the Board?

Yes, yes and yes.

16. Were appropriate procedures in place to give due consideration to mitigating circumstances and medical evidence?

Yes.

Other comments

Please use this box if you wish to make any further comments not covered elsewhere on the form

<<>>

**Response to the External Examiner's Report
on Undergraduate Programmes in Mathematics, 2015/16**

We thank <<>> for <> thorough work in examining our programmes and for <> valuable contribution to the Board of Examiners meeting in June. We welcome <<>> favourable comments on the overall standards of our teaching and assessment. We are particularly pleased by <<>> comment on the clear evidence of research-led teaching in Leeds.

<<>>

Head of School of Mathematics

October 2016