

The University of Leeds
EXTERNAL EXAMINER'S REPORT
ACADEMIC YEAR: 2010– 2011

PART A: GENERAL INFORMATION*Subject area and awards being examined:*

School of: Mathematics	Subject(s): Applied Mathematics
Programme(s) / Module(s): Mathematics programmes	awards: (e.g. BA/BSc/MSc etc.) BSc, MMath and MSc

The completed report should be attached to an e-mail and sent as soon as possible, and no later than 6 weeks after the relevant meeting of the Board of Examiners, to exexadmin@leeds.ac.uk.

Alternatively you can post your report to:

Head of Academic Quality and Standards,
Academic Quality and Standards Team,
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.

N/A

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.

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.*

The aims and ILOs were in my opinion appropriate and of a comparable level to those at other institutions.

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.

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.*

These are appropriate. The papers were set and checked professionally, and the solutions, mark-schemes and context (bookwork, seen or unseen) were generally helpful. I did note that in some papers there seemed to be little or nothing that was not marked as "seen" – in principle I would hope to see some "unseen" questions on every paper. I also note that there was quite a wide range of rubrics that were almost the same. I have no problem with justified differences in exam rubrics, but I didn't see the justification for this. In particular, several papers gave full marks for four out of five questions but for some rubrics it was not clear what would happen if more than four were attempted- were the best four answers taken, the first four, or the sum of all marks with a cutoff at 100% etc? Similarly, it would be a help to students and examiners to have format templates for the exam papers that are strictly adhered to.

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, I believe so. The students in general seemed to be performing well in the applied mathematics modules that I was examining.

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. 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.

N/A (first year of examining)

7. 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.

Yes, there were some interesting and stimulating modules that were clearly informed by research interests within the school. In particular in the final years the students have a wide range of choices between modules.

The Examination Process

8. **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

9. **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?**

- *The coherence of the policies and procedures relating to external examiners and whether they match the explicit roles they are asked to perform.*

Yes

10. **Was sufficient assessed/examination work made available to enable you to have confidence in your evaluation of the standard of student work?**

Yes

11. **Were the administrative arrangements satisfactory for the whole process, including the operation of the Board of Examiners?**

Yes, the process was efficient and well-managed. In particular I believe the Examinations Monitoring Group is doing a good job of checking the performance of students within examinations.

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

Yes, though there was a temptation to repeat some discussion of mitigating circumstances during the exam board. I have no concerns that there was any unfairness. If the board was held anonymously then this would not happen and I think students could have more confidence that the process could not be influenced by e.g. presence or absence of a personal tutor at the board.

For Examiners involved in Mentoring Arrangements

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

Other Comments

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

N/A

The University of Leeds
EXTERNAL EXAMINER'S REPORT
ACADEMIC YEAR: 2010– 2011

PART A: GENERAL INFORMATION*Subject area and awards being examined:*

School of:	Subject(s):
Programme(s) / Module(s):	awards: (e.g. BA/BSc/MSc etc.)
Mathematics	BSc, MMath
Statistics	BSc, MMath
BSc Maths with Finance, BSc Mathematical Studies and related programmes (incl year away programmes)	

The completed report should be attached to an e-mail and sent as soon as possible, and no later than 6 weeks after the relevant meeting of the Board of Examiners, to exexadmin@leeds.ac.uk.

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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.

The programme has remained largely the same during the 4 years of my appointment, with only some minor changes to programmes and regulations which are fine. I welcome the new programmes on Actuarial Mathematics which started this academic year. The modules in Statistics and related topics on offer at Leeds are excellent, both in spread of topics and quality of teaching, the latter as particularly shown by good performances of students. In particular project work shows that students achieve a good level of skills and understanding. The standards achieved by the students are comparable with those at similar leading research oriented universities in the UK. One area in which the programme might have some gaps is (Mathematical) Operations Research, but with strong programmes in Finance and now also Actuarial Mathematics there is much on offer, both for more theoretically and more practically oriented students. The exams processes and administration are excellent and made my duties as external examiner

mostly straightforward. There is much good academic and administrative practice, and I support the current procedures and practices on marking and assessment. As before, however, I would prefer the marking process and Board of Examiners meeting to take place with full anonymity of the students. This has become the standard at, I believe, most UK universities, at Durham it functions very well and is seen as fair to all students. In particular where medical evidence is presented to the Board, in light of a final degree classification, anonymity is of benefit, and knowing that any such issues being discussed will be with full anonymity (except of course to a small group of people) may reduce a possible hurdle for some students to report special circumstances.

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 ILOs for the programmes are fully appropriate and the structure and content of the programmes are excellent. The standards are fully appropriate for the awards, with one worrying aspect that should be kept in mind and that is recognized throughout the UK Mathematical Sciences university departments: if university rules are strictly adhered to, the awards would not always be fully appropriate for the standards achieved by some students. The problem is the required number of credits. In Mathematics, more than in any other topic, one expects to see, and indeed sees, a substantial variation in exam performance from module to module for a single student. Due to the nature of the topic, marks near the top end are more common than in many other programmes, but also outliers to the very low marks occur far more regularly. It therefore happens quite regularly that a student just misses the required number of credits (for a specific year or in total), yet has achieved a module average which safely places this student in a good degree class. It is important that the Board of Examiners has the discretion to award an appropriate degree to such students based on their academic judgement. I am not suggesting that a change in rules is required, but it would be good to emphasize that the Board of Examiners should make such judgements and that their final judgement will be supported by the University. This is the case at Durham, and I know that several other UK universities go even further than this and formally allow the degree being awarded on the basis of the module average.

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 programmes are fully in line with the national subject benchmarks, and are at least of a similar quality and variety than those offered at other UK universities.

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 methods are fully appropriate, and the way the raw exam marks are scaled is fair. Judging by the students' performance in exams, the teaching and learning practices are excellent.

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.*

Students have the opportunity to demonstrate their achievement in the exams and in course work and projects, with all ILOs appropriately covered. The knowledge and skills demonstrated by students in, particularly, their final exams show that their education and training is of high standards and certainly compares well with that of other high quality UK universities. One weakness of the current and recent student cohorts, also recognized at Durham and other UK universities, is the tendency to 'study towards the exam', that is the apparent belief that passing exams is the main goal of university education. While this is understandable from the students' perspective, and probably in line with the nature of teaching at A-level, it is particularly harmful in Mathematics as topics in earlier years are prerequisites for those in later years and the latter can only be fully understood if one has a deep understanding of the former. This may require some reflection on the way Mathematics is taught and examined, and indeed how the goals of university education are communicated to students. As mentioned this is a UK-wide problem.

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. 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 programmes and modules did not change significantly from last year – there was no reason for a change.

7. 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 modules available in Statistics and related topics cover both general theory and specific topics which are close to research interests and activities of the Department's lecturing staff. Topics in the latter category are also often covered by students in project modules, and their performance in these projects is mostly impressive.

The Examination Process

8. **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.*

All materials provided were clear and all communications were efficient and effective.

9. **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?**

- *The coherence of the policies and procedures relating to external examiners and whether they match the explicit roles they are asked to perform.*

Yes

10. **Was sufficient assessed/examination work made available to enable you to have confidence in your evaluation of the standard of student work?**

Yes

11. **Were the administrative arrangements satisfactory for the whole process, including the operation of the Board of Examiners?**

Yes; it seems that the software used in this process is now mostly fully adequate – not yet perfect but some tedious problems that occurred during the meetings last year seem to have been resolved.

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

This remains a topic of some concern to me. As mentioned before, I strongly feel that anonymity would be of benefit in this process. Furthermore, the Board of Examiners meeting attended by the external examiners spent in my view too long on these issues, partly because it seems that more and more students put in special circumstances. At Durham, this increase in numbers has been drastically reversed (we had a fall from about 500 to about 50 this year!) by a new procedure where students must provide such evidence via their colleges, and a (near) immediate judgement on the impact is made and formally communicated. At department level, we have a small team of people responsible for dealing with such information during the year, presenting to the examiners meeting an overview with a four-point scale of impact (none – minor – severe – critical), whether this is on one or more specific exams or on general learning, and a suggestion with regard to effect on final degree classification. These judgements are considered by external examiners, and at the final BoE meeting it has reduced the discussions for such cases enormously while there was a strong feeling of fairness to all students. I should emphasize that I do believe that the students' circumstances were dealt with in a fair way.

For Examiners involved in Mentoring Arrangements

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

Other Comments

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

It has been a pleasure (well..) to serve Leeds University in this capacity during the last 4 years. I am impressed by the department and its staff, and I believe that students have an excellent learning experience in Mathematics, particularly also in Statistics, at Durham. Both academic and support staff have been very helpful and the processes are efficient. The move to make materials available online has been a great help to me, I would recommend a further reduction of the use of paper, ideally to `near zero`.

The University of Leeds
EXTERNAL EXAMINER'S REPORT
ACADEMIC YEAR: 2010– 2011

PART A: GENERAL INFORMATION

Subject area and awards being examined:

School of:	Subject(s):
Programme(s) / Module(s):	awards: (e.g. BA/BSc/MSc etc.)
Mathematics	BSc, MMath, MSc
Mathematical Studies	BSc
Mathematics with Finance	BSc
Statistics	BSc, MMath
Actuarial Mathematics	BSc
Mathematics and Computer Science	MMath

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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 matters that require urgent attention.

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.

Throughout the period of my appointment the School has maintained the variety and high standard of its pure mathematics modules, available at undergraduate and postgraduate level. These modules continue to make a vital contribution to all the School's degree programmes. There has also been a continual development of procedures; for example:

- Improvements to the procedure for responding to comments from external examiners on exam papers, and in the annual report.
- More appropriate and consistent differentiation in the assessment of "co-taught" modules at H-level and M-level.
- Improved checking of exam scripts.

- A considerably improved procedure for the dissemination of exam papers to external examiners.

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 aims and ILOs of the various programmes are certainly attainable by students on those programmes, and appropriate to the level of award (BSc, MMath or MSc). The pure mathematics modules specified for each programme ensure that sufficient content is available at the requisite level, whether H-level or M-level.

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 pure mathematics component of all the BSc and MMath programmes is certainly compliant with the QAA Benchmark Statement for Mathematics, Statistics and Operational Research (MSOR), and compares favourably with that of similar programmes across the sector.

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 majority of pure mathematics modules are assessed by closed examination, in accordance with standard practice for mathematics degree programmes across the sector. Detailed solutions and mark schemes are submitted to the external examiners along with the exam papers, and marked scripts may be viewed when the externals visit the School in June, to verify that marking is consistent and carried out according to the approved mark schemes. Scalings are applied algorithmically and produce accurate measurements of student attainment in individual modules, which are reflected in an appropriate final award.

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 examination papers for pure mathematics modules are very well constructed, giving thorough coverage of material and allowing students to perform at a variety of levels. The levels of achievement correlate with what one would expect to see on comparable courses, including those at my own institution.

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. 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.

There have been no major programme or module changes involving pure mathematics since 2009/10.

7. 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 interests of pure mathematicians in the School are reflected in the list of more advanced modules offered, some of which would not be available at many other institutions. The optional final year project module gives students the opportunity to exploit this link further.

The Examination Process

8. **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 provided was sufficient preparation for the external examiner role. I was also encouraged to request additional material, if needed.

9. **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?**

- *The coherence of the policies and procedures relating to external examiners and whether they match the explicit roles they are asked to perform.*

I received all appropriate documentation, which was very helpful. The role of external examiner is a clearly defined element of the School's examination procedures.

10. **Was sufficient assessed/examination work made available to enable you to have confidence in your evaluation of the standard of student work?**

I had access to all assessed work.

11. **Were the administrative arrangements satisfactory for the whole process, including the operation of the Board of Examiners?**

The administration was excellent, at all stages of the process.

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

Candidates with mitigating circumstances had been identified prior to the Board of Examiners, and were brought to the attention of the meeting by the Chair.

For Examiners involved in Mentoring Arrangements

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

Other Comments

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

Comments (some of a valedictory nature) for the consideration of the School:

- Although there has been a degree of harmonisation of rubrics and formats between different exam papers, there is still scope for further progress; for example, the Differential Geometry paper is still operating with a Section A/B format.
- Practice at York for moderating module marks is to rescale only the exam mark, and leave any coursework marks unchanged.
- It is certainly good to allow third year MMath students to take some M-level modules, but it may be wise to restrict these to the second semester (if practical).
- Although not without its charm, I have always considered the "jump" from Level 3 to Level 5 slightly bizarre!
- There is a case to be made for including an indication of the mark scheme on exam question papers; this has been standard practice in Mathematics at York for about 6 years, and is now virtually universal across all departments using

closed examinations.

- The preservation of candidate anonymity for as long as possible during the degree classification process is a university requirement at York, with the consideration of mitigating circumstances only possible at the very last stage. If this procedure were implemented at Leeds, it would mean, for example, the first part of the Examiners Meeting operating without candidates' names. Although I can't recall any occasions in a Leeds meeting where lack of anonymity prejudiced or unfairly influenced a final decision, it is a potential weakness of the system, which could also be exploited by external mischief makers.

**University of Leeds
School of Mathematics**

Response to the External Examiners' Reports for 2010/11

We begin by thanking our three Examiners, <<<>>, for their considerable work throughout the entire academic year, and especially for their thorough scrutiny of borderline candidates prior to the Board of Examiners. All three Examiners commented favourably on the organization of the meeting, as well as on our overall standards and level of achievement.

Specific Comments, and the School's Response

1. We are pleased about the positive comments from <<<>> and <<<>> concerning noticeable improvements in the software used at the Board of Examiners meetings.
2. We welcome the favourable comments about the recently introduced system allowing web-based distribution of exam papers and solutions to the Examiners.
3. As in previous years, <<<>> questioned the University's strict credit rules, which may result in students being awarded ordinary degrees despite having averages clearly above 40. However, where issues have been raised that relate to institutional policy, a senior officer of the University will respond and it is probably better that I leave the issue of the classification system and credit rules to that new procedure.
4. All three Examiners expressed their preference for conducting the Board of Examiners anonymously. This issue has been discussed at the School's Teaching and Learning Committee and the School will look into conducting degree classification anonymously in the future.
5. <<<>> remarks on current UK-wide tendency for the students to 'study towards the exam'. We recognise this problem and will keep discouraging students from relying too much on past exam papers.
6. Also, <<<>> commented that some exam papers consisted almost entirely of 'seen' questions. Our guidance to examiners currently says that all exam papers should contain some unseen material, and should also contain at least some material that would be challenging even for the best students. We will continue to remind the exam setters about that policy and the need to make exams less predictable, and will monitor the situation to see if further measures are necessary.
7. <<<>> repeated his suggestion that exam papers should indicate the allocation of marks for sub-questions. The School's Taught Student Education Committee has decided to look into implementing this suggestion.
8. <<<>> and <<<>> commented on a wide variety of different rubrics used in exam papers and suggested that the School should introduce standard templates for exam papers and adhere to them. We agree with these comments and will look into introducing standard exam templates and rubrics.
9. We are pleased about the positive comments about the clarity and uniformity of the scaling of the exam marks.
10. While supporting the option for Year 3 students to take level M modules, <<<>> suggests restricting this option to the second semester. The School's Taught Student Education Committee has discussed this issue and felt that this would have a negative impact on the module choices for the students on the MMath program and would

disadvantage students with particular interests. We believe that this is not a practical approach for our MMath programme.

11. All three Examiners comment that the Board of Examiners meetings sometimes discuss special circumstances in too great a detail. The School is planning to introduce some changes into the way the Special Cases Committee operates, with the aim to make consideration of special cases at the Exam Board more straightforward.

Prof Charles Taylor
Head of School of Mathematics
November 2011