

DIVISION OF MATHEMATICAL AND PHYSICAL SCIENCES

MSc in Mathematics and the Foundations of Computer Science Report of the Examiners (2005-2006)

Part I

1. Results

Entries	11
Passed	11
Distinctions Awarded	6

2. Vivas

All eleven candidates who submitted dissertations had vivas.

3. Number of scripts multiply marked

Each written assignment (mini-project) was marked by the lecturer for that course (who was therefore appointed as an assessor if he was not already an examiner) and moderated by the examiners. Each dissertation was doubly marked by two readers, and then moderated by the examiners.

4. Distribution of topics

Of the 29 topics available, the numbers taken were as follows:

<i>Michaelmas Term</i>	<i>Passed</i>	<i>Failed</i>
Algebras	5	0
Axiomatic Set Theory	2	0
Domain Theory	1	0
Group Theory	3	0
Lambda Calculus & Types	2	0
Lie Groups	1	0
Model Theory	2	0
Modular Forms	2	0
Representation Theory of Symmetric Groups	0	0
Applied Probability	0	0
Communication Theory	2	0
Computational Complexity	4	0
Concurrency	0	0
Logic of Multi-Agent Information Flow	5	0
Computer Aided Formal Verification	5	1

<i>Hilary Term</i>	<i>Passed</i>	<i>Failed</i>
Algebraic Number Theory	2	0
Analytic Topology	1	0
Godels Incompleteness Theorems	2	0
Lie Algebras	1	0
Further Set Theory ®	2	0
Profinite and Pro-p Groups ®	1	0
Graph Theory	4	0
Algebraic Coding Theory	1	0
Computational Group Theory ®	2	0
Categories, Proofs and Programs	8	0
Elliptic Curves	3	0

Quantum Computer Science	1	0
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<i>Trinity Term</i>	<i>Passed</i>	<i>Failed</i>
Computational Number Theory ®	1	0
Automata, Logic and Games ®	1	0

Courses marked ® were reading courses.

There was one case of a written assignment being given a fail grade, and one case where no mark was given on the recommendation of the Proctors.

5. Assessors

There were 32 assessors appointed to help with the examination. Of these, 3 were not required at all and 7 were called upon to assess dissertations (including taking part in vivas).

B. Changes in examination methods and procedures this academic year

Two expert assessors read each of the dissertations. Each dissertation, together with the assessors' reports, was then sent to one of the two external examiners to monitor standards. All the examiners attended the vivas, which were held on 20 September 2006, and one assessor for each project was also in attendance. This procedure worked well and was felt to produce good evaluations of the candidates' work. In some cases, however, the expert assessor's report was not made available to the external examiners until quite late. This should be avoided in future.

C. Changes in examining methods and procedures envisaged

Generally the existing procedures worked well, so no major changes are envisaged at this point.

This year, however, at least two candidates started doctoral degree courses at US universities before the date of the MFoCS vivas. In consultation with the supervisory committee, the examiners considered the question of whether an early viva would be possible for such students but rejected this as unworkable in practice. Assessors and examiners are often not available earlier in the summer, and it may be problematic if a low or failing grade is awarded to a candidate who submits a dissertation early for an early viva. The examiners did consider the possibility of holding the viva for such students by videoconference, and the Proctors were asked to approve one such viva this year. Difficulties in setting up a videoconferencing arrangement that would satisfy the proctor's conditions meant that this plan had to be abandoned in this instance. However this remains a possibility for future cases of this kind.

Part II

29 courses were offered, of which five were reading courses. Only 2 courses failed to attract any students. The performance was of a high standard, with 59 leading alphas, 10 betas, 4 gammas and 1 Fail, (including dissertations). The overall standard of dissertations was very high this year. Five dissertations were awarded a grade of alpha, one a grade of alpha+, and two a grade of alpha-. In only one case was a good dissertation in terms of results was marred by a notably low standard of presentation.

The dissertation topics, which all had some (theoretical or practical) computing aspect to them, were as follows:-

- On the Undecidability of Universality for Timed Automata with Minimal Resources
- Colouring of Random Graphs
- Computation of Polycyclic Quotients of Finitely Presented Groups
- Descent Via Isogeny on Elliptic Curves with Large Rational Torsion Subgroups
- A Logic for Knowledge Communications
- Group Structure of Elliptic Curves and Mordell's Theorem
- Subgroup Structure of Some Analytic Pro-p Groups
- Provability Logic in Set Theory
- Canonical Forms for Matrices under the Action of some Classical Groups
- Applications of Bounded Treewidth in Network and Database Theory
- Extending Public Announcement Logic

Each candidate showed a good knowledge of his or her chosen area in the oral examination.

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