

DIVISION OF MATHEMATICAL AND PHYSICAL SCIENCES

MSc in Mathematics and the Foundations of Computer Science Report of the Examiners (2006-2007)

Part I

1. Results

Entries	11
Passed	10
Distinctions Awarded	5
Failed	1

2. Vivas

Ten 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 marked by one reader, and then moderated by the examiners.

4. Distribution of topics

Of the 28 topics available, the numbers taken were as follows:

<i>Michaelmas Term</i>	<i>Passed</i>	<i>Failed</i>
Algebras	4	0
Analytic Number Theory	3	0
Analytic Topology	0	0
Godels Incompleteness Theorems	1	0
Lambda Calculus & Types	1	0
Lie Algebras	1	0
Topology and Groups	1	0
Applied Probability	1	0
Categories, Proofs and Programs	1	0
Communication Theory	0	0
Computational Complexity	7	0
Concurrency	0	0
Graph Theory	8	0
Logic of Multi-Agent Information Flow	4	0
Computer Aided Formal Verification	4	0

<i>Hilary Term</i>	<i>Passed</i>	<i>Failed</i>
Algebraic Number Theory	3	0
Axiomatic Set Theory	0	0
Model Theory	1	0
Algebraic & Relational Methods for Propositional Logics	0	0
Domain Theory	1	0
Representation Theory of Symmetric Groups	3	0
Probabilistic Combinatorics	1	0
Automata, Logic and Games	6	1
Computational Algebra	0	0

Elliptic Curves	4	0
Quantum Computer Science	2	0
Theory of Data and Knowledge Bases	5	0

<i>Trinity Term</i>	<i>Passed</i>	<i>Failed</i>
Computational Number Theory	1	0

There was one case of a written assignment being given a fail grade.

5. Assessors

There were 31 assessors appointed to help with the examination. Of these, 6 were not required at all and 8 were called upon to assess dissertations (including taking part in vivas).

B. Changes in examination methods and procedures this academic year

One expert assessor read each of the dissertations and wrote a report; an additional brief report was requested from the supervisor, to help measure the extent of each candidate's contribution. Each dissertation, together with the reports from the assessors and supervisors, was then sent to one of the two external examiners to monitor standards. All the examiners attended the vivas, which were held on 21 September 2007, and the assessor for each project was also in attendance. This procedure worked well and was felt to produce good evaluations of the candidates' work.

C. Changes in examining methods and procedures envisaged

Generally the existing procedures worked well. However, there was some preliminary discussion of USMs (which are required for next year). It was generally felt that the award of a distinction should be a matter of judgement for the examiners, based on overall performance across miniprojects, dissertation and viva, rather than being determined by a numerical formula.

Part II

28 courses were offered. 5 courses failed to attract any students. The performance was of a high standard, with 51 leading alphas, 20 betas, 2 gammas and 1 Fail, (including dissertations). The overall standard of dissertations was very high this year. Three dissertations were awarded a grade of alpha, one a grade of alpha+, and one a grade of alpha-.

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

- Abstract Semantics for a Simple Quantum Programming Language
- On model checking using probabilistic Büchi automata and the emptiness problem
- Model Checking on Pushdown Systems
- Efficiently generating hypergraph-automorphism in relation with finding symmetries in CSP instances
- The Sum of Euler's ϕ Function in Arithmetic Progressions
- Meromorphic Continuation of Euler Products
- 2-Descents and Visualisation techniques for Curves of Genus 2
- An elementary proof of the Hasse Inequality and certain other topics in the Theory of Elliptic Curves
- Data Exchange and Schema Mappings
- Modal Logics for Knowledge, Belief & Belief Revision: New Concepts, Expressivity Results & Axioms

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

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