

DIVISION OF MATHEMATICAL PHYSICAL AND LIFE SCIENCES

MSc in Mathematics and the Foundations of Computer Science
Report of the Examiners (2017-18)

PART I

A: Statistics

1. Numbers and percentages in each category

Category	Number			Percentage (%)		
	2017/18	2016/17	2015/16	2017/18	2016/17	2015/16
Distinction	15	11	10	75	50	47.6
Pass	2	11	10	10	50	47.6
Fail	1	0	0	5	0	0
Failed TT hurdle	0	0	1	0	0	4.8
Entries	20	22	21	100	100	100

2. Vivas

The 17 who submitted dissertations also had viva examinations.

3. Number of scripts multiply marked

Each written assignment (mini project) was marked by the lecturer of that course (who was therefore appointed as an assessor if they were not already an examiner) and was also marked by a second assessor in accordance with the examination conventions. All of the marks were moderated by the examiners.

Each dissertation was marked by the dissertation supervisor (who was therefore appointed as an assessor) and was also marked by a second assessor. These marks were then moderated by the examiners taking into consideration comments provided by both markers.

B: New examination methods and procedures this academic year

The second assessors were required to be present at the vivas instead of the dissertation supervisors.

C: Changes in examining methods and procedures envisaged

None.

D: Examination Conventions

The conventions are available on the course webpage <https://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mfocs> and are circulated to students along with Notices to Candidates.

PART II

A: General Comments

43 courses were offered. 8 courses failed to attract any students. The overall performance was of a high standard with 18 mini-project scripts receiving marks of 90 and above, 35 receiving 80 and above, 30 receiving 70 and above, 8 receiving 60 and above, 4 receiving 50 and above, and 2 failures. The overall standard of dissertations was very high this year. 13 were awarded a grade of 80 and

above, 2 at 70 and above, 2 at 60 and above. No students were awarded marks under 60. There were 29 assessors appointed to contribute to the examination.

Examination Recommendations

None.

B: Breakdown of results by gender

	Total	Male	Female
Entries	20	17	3
Passes awarded	2	2	0
Distinctions Awarded	15	12	3

C. Distribution of topics

Of the 43 topics available, the numbers taken were as follows:

Michaelmas Term	Passed	Failed
Algebraic Geometry	3	0
Algebraic Topology	1	0
Analytic Topology	-	-
Applied Probability	-	-
Automata, Logic and Games	4	0
Categories Proofs & Processes	12	0
Combinatorics	5	0
Communication Theory	-	-
Computational Game Theory	3	0
Computer-Aided Formal Verification	1	0
Elliptic Curves	4	0
Foundations of Computer Science	4	0
Graph Theory	2	0
Homological Algebra	1	0
Introduction to Cryptology/Cryptography	3	0
Introduction to Representation Theory	1	0
Lie Algebras	1	0
Model Theory	4	0
Topology and Groups	1	0

Hilary Term	Passed	Failed
Algebraic Number Theory	1	0
Advanced Cryptology/Cryptography	3	0
Analysing Logics using tree Automata (reading course)	2	0
Analytic Number Theory	-	-
Axiomatic Set Theory	2	0
Categorical Quantum Mechanics	5	0
Commutative Algebra	-	-
Computational Algebraic Topology	2	0
Computational Learning Theory	1	0
Distributional Models of Meaning * (reading course)	4	0
Geometric Group Theory	1	0

Gödel's Incompleteness Theorems	-	-
Infinite Groups	2	0
Introduction to Schemes	-	-
Lambda Calculus and Types	4	0
Modular Forms	3	0
Networks	1	0
Non-Commutative Rings	-	-
Probabilistic Combinatorics	3	0
Probability and Computing	4	0
Quantum Computer Science	6	0
Rep Theory of Semisimple Lie Algebras	-	-

Trinity Term	Passed	Failed
Concurrency	1	1
Computational Number Theory * (reading course)	1	1

D: The dissertation topics were as follows:-

- Arithmetic Geometry in Curves of Genus Larger Than 1
- A Compositional Distributional Model for Ambiguous Grammars
- An investigation into Liquid Democracy and the affect of effort on collective decision making
- Categorical Semantics of Time-Travel and its Paradoxes
- Combinatorial Structures and Lambda Calculi
- Comparing Two Cohomological Obstructions for Contextuality
- Cryptanalysis of WalnutDSA
- Decision Procedures for Guarded Logics
- Efforts in the Direction of Hilbert's 10th Problem
- Kähler Geometry, Elliptic Equations and the Calabi-Yau Theorem
- On Surjective and Lower-Bounded General-Valued Constraint Satisfaction Problems
- On the Sparsifiability of Valued Constraint Satisfaction Problems
- Proof and Model Theoretic Investigations into Higher-Order Constrained Horn Clauses
- Stability and Exploitation in Differentiable Games
- Stable Groups
- Topics in Categorical Quantum Semantics of Natural Language
- Towards Lattice-Based Fuzzy Signatures

Each candidate showed a good knowledge of his or her chosen area in the oral examination. Instead of inviting the dissertation supervisors, this year the Supervisory Committee recommended inviting the second assessors to attend the vivas and where they were unable to attend they appointed a representative.

E: Names of members of the board of examiners

C. Cirstea
T. Lukasiewicz
J. Pila (Chair)
I. Tomasic