DIVISION OF MATHEMATICAL PHYSICAL AND LIFE SCIENCES

MSc in Mathematics and the Foundations of Computer Science
Report of the Examiners (2021-22)

PART I

A: Statistics

1. Numbers and percentages in each category

Category	Percentage (%)					
	2021-22	2020-21	2019-20	2021-22	2020-21	2019-20
Distinction	10	15	13	62	65	93
Merit	4	3	0	25	13	0
Pass	2	3	1	13	13	7
Fail	0	2	0	0	9	0
Failed TT hurdle	0	0	0	0	0	0
Entries	16	23	14	100	100	100

2. Vivas
The 16 students who completed dissertations all had vivas with two examiners and their second assessor (where the second assessor was available).

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, except for where the assignment had an accompanying mark scheme, this was marked by the lecturer of that course, 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
There were no new methods or procedures

C: Changes in examining methods and procedures envisaged
In the next academic year, submitted mini projects will be screened by Turnitin (plagiarism) software which will compare them to a wide range of material (both published and unpublished) and to the work of other candidates. The Examiners will be notified of the extent of any textual matches discovered by Turnitin, and will consider, for instance, whether any text that a candidate has copied from elsewhere is properly identified and the source duly acknowledged.

D: Examination Conventions
The conventions are available on the course webpage
https://www.maths.ox.ac.uk/members/students/postgraduate-courses/msc-mfocs/information-current-students are circulated to students along with Notices to Candidates.

PART II

A: General Comments

48 courses were offered. 15 courses failed to attract any students. The overall performance was of a high standard with 10 mini-project scripts receiving marks of 90 and above, 33 receiving 80 and above, 28 receiving 70 and above, 16 receiving 60 and above, 5 receiving 50 and above, and 4 failures. The overall standard of dissertations was high this year; 2 were awarded a grade of 90 and above, 5 at 80 and above, 7 at 70 to 80, 1 at 60 to 70, 1 student was awarded marks under 60. No overall fails.

Examination Recommendations

At the final examiners meeting;

- It was noted that it would be useful to provide the Examiners with data on average mark in relation to number of students submitted at future meetings.
- It was agreed that the marking criteria needs to be clearer to ensure the students are clear on what the marker is expecting.
- It was agreed to include some good practice in the guidance to assessors on setting and marking, to help maintain some consistency.
- It was agreed to include a template to assessors including some examples of good feedback.

B: Breakdown of results by gender

	Total	Male	Female	Non-Binary
Entries	16	10	6	0
Passes awarded	2	0	2	0
Merits awarded	4	2	2	0
Distinctions Awarded	10	8	2	0

C. Distribution of topics

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

Michaelmas Term	**Passed**	**Failed**
Lie Algebras	0	0
Model Theory	2	0
Introduction to Representation Theory	0	1
Algebraic Topology	0	0
Analytic Number Theory	5	0
Analytic Topology	1	0
Topology and Groups	1	0
Differentiable Manifolds	0	0
Category Theory	2	0
Infinite Groups	0	0

Homological Algebra	0	0
Algebraic Geometry	1	0
Categories, Proofs, and Processes (CS)	1	1
Computer Aided Formal Verification (CS)	2	2
Graph Theory	6	0
Integer Programming	0	0
Quantum Processes and Computation (CS)	7	1
Automata, Logic, and Games (CS)	1	0
Bayesian Statistical Probabilistic Programming (CS)	1	0
Combinatorics	12	0

14+6 not taken

Hilary Term	**Passed**	**Failed**
Algebraic Number Theory	0	0
Commutative Algebra	0	0
Godel Incompleteness Theorems	0	0
Lambda Calculus and Types (CS)	1	0
Lie Groups	0	0
Axiomatic Set Theory	1	0
Geometric Group Theory	0	0
Introduction to Schemes	1	0
Non Commutative Rings	0	0
Low Dimensional Topology	0	0
Representation Theory of Semisimple Lie Algebra	0	0
Computational Complexity (CS)	1	1
Information Theory	1	0
Introduction to Quantum Information	4	0
Additive Combinatorics	1	0
Analysing Logics using Tree Automata* (CS)	0	0
Computational Algebraic Topology	1	0
Computational Game Theory (CS)	4	0
Elliptic Curves	3	0
Networks	3	0
Probabilistic Combinatorics	8	0
Probability and Computing (CS)	8	0
Quantum Software (CS)	3	0

14+9 not taken

Trinity Term	**Passed**	**Failed**
Topological Groups	1	0
Concurrency (CS)	1	0
Applied Category Theory*	1	0
Cryptography	3	0

4 taken

D: The dissertation topics were as follows:

S-unit attacks on structured lattice-based cryptosystems
Undoubling the ZX-calculus Classical Simulation of Quantum Circuits
Deformation Theory of Galois Representations
Slow mixing of the edge dynamics in the Potts model on random regular graphs
Louvain and Leiden: Investigating Modularity-Based Community Detection
Sparsification of Submodular Functions
Graphical Stabilizer DecompositionsFor Counting Problems
Chromatic number of triangle-free graphs
Some Model Theoretic Results for Set Theory
Dynamics of optimal group testing strategies for COVID-19
Generating random supersingular Elliptic Curves using modular polynomials
Notions of Agreement and Disagreement in Social Choice
Qudit ZH-Calculus
Clonal Interference: Efficiently Approximating Fixation Probabilities in the Moran Process with Multiple Types
General Spin Systems on Bipartite Graphs with Unbounded Degree
Switchings in configuration model, with applications in random regular graphs

Each candidate showed a good knowledge of his or her chosen area in the oral examination. Instead of inviting the dissertation supervisors, the second assessors were invited to attend the vivas.

G: Names of members of the board of examiners

A. Kissinger (Chair)
O.Riordan
I. Potapov
J. Wolf