

# MSM3P17 Computability

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This course comprises of twenty-two lectures and five back-up sessions and gives an introduction to computability and complexity theory: the aim is to provide a rigorous and robust notion of problems which are solvable by computer, and also a notion of which problems can be solved efficiently.

## Syllabus

Computability:

- Turing machines and computable functions,
- Space and time complexity,
- ‘equivalent’ models of Turing machines (including nondeterminism and multiple tapes),
- undecidable problems

Complexity:

- the classes P and NP, PSPACE and EXP
- self-reducibility,
- NP-completeness and Cook’s theorem,
- polynomial reductions

## Assessment

The course is assessed both continually and by final examination. The continuous part of the assessment will be based on your performance on the work handed in from the 5 example sheets and will contribute 20% to your final grade of this half of the module. The final examination will take three hours and contribute 80% to your final grade.

## Texts

The material in this course is covered by

- Hopcroft, Motwani and Ullman ‘Introduction to Automata theory, languages and Computation’ (Addison Wesley, this is a new edition of the same book by the first and third author)
- Lewis and Papadimitriou ‘Elements of the theory of Computation’ (Prentice-Hall)
- J. Martin, Introduction to languages and the theory of computation (McGraw Hill)
- T. Sudkamp, Languages and machines: an introduction to the theory of Computer Science (Addison Wesley)

and several other books in the library with similar titles (usually with class-mark QA267).