UNIVERSITY OF CAMBRIDGE COMPUTER LABORATORY

Computer Science Tripos, and
M.Phil in Advanced Computer Science

Selective List of Recommended Reading for Taught Courses

September 2019

This list aims to complement the complete reading lists which are compiled for the M.Phil in Advanced Computer Science, and the Computer Science Tripos. It is intended to satisfy a need expressed by some librarians for more guidance on the most useful books for these degree courses. It is hoped that this list will be particularly helpful to those expanding or planning major changes to their computer science collections.

Very often the lists of “most borrowed” do not give an accurate or complete account of the most useful books. The present list has therefore been compiled based on a number of criteria such as the librarian’s experience of the books requested by students, the coverage of course content, and how closely the book’s approach matches that of the lecturer.

Priority has been given to those books which are suitable for both the undergraduate and M.Phil courses, but this has not always been possible. In this case, therefore, books have been identified as being suitable for one particular group. Beyond this, the list has been organised into four broad areas of computer science to give a better indication of the applicability of individual titles.

Systems

This topic includes both the design of physical hardware, and the system software necessary for the computer’s basic operation. It includes undergraduate courses such as Operating systems, Digital electronics and Computer design. The M.Phil courses Advanced topics in computer architecture and Advanced operating systems are similar, but go much further. Topics such as databases and computer networking are often covered here.

Gregg, B. & Mauro, J. (2011). DTrace: dynamic tracing in Oracle Solaris, Mac OS X and FreeBSD. Prentice Hall. [M.Phil only]


Lemahieu, W., Broucke S. van den & Baesens, B. Principles of database management. Cambridge University Press. ISBN 9781107186125 [undergraduate only]

McKusick, M.K., Neville-Neil, G.V., and Watson, R.N.M. (2014). The Design and implementation of the FreeBSD operating system. (2nd ed.). Pearson Education. ISBN 9780321968975
This topic covers programming languages, as well as their design and implementation. This includes the popular undergraduate courses like *Programming in C* and *Java*. By the time students reach the M.Phil, it is assumed that they will have learned the practical aspects of programming, and courses cover more specialised topics like *Multicore semantics and programming*.


**Theory**

Theoretical topics cover the application of formal logic and mathematics to provide a rigorous foundation for computer science. This enables the development of precise specifications of hardware and software, while making it possible to reason about systems, or prove them correct. This includes undergraduate courses like *Logic and proof*, *Types* and *Denotational semantics*. There are also a number of theoretical options for the M.Phil such as *Category theory* and *Formal verification*.


Awodey, S. (2010). *Category theory*. Oxford University Press (2nd ed.). [M.Phil only]


Applications

Applications is a broad topic covering practical aspects of computing, and the interface between computer science and other disciplines. Amongst others, this includes the popular courses on machine learning, based on the statistical classification of patterns, and natural language processing. This includes the undergraduate courses *Machine learning and Bayesian inference* and *Formal models of language*. These topics are very popular with M.Phil students too, where there are many similar courses available.


Jurafsky, D. & Martin, J. (2008). *Speech and language processing*. Prentice Hall.


