

Preparing for the MSc**2011**

Welcome to the MSc, and, for those of you who are new here, to the University and to Bristol.

The units on this MSc cover advanced material and therefore assume that you are familiar with some fundamental concepts and topics. The following gives details of what these are for certain units. We also list the textbooks used so that you can check whether you have the required background knowledge, or read about the subject before the programme starts. There are some notes on how the department works and what is expected of you. If you require any further information then contact the MSc course director or the relevant unit director. The website for this degree is <http://www.cs.bris.ac.uk/Teaching/MachineLearning/>

Programming requirements. You will need to be proficient in at least one major programming language such as C, C++, or Java. Our recommended textbook for C is: *C by Dissection: The Essentials of C Programming*. Al Kelley and Ira Pohl, Addison-Wesley. Our recommended textbooks for Java are *Objects First with Java - A Practical Introduction using BlueJ*. David J. Barnes & Michael Kolling, Prentice Hall / Pearson Education, and *Java: How to Program*. Deitel and Deitel, Prentice Hall. Get the most recent edition you can find. These books are quite different in style. You can find more information on these and other java books at <http://www.cs.bris.ac.uk/Teaching/Resources/COMSM0103/>

Your choice of units. You can find out which units are optional and which are required by visiting <http://www.cs.bris.ac.uk/Teaching/MachineLearning/> (Prior to October you will need to click the >> symbol at the top of the page to advance the system to the academic year you will be entering.) Note that you will have to take some combination of optional units in order to have a sufficient number of credits. If there are optional units you should be registered for all of them at the start of the semester so you can try as many as you like. Within a couple of weeks of the start of the semester you will be asked which units you want to take for credit and you will be unregistered from the others.

Programming Test. In October there will be a programming test to help assign you to either the F (Foundation) or E (Experienced) stream. The difference is only that in the Autumn the F stream does a 20 credit C programming unit while the E stream does two 10-credit machine learning units. You can write the test in either C or Java. The test is about basic programming concepts such as loops and arrays. You will be asked to complete some short programs but you do not have to compile them so typos and other minor problems do not matter. If you are comfortable with loops and arrays you do not need to prepare anything specific.

Communicating with the department. We make extensive use of electronic communication: coursework is set and submitted online, marks appear online, timetables are online, and there are forums to discuss courses. Please check your email every day during your studies as e.g. there may be a last-minute change to the location of a lecture or we may want to contact you for an administrative reason. You can contact your MSc course director about any issue.

Things you should know about the department. You will find a lot of information from the

department's index at <http://www.cs.bris.ac.uk/theindex.html>. You should become familiar with the handbook of the department of Computer Science <http://www.cs.bris.ac.uk/handbook/> which is where we put most of the information we think you will need. In particular you should find and note the sections on plagiarism, communication in the department (e.g. how to get in touch with lecturers), mitigating circumstances (if e.g. you become ill and it affects your work), the penalties for late submission of coursework, and the UK marking scale. Computer Science unit codes begin with COMS. A number of units on the MSc are run by the department of Engineering Mathematics, and their unit codes begin EMAT. Information on that department can be found at <http://www.enm.bris.ac.uk/>

Plagiarism. Every year we have unfortunate cases of plagiarism, for which the minimum penalty for a first offence is a mark of 0 on the work concerned. Many cases of plagiarism occur because students have previously studied in a different country where there are different standards about how much help students can give each other. We realise it can be difficult to change the way you work, and that it can be difficult to judge what is appropriate, but we consider this a very serious issue and we insist that students adhere to our standards of scholarship. We check submissions carefully and we have very effective software to compare code and text. If you have any questions about what is appropriate, please ask.

Prerequisites and reading. To start reading on machine learning look at the texts used by *Artificial Intelligence with Logic Programming* and *Introduction to Machine Learning* as those are the core introductory units. Please bear in mind that the information below may go out of date so if there are particular issues you may want to check with the relevant unit director. For example, before learning calculus for a unit, check that it will still be needed this year. For each entry we show the year it was last updated. You should also check the website for each unit for more information - the list below is just to summarise things in one place.

Semester 1

COMS30300 Introduction to Machine Learning. Updated for 2011-12.

This unit assumes a basic knowledge of probability theory and statistics, although a review of these subjects is made. The main assignment must be written in Java because an automarker will be used. The recommended books are: T. Mitchell. *Machine Learning*. McGraw-Hill, 1997. ISBN: 007115467. Also: I. Witten & E. Frank. *Data Mining*. Morgan Kaufmann, 2nd ed., 2005. ISBN: 0-12-088407-0.

COMSM0305 Learning in Autonomous Systems. Updated for 2011-12.

Students will be given Java code to modify as an assignment, so a basic understanding of Java will be needed. Textbook used: R. Sutton and A. Barto. *Reinforcement Learning. An Introduction*. The MIT Press, 1998. ISBN: 0-262-19398-1.

COMSM1402 Advanced Algorithms. Updated for 2011-12.

This unit provides a second course in algorithms and data structures, building on material you will have covered as an undergraduate. Recommended reading: S. Dasgupta, C.H. Papadimitriou and U.V. Vazirani. *Algorithms*. McGrawHill, 2006 and T. Cormen, C. Leiserson, R. Rivest and C. Stein. *Introduction to Algorithms* (3rd edition). MIT Press 2009

COMSM2006 Algorithmic and Economic Aspects of the Internet. Updated for 2010-11.

This unit will teach about the structure of the internet, its use in computer algorithms, and the

economic issues it raises. We will review the necessary concepts in algorithms, game theory and linear algebra, but some knowledge of probability will be required. Recommended Reading for this course: N. Carr (2008) *The Big Switch: Rewiring the world from Edison to Google*. W.W. Norton & Co.

EMATM0004 Computational Genomics and Bioinformatics Algorithms. Updated for 2010-11. Textbook used: N. Cristianini and M. W. Hahn. *Introduction to Computational Genomics - A Case Studies Approach*. Cambridge University Press, 2006. ISBN-13: 9780521856034. ISBN-10: 0521856035

EMATM1120 Uncertainty Modelling for Intelligent Systems. Updated for 2010-11. Please see the website or contact the unit organiser Jonathan Lawry: J.Lawry@bristol.ac.uk

COMS30121 Computer Vision. Updated for 2011-12. Please see the website or contact the unit organiser.

COMSM0106 Mobile and Ubiquitous Computing. Updated for 2011-12. Students will be given an assignment programming for Android devices so a basic understanding of Java will be needed, and you may also wish to familiarise yourself with installing and using the Eclipse IDE before the unit begins. No textbook is used.

Semester 2

COMSM0106 Artificial Intelligence with Logic Programming. Updated for 2011-12. This unit assumes a basic knowledge of logic and set theory. In addition, Prolog is taught as a knowledge representation and programming language and a basic familiarity with declarative languages such as Prolog or Haskell will be useful.

Textbook used: P. Flach. *Simply Logical: intelligent reasoning by example*. John Wiley & Sons. 1994. ISBN: 0471 94152 2. Available online: <http://www.cs.bris.ac.uk/home/flach/SimplyLogical.html>

COMS30127 Computational Neuroscience. Updated for 2011-12. The unit assumes basic knowledge of calculus and probability theory. Parts of the unit are based on the textbook: Peter Dayan, Larry F Abbott. *Theoretical Neuroscience* MIT-Press, 2001. ISBN: 0-262-04199-5

COMSM4111 Robotic Systems. Updated for 2011-12. This unit assumes basic knowledge of Probability and algorithms. Familiarity with basic Matlab is also desirable. Please see the unit website or contact the unit director Walterio Mayol-Cuevas: wmayol@compsci.bristol.ac.uk for further details.

EMATM1400 Pattern Analysis and Statistical Learning. Updated for 2011-12. This unit assumes knowledge of basic algebra, some abstract algebra, and linear algebra including vector spaces and eigenvalue problems. Also a basic knowledge of applied probability and statistics. Knowledge of optimization theory is a plus but not necessary. An elementary knowledge of algorithms and data structures would be useful but is not necessary.

[Unit code to be added] High Performance Computing. Updated for 2011-12.

This is a very hands-on, programming-intensive unit, so I would recommend practising your programming skills as much as possible before hand, especially programming in C, and using Linux from the command line. Please also check the website at <http://www.cs.bris.ac.uk/Teaching/Resources/COMS35101/>

COMSM2001 Server Software. Updated for 2011-12.
Please see the website or contact the unit director.

Things to remember:

- If you are getting behind on your work for any reason please tell us sooner rather than later.
- If you submit nothing for an assignment you will get a mark of 0, but if you submit something, no matter how little it is, you are likely to get some marks.
- Please do not plagiarise.
- We would like to know what you think about units and the MSc.