

# Introduction to **informatics** 1

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**<http://tinyurl.com/inf1-handbook>**

## **Computer Science**

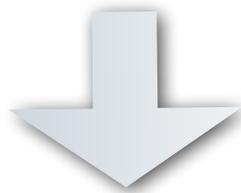
- ▶ Theoretical analysis of computation  
The design and use of computing devices

## **Artificial Intelligence**

- ▶ Understanding, modelling and simulating intelligent behaviour

## **Cognitive Science**

- ▶ The computational structure of natural cognitive systems



## **Informatics**

- ▶ The study of the structure, behaviour, and interactions of natural and engineered computing systems

## Informatics Courses (40 credits)

- ▶ Functional Programming | Semester 1
- ▶ Computation and Logic | Semester 1
- ▶ Object-oriented Programming | Semester 2
- ▶ Data and Analysis | Semester 2

## Maths Courses (40 credits)

- ▶ Introduction to linear algebra | Semester 1
- ▶ Calculus and its applications | Semester 2

## Outside Courses (40 credits)

- ▶ Chosen from anywhere in the University (timetable permitting)



**See the handbook for details** - look for the course web page



## The basics of functional programming using the language Haskell

- ▶ (Pure) functional programs have no state and no “side-effects”
  - the output from a function depends only on the input
  - this makes it much easier to predict the behaviour
- ▶ The course introduces fundamental concepts such as recursion, abstraction, higher-order functions and data types
- ▶ And emphasises the practical use of these constructs ...
- ▶ Functional languages are becoming more popular in commercial applications
  - Barclays, Deutsche Bank, Facebook, Google, Intel (Haskell)
  - Netflix, Twitter, Foursquare, LinkedIn (Scala)

## Communication

▶ Our natural languages are often verbose and ambiguous. This course introduces some tools that we use to talk and reason, clearly and unambiguously, about computational systems. We will study two fundamental topics:



## Finite State Systems

▶ Finite state machines provide a simple model of computation that is widely used. We will study their structure and behaviour. They are used as basic computational models across the whole of Informatics and at the same time underpin many widely used applications and components.

## Propositional Logic

▶ Propositional logic is the first step in understanding logic. We use it to build computational tools for solving puzzles and reasoning about Informatics systems and their properties.

**Michael Fourman**



## General principles of programming in imperative and object oriented frameworks using the language Java

- ▶ learn to program in major real-world programming language, Java
  - Many libraries and existing applications are written in Java
- ▶ Uses an imperative, object-oriented paradigm in contrast to Haskell
  - “Object-oriented” languages encapsulate the data, together with the code which manipulates them into “objects”
- ▶ This course tries to be very flexible to cater for very wide range of prior experiences, from no previous experience (or failing Inf1FP...) to lots
  - to make that work, it's essential to go in ready to be in charge of your own learning and pick appropriate challenges

**An introduction to ways of thinking about data from areas across Informatics: what it is, how much there is, how to represent it, process it, and analyse it to find out new things.**

▶ Structured Data

- The highly-structured records and files in relational databases of all sizes: how they fit together, and how to use SQL to extract the information within.

▶ Semistructured Data

- Flexible and adaptive trees of self-describing data, using XML to represent them and XPath to process them.

▶ Unstructured Data

- Massive text repositories, acres of numerical data from scientific experiments: ways to build up these giant datastores and ways to analyse their content.



## Lectures

- ▶ Check the web pages for the times & dates
  - Some weeks there may be no lecture, or the courses may be swapped
  - Some lectures start on the hour, some at 10 past
- ▶ Check the web pages for any recommended textbooks and notes

## Tutorials

- ▶ Tutorials are a valuable resource - these are compulsory
  - you will be allocated a group/time by the ITO
  - the tutor is there to facilitate your discussions and answer your questions
  - to take advantage of this, you must work on the exercises beforehand

## Lab Sessions

- ▶ Practical programming requires practice
  - Demonstrators are available during lab sessions to help you



## **Computing facilities for Informatics 1 are available in the Computer Laboratories in Appleton Tower**

- ▶ DICE: “Distributed Informatics Computing Environment”
  - Linux based. Provides all of the software that you need for your courses
  - please use the systems responsibly!
- ▶ You may use your own machines for your coursework
  - but DICE machines are used for the exams, so you must learn to use them
- ▶ There may be some introductory sessions
  - this covers “local” information, such as the location of printers etc.

## Exams

- ▶ All courses are assessed by an exam at the end of the semester
  - some exams are “open book” (but no network access)
- ▶ Past papers are available via the website

## Feedback

- ▶ There is a range of opportunities to get “formative” feedback on your progress during the course:
  - tutorial exercises
  - marked class tests & mock exams

## **Class representatives are appointed to represent the views of students**

- ▶ By conveying student opinion about the courses, or by alerting staff to student issues that they are unaware of, class reps can make a real difference to how Informatics 1 functions
  - gather feedback from students on all aspects of courses and facilities
  - alert staff to issues
  - eligible to be selected as a member of Board of Studies or Teaching Committee
  - attend weekly lunchtime meetings during semester
- ▶ Volunteer as a class rep! This is also a great opportunity for your CV
  - see <http://tinyurl.com/inf1-reps> for details
  - we need at least three representatives (must be taking an Inf degree)
    - at least one taking the Cognitive Science course
  - I will be mailing around for volunteers ...
    - please mail, or come and see me if you have any questions

**It may seem rather early to be thinking about “Careers”!**

**But ...**

- ▶ There are things that you can do right now which will make a difference to your future job prospects.
- ▶ You may want to take up vacation jobs or internships.

**The careers service can help with all of these**

- ▶ The 5min video on the course website is well worth watching.



## **See the handbook** - “contacts” page

- ▶ Talk to your personal tutor if you are having difficulties
  - “sooner” rather than “later”!
- ▶ Talk to the lecturers & tutors about course content
- ▶ Take advantage of the demonstrators by asking their advice
- ▶ Ask the ITO for general enquires
  - in person - Mon-Fri 09:00-12:30 and 13:30-16:30
  - or email [ito@inf.ed.ac.uk](mailto:ito@inf.ed.ac.uk)
- ▶ Talk to the computing support staff about computing problems
  - or fill in the online support form
- ▶ InfBase provides additional support “when you need it”
- ▶ Talk to me if all else fails!

## **Take responsibility for your own learning.**

- ▶ This may be different from the model that you are used to.
- ▶ All of the activities are designed to help you

## **Take advantage of the tutorials.**

- ▶ Turn up & be prepared.
- ▶ Participate. ask questions. make the tutorial work for you.

## **Don't give up if it gets hard.**

- ▶ Some things just are hard & it takes a while. try again.

## **If you are having difficulties, don't wait until it is too late.**

- ▶ Discuss it with someone (usually your PT) as soon as possible

**Have fun!**

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