

# **CM1 I03: Problem Solving with Python**

---

Stuart Allen

CM1 I03

School of Computer Science & Informatics  
Cardiff University

# Syllabus & recommended reading

## Syllabus

- Fundamental programming concepts in Python
- Algorithms (inc. searching, sorting, recursion)
- Mathematics (mainly discrete mathematics)
- Scientific report writing

## Reading

- Think Python! (see Learning Central)
- Discrete Mathematics with Applications, at least Second edition, S.S. Epp. Available from the library short loan section, QA39.2.E7

## **Skills that will be practised and developed:**

- Programming in Python
- Problem Solving
- Effectively using online and offline API documentation
- Writing scientific reports
- Using the command line to manipulate files and run code

See structured weekly activity in Learning Central

- Videos - watch **before** the indicated interactive sessions
- Five one-hour interactive sessions per week:
  - Two Discrete Maths & one optional maths tutorial support session (Dr Wu)
  - Two Problem Solving/Algorithms/Python (Prof Allen)
  - Time in these to recap (and cover any other topics you request - <https://forms.office.com/e/mTu85mXytN>)

Two optional 2-hour interactive lab sessions (weeks 5 - 9) with accompanying worksheets covering range of topics in Python (Dr Matt Morgan)

- Thursday: Support for the programming exercise - request questions in advance via online poll
- Friday: Revision and recap of the week's topics
- Optional 'advanced' questions
- One challenge question per week

## Summative

- Programming exercise – **40%**
  - Set in Week 8 (Monday, November 20, 2023), submit in week 11 (Thursday, December 14, 2023)
- Class test in Week 12 (exact date to be confirmed, likely to be Wednesday, January 10, 2024)– **60% (2 hours)**

## Formative

- Labs → Programming exercise coursework
  - weekly questions with solutions
  - one question with “doctests” per week on key concepts (e.g. loops, reading files, ...)
- Tutorials, online maths tests: multiple choice, fill in the blanks, etc. → Class test

## Support

- StackOverflow: [stackoverflow.com/c/comsc/questions/tagged/14](https://stackoverflow.com/c/comsc/questions/tagged/14)
- Office hours
- Email: [AllenSM@cardiff.ac.uk](mailto:AllenSM@cardiff.ac.uk), [WuJlI@cardiff.ac.uk](mailto:WuJlI@cardiff.ac.uk),  
[MorganMJW@cardiff.ac.uk](mailto:MorganMJW@cardiff.ac.uk)

## Giving us feedback

- Email: [AllenSM@cardiff.ac.uk](mailto:AllenSM@cardiff.ac.uk), [WuJlI@cardiff.ac.uk](mailto:WuJlI@cardiff.ac.uk),  
[MorganMJW@cardiff.ac.uk](mailto:MorganMJW@cardiff.ac.uk)
- Weekly survey
- Lab tutors and teaching assistants
- Student staff panel

## Learning outcomes

On completion of the module a student should be able to:

1. Use Python and common modules to implement simple algorithms expressed in pseudocode, and understand fundamental programming concepts
2. Develop informal algorithms and apply recursion to solve simple problems
3. Informally analyse the efficiency of algorithms and contrast different searching algorithms
4. Understand and apply basic logic, set theory, counting techniques, probability and statistics
5. Write scientific reports describing the analysis of a problem



## What you should expect

- Added more contact hours, but kept existing videos where appropriate
- Too much/too little maths
- Too much/too little Python
- Labs too long/not long enough
- More labs! More labs! More labs! More labs! More labs!
- Python assessments too hard
- I found it hard to grasp the Python syntax in just 2hrs of labs per week
- “Didn’t really stop and explain the language itself. You just give us a huge piece of code and tell us what it does.”

## What we expect from you

- Attendance
- Questions
- Engagement
- Independent study
- Practice

# Devices

See <https://punkrockor.com/2019/10/18/a-digital-device-policy-in-the-classroom-2/>

## Phone / Laptop / Tablet / Device Use

In the real world, people have their phones and devices with them at their jobs, meetings, and courses.

Adults do not have their devices taken away from them.

They are expected to manage their own use and conform to professional expectations in every setting.

## Far Below Expectations

Use is inappropriate. Device is a distraction to others.

Example: A student plays games, views non-academic material, types (not for taking notes), reads non-academic articles, has text or chat conversations.

## Below Expectations

Use is distracting. Device is a distraction to the student. Student frequently checks phone or device during learning.

Example: A student takes out their phone to look at a text several times during a class period.

## Meeting Expectations

Device is not used except for designated appropriate times OR use is limited to a quick check of the phone during a transition or appropriate time.

Example: If a student receives an important message from a parent, they quickly check while still being engaged in class and with no distraction to others.

## Exceeding Expectations

Device is not used except for as an efficient academic tool for a direct purpose. Devices are not a distraction and are used at appropriate times as an extension of work or learning.

Example: A student follows along with the lecture notes on a tablet and goes back a slide to correct a misconception about the lecture material. Student looks up the formula for the Binomial theorem for an in-class example,