

# PX150-6 Physics Programming Workshop

**21/22**

**Department**

Physics

**Level**

Undergraduate Level 1

**Module leader**

Michal Kreps

**Credit value**

6

**Module duration**

5 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

This module introduces the Python programming language. It is quick to learn and encourages good programming style. Python is an interpreted language, which makes it flexible and easy to share. It allows easy interfacing with modules, which have been compiled from C or Fortran sources. It is widely used throughout physics and there are many downloadable free-to-user codes available. The module also looks at visualisation of data.

[Module web page](#)

### Module aims

To introduce scientific programming with the help of the Python programming language, a language widely used by physicists.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

A brief introduction to python: Simple maths and physics on the computer

Data/File Input/Output and control in Python: Loops, conditions and lists; analyse simple physics data; Arrays and computer graphics; plotting curves and working with vectors and matrices

Functions: Algorithms and software design; tests, error handling and modules; Random numbers and computer simulations; Maths on the computer; Differential equations, integration, linear algebra

## Learning outcomes

By the end of the module, students should be able to:

- Use scientific and graphical libraries
- Respect the principles of good software design
- Present their results graphically
- Write python programs to formulate and solve simple maths and physics problems involving differential equations, linear algebra and integration

## Indicative reading list

Python documentation: <http://www.python.org/doc/>

Scientific Python: <http://docs.scipy.org/doc/scipy/reference/>

H.P. Langtangen, A Primer on scientific programming with Python, Springer e-books (2012):  
<http://link.springer.com/book/10.1007%2F978-3-642-18366-9>

[View reading list on Talis Aspire](#)

## Subject specific skills

Programming in Python

## Transferable skills

IT, problem-solving, self-study

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## Study

### Study time

Type	Required
Lectures	5 sessions of 1 hour (8%)
Practical classes	5 sessions of 2 hours (17%)
Private study	45 hours (75%)
Total	60 hours

## Private study description

Work through module notes, write programs in Python, discuss with others taking the module, prepare and submit assessments

## Costs

No further costs have been identified for this module.

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## Assessment

You do not need to pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

### Assessment group A1

	Weighting	Study time
Problem sets / Practical tasks	100%	
Weekly problems sets, practical tasks		

## Feedback on assessment

Surgery discussions and comments on assessed work

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## Availability

## Courses

This module is Core for:

- Year 1 of UPXA-FG33 Undergraduate Mathematics and Physics (BSc MMathPhys)
- UPXA-GF13 Undergraduate Mathematics and Physics (BSc)
  - Year 1 of GF13 Mathematics and Physics
  - Year 1 of GF13 Mathematics and Physics
- UPXA-FG31 Undergraduate Mathematics and Physics (MMathPhys)
  - Year 1 of FG31 Mathematics and Physics (MMathPhys)
  - Year 1 of FG31 Mathematics and Physics (MMathPhys)
- UPXA-F300 Undergraduate Physics (BSc)
  - Year 1 of F300 Physics
  - Year 1 of F300 Physics
  - Year 1 of F300 Physics

- UPXA-F303 Undergraduate Physics (MPhys)
  - Year 1 of F300 Physics
  - Year 1 of F303 Physics (MPhys)
- Year 1 of UPXA-F3N1 Undergraduate Physics and Business Studies
- UPXA-F3F5 Undergraduate Physics with Astrophysics (BSc)
  - Year 1 of F3F5 Physics with Astrophysics
  - Year 1 of F3F5 Physics with Astrophysics
- Year 1 of UPXA-F3FA Undergraduate Physics with Astrophysics (MPhys)
- Year 1 of UPXA-F3N2 Undergraduate Physics with Business Studies