



Module Specification

Programming for Data Science

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Part 1: Information

Module title: Programming for Data Science

Module code: UFCFVQ-15-M

Level: Level 7

For implementation from: 2021-22

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Delivery locations: Frenchay Campus

Field:

Module type: Standard

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module introduces you to principles of data science and programming with a range of applications to appropriate domains.

Features: Not applicable

Educational aims: This module is intended for students with little or no programming experience but also for those keen to improve their programming skills.

It aims to provide students with an understanding of the role computation can play in solving problems and, regardless of their background, feel justifiably confident of their ability to write small programs that allow them to accomplish useful goals.

Outline syllabus: The module will cover the following topics:

Introduction:

- Introduction to the field of data science
- Developing a working knowledge of common development tools used in the context of data science (such as Jupyter Notebooks, Visual Studio Code and Git)

Basic Programming and Algorithm Design:

- Principles of programming through the Python programming language (such as variables, flow control and data structures)
- Use of appropriate IDE or an approved virtual programming environment for the practical sessions.
- Procedural implementation of statistical algorithms

Data analytics practices:

- Introduction to popular data analysis and statistical learning tools and frameworks (such as Pandas, Numpy and Matplotlib)
- Develop an understanding the concept of data structures (such as Lists, Dictionaries, Sets, Arrays and DataFrames).
- Learn how to read in data into Pandas' Data Frames, how to query these structures, how to generate summary tables, data groupings, and how to clean and manipulate data
- Develop skills in Data Visualisation to support numerical data analysis

Part 3: Teaching and learning methods

Teaching and learning methods: See Assessment

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Apply the principles of programming and data management to solve problems On successful completion of this module students will achieve the following learning outcomes.

MO2 Demonstrate the use of an object-oriented paradigm when solving software problems On successful completion of this module students will achieve the following learning outcomes.

MO3 Design and implement algorithms for numerical analysis On successful completion of this module students will achieve the following learning outcomes.

MO4 Demonstrate the use of proactive error handling techniques to address software reliability and program vulnerability issues On successful completion of this module students will achieve the following learning outcomes.

MO5 Critique and reflect on alternative solutions to a given problem or on their own work in a constructive way On successful completion of this module students will achieve the following learning outcomes.

MO6 Undertake independent research activities with relation to innovative approaches to data science problem solving On successful completion of this module students will achieve the following learning outcomes.

MO7 Demonstrate the use of Data Visualisation techniques for supporting numerical data analysis On successful completion of this module students will achieve the following learning outcomes.

MO8 Demonstrate the use of a version control system (such as Git) as part of an integrated development process

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufcfvg-15-m.html) via the following link <https://uwe.rl.talis.com/modules/ufcfvg-15-m.html>

Part 4: Assessment

Assessment strategy: The assessment strategy for this module is a single coursework assignment. The assignment is a highly interactive one, wherein students are expected to demonstrate and present their code solutions. One-to-one and immediate feedback is provided, which enriches and deepens the on-going learning of the student. Summative assessment is achieved through this demonstration of a set of programming exercises solutions together with the submission of a reflective development process report. The reflective report should focus on the process taken to develop solutions. In particular, identifying any strengths/weaknesses in their approach, suggestions for improvements, and any alternative approaches that could have been taken.

Resit Assessment Strategy: Students will be required to submit a single coursework assignment with the same structure as described above, i.e. a set of programming exercises and a reflective development process report.

Assessment components:

Practical Skills Assessment - Component A (First Sit)

Description: Practical coursework

Weighting: 100 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7, MO8

Practical Skills Assessment - Component A (Resit)

Description: A programming coursework

Weighting: 100 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7, MO8

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Data Science [Sep][FT][GCET][1yr] MSc 2021-22

Data Science [Sep][FT][Frenchay][1yr] MSc 2021-22

Data Science [Sep][PT][Frenchay][2yrs] MSc 2021-22

Financial Technology [Sep][FT][Frenchay][1yr] MSc 2021-22

Financial Technology [Sep][PT][Frenchay][2yrs] MSc 2021-22

Financial Technology [Sep][FT][TBC][1yr] MSc 2022-23

Data Science [Sep][FT][TBC][1yr] MSc 2022-23