



Programming with Data

Course Title	Programming with Data	Faculty	Philosophy
Course Code	NCHAI758	Course Leader	TBA
Credit Points	15	Teaching Period	Any
FHEQ Level	Level 7	Date Approved	June 2020
Compulsory/ Optional	Compulsory		
Pre-requisites	None		
Co-requisites	None		

COURSE SUMMARY

By the end of this course, students will be able to implement code in Python to an intermediate level. Students will understand the basics of working with data using Python and implement code following mathematical expressions. This module covers basics of Linear Algebra. The program covers how data structure constructs such as dictionaries, sets, tuples, lists and arrays work. The module also covers functions, counters, control flow and automated testing and assert functions.

COURSE AIMS

- To understand how to read mathematical expressions vectors and matrices and implement them in code.
- To build on the skills working with data structures in Python and choosing the right data structure for a given problem.
- To learn to use the appropriate control flow statements for a given problem set.
- To be able to have sufficient understanding of when to use a function and when to use a module and what would be a good choice for creating a data structure in Python.
- To be able to use automated testing as a way of assertion.
- To be able to read, analyse and code complex functions in Python.

LEARNING OUTCOMES

On successful completion of the course, students will be able to:

KNOWLEDGE AND UNDERSTANDING

- K1d Demonstrate knowledge, understanding and critical awareness of which data structure to use in Python.
- K2d Show comprehensive knowledge and comprehensive understanding of when to use a function and when to create a module.
- K3d Demonstrate knowledge and understanding and familiarity of basic to intermediate level of programming.

SUBJECT SPECIFIC SKILLS

- S1d Engage critically in the theory behind the choice of an appropriate data structure.
- S2d Demonstrate the ability to identify the correct and appropriate syntax to use for the relevant data structures, and apply them originally.
- S3d Identify and apply the correct choice of appropriate control structures to use.
- S4d Identify when it would be necessary and appropriate to use automated testing.

TRANSFERABLE AND PROFESSIONAL SKILLS

- T1d Demonstrate initiative in working independently, effectively, and to deadlines.
- T2d Identify, organise, and critically evaluate the choice of appropriate data structures and evaluate the code using automated testing and assertion.
- T3d Produce clear and concise and well documented code.
- T3d Consistently apply an excellent level of technical proficiency in written English, using an advanced application of scholarly terminology, that demonstrates the ability to deal with complex issues both systematically and with sophistication.

TEACHING AND LEARNING

Teaching and learning strategies for this course will include:

- 10 x 1.5 hours of full-cohort Lectures
- 10 x 1.5 hours of full-cohort Python Labs
- 2 hours of office hour per teaching week

Course information and supplementary materials are available on the College's Virtual Learning Environment (VLE).

Students are required to attend and participate in all the formal and timetabled sessions for this course. Students are also expected to manage their directed learning and independent study in support of the course.

EMPLOYABILITY SKILLS

- Skills in writing and analysing complex code
- Presentation skills in presenting code accordingly
- Skills in organisation of written and coding discourse
- Skills in being able to read, understand and comprehend the code

ASSESSMENT

FORMATIVE

During the course, students will be assessed to check their understanding of concepts via weekly exercises to be done using Python code.

SUMMATIVE

Students will be assessed during the course by means of set assignments.

AE:	Assessment Activity	Weighting (%)	Online submission	Coding	Notebook Submission
1	Coding Assignment	50%	No	Yes	Code and 2500 word explanation
2	Coding Assignment	50%	No	Yes	Code and 2500 word explanation

The assessment will consist of two written coding assignments which the student will have to do to the set guidelines for coding. These assignments will be assessed in accordance with the assessment aims set out in the Programme Specification.

FEEDBACK

Students will receive formal feedback in a variety of ways: written (including via email correspondence); oral (within one-to-one tutorials or on an *ad hoc* basis) and indirectly through discussion during group tutorials. Student's will also attend Collections in which they will receive constructive and developmental feedback on their performance.

Feedback is provided on summative assessment and is made available to the student either via email, the VLE or another appropriate method.

INDICATIVE READING

Note: Comprehensive and current reading lists for courses are produced annually in the Course Syllabus or other documentation provided to students; the indicative reading list provided below is used as part of the approval/modification process only.

BOOKS

Joel Grus (2019), *Data Science from Scratch*, 2nd ed., O'Reilly: Boston.

Wes McKinney (2017), *Python for Data Analysis*, 2nd ed., O'Reilly: Boston.

ELECTRONIC RESOURCES

Students can visit courses on Datacamp, Coursera and Udemy to watch videos on Python Programming.

INDICATIVE TOPICS

Students will study the following topics:

- Mathematical expressions, vectors, and matrices
- Data structures in Python
- Control flow statements
- Functions and modules
- Automated testing
- Creating functions

Title: NCHAI758 Programming with Data Course Descriptor					
Approved by: Academic Board					
Location: Academic Handbook/Programme specifications and Handbooks/ Postgraduate Programme Specifications/MA Philosophy & Artificial Intelligence Specification/Course Descriptors					
Version number	Date approved	Date published	Owner	Proposed next review date	Modification (As per AQF4) & category number
2.0	January 2022	May 2022	Brian Ball	April 2025	Category 3: Change to learning outcomes.
1.0	June 2020	June 2020	Brian Ball	April 2025	