

CS118-15 Programming for Computer Scientists

24/25

Department

Computer Science

Level

Undergraduate Level 1

Module leader

James Archbold

Credit value

15

Module duration

10 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module is a first course in computer programming.

Module aims

The principal aim of this module is to introduce students to problem solving and structured and object oriented programming.

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.

Fundamentals of programming

Introduction to programming: Programming paradigms; From Specification through Algorithms to Implementation; Program compilation and testing.

Building Elements: Preconditions and postconditions; Basic data types; Variables, identifiers and scope.

Control structures: Conditionals; Case statements and loops; Correctness issues when programming with loops.

Methods: Comparison between iteration and recursion.

Object oriented programming.

An introduction to multi-threading.

Programming with objects and classes: Complex data types; Parameter passing by reference and by value; Encapsulation.

Arrays and strings

Class inheritance: Dynamic binding; Multiple inheritance; Interfaces, abstract classes and generics.

Design, construction and testing

Program specifications

Error handling and exceptions.

Methods of testing, coding practices and basic software engineering techniques.

Learning outcomes

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

- Students should be able to understand the programming process, from the definition of the problem and the design of a solution at an abstract level, to the coding itself with an integrated approach to testing for correctness.
- Student should be able to develop programs in a high-level programming language using the imperative paradigm.
- Students should be able to structure complex software using principles of encapsulation and abstraction in the object-oriented programming abstractions.
- Students should be able to apply informal reasoning techniques to justify the correctness of methods and programs, and justify desired properties such as termination.
- Students should be able to use different strategies for testing programs and managing run-time errors using exception handling.

Indicative reading list

Please see Talis Aspire link for most up to date list.

[View reading list on Talis Aspire](#)

Subject specific skills

Experience with the Java programming language

Understanding of Data Types

Iterative Statements

Conditional Statements

Imperative Programming

Object Oriented Programming

Inheritance

Abstract classes

Generics

Multi-threading in Java

Error Handling & Exceptions

Passing by value vs passing by reference.

Learning to think programmatically and algorithmically and how to take a specification and turn it into a plan for a program.

Introduction to good coding practices & basic software engineering techniques

Transferable skills

Coding

Problem solving

Communication skills (verbal)

Critical thinking

Study

Study time

| Type | Required |
|-------------------|-----------------------------|
| Lectures | 20 sessions of 1 hour (13%) |
| Practical classes | 10 sessions of 1 hour (7%) |
| Private study | 120 hours (80%) |
| Total | 150 hours |

Private study description

A significant proportion of independent study should be spent with the coursework assignments, and additional programming practice. The rest should be revision of the material and practising the concepts discussed.

Costs

No further costs have been identified for this module.

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 D5

| | Weighting | Study time |
|--|------------------|-------------------|
| Programming assignment 1 This assessment is eligible for self-certification (extension) | 20% | |
| Programming assignment 2 This assessment is eligible for self-certification (extension) | 20% | |
| In-person Examination Exam | 60% | |

- Answerbook Pink (12 page)

Assessment group R3

| | Weighting | Study time |
|---|------------------|-------------------|
| In-person Examination - Resit Resit Exam | 100% | |

- Answerbook Pink (12 page)

Feedback on assessment

Written feedback via Tabula.

[Past exam papers for CS118](#)

Availability

Courses

This module is Core for:

- UCSA-G500 Undergraduate Computer Science
 - Year 1 of G500 Computer Science
 - Year 1 of G500 Computer Science
- UCSA-G503 Undergraduate Computer Science MEng
 - Year 1 of G500 Computer Science
 - Year 1 of G503 Computer Science MEng
 - Year 1 of G503 Computer Science MEng
- Year 1 of UCSA-I1N1 Undergraduate Computer Science with Business Studies

- Year 1 of UCSA-G406 Undergraduate Computer Systems Engineering
- Year 1 of UCSA-G408 Undergraduate Computer Systems Engineering
- USTA-G302 Undergraduate Data Science
 - Year 1 of G302 Data Science
 - Year 1 of G302 Data Science
- Year 1 of USTA-G304 Undergraduate Data Science (MSci)
- UCSA-G4G1 Undergraduate Discrete Mathematics
 - Year 1 of G4G1 Discrete Mathematics
 - Year 1 of G4G1 Discrete Mathematics
- Year 1 of UCSA-G4G3 Undergraduate Discrete Mathematics