WM145-24 Software Development and Security

23/24

Department
　WMG
Level
　Undergraduate Level 1
Module leader
　Harjinder Lallie
Credit value
　24
Module duration
　30 weeks
Assessment
　Multiple
Study location
　University of Warwick main campus, Coventry

Description

Introductory description

Fluency in the process of software development is a prerequisite to the study of much of the remainder of this programme. In order to use computers to solve cyber security problems effectively, students must be competent at reading and writing programs in multiple programming languages. In addition, they must be able to design and analyse algorithms, select appropriate paradigms, and utilize modern development and testing tools. This module brings together those fundamental concepts and skills related to the software development process. As such, this module provides a foundation for other software-oriented aspects of the programme: programming languages for cyber security, data science for algorithms and complexity in the cyber context, and the cyber context of software engineering. This module focuses on the cyber context of the entire software development process, identifying those concepts and skills that should be mastered in the first year of the programme. This includes the design and simple analysis of algorithms, fundamental programming concepts and data structures, and basic software development methods and tools. A significant feature of the module is the use of group development projects. A single programming language and development environment will be used to exemplify the abstract concepts being developed. There will necessarily be some significant proportion of the module's independent study time being spent gaining familiarity with the language and its associated environment.

Module aims

To introduce, develop, and affirm fundamental programming knowledge and skills
Outline and affirm secure coding principles

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.

Outline content
The content of this module will be taught from a cyber security perspective.

- algorithms and design
- fundamental programming concepts
- fundamental data structures
- secure software development
- development methods

Learning outcomes

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

- Develop a software component that meets a given problem
- Analyse the behaviour of a program in response to various combinations of interesting inputs
- Utilise standard algorithms and data structures in the solution to well defined problems

Indicative reading list

Kernighan, Brian W., and Dennis M. Ritchie, "The C programming language", 2 Ed, Prentice Hall (1988)

Kochan, Stephen G., "Programming in C", 4 Ed, Addison Wesley (2014)

Sommerville, Ian, "Software Engineering", 10 Ed, Pearson (2015)

[View reading list on Talis Aspire](#)

Subject specific skills

Collaborate on the development of a software component to a well-defined problem.
Analyse the behaviour of a program in response to various combinations of interesting inputs.
Utilise standard algorithms and data structures in the solution to well defined problems.

Transferable skills

Problem solving, teamwork

Study

Study time

Type	Required
Supervised practical classes	18 sessions of 3 hours (47%)
Private study	62 hours (53%)
Total	116 hours

Private study description

Independent development activity between workshops

Costs

No further costs have been identified for this module.

Assessment

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

Assessment group A4

	Weighting	Study time
Coursework	70%	64 hours

Report on the development of a program which demonstrates the development, testing and reporting of the tool.

	Weighting	Study time
A collaborative software development assessment	30%	40 hours

A viva/presentation accompanied by a brief report which demonstrates a software solution that meets a given set of requirements. The viva/presentation may be delivered in traditional face to face format, or as a video - as determined by the module tutor.

The report might typically comprise two sections: one which describe the functionality of the software solution as a brief user manual, and the second which comprises an executive summary outlining how the solution meets the requirements.

Assessment group R

	Weighting	Study time
Coursework (Resit)	100%	

Feedback on assessment

Written feedback for each assignment
Verbal feedback during tutorial sessions
Solutions provided to tutorial questions
Summative feedback on assignments

Availability

Courses

This module is Core for:

- UWMA-H651 Undergraduate Cyber Security
    - Year 1 of H651 Cyber Security
    - Year 1 of H651 Cyber Security
    - Year 1 of H651 Cyber Security