WM145-24 Software Development and Security

20/21

Department
> WMG

Level
> Undergraduate Level 1

Module leader
> Andrew Hood

Credit value
> 24

Module duration
> 30 weeks

Assessment
> 100% coursework

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

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

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:

- 1 – Collaborate on the development of a software component to a well-defined problem.
- 2 - Analyse the behaviour of a program in response to various combinations of interesting inputs.
- 3 - 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)

Subject specific skills

1 – Collaborate on the development of a software component to a well-defined problem.
2 - Analyse the behaviour of a program in response to various combinations of interesting inputs.
3 - 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 (22%)
Private study	62 hours (26%)
Assessment	124 hours (52%)
Total	240 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 A2

	Weighting	Study time
Coursework	100%	124 hours

The precise composition of the coursework may vary from year to year. It may include two or more sub-components. Where there are two or more sub-components, the weighting of each sub-component towards the overall module grade will be published near the beginning of the module.

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