Module Proforma

Approved, 2022.02

Summary Information

Module Code	5218COMP
Formal Module Title	Secure Software Development
Owning School	Computer Science and Mathematics
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Mahmoud Hashem Eiza	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings
Sorren Hanvey	Yes	N/A
Nathan Shone	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings

Teaching Responsibility

LJMU Schools involved in Delivery
Computer Science and Mathematics

Learning Methods

Learning Method Type	Hours
Lecture	22
Practical	22

Module Offering(s)

Offering Code	Location	Start Month	Duration
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

Aims	To familiarise students with common software security problems and vulnerabilities, and the methods, tools and techniques that can be used during software development to prevent them, including formal techniques.To provide students with an understanding of techniques that should be applied throughout the software development lifecycle in order to improve software security.

Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Analyse software security vulnerabilities and apply best-practice practical techniques to prevent them.
MLO2	Apply wide-ranging technical and conceptual security skills to the software development lifecycle.
MLO3	Use mitigation techniques to fix vulnerabilities that exist in complex software.
MLO4	Apply group-based development and testing principles to address a broad range of security issues.

Module Content

Outline Syllabus
Characteristics of large-scale software systems projects, team membership and activities.Common software vulnerabilities.Programming languages and security characteristics, decompilation and obfuscation. Integrating security into the software development lifecycle.Threat modelling.Formal techniques for vulnerability analysis.Testing, including practical experience of unit testing and fuzz testing. Networking vulnerabilities. Random number generation and cryptography.Secure deployment.General rules and guidelines; secure coding policies.Recent examples from computing are used throughout and practical exercises used to illustrate the applications of these concepts.

Module Overview
This module familiarises you with common software security problems and vulnerabilities, and the methods, tools and techniques that can be used during software development to prevent them, including formal techniques. You will undertake a group software engineering task involving the application of secure software development lifecycles to a software development task. As part of this task, you will be expected to undertake a variety of roles as seen in a secure software development teams (i.e., developer, software tester, vulnerability researcher, report and documentation author, etc). You will be expected to complete a report that demonstrates an understanding of how software should be designed, implemented, and tested to reduce the risk of security vulnerabilities.

Additional Information
Students will undertake a group software engineering task involving the application of secure software development lifecycles to a software development task. As part of this task, students will be expected to undertake a variety of roles as seen in a secure software development teams (i.e., developer, software tester, vulnerability researcher, report & documentation author, etc). Students will be expected to complete a report that demonstrates an understanding of how software should be designed, implemented, and tested to reduce the risk of security vulnerabilities. Students will also be expected to discover and mitigate vulnerabilities in software provided to them as part of this activity.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Artefacts	Software Development	80	0	MLO1, MLO2, MLO4
Presentation	Presentation on security task	20	0	MLO3, MLO4