

# Module Descriptor

## Section A

### 1. Module Title

Software Quality Assurance

### 2. SITS Module Code

UI108009

### 3. SCQF Level

8

### 4. SCQF Credit Points

20

### 5. Module Leader, include staff ID and email address

Philippe Gleizon – nwh1pg ([philippe.gleizon@uhi.ac.uk](mailto:philippe.gleizon@uhi.ac.uk))

### 6. Module Team Members, include staff IDs and email addresses

Charles McCrimmon – nwh21cm ([charles.mccrimmon@uhi.ac.uk](mailto:charles.mccrimmon@uhi.ac.uk))

### 7. Faculty and Cognate Subject Group

Faculty: Science, Health and the Environment

CSG: Engineering, Computing and the Built Environment

### 8. Exam Board and Exam Board Module Sub-group

Exam Board: Science, Technology and the Environment

Sub-group: Computing

### 9. Date of Module Start / Most Recent Revision

September 2021 / December 2024

### 10. Semester

SC

### 11. Minimum / Maximum Student Numbers

Minimum numbers: 10  
Maximum numbers: n/a

## 12. Pre-requisites

n/a

## 13. Co-requisites

n/a

## 14. Mode of Study

Give estimate of proportions of mode of study but also highlight **main** mode of study.

Table 1: Proportions of mode of study

Mode of study	Percentage	Hours
Face to face	0%	0
Video-conference (VC facilities on UHI campus or learning centre)	15.0%	30
Video-conference (other video technologies accessed via Internet)	0%	0
VLE (online, tutor-supported study)	12.5%	25
Audio conference	0%	0
Self-directed study	35.0%	70
Other (please specify) Team activities	37.5%	75
<b>Total</b>	<b>100%</b>	<b>200 Hours</b>

## 15. Assessment

Table 2: Assessment

Assessment number	Type	Details	Weighting	Component Threshold Mark	Submission week	Learning Outcome(s) assessed
1	Oral presentation	Identify the customer's requirements and devise a quality assurance strategy.	20%	40%	12 (S1)	LO1, LO2, LO3, LO4
2	Report	Produce a verification report to demonstrate the software quality standards (2500 words)	30%	40%	12 (S2)	LO1, LO4, LO5, LO6
3	Group work	Portfolio of	50%	40%	14 (S2)	All

		evidence, equivalent to 3000 - 3500 words in total. Evidence submitted in a variety of formats including project, practical, oral presentation, discussion board participation.				
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## 16. Experiential Education

Highlight all that apply

Work placement

Case studies ✓

Simulations

Field trip

Laboratory work

Research project

Internship

Guest lecture ✓

Clinical practice

Community engagement

Service learning

Job shadowing

Study abroad

Summer school

Volunteering

Co-operative education ✓

Capstone course

Other ✓

Other detail: group project

## 17. Specialist Learning Resources

Students are expected to sign up to several online services that will facilitate their learning and team work. This includes but is not limited to:

- IBM Cloud,
- Atlassian Jira,
- Bitbucket.

## 18. Additional Costs to Students

Students are expected to have access to a computer that they have complete control over. The following table has the recommended minimum requirements for a system. This is slightly higher than the UHI minimum requirements found at [Information for Students - Buying your own device](#).

Minimum System Requirements		
	Windows	Mac
Operating system	Windows 10 or 11	MacOS 11 or newer
Processor	2 GHz or better, INTEL or AMD is recommended (Must support virtual machines)	
Graphics	OpenGL version 1.2 or later compatible	
RAM	8GB or more	
Monitor	17" or larger (the bigger the better) (Laptop: 15" or larger screen)	
Microphone / headphones	USB headset with microphone	
Webcam	Built-in or external (it is easier to adjust the camera angle with an external)	
Broadband	Reliable connection required 1.0 Mbps (receive) 1.5 Mbps (send) (Cisco recommendations for good quality video calls)	

Students are expected to be willing to sign up to a range of industry standard tools located online. Students will not be required to pay for any software.

## 19. Employability / Graduate Attributes

Employability attributes (meta-skills) have been aligned with [Skills Development Scotland's Skills 4.0](#), published in 2018.

The ability to filter out non-essential information and focus on the essential problem at hand	✓
The ability to understand and manage emotions, strengths, belief systems and limitations, and the effects of these on behaviours and the way they impact on others	✓
Being open to new ideas and approaches – having a growth mindset	✓
The ability to critically reflect on new knowledge and experiences in order to gain a deeper understanding, embed and extend learning	✓
Flexibility when handling the unexpected, adapting to circumstances as they arise	✓
The ability to self educate without the guidance of others	✓
Ability to respond positively and constructively to constantly evolving challenges and complexity	✓
The ability to think for one's self and trust one's own judgement	✓
A feeling of trust in one's abilities, qualities and judgement	✓
The ability to follow through on commitments, be proactive and take responsibility	✓
Giving written or verbal communication in a way that can be best understood by those receiving the communication	✓
The ability to tell stories that persuade, motivate and/or inspire as well as bringing the sharing of knowledge to life through examples and illustrations	✓
The ability to take the perspective of others in order to understand their feelings and motivations	✓
A sense of responsibility and concern for wider society	✓
The ability to coach and constructively review the work of others to improve and advance their skills, knowledge and performance level	✓
Translating information and thought into accessible expressions, readable and recognisable images	✓
The ability to see the big picture and understand subtle nuances of complex situations	✓
Breaking down a complex problem or system into smaller, more manageable parts before developing a new way of addressing the problem	✓
The ability to identify, analyse and evaluate situations, ideas and information in order to formulate responses to problems	✓
The act or process of forming an opinion after careful thought	✓
The ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning	✓

## Section B

### 20. Module Summary

This module introduces the students to how they can build in processes to create good quality software. Students will learn how Agile can enable better quality software to be delivered to

clients. They will compare different ways of working and how that impacts the efficiency of development and quality. The module will introduce students to good security practices that will limit potential for vulnerabilities. Students will build on their knowledge of tools to verify code and use test drive development techniques to maintain consistency as requirements change.

## **21. Module Keywords**

Backend, server-side, services, web servers, microservices, cloud, data centre

## **22. Module Learning Outcomes**

“On successful completion of this module, students should be able to...”

### **Learning Outcome 1 (LO1):**

*Agile:* Analyse the importance for the need to identify and manage project deliverables, identifying benefits for development and customer.

### **Learning Outcome 2 (LO2):**

*Business:* Compare and contrast different industry standard software development processes, including distributed work (e.g. onshore, near shore and offshore), and identify the key enablers to make each model successful.

### **Learning Outcome 3 (LO3):**

*Meta-skills<sup>1</sup>:* Examine the use of performance evaluation tools in a business context and justify how his/her own work is providing value to the team.

### **Learning Outcome 4 (LO4):**

*Security:* Implement robust, scalable and future-proof software security solutions that meet specific and generic requirements, and internal/external security standards and best practice.

### **Learning Outcome 5 (LO5):**

*Technical:* Compare and contrast the different types and levels of verification (analysis, demonstration, test, formal proof, inspection etc.) and testing (unit, integration, systems, and acceptance) including the role and value of test-driven development techniques.

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<sup>1</sup> Meta-skills are also known as soft skills or employability skills.

## Learning Outcome 6 (LO6):

*Sustainability:* Evaluate the efficiency of a process (CPU time, computational economy, volume of information, streamlining).

## 23. Indicative Content

### Skills that will be practiced and developed:

- Practice managing deliverables to clients
- Giving and receiving constructive feedback based on value to the team
- Develop confidence in creating secure code and automated testing for common threats
- Develop your skills in creating unit tests
- Develop confidence in Behaviour Driven Development
- Develop confidence in Test Driven Development
- Gain practical experience of formal verification of code
- Report on test coverage and articulate the impact of this when code needs changing
- Evaluate robustness of codebase

### Syllabus Content

- Agile project management from the customer point of view
- Developing code to a contract
- Business models for software development
- Performance evaluation tools in SME
- Justifying your value to the team and professional reviews
- Writing test driven code and different levels of verification
- Serving of media content e.g. using CDNs
- Behavioural Driven Development
- Test Driven Development
- Securing backend services
- Software verification methods
- Testing methods
- Auditing a codebase to ensure it matches quality specifications
- Using a linter to maintain standards

## 24. Library Resources

[Talis Library Resource List](#)

Recommended readings:

Author(s)	Title	Editor	Year	ISBN/ISSN
Neil Walkinshaw	Software quality assurance:	Springer	2017	ISBN 978-3-319-64821-7

	consistency in the face of complexity and change			<a href="#">e-ISBN 978-3-319-64822-4</a>
Dietmar Winkler Stefan Biffl Johannes Bergsmann	Software quality - The next big thing in software engineering and quality	Springer	2022	ISBN 978-3-031-04114-3 <a href="#">e-ISBN 978-3-031-04115-0</a> ISSN 1865-1348 e-ISSN 1865-1356