

# Module Descriptor

## Section A

1. **Module Title :** Software Architecture
2. **SITS Module Code:** UI108008
3. **SCQF Level:** 8
4. **SCQF Credit Points:** 20
5. **Module Leader, include staff ID and email address:**  
Les Wright ar02lw ar02lw@uhi.ac.uk
6. **Module Team Members, include staff IDs and email addresses**  
tbc
7. **Faculty and Cognate Subject Group**  
  
Faculty: Science, Technology and the Environment
8. **Exam Board and Exam Board Module Sub-group**  
CSG: Computing & IT
9. **Date of Module Start / Most Recent Revision**  
September 2020/September 2020
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
Video-conference (other video technologies accessed via Internet)	15.0%	30 hours
Online supervised practical work	12.5%	25 hours
<b>Team activities</b>	<b>37.5%</b>	<b>75 hours</b>
VLE (self-directed & team study)	35.0%	70 hours
<b>TOTAL</b>	<b>100.0%</b>	<b>200 hours</b>
<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
Assessment 1	Group work	Portfolio of evidence, equivalent to 3000 - 3500 words in total. Evidence submitted in a variety of formats including essay, project, group work, practical, oral presentation, discussion board participation.	50%	40%	14	ALL
2	Progress log/Vlog	Evidence of progress, and breadth and depth of knowledge/research. This may take the form of short written, oral or video progress report(s) detailing for example, project management, code reviews.	50%	40%	6,14	ALL

## 16. Experiential Education

Highlight all that apply

Work placement

Clinical practice

**Case studies**

Community engagement

Simulations

Service learning

Field trip

Job shadowing

Laboratory work

Study abroad

Research project

Summer school

Internship

Volunteering

**Guest lecture**

**Co-operative education**

Capstone course

**Other**

Other detail:

## 17. Specialist Learning Resources

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

- IBM Cloud
- Atlassian Jira
- Bitbucket.
- GitHub

These are available free to the student.

## 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 <https://www.uhi.ac.uk/en/lis/buying-your-own-device>.

Minimum System Requirements		
	Windows	Mac
Operating system	Windows 7, 8 or 10	Mac OS 10.10.x 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 sort information into categories and to understand the relationship between information	X
The ability to focus on the present and deflect/avoid distractions	X
The ability to filter out non-essential information and focus on the essential problem at hand	X
The ability to think for one's self and trust one's own judgement	X
The act of making a considered choice after appropriately using intuition and careful thought	X
Understanding and mentally processing verbal or written communication	X
The ability to actively understand information provided by the speaker, and display interest in the topic discussed	X
Working with others toward shared goals. Creating group synergy in pursuing collective goals	X

The ability to notice behaviour or information and register it as being significant	X
The ability to ask questions in order to increase understanding about a subject or experience	X
The ability to filter resources and information to find information relevant to an issue or topic	X
The acknowledgement and definition of a problem	X
Proficiency at thinking and coming up with solutions and responses beyond that which is rote or rule-based	X
The process of classifying information into objects or classes based on key features	X
The process of organising, manipulating, pruning and filtering gathered data into cohesive structures for information building	X
The ability to identify areas of opportunity for innovation	X
A systematic examination and evaluation of data or information, by breaking it into its component parts to uncover their interrelationships	X
Breaking down a complex problem or system into smaller, more manageable parts before developing a new way of addressing the problem	X
The ability to identify, analyse and evaluate situations, ideas and information in order to formulate responses to problems	X
The act or process of forming an opinion after careful thought	X
The ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning	X

Meta-skills from SDS 2022

- **Self-management:** Estimating and scheduling tasks.
- **Social intelligence:** Working in teams, fostering synergy.
- Innovation:** Identifying fresh architectural approaches or sustainability measures

## Section B

### 20. Module Summary

This module complements the Software Services modules by looking at systems as a whole and focusing on developing, as opposed to using, technologies such as API and libraries. This module deepens students' understanding of software architecture across varied modern contexts - cloud, client-server, embedded. Focused on design patterns, threat modelling, and sustainable development, students learn agile-based planning and cost-estimation methods. By the end, you'll be able to propose robust architectures that balance performance, security, and environmental impact.

### 21. Module Keywords

Software Architecture, Agile, Sustainability, Security, API Development, Cloud computing, Threat assessment.

## 22. Module Learning Outcomes

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

Number	Theme	Learning Outcome
1	Agile	Analyse digital development activities, estimating financial, effort, and environmental costs to effectively manage software development projects.
2	Business	Compare, from a provider's perspective, threat, risk, and vulnerability, examining typical attacks and exploits that might arise in software architectures.
3	Meta-skills**	Use analytical and critical thinking to develop technology solutions, with consideration given to systems security, systematically applying structured problem-solving techniques.
4	Security	Evaluate software vulnerabilities through common testing methods and implement strategies to enhance software resilience against threats.
5	Technical	Examine key components of technology solutions in modern business environments, assessing their interactions and comparing different system architectures (e.g., game consoles, smartphones, embedded systems).
6	Sustainability	Apply sustainable software development principles by considering energy efficiency, resource consumption, and long-term environmental impact in technology solutions.

## 23. Indicative Content

Skills that will be practiced and developed:

- Managing the costs of a project and planning for different scenarios
- Presenting the threats that a service provider might face when exposed to the public.
- Practice creating an API for others to make use of
- Practice documenting an API so that others can effectively use it
- Managing the threats in different software architectures and product types
- Start to break down goals in a structured way and map these to standard methods

Syllabus Content

- Costing the development of a set of features
- Threat assessments for service providers
- Creating a server-side service and API
- Verifying credentials and using authentication services SAML and OAuth2

- Client-Server architecture
- Cloud architectures · Preserving state
- Architecting services for the cloud
- Creating high availability services
- Testing for common threats such as buffer overflows

## **24. Library Resources**

[Talis Library Resource List](#)