CS4004 Software Testing and inspection

Module Introduction

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The Team

Lectures: Dr Salim Saay

Labs: Amandeep Singh (Doctoral Researcher)

Lecturer Background

Academic

❖Lecturer at the department of software Engineering, AIT
❖Postdoctoral research fellow at **University of Limerick**
❖Team member of the BANG research group , **University of the wester cape**

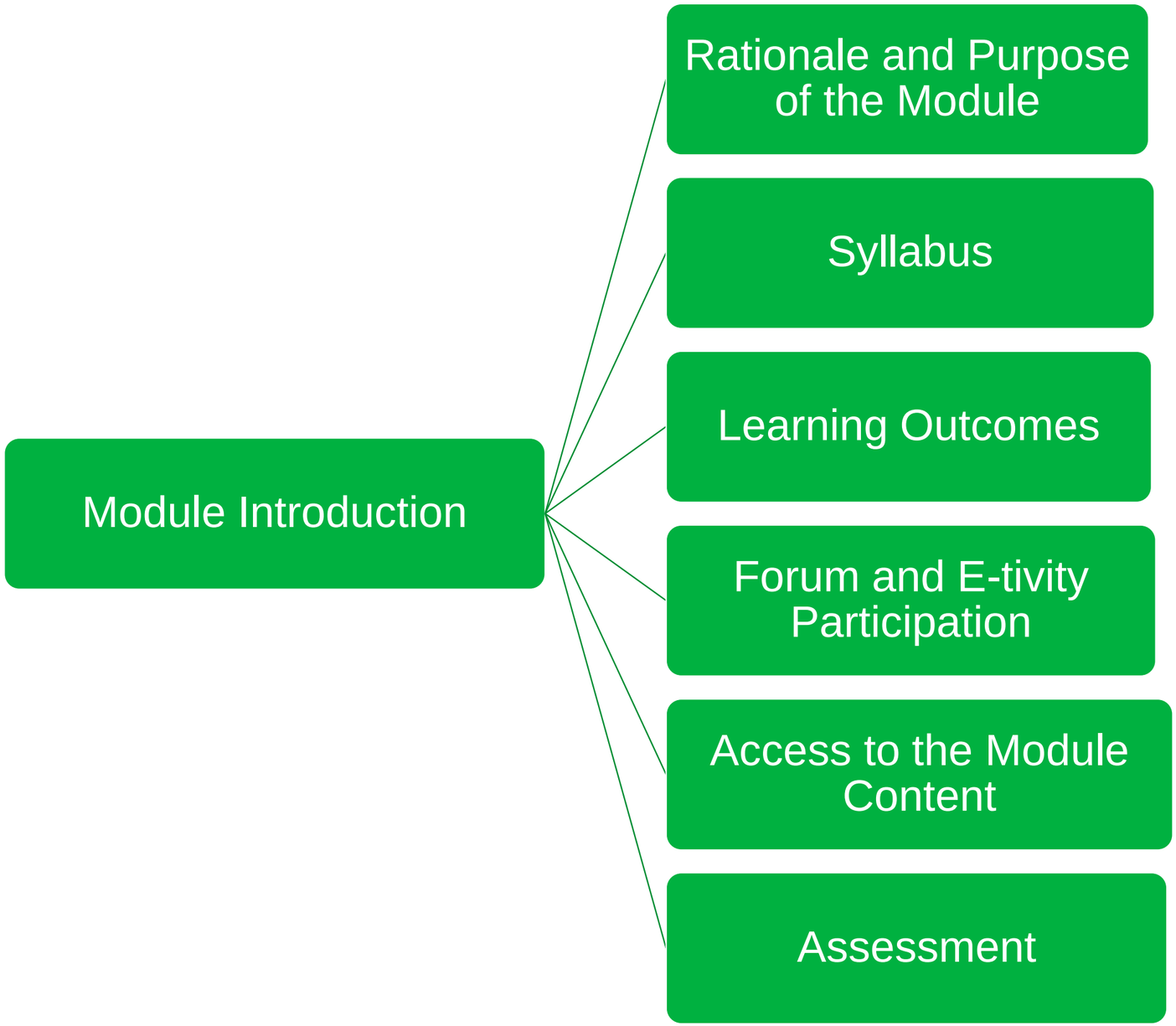
Education

❖Ph.D. SE, Tallinn University, Estonia
❖MSc. CS, Univ. of the Western Cape, South Africa

Industry

❖Manager of a National Research and Education Networks (AfgREN) worked with NATO
❖Cisco lead instructor at United Nations Development Programme (UNDP)

Overview


Module Introduction
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Rationale and Purpose of the Module

- This module introduce software **testing** and **inspection**
- Software **testing** is an investigation
  - To provide information about the **quality** of the software product or service under test
- **Inspection** in software engineering, is
  - **Peer review** of the software product **by trained individuals** who look for defects of software.

- Software testing is the process of **evaluating** a system with the **intent of finding bugs**.
  - It is performed to check if the system **satisfies** its specified requirements.

Software Testing life Cycle

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Syllabus

- **Key Terminology:** testing, debugging, error, bug, defect, …
- **Test types** and their place in the software development process;
  - Black-box and white-box testing;
  - Program reading and comprehension;
  - Refactoring code;
- Inspections, walkthroughs and desk-checking;

Syllabus

- Programming with assertions;
- Using a debugger for white-box testing;
- **Reporting and analysing bugs**: content of the problem report, analysis of a reproducible bug, making a bug reproducible;
- **Test case design**: characteristics of a good test, equivalence classes and boundary values;
- **Expected outcomes**, test case execution and regression testing;
- **Requirements** for white-box and black-box testing tools;

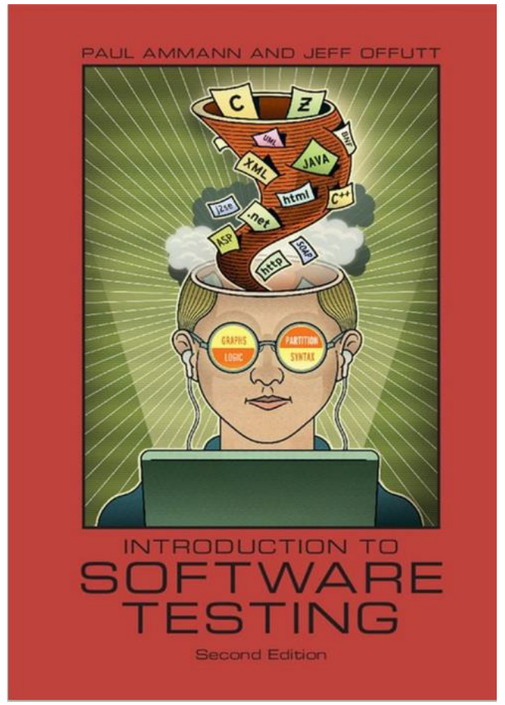
Learning Outcomes of the Module

By completion of this module

- Explain the key **terminology** in software **testing** and **inspection**.
- How to write the black box test cases by applying techniques such as **equivalence classes** and **boundary value analysis**.
  - **equivalence** classes is a technique that divides the **input data i**nto partitions which test cases can be derived.
  - **Boundary value analysis** is a technique in which **tests are designed** to include representatives of boundary values in a range.
- Students would be able to **write** the **tests**, **run** them, and **report** the **errors**.

Bibliography

- Software Testing (second edition) Paul Ammann and Jeff Offut
- Software Testing and Analysis: Process, Principles and Techniques, Mauro Pezze and Michal Young
- Software Engineering (tenth edition) Ian Sommerville



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Lecturers and LABs

We use a combined **teaching** methods

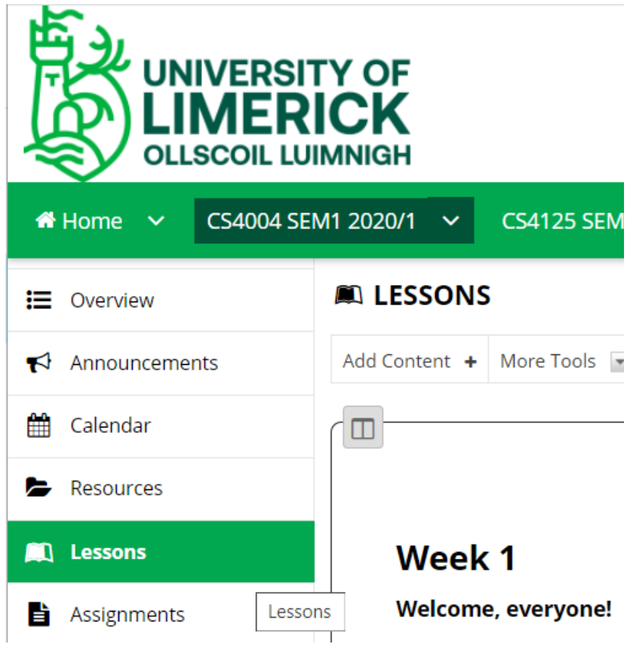
- ❖ Classroom **lectures** and **labs**,
  - ➢ Project-oriented
  - ➢ Blended learning
- ❖ Lecturers and Lab also will be **Problem-oriented**
  - ➢ It allow students to apply these concepts
  - ➢ They choose and **adapt technologies** to develop solutions for given **problems** and realistic **scenarios** (Creative) in groups (Collaborative).

Lecturers and LABs

- In many cases, the addressed **problems** and **scenarios** will include aspects like
  - social challenges,
  - local and global impact,
  - ethical considerations,
  - contributions to society (Responsible)
  - the active use of technology and research to drive positive change (Proactive).
- Students will have to **argue** their **rationale**, e.g., for technical choices and design decisions and **present the results** of their work (Articulate).

Lecturers and LABs

- ❖ All the lectures will be recorded and made available on **Sulis**
- ❖ Campus class and **Live session** is every week
  - ➢ allow everyone to ask questions
- ❖ Where will I find the recordings?
  - ➢ In “**Lessons**” organised by week



Cloud based repository

- Toolsets
  - Jira (https://www.atlassian.com/software/jira)
  - JUnit 5 with Eclipse (https://www.eclipse.org/downloads/)

Lecturers and LABs

Week	Lecture	Week	Lab	Aassessments
W1	Module Introduction and Terminology	W1	Introduction to the LAB required tools	Weekly continues assessment
W2	SW-Model-Driven Test Design	W2	Remote Repository (Jira 1)	
W3	Bug Reporting	W3	Jira II	
W4	MDTD and Criteria Based	W4	Jira III	
W5	Criteria-Based Testing	W5	Reserved	
W6	Functional Testing and Combinatorial Testing	W6	JUnit Testing Exercise	
W7	StructuralTesting	W7	JUnit II	
W8	Test Driven Development	W8	JUnit III	
W9	DataFlowTesting	W9	JUnit IV	
W10	Inspection	W10	Reserved	
W11	Module recap and information about test	W11	Reserved	
W12	Reserved	W12	Reserved	Final project submission

UL Timetable

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	09:00 - 10:00 CS4004 - TUT - 3A SAAY SALIM DR SG19 Wks:2-12		09:00 - 10:00 CS4004 - LAB - 2C SAAY SALIM DR CS1044 Wks:3-12	09:00 - 11:00 CS4004 - LEC SAAY SALIM DR P1033 Wks:1-6 09:00 - 11:00 CS4004 - LEC SAAY SALIM DR P1033 Wks:7-12	
	10:00 - 11:00 CS4004 - TUT - 3D SAAY SALIM DR SG19 Wks:2-12		10:00 - 11:00 CS4004 - TUT - 3C SAAY SALIM DR SG20 Wks:2-12		
	12:00 - 13:00 CS4004 - LAB - 2B SAAY SALIM DR CS1044 Wks:3-12				
				13:00 - 14:00 CS4004 - LAB - 2A SAAY SALIM DR CS1044 Wks:3-12	
			14:00 - 15:00 CS4004 - TUT - 3B SAAY SALIM DR SG19 Wks:2-12		
			15:00 - 16:00 CS4004 - LAB - 2D SAAY SALIM DR CS1044 Wks:3-12		

Forum and E-tivity Participation

❖ Forums are an important part of your learning journey.

- ➢ They allow you to **socialise** with your **peers**
- ➢ they help create a **collaborative community** where you can ask and answer questions.
- ➢ Forums also give you the opportunity to clarify general points **with your module leader/ TA** in an open environment.
- ➢ By asking these questions on a forum, rather than in an email, you **allow your peers to also benefit** from the **answers**.

❖ We want to keep **the quality of posts high** so that the forums remain a valuable learning resource

- ➢ So please read the forum guidelines listed below.
- ➢ Netiquette Tips For Online Discussions.

Forum and E-tivity Participation

- Post questions to the forums first and wait for the **answer** of your **peers**, or module leader/TA
  - Only **personal issues** should be sent to the module **leader via e-mail**
  - Make sure that other students can see both, the **question** and the **responses** and to allow for **efficient communication**
- Do not post about the **same issue** in multiple locations on the forums
- Engage on forums regularly
- Engage in E-tivities (e.g. quizzes)
- When **emailing**, please use subject line [CS4004]

Group Work and Peer-Based Learning

- Contribute to peer-based learning
- Engage in group work regularly
- For brief issues, you should aim to **respond** to your group members on the same day (during the week), but **no later than 24 hours**.
- It is also a good idea to agree on how and how often you will **communicate** within your group at the start of the group work.
- You need to agree on a **communication tools**

Synchronous Sessions

- Attend the scheduled **weekly sessions**
  - If you can’t attend, please ensure you watch **the recording**
- Please (muted your microphone if you patriciate online)
- For small-group live sessions (e.g. tutorials and labs), please be **prepared** that if needed to join with **camera** on and be prepared to **share your screen**
- Prepare **questions** in **advance** and if asked, provide them ahead of the webinar

Access to the Module Content

- Open the module (CS4004) in SULIS
  - Go over every week's module content in its respective weeks
  - Engage with other students on module content, for example on the forums
  - Ask for help **early**.
  - If you struggle, please get in touch immediately rather than disappearing and struggling by yourself
  - Remember, that I am always ready to help you and I want you to do well

Additional Instructions

- ❖ Contribute in SULIS systematically every week
- ❖ SULIS keeps **statistics** of **interactions** and these go towards your **10% in** engagement marks
- ❖ Attend the class as much as possible
- ❖ Start thinking about **creating a project group**
  - ➢ 4 per group is the best

Your Questions / Worries on This Module

- Your questions and answers in the Forum show your activity and your motivation
- Remember that I do not see your reactions / body language in the forum
- There are no “unsafe” questions

Assessment of the Module

Due	Percentage	Assessment Type
ongoing	10%	Online engagement (e.g. discussions, quizzes in Sulis)
Week 6	10%	Online exam
Weeks 2,3,4,7,8,9,10,11	40%	Group project
Week 12	40%	Online exam

Thank you

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