

Course outline  
**SFWRENG 3S03 Software Testing**  
(2026 Winter)

## INSTRUCTORS

- **C01: Istvan David, PhD** Assistant Professor, Dept. of Computing and Software
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  - Office hours: by appointment
- **C02: Alicia Marinache, PhD**
- **Teaching assistants**
  - C01: Feyi Adesanya, Kyanna Dagenais, Sathurshan Arulmohan
  - C02: TBD

## GENERAL INFORMATION

### CALENDAR DESCRIPTION

Measurement fundamentals, software measures and metrics, cost and effort estimation, testing strategy, testing plan, testing documentation, slicing and debugging, test coverage, functional testing techniques, system testing techniques, automated testing, maintenance fundamentals, regression testing.

### PREREQUISITES

Basic knowledge of discrete math, data structures and algorithms. Familiar with fundamental ideas of software development. Comfortable in at least one programming language (examples will mostly make use of Java, but there'll also be some C and Python from time to time). It's helpful if you've done some testing before (and you probably have) but you don't need to have done testing systematically.

### LEARNING OBJECTIVES<sup>1</sup>

#### Know and understand:

- The fundamentals of measurements and experimentation
- The principles, scope, and best practices of test planning
- The ways to measure and control the testing process
- What a test case, test plan, and other basic testing concepts are
- How to derive test cases and test procedures from requirements use cases/scenarios
- Principles of manual testing and test automation and its place in software life cycle
- The set of procedures and error-detection techniques of inspection
- How software testing practices can be deployed in practice

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<sup>1</sup> Based on the descriptions of Dr. Richard Paige (3S03 – Winter 2024).

**Be able to:**

- Articulate test plans
- Perform Coverage-based testing, Fault-based testing, Error-based testing, Black-box testing, and White-box testing, Evolutionary Testing, Debugging using Slicing, Mutation Testing, Integration Testing, Acceptance Testing, Regression Testing
- Perform security testing and performance testing
- Document testing results
- Properly execute error-detection techniques of inspection

**COURSE PAGE**

The course uses *Avenue2Learn* (A2L) to distribute material.

**SCHEDULE**

Slot	Monday	Tuesday	Wednesday	Thursday	Friday	
8:30AM 9:20 AM		T04 (Bi-weekly)				
9:30AM 10:20 AM						
10:30AM 11:20 AM						
11:30 AM 12:20 PM						
12:30 PM 1:20 PM	T05 (Bi-weekly)	T03 (Bi-weekly)				
1:30 PM 2:20 PM						
2:30 PM 3:20 PM	Lecture C02		Lecture C02			
3:30 PM 4:20 PM	Lecture C01			Lecture C01		
4:30 PM 5:20 PM		Lecture C01	T06 (Bi-weekly)	T01 (Bi-weekly)	T02 (Bi-weekly)	Lecture C02
5:30 PM 6:20 PM						

The tutorials are scheduled bi-weekly, on weeks 2, 4, 8, 10, and 12.

Attendance of lectures and tutorials is not mandatory but highly recommended.

The Instructor reserves the right to make lectures and/or tutorials mandatory in case class performance necessitates. Such changes will be announced clearly and in a timely fashion.

The Instructor reserves the right to cancel a scheduled lecture according to unexpected circumstances.

## TEXTBOOK AND COURSE MATERIAL

No textbook is mandatory for this course. Recommended ones:

- Paul Ammann and Jeff Offutt, Introduction to Software Testing, Second Edition.
- Cem Kaner et al, Lessons Learned in Software Testing: A Context Driven Approach

## COURSE CONTENTS

### OUTLINE

The course will (tentatively) cover the following topics.

Week	Date	Module	Topic	Format
1	Jan 5	Module 1: Basics	Intro to testing	In person
	Jan 6		Known cases to motivate testing	In person
	Jan 8		Types of testing (dynamic/static, white/grey/black box...)	In person
2	Jan 12		What and when to test? (unit, system, regression, etc)	In person
	Jan 13		Economics of testing, why to test, etc	In person
	Jan 15		Types of SUTs, Testing techniques	In person
3	Jan 19	Module 2: Validation	Classification of techniques	In person
	Jan 20		Lifecycle models	In person
	Jan 22		Flipped classroom (test doubles)	In person
4	Jan 26	Module 3: Goals and metrics	Goals and metrics	In person
	Jan 27		Goals and metrics 2	In person
	Jan 29		Metrics subsumption, evaluation	In person
5	Feb 2	Module 4: Evaluation	Reviews	In person
	Feb 3		Evaluating test methods	In person
	Feb 5	Static and dynamic testing	In person	
6	Feb 9	Module 5: Verification	Type checking	In person
	Feb 10		<b>MIDTERM</b>	
	Feb 12		Code quality analysis	In person
7	<b>Recess week – No lectures</b>			
8	Feb 23	Module 6: MBT and verification by formal methods	Contract verification	In person
	Feb 24		Data flow, Hoare logic, Wrap-up of verification	In person
	Feb 26		Basics of MBT, Petri nets: structure, semantics, examples + tools (TAPAAL)	Video
9	Mar 2		Petri nets properties: reachability, liveness, invariants	Video
	Mar 3		Petri nets analysis: modal temporal logic	Video
	Mar 5		Timed automata + tools (UPPAAL)	Video
10	Mar 9	Directed readings	No class	
	Mar 10	Flipped classroom	In person	
	Mar 12	Module 7: Test plan and strategy	Test plan and strategy	In person
11	Mar 16		Test plan and strategy	In person
	Mar 17		Test plan and strategy	In person
	Mar 19		Test plan and strategy	In person
12	Mar 23	Module 8: QA	Metrics and measurement	In person
	Mar 24		Non-functional testing and UI testing	In person
	Mar 26	Module 9: Advanced topics	Security testing	In person
13	Mar 30		Invited talk	In person
	Mar 31		Testing of and by AI	In person
	Apr 2		Invited talk	In person
14	Apr 6	Testing CPS	In person	
	Apr 7	Wrap-up	In person	

The instructor reserves the right to modify this tentative planning during the term. If any modification becomes necessary, reasonable notice and communication with the students will be given with an explanation and the opportunity to comment on changes.

## GRADING & EVALUATION

ID	Type	Kind	Weight	Available	Due
Assignment 1	Assignment	Group	15%	Week 4	Week 8
Midterm test	Assessment	Individual	25%	Week 6	
Assignment 2	Assignment	Individual	15%	Week 8	Week 11
Assignment 3	Assignment	Group	10%	Week 11	Week 13
Final exam	Assessment	Individual	35%	TBA (Registrar)	

The instructor reserves the right to modify this plan during the term. Such changes will be announced clearly and in a timely fashion on A2L.

Assignments reports are submitted on A2L. Program code is submitted on GitHub.

**Group assignments** are expected to be executed by groups of 2-4 students within the same course section.

**Individual assignments** are expected to be executed individually, without collaboration.

**Type-A MSAFs** are automatically accepted when submitted with the following relief:

- **Assignments:** the MSAF gives the student **three (3) additional days** to finish their part in the project. The team the student is part of must clearly document the student's expected contributions as well as provide an assessment of the work distribution in the specific assignment.
- **Midterm:** the assessment is cancelled and **its weight is carried to the final exam** (i.e., the final exam is worth 60% of the final mark).
- **There is no need to contact the instructor for Type-A MSAFs.** Submit your MSAF through Mosaic.

**Type-B MSAFs** will be discussed with the student **after** being accepted by the Faculty.

## ACADEMIC INTEGRITY & PLAGIARISM<sup>2</sup>

You are expected to exhibit honesty and ethical behavior in all aspects of the learning process. The academic credentials you earn are rooted in honesty and academic integrity principles. Individual assignments must be solved by one person only, **any** outside source (this includes asking other people or using any books or information found on the web) **has** to be documented. In compliance with the senate regulations on academic integrity, I remind you that: **People who let other people copy are as guilty as the ones who copy.** You can consult outside sources, meaning textbooks or the web, but **any** use of an outside source **must** be documented. **Code plagiarism detection tools will be used systematically.** Similarly, group assignments must be solved by members of that group only, and the University policies apply as well (see "Advisory Statements" below).

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<sup>2</sup> Adapted from Dr. Jacques Carette outline for SFWRENG 3GB3 – Fall 2021

## ADVISORY STATEMENTS

### ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "*Grade of F assigned for academic dishonesty*"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the **Academic Integrity Policy**, located at <https://secretariat.mcmaster.ca/university-policies-proceduresguidelines/>

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

### AUTHENTICITY / PLAGIARISM

**Some courses may** use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. Avenue to Learn, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to [www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

### COURSES WITH AN ON-LINE COMPONENT

**Some courses may** use on-line elements (e.g. e-mail, Avenue to Learn, LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

## **ONLINE PROCTORING**

**Some courses may** use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

## **CONDUCT EXPECTATIONS**

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

## **ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES**

Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or [sas@mcmaster.ca](mailto:sas@mcmaster.ca) to make arrangements with a Program Coordinator. For further information, consult McMaster University's [Academic Accommodation of Students with Disabilities policy](#).

## **REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK**

In the event of an absence for medical or other reasons, students should review and follow the [Policy on Requests for Relief for Missed Academic Term Work](#).

## **ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)**

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](#) policy. Students should submit their request to their Faculty Office **normally within 10 working days** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

## **COPYRIGHT AND RECORDING**

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors. Distribution of course material is prohibited.

Recording of the instructors and distribution of such material is prohibited and **will be met with immediate legal action** from the Lead Instructor.

## **EXTREME CIRCUMSTANCES**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, Avenue to Learn and/or McMaster email.