UNSW Course Outline

COMP3142 Software Testing and Quality Assurance - 2024

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General Course Information

Course Code : COMP3142
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Computer Science and Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Software plays an important role in our daily life. It is important to construct robust, operational software, especially under limited development budget and time constraints. To address this problem, a thorough verification and validation process is needed.

In this course, you will study classic and modern techniques for the automated testing and analysis of software systems for reliability, security, and performance. Throughout the course, you will gain insight into a spectrum of software quality assurance techniques, including but not limited to fuzz testing and symbolic execution. These techniques will be not only studied but also applied in real-world scenarios, providing practical skills that are highly relevant in the ever-evolving landscape of software development.

Course Aims

This course aims to combine theoretical knowledge and practical application. The inclusion of software quality assurance techniques like fuzz testing and symbolic execution, along with their hands-on application, aims to ensure that students are well-prepared to address the pressing industry need for reliable, secure, and high-performance software.

Relationship to Other Courses

This course complements COMP3141 by addressing the software quality problem from a different angle.

In COMP3141, the knowledge/technique is used for relatively small but critical software (e.g., control systems for airplanes, some OS kernels, some smart contracts ...).

In COMP3142, the knowledge/technique is used for a broader range of targets.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Apply the fundamental concepts and principles of software testing and quality assurance.
CLO2 : Identify and address common quality assurance challenges in software development.
CLO3 : Evaluate and select appropriate testing tools and frameworks.
CLO4 : Apply various software testing techniques to identify defects and ensure software reliability.
CLO5 : Analyse and interpret test results to make informed decisions.
CLO6 : Create effective automated test tools.

Course Learning Outcomes	Assessment Item
CLO1 : Apply the fundamental concepts and principles of software testing and quality assurance.	• Weekly Quizzes
CLO2 : Identify and address common quality assurance challenges in software development.	• Weekly Quizzes
CLO3 : Evaluate and select appropriate testing tools and frameworks.	• Weekly Quizzes
CLO4 : Apply various software testing techniques to identify defects and ensure software reliability.	• Assignment 1 • Assignment 2 • Weekly Quizzes
CLO5 : Analyse and interpret test results to make informed decisions.	• Assignment 1 • Assignment 2 • Weekly Quizzes
CLO6 : Create effective automated test tools.	• Assignment 1 • Assignment 2 • Weekly Quizzes

Learning and Teaching Technologies

Moodle - Learning Management System | EdStem | Microsoft Teams

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment 1 Assessment Format: Individual	30%	
Assignment 2 Assessment Format: Group	60%	
Weekly Quizzes Assessment Format: Individual	10%	

Assessment Details

Assignment 1

Assessment Overview

The students will use various software testing techniques to test example or real-world programs. The students will also practice the knowledge they learned about software complexity and code coverage. This assignment will be automatically marked by some program based benchmarks. The students can also get feedback about their assignments during the follow-up lectures as some commonly faced problems will be covered.

Course Learning Outcomes

- CLO4 : Apply various software testing techniques to identify defects and ensure software reliability.
- CLO5 : Analyse and interpret test results to make informed decisions.
- CLO6 : Create effective automated test tools.

Generative AI Permission Level

Assistance with Attribution

This assessment requires you to write/create a first iteration of your submission yourself. You are then permitted to use generative AI tools, software or services to improve your submission in the ways set out below.

Any output of generative AI tools, software or services that is used within your assessment must be attributed with full referencing.

If outputs of generative AI tools, software or services form part of your submission and are not appropriately attributed, your Convenor will determine whether the omission is significant. If so, you may be asked to explain your submission. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office

for investigation for academic misconduct and possible penalties.

For more information on Generative AI and permitted use please see here.

Assignment 2

<u>Assessment Overview</u>

The course staff will form groups of 3-4 students at the beginning of the course.

The students will implement greybox fuzzers using the framework provided in the course. They will also apply their fuzzers to finding bugs in example or real-world programs. This assignment will be automatically marked by some program based benchmarks. The students can also get feedback about their assignments during the follow-up lectures as some commonly faced problems will be covered.

Note that half (30% overall mark) of the mark will be awarded based on the group's work as a whole. The remainder of the mark will come from individual contributions that are determined by both automatic systems, course staff review, and peer evaluation.

<u>Course Learning Outcomes</u>

- CLO4 : Apply various software testing techniques to identify defects and ensure software reliability.
- CLO5 : Analyse and interpret test results to make informed decisions.
- CLO6 : Create effective automated test tools.

<u>Generative AI Permission Level</u>

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Weekly Quizzes

<u>Assessment Overview</u>

8 weekly marked quizzes, starting in Week 1. Each quiz assesses the theoretical lecture content for that week, in a series of multiple choice questions, and will be due on the Friday of the following week. Quizzes are all automatically marked and feedback will be provided.

<u>Course Learning Outcomes</u>

- CLO1 : Apply the fundamental concepts and principles of software testing and quality assurance.
- CLO2 : Identify and address common quality assurance challenges in software development.
- CLO3 : Evaluate and select appropriate testing tools and frameworks.
- CLO4 : Apply various software testing techniques to identify defects and ensure software reliability.
- CLO5 : Analyse and interpret test results to make informed decisions.
- CLO6 : Create effective automated test tools.

<u>Generative AI Permission Level</u>

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see here.

General Assessment Information

<u>Grading Basis</u>

Standard

<u>Requirements to pass course</u>

Achieve a composition mark of at least 50 out of 100.

Course Schedule

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Resources

Recommended Resources

https://www.fuzzingbook.org/

Course Evaluation and Development

Apart from the official feedback channels provided by UNSW. This course will have an individual feedback survey to collect student feedbacks.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	Sarah Chen					No	No
	Shuangxiang Kan					No	Yes

Other Useful Information

Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance

- [UNSW Email Address](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Equitable Learning Services](#)

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit:

student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,

- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School Contact Information

CSE Help! - on the Ground Floor of K17

- For assistance with coursework assessments.

The Nucleus Student Hub - https://nucleus.unsw.edu.au/en/contact-us

- Course enrolment queries.

Grievance Officer - grievance-officer@cse.unsw.edu.au

- If the course convenor gives an inadequate response to a query or when the courses convenor does not respond to a query about assessment.

Student Reps - stureps@cse.unsw.edu.au

- If some aspect of a course needs urgent improvement. (e.g. Nobody responding to forum queries, cannot understand the lecturer)

You should **never** contact any of the following people directly:

- Vice Chancellor

- Pro-vice Chancellor Education (PVCE)

- Head of School

- CSE administrative staff

- CSE teaching support staff

They will simply bounce the email to one of the above, thereby creating an unnecessary level of indirection and a delay in the response.