COMP4060

Advanced Software Engineering

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Computing

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General Information

Unit convenor and teaching staff
Convenor
Carl Svensson
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by appointment - details in iLearn

Lecturer
Lachlan Patrick
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by appointment - details in iLearn

Credit points
10

Prerequisites
200cp at 1000 level or above including COMP2050 and COMP3010

Corequisites

Co-badged status

Unit description
This unit integrates prior learning in a specialist area of engineering with problem solving, emerging technology and aspects of engineering application, technical reporting and self-management to prepare students to work at a professional capacity. The unit aims to address the application of fundamental principles and methods at an advanced level in the context of standards and practices, modelling, analysis, design and practical implementation. The unit also develops skills in the critical evaluation of information, software and sources of error, and experimental methods. Learning will be achieved using case studies, laboratories, presentations, group work and traditional lecture format.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Industry, Innovation and Infrastructure

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Regularly reevaluate your own skill-base with respect to the ACS-EA Joint Board on Software Engineering competencies, in addition to practising detailed technical skills in each of the competency areas

ULO2: Describe and critically analyse the state of the profession of software engineering in Australia, and in less detail internationally, including significant industrial stakeholders, the roles of professional societies, legislative support for professionals, and the nature of professionalism

ULO3: Demonstrate mastery of selected advanced concepts in software engineering, including topical issues and current research (more specific outcomes are negotiated individually for chosen advanced concepts)

ULO4: Effectively practise self-learning, time-management, and project management, individually and in a group setting.

General Assessment Information

In order to pass the unit

Note that each student is expected to complete satisfactorily all three components of the assessment. This is a highly integrated unit and attempts to merely accumulate marks in a component without utilising material from the others would be destined to fail.

This unit, like the workplace you will soon be in, requires active involvement and, like the workplace, you will be being judged throughout the semester.

There will be regular feedback during the semester, so students should have an idea of how they are progressing (and if you don't have a clear idea, be sure to ask!).

But it's really important to realise that this unit, the culminating unit in software engineering linking your degree to the workplace, is not like many (probably any) of the units you have studied before. You need to attend all classes and be actively involved. You need to work between classes and prepare for the following week's classes. You need to plan and manage carefully your own individual tasks. And you need to take all this seriously and complete it in a business like and conscientious manner. Feedback / discussion on items that students have prepared will continue in following workshops to help build / refine / develop / use those submissions for other progressive learning activities.

It goes without saying, but we'll say it anyway, that there are no recorded lectures or web-based PowerPoint presentations for you to use if you miss things. The unit has lectures, but the unit is **about you** and your participation is essential for success.

Late Submissions and Special Consideration

As with all software engineering, timely submission is essential. Late submissions **will not be accepted**. If you are seriously affected by unavoidable and unforeseeable circumstances, you should email the unit convenor as early as possible, and certainly before the due date of piece of work. **In any case, be sure to submit by the due date whatever work you have available for submission.** If, after application for for Special Consideration as a result of unavoidable disruption to studies, the university deems you to be eligible to complete further work on the assessment item, you may be given an opportunity to add to your submission or you may be given a substitute task.

Written submissions

Software engineering frequently requires written reports, and such reports need to be, as far as possible, of professional quality. Students need to strive to present work which is written clearly, with good grammar, correct word usage, correct punctuation and correct spelling. Wherever required, all written work must be properly referenced and conform to standard stylistic conventions.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Student Engagement	50%	No	weekly		No	
Student Presentations	20%	No	in-class during week 12 and 13		No	
Submissions	30%	No	multiple - discussed with each student in week 1		No	

Student Engagement

Assessment Type [1]: Simulation/role play
Indicative Time on Task [2]: 56 hours
Due: **weekly**
Weighting: **50%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

In a simulated environment the students will interact as professionals in a business to analyse

proposals, manage projects and evaluate performance in advanced software engineering problems.

The unit is built around highly interactive sessions for which students need to prepare between classes, and then they need to demonstrate critical thinking and active engagement in the in-class debates. Assessment of each student will be openly discussed with frequent feedback in a small class environment (and with each student's agreement).

This mode of learning is so important for the unit, and requires so much work by the students, that it has initially been given a substantial weighting in the assessment.

Nevertheless, as part of the active involvement of students the weightings are subject to negotiated change.

On successful completion you will be able to:

- Regularly reevaluate your own skill-base with respect to the ACS-EA Joint Board on Software Engineering competencies, in addition to practising detailed technical skills in each of the competency areas
- Describe and critically analyse the state of the profession of software engineering in Australia, and in less detail internationally, including significant industrial stakeholders, the roles of professional societies, legislative support for professionals, and the nature of professionalism
- Demonstrate mastery of selected advanced concepts in software engineering, including topical issues and current research (more specific outcomes are negotiated individually for chosen advanced concepts)

Student Presentations

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 10 hours
Due: **in-class during week 12 and 13**
Weighting: **20%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

During the unit students are individually assigned problems to analyse (both critically themselves, and through a review of relevant literature) and the results of their studies are made available to the class in formal presentations.

Assessment of presentations includes a substantial component based on content, but also a component for surface features including the quality and clarity of their communication.

On successful completion you will be able to:

- Demonstrate mastery of selected advanced concepts in software engineering, including topical issues and current research (more specific outcomes are negotiated individually for chosen advanced concepts)
- Effectively practise self-learning, time-management, and project management, individually and in a group setting.

Submissions

Assessment Type [1]: Reflective Writing
Indicative Time on Task [2]: 45 hours
Due: **multiple - discussed with each student in week 1**
Weighting: **30%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

There will be a sequence of agreed written deliverables (these can include problem solutions, software, reports and essays) required throughout the unit. The most important of these is the unit portfolio, and it is expected that the other deliverables will form a part of it too. Nevertheless, some deliverables need to be submitted during the unit, while the portfolio will only be finally submitted near the end of the unit.

The unit portfolio is a student's record of their significant achievements, including their reflections, from throughout the unit. Thus it is both a technical document, and a personal journal. The personal reflections are very important.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- Academic Success for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation.

[3] An automatic short extension is available for some assessments. Apply through the Service Connect Portal.

Delivery and Resources

Week 1: When do we meet?

With classes starting in week 1, and the first workshop on Friday 12 noon, this unit emphasises a dynamic combination of lecture, practical and laboratory work, group and individual assigned task work, and a high degree of self-learning. The overall goal is to be a "finishing school" for software engineers, and the unit includes highly technical work as well as deep reflection on the nature of the discipline and its state in Australia and internationally.

Research and Resources

Research "in the library" (outside of scheduled sessions) as to the state of the art in software engineering will be required as the student develops their own understanding in identified areas as part of the assigned task work.

There are no set texts, but a wide range of sources will need to be consulted and reading lists developed.

This unit is different each year because the content is tailored to the individual experiences of each of the students that arise from their particular choices of electives in the software engineering program and any work experience, and it is also tailored to the students' medium term career goals. The exact nature of the change from year to year depends of course upon the exact nature of the individual experiences and the goals of the enrolled students in each year.

Methods of Communication

Communication with students will be done in person during the weekly meetings. This may include action items, feedback, queries on progress, and any other topics that arise as part fo the weekly discussions.

We will - where necessary - communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn.

Teaching and Learning Activities

Lecture

Delivery of material not previously seen by the students or material which will be presented in a differenct context with regard to graduate capabilities. There may be some review material, but this is minimal.

Workshop

Develop skills based competencies in experimentation with overlap/application to theory and simulation.

Projects

Students plan and execute a combination of group and individual work to execute a project of substance, possibly with real world application. This activity leads to assessments that may be of both a group and individual nature as well as formal reports and a presentation

Class debates

This activity is used widely in this unit to engage students and encourage deep learning. At this advanced level, as well as technical material there is a need for students to develop their own internalised understanding of matters such as ethics, the nature of the profession, their approach to professional development, and their career goals. There aren't simple answers, and there is a strong need for detailed student engagement with the issues.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated priarilly via iLearn, but may include direct email communication through you student email.

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au. More details are in the "General Assessment Information" for specific assessments.

Unit Schedule

The class runs on Friday each teaching week of session 1 (except for public holidays). Below is a tentative schedule for the unit, but a more definite scheudle will be discussed with students

based on their self-evaluation against accreditation criteria.

Week commencing	Topic **
Mon 19 February - Week 1	Intro and raison d'etre for 4060
Mon 26 February - Week 2	The nature of the discipline
Mon 4 March - Week 3	The role of professional societies
Mon 11 March - Week 4	How to develop individual projects and how to present individual projects
Mon 18 March - Week 5	How to contract for individual projects
Mon 25 March - Week 6	Working on individual projects (Good Friday Public Holiday)
Mon 1 April - Week 7	Working on individual projects + progress reports on individual projects
Mon 8 April - Week 8	Software engineering disasters
Mon 15 April - Non-teaching week	Break from classes (work on projects, portfolio, and news items)
Mon 22 April - Non-teaching week	Possible break from classes (work on projects, portfolio, and news items)
Mon 29 April - Week 9	Software assurance and operating systems
Mon 6 May - Week 10	Systems security, software security, and low level analyses
Mon 13 May - Week 11	Software Verification
Mon 20 May - Week 12	Student Presentations
Mon 27 May - Week 13	Student Presentations
Mon 3 June	Final Reporting / Examination if required

** Please note that this is the initial plan for arranging unit content, but it is subject to change. Our goal is to best serve student learning and depending on the distribution of Joint Board competencies already attained by the incoming students material may be rearranged and relative timings reallocated (in consultation with the enrolled students).

Individual projects will cover many areas including CASE tools, process methodologies, testability and formal verification as well as project specific technical material. The precise combination will vary based on the nature of each individual project.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

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Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Academic Success

Academic Success provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE

- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

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The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

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Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

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Student Enquiries

Got a question? Ask us via the Service Connect Portal, or contact Service Connect.

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IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

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Changes from Previous Offering

As noted above, COMP4060 is different every year because it is tailored to the varied experiences of the enrolled students and because assessment weightings are negotiated with students during the unit.

As part of this process of a tailored experience for each student, we include a student reflection on their experiences in the unit which includes feedback and suggestions for future offerings. While there are no macro-changes to the units for this offering based on feedback from the previous cohorts, there was a strong preference on keeping more of the discussion in a face to face mode rather than using online forums to suppliment the discussions. There was also an overwhelmingly positive response to the tailored nature of the unit with the breakout discussion sessions which will remain for this offering as well.

Unit Goals

As we've said, COMP4060 is a very different unit from the other kinds of units you will have studied in your software engineering (SE) program. So, we want to be explicit about the unit's goals. They are:

1. To fill the gaps in ICT knowledge that can arise from a curriculum for SE including a limited number of required specialist IT units. Each student has different gaps, as they

depend on the students' choices of electives and on their goals for future employment in software engineering (there are many different kinds of software engineers).

2. To provide a culminating experience in which students reflect upon their entire degree and contextualise it with respect to other software engineering degrees, SE curricula, and their own understanding of SE, as well as developing their own near-graduation perspective on SE as a field, on professionalism and on professional practice.

These are the goals that lie behind the learning outcomes.

Unit information based on version 2025.04 of the Handbook