UNIVERSITY OF CANBERRA

Software Systems Architecture

Unit code and version	11491.1
Unit offering option	213698
Study level	Level 3 - Undergraduate Advanced Unit
Credit points	3
Faculty	Faculty of Science and Technology
Discipline	Academic Program Area - Technology
Unit offering details	Semester 2, 2023 , ON-CAMPUS , UC - Canberra, Bruce
Unit convener name and contact details	Unit Convener/Lecturer Name: Dr. Richa Awasthy Availability: By appointment Office:6C30 Email:richa.awasthy@canberra.edu.au
Administrative contact details	Student Central Building 1, Level B E: Student.Centre@canberra.edu.au T: 1300 301 727

Academic content

Unit description

In this unit, the students will learn how to produce software architecture design from system requirements; The course covers terms, concepts and techniques used in the design of software architectures, including architectural requirements, architectural styles, architecture documentation and architecture evaluation. Students will learn about the role of architecture and architects in software engineering. Modern architectures such as service-oriented and cloud architecture and wireless systems architecture are also covered in detail. This unit will be co-taught with unit 8746 Software Systems Architecture G.

Learning outcomes

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

1. Demonstrate a firm understanding of the principles of software architecture, architectural best-practices, and how architecture is used in modern software engineering;
2. Understand the role of a software architect in software engineering practice;
3. Examine and compare various architecture styles and solutions;
4. Design an architecture that reflects and balances the different needs of its stakeholders; and
5. Communicate the architecture to stakeholders and demonstrate that it has met their requirements.

Graduate attributes

1. UC graduates are professional
    - communicate effectively
    - display initiative and drive, and use their organisation skills to plan and manage their workload
    - employ up-to-date and relevant knowledge and skills
    - use creativity, critical thinking, analysis and research skills to solve theoretical and real-world problems
    - work collaboratively as part of a team, negotiate, and resolve conflict
2. UC graduates are global citizens
    - make creative use of technology in their learning and professional lives
3. UC graduates are lifelong learners
    - reflect on their own practice, updating and adapting their knowledge and skills for continual professional and academic development

The graduate attributes of this unit address communication, analysis and inquiry, problem solving, working independently and with others, professionalism and social responsibility.

Skills development

As students of the University of Canberra, you will develop your critical thinking skills, your ability to solve complex problems, your ability to work with others, your confidence to learn independently, your written communication skills, your spoken communication skills and a number of work-related knowledge and skills.

Prerequisites

11486 Systems Analysis and Modelling

Corequisites

None.

Accreditation

This unit is a part of courses accredited by the ACS and EA. It meets the following skill categories:

Skills Framework for the Information Age (SFIA)

This unit meets the following SFIA skills specification

- ARCH - Developing and communicating a multi-dimensional solution architecture to deliver agreed business outcomes.
- BPRE - Creating new and potentially disruptive approaches to performing business activities.
- BUSA - Investigating business situations to define recommendations for improvement action.
- CIPM - Planning, designing and implementing activities to transition the organisation and people to the required future state.

- DESN - Designing systems to meet specified requirements and agreed systems architectures.
- SWDN - Software Design

SFIA skills are defined by levels of responsibility, based on autonomy, influence, complexity, business skills, and knowledge. Although this unit may cover knowledge and skills at higher levels, it is expected that graduates of undergraduate degrees will be capable of operating at Level 2 overall.

Seoul Accord

The UC generic attributes address graduate attributes 1, 6, 7, 9, and 10 of the Seoul Accord. The remaining graduate attributes that are covered in this unit are::

2. Knowledge for Solving Computing Problems
4. Design/Development of Solutions
5. Modern tool usage
6. Individual and Teamwork
10. Life-long learning

This unit addresses complex computing problems that have one or more of the following characteristics:

- involves wide-ranging or conflicting technical, computing, and other issues;
- has no obvious solution, and requires conceptual thinking and innovative analysis to formulate suitable abstract models;
- a solution requires the use of in-depth computing or domain knowledge and an analytical approach that is based on well-founded principles;
- is outside problems encompassed by standards and standard practice for professional computing;
- involves diverse groups of stakeholders with widely varying needs;
- has significant consequences in a range of contexts;
- is a high-level problem possibly including many component parts or sub-problems;
- identification of a requirement or the cause of a problem is ill defined or unknown.

These complex computing problems are assessed in the following assessment items:

- Final assessment

EA Accreditation. This unit is part of courses accredited by Engineers Australia. It meets the following Stage 1 competencies:

- 1.1 Comprehensive, theory based understanding – Indicators Assessed: a

  1.5 Knowledge – Indicators Assessed: a, b, c; Exposed: d, e, f

  1.6 Understanding – Indicators Assessed: a, d; Exposed b, c, e

  2.4 Application of systematic approaches – Indicators Assessed: a, d, f; Exposed b, c, e

  3.1 Ethical conduct and professional accountability – Indicators Assessed: a, d; Exposed b, c

  3.2 Effective oral and written communication in professional and lay domains – Indicators Assessed: a, b

  3.4 Professional use and management of information – Indicators Assessed: a; Exposed b, c

  3.5 Orderly management of self, and professional conduct - Indicators Assessed: a, d, f; Exposed b, c, e

Timetable of activities

Week	Topic	Assessment Due
1	Introduction to the unit	NO TUTORIAL
2	Software systems architecture	Tutorial 1 and Online Quiz 1
3	Quality attributes	Tutorial 2 and Online Quiz 2
4	Quality attributes	Tutorial 3 and Online Quiz 3
5	Quality attributes	Tutorial 4 and Online Quiz 4
6	Architectural tactics & patterns	Mid-term Assessment
7	Architectural tactics & patterns	Tutorial 5 and Online Quiz 5
8	CLASS FREE PERIOD	
9	Architectural tactics & patterns	Tutorial 6 and Online Quiz 6
10	Architectural tactics & patterns	Tutorial 7 and Online Quiz 7
11	Architectures in the cloud	Tutorial 8 and Online Quiz 8
12	Architectures in the cloud	Tutorial 9 and Online Quiz 9
13	Review	Tutorial 10 and Online Quiz 10
14	Final assessment	
15	EXAM PERIOD	

Note: Changes in the timetable may occur. Please check constantly announcements on Canvas and your UC email for updates.

Unit resources

Required texts

Recommended Text book:

Len Bass, Paul Clements and Rick Kazman. (2013) Software Architecture in Practice, Addison-Wesley, 3rd edition.

Supplementary Text books:

Richard N. Taylor, Nenad Medvidovic and Eric Dashofy. (2009) Software Architecture: Foundations, Theory, and Practice, Wiley.

Roger Pressman and Bruce Maxim. (2014) Software Engineering: A Practitioner's Approach, McGraw-Hill Education, 8th edition.

John Dooler. (2011) Software Development and Professional Practice. Apress

Please consult the unit teaching site for further information on texts/readings recommendations.

Materials and equipment

Library and web resources will be announced on the unit website.

Laptop computers are not mandatory for this unit, but students are highly encouraged to bring their own devices to enhance their learning experience during the tutorial classes.

Unit website

Each unit you are enrolled in has an online teaching site in the learning management system UCLearn. You access UCLearn through MyUC.

Social Media

Social media will be used as part of the teaching and learning of this unit, and relates to websites and applications that allow students and staff to create and share material, or interact via social networking activities. This can take many forms including text, images, audio, video, gestures (such as 'liking', 'favouriting', 'following') and other multimedia communications. Students and staff should be aware that social media creates an environment for limitless communication, collaboration, dialogue and information exchange but that there should be an awareness of the 'amplificatory' effect of popular content, which can portray both positive and negative outputs. Students should note that social media is not at the control of the University and, therefore, changes may be made to learning or assessment materials at late notice as a consequence of changes to content or access to the social media platform. Students are warned that there may be possible disturbing content that can be viewed when using social media, that is outside the control of the University. Students who are concerned with the use of social media for privacy or other issues are advised to speak with their unit convener as soon as possible.

For further information please refer to the section on Social Media in the Assessment Procedures.

Assessment

Assessment item details

Mid-Term Assessment

Due date

Week 6, during tutorial classes

Weighting

20%

Assessment details

Full details for each assessment item will be available on the Canvas site.

Attendance (in person) is mandatory as this assessment item must be completed during the tutorial class of week 6.

Access to Canvas will be permitted, but no other materials will be allowed. A calculator (any kind) can be used.

A deferred mid-term assessment will only be considered for students who submit an assignment extension form, as well as documentary evidence to support the request (e.g., medical certificate). The request will only be granted if it is in accordance with the University's policies for extensions.

Please consult the unit website for further information on this assessment item.

Addresses learning outcomes

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

- 1. Demonstrate a firm understanding of the principles of software architecture, architectural best-practices, and how architecture is used in modern software engineering;
- 2. Understand the role of a software architect in software engineering practice;
- 3. Examine and compare various architecture styles and solutions;

Related graduate attributes

1. UC graduates are professional
    - communicate effectively
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Quizzes (Continuous Assessment)

Due date

Weekly - Sunday 23:59

Weeks 2-13

Weighting

20%

Additional information

There will be 10 weekly quizzes, corresponding to the lectures of weeks 1-12.

Each quiz will be worth 2% of the final grade.

Late submissions will not be accepted. Extensions will not be granted for quizzes.

Assessment details

Full details for each assessment item will be available on the Canvas site.

Addresses learning outcomes

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Final assessment

Due date

Tuesday 23:59 Week 13

Weighting

50%

Additional information

Students need to obtain at least 40% in the final assessment to pass the unit.

Assessment details

This is a group assignment. Full details for the assessment item will be available on the Canvas site.

An assignment to be submitted as a report with architecture via Canvas site.

Please consult the unit canvas website for further information on this assessment item.

Addresses learning outcomes

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Tutorials

Due date

Weekly- during tutorial time

Weighting

10%

Assessment details

Full details for each assessment item will be available on the Canvas site.

Attendance (in person) is required as this assessment item must be demonstrated during the tutorial classes.

Students need to attend tutorial classes every week to complete this assessment item or contact the unit convener for different arrangements.

Please consult the unit website for further information on this assessment item.

Addresses learning outcomes

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

- 1. Demonstrate a firm understanding of the principles of software architecture, architectural best-practices, and how architecture is used in modern software engineering;
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Submission of assessment items

Approval of extenuating circumstances for late submission of assignments will be dependent upon the production of supporting documentation and at the discretion of the unit convener.

Late submissions for quizzes and mid-term assessments are not permitted due to the nature of these assessments. Unless supported by Inclusion & Welfare, extensions will not be granted for these assessment items. A medical certificate will only be considered for these assessment items if a) it covers the entire period the quiz was open, and b) if the extension request happens before the answers to the assessment item have been published. Please consult the unit website to see the dates when the answers will be published.

No other forms of submission other than the indicated in each assessment item will be accepted. Submissions via email will be ignored. If a student chooses to submit his/her assignment via the Internet of the campus, it is the responsibility of the student to guarantee the accessibility of the Internet. Not being able to access the Internet at a location that is off the campus is not an excuse for an extension.

Students will be asked to confirm the following online declaration at the point of submission. I certify that:

1. The attached assignment is my own work and no part of this work has been written for me by any other person except where such collaboration has been authorized by the lecturer/s concerned;

2. Material drawn from other sources has been fully acknowledged as to author/creator, source, and other bibliographic details according to unit-specific requirements for referencing; and

3. No part of this work has been submitted for assessment in any other unit in this or another Faculty except where authorized by the lecturer/s concerned.

Extensions

Students can apply for an extension to the submission due date for an assessment item due to extenuating, evidenced circumstances (specific details are found in the Assessment Procedures). An extension must be applied for before the due date. Documentary evidence (e.g. medical certificate) will be expected for an extension to be granted, however this will not guarantee that the application will be successful. The Unit Convener or relevant Program Director/Course Convener will decide whether to grant an extension and the length of the extension.

An Assignment Extension form is available from the Student Forms page.

Late submissions

The following late submission period and penalty is applicable to any teaching period commencing after 1 April 2024.

To support the provision of timely feedback to students within the unit, late penalties will apply for summative assessments where late

submission is permitted. Late submissions without an approved extension or reasonable adjustment will result in a penalty of a mark reduction of 10% of the maximum available marks for the assessment item per day (or part thereof) up to and including three calendar days. If a student submits more than three calendar days late without an approved extension or reasonable adjustment, the student will be allocated a mark of zero for that assessment, with no feedback provided.

Approval of extensions based on extenuating circumstances will be dependent upon the production of supporting documentation and at the discretion of the unit convener.

For teaching periods commencing prior to 1 April 2024, a late penalty of 5 % of the maximum available marks for the assessment item per day (or part thereof) was applied up to and including seven calendar days. An assignment submitted over 7 days late will not be accepted.

Special assessment requirements

OVERALL MARK & REQUIREMENTS TO PASS THE UNIT

Each assessment item will be given a grade and an associated percentage mark. The marks will be totaled to produce an overall coursework mark.

The Overall Mark will be calculated as follows:

Overall Mark =

Mid-Term Assessment (20%) +

Tutorial (10%)

Quizzes (Continuous Assessment) (20%) +

Final assessment (50%)

Conditions to PASS the unit:

1. Students need to obtain at least 50% in the Overall Mark, calculated as described above;

AND

2. Students need to obtain at least 40% in the Final assessment.

Satisfying only conditions 1 or 2 will not be enough to pass the unit.

Once you have met the conditions for a Pass, higher grades will be awarded on the basis of the highest category shown below, in which your marks fit.

85 <= Final mark <= 100Final grade = HD

75 <= Final mark < 85 Final grade = DI

65 <= Final mark < 75 Final grade = CR

50 <= Final mark < 65 Final grade = P

0 <= Final mark < 50 Final grade = FAIL (NX, NS, NC or NN)

The unit convener reserves the right to question students orally on any of their submitted work.

Some assessment items for G students will differ from UG students.

Supplementary assessment

Refer to the Assessment Policy and Assessment Procedures

Academic integrity

Students have a responsibility to uphold University standards on ethical scholarship. Good scholarship involves building on the work of others and use of others' work must be acknowledged with proper attribution made. Cheating, plagiarism, and falsification of data are dishonest practices that contravene academic values. Refer to the University's Student Charter for more information.

To enhance understanding of academic integrity, all students are expected to complete the Academic Integrity Module (AIM) at least once during their course of study. You can access this module within UCLearn (Canvas) through the 'Academic Integrity and Avoiding Plagiarism' link in the Study Help site.

Use of Text-Matching Software

The University of Canberra uses text-matching software to help students and staff reduce plagiarism and improve understanding of academic integrity. The software matches submitted text in student assignments against material from various sources: the internet, published books and journals, and previously submitted student texts.

Student responsibility

Learner engagement

Activities	Estimated hours
12 Lectures X 2 hours each	24
Lecture's preparation (2X12)	24
Weekly Tutorial classes (1 X 11)	11
Weekly Tutorial preparation (1X11)	11
Mid-Term	35
Final assessment	45
Total	150

Inclusion and engagement

It is strongly recommended that students who need assistance in undertaking the unit because of disability or an ongoing health condition register with the Inclusion and Engagement Office as soon as possible so that reasonable adjustment arrangements can be made.

Participation requirements

Your participation in both class and online activities will enhance your understanding of the unit content and therefore the quality of your assessment responses. Lack of participation may result in your inability to satisfactorily pass assessment items.

Withdrawal

If you are planning to withdraw please discuss with your Unit Convener. UC College students must also seek advice from the College.

Required IT skills

IT skills commensurate with the advanced study of information technology are assumed.

Work integrated learning

Not applicable to this unit.

Additional information

Provision of information to the group

Notifications through the unit website are deemed to be made to the whole class. It is the responsibility of the student to ensure that they check for announcements on the unit website regularly. Not checking the unit website and the student email regularly will not excuse the student from following the instructions provided via both means of communication, which may include updates to the unit contents, assignments, and deadlines, among others.

Use of student email account

The University Email policy states that “students wishing to contact the University via email regarding administrative or academic matters need to send the email from the University account for identity verification purposes”. Therefore all unit inquiries should be emailed using a student university email account. Students should contact servicedesk@canberra.edu.au if they have any issues accessing their university email account.

In all cases of absence, sickness, or personal problems it is the student’s responsibility to ensure that the unit Convener is informed within the appropriate timeframe. The minimum participation requirement must be met in order to pass the unit (regardless of supporting documentation).

Student feedback

All students enrolled in this unit will have opportunities to provide anonymous feedback on the unit through the InterFace Student Experience Questionnaire (ISEQ). The request for your feedback will be posted on your InterFace page at least twice during a teaching period. InterFace can be accessed through MyUC.

Changes to unit based on student feedback

The content and material prepared for this unit has been reviewed in the light of feedback from previous student surveys/evaluation.

We strongly encourage students to give feedback by answering UC surveys. In addition, please feel free to contact your Unit Convener at any time should you have any suggestions or comments about this unit.

Authority of this unit outline

This unit outline must be read in conjunction with the University of Canberra's Policies and Procedures, including the Assessment Policy and associated Procedure. The Assessment Policy and Assessment Procedure include information on matters such as plagiarism, grade descriptors, moderation, feedback, and deferred exams.

Any change to the information contained in the Academic content and Assessment sections of this document, will only be made by the Unit Convener if the written agreement of the Program Director and a majority of students has been obtained; and if written advice of the change is then provided on the teaching site in UCLearn. If this is not possible, written advice of the change must be then forwarded to each student enrolled in the unit at their registered term address. Any individual student who believes themselves to be disadvantaged by a change is encouraged to discuss the matter with the Unit Convener.

Authority Text

Main

Exception – Potential changes to a unit's learning activities and assessment items (Approved Academic Board 2020)

In the event of Australian Government and/or ACT Government directive, such as those requiring physical distancing and restrictions on movement because of a pandemic, learning activities and/or assessment items in some units may change. These changes will not be updated in the published Unit Outline but will be communicated to students via the unit's UCLearn (Canvas) teaching site. The new learning activities and/or assessment items will continue to meet the unit's learning outcomes, as described in the Unit Outline.

New learning activities and/or assessment items will be available on the unit's UCLearn (Canvas) teaching site. Please contact the Unit Convener with any questions.

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CRICOS 00212K

TEQSA Provider ID: PRV12003 (Australian University)

UC acknowledges the Ngunnawal people, traditional custodians of the lands where Bruce campus is situated. We wish to acknowledge and respect their continuing culture and the contribution they make to the life of Canberra and the region. We also acknowledge all other First Nations Peoples on whose lands we gather.