UNSW Course Outline

COMP6452 Software Architecture for Blockchain Applications - 2024

Published on the 30 May 2024

General Course Information

Course Code : COMP6452
Year : 2024
Term : Term 2
Teaching Period : T2
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Computer Science and Engineering
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate, Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

This course addresses the knowledge that is needed in order to build applications based on blockchain technology, by offering an architectural view of software systems that make beneficial use of it. It provides guidance on assessing the suitability of blockchain, on the roles

blockchain can play in an architecture, on designing blockchain applications, and on assessing different architecture designs and tradeoffs. It also serves as a reference on blockchain design patterns and design analysis, and refers to practical examples of blockchain-based applications.

The course covers the following:

- a general introduction to the topic and to existing blockchain platforms including Bitcoin, Ethereum, and Hyperledger Fabric, and offers examples of blockchain-based applications;
- the functional aspects of software architecture are covered, describing the main roles blockchain can play in an architecture, as well as its potential suitability and design process;
- non-functional aspects of blockchain applications, which are often cross-cutting concerns including cost estimation, performance, security;

Real-world use cases will be covered, offering additional insights from a practical perspective.

Course Aims

The course aims to produce graduates who can analyse blockchain scenarios and design effective solutions using blockchain technology.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : explain the principles of blockchain and which roles it can play in an application architecture
CLO2 : decide the suitability of blockchains and how to design applications on them
CLO3 : make functional and non-functional trade-offs for blockchain-based applications
CLO4 : build small applications on blockchain

Course Learning Outcomes	Assessment Item
CLO1 : explain the principles of blockchain and which roles it can play in an application architecture	• Quiz • Final Exam
CLO2 : decide the suitability of blockchains and how to design applications on them	• Quiz • Final Exam
CLO3 : make functional and non-functional trade-offs for blockchain-based applications	• Assignments
CLO4 : build small applications on blockchain	• Assignments

Learning and Teaching Technologies

Moodle - Learning Management System | https://webcms3.cse.unsw.edu.au/COMP6452/24T2/

Learning and Teaching in this course

Blockchain technology is playing an increasingly important role in modern transactional applications. This course addresses the knowledge that is needed in order to build applications based on blockchain technology, by offering an architectural view of software systems that make beneficial use of it. It provides guidance on assessing the suitability of blockchain, on the roles blockchain can play in an architecture, on designing blockchain applications, and on assessing different architecture designs and tradeoffs. It also serves as a reference on blockchain design patterns and design analysis, and refers to practical examples of blockchain-based applications.

The course is primarily lecture-based because students (a) typically have limited background in blockchain concepts and (b) need to be brought up-to-speed to complete the assignments. Lectures will include many case-studies, to contextualise the concepts. Practical lab exercises and group project mentoring are offered throughout the term to provide opportunities to explore the material in more depth. In particular, the group projects give the opportunity to explore blockchain application design and implementation scenarios in depth.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Quiz	25%	Start Date: Not Applicable Due Date: Not Applicable
Assignments	25%	Start Date: Not Applicable Due Date: Not Applicable
Final Exam	50%	Due Date: TBA - Exam Period

Assessment Details

Quiz

Assessment Overview

Mid-term quiz conducted in class on material covered up to that point.

Course Learning Outcomes

- CLO1 : explain the principles of blockchain and which roles it can play in an application architecture

- CLO2 : decide the suitability of blockchains and how to design applications on them

Detailed Assessment Description

Please refer to WebCMS for the correct Assessment Name and Weighting.

Two 20 minute online quizzes on material covered up to that point.

First quiz in Week 4 on lecture topics from Week 1 to 4.

Second quiz in Week 8 on lecture topics from Week 5 to 8.

Assessment Length

20 minutes

Assignment submission Turnitin type

Not Applicable

Assignments

Assessment Overview

Two assignments where students analyse and implement blockchain scenarios.

Course Learning Outcomes

- CLO3 : make functional and non-functional trade-offs for blockchain-based applications
- CLO4 : build small applications on blockchain

Detailed Assessment Description

Please refer to WebCMS for the correct Assessment Name and Weighting.

Two Projects as follows:

Project 1: Smart Contract Programming (Individual), due in Week 3, Worth 15%

Project 2: System design and smart contract programming (group), due in Week 10, Worth 30%.

Assessment Length

Not applicable

Assignment submission Turnitin type

Not Applicable

Final Exam

Assessment Overview

A written examination, testing all course content, with a focus on material from the second half of the course.

Students must obtain a passing grade on the exam in order to pass the course.

Course Learning Outcomes

- CLO1 : explain the principles of blockchain and which roles it can play in an application architecture
- CLO2 : decide the suitability of blockchains and how to design applications on them

Detailed Assessment Description

Please refer to WebCMS for the correct Assessment Name and Weighting.

Final exam worth 35%. An online open book exam. The coverage will be comprehensive.

Hurdle rules

Students must score 50% on the final exam to pass the course.

General Assessment Information

Grading Basis

Standard

Requirements to pass course

Students must score 50% overall and 50% on the final exam to pass the course.

Course Schedule

Attendance Requirements

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

General Schedule Information

Please refer to the detailed schedule at - https://webcms3.cse.unsw.edu.au/COMP6452/24T2/

Course Resources

Prescribed Resources

The recommended books associated with this course are:

Xiwei Xu, Ingo Weber, Mark Staples, Architecture for Blockchain Applications , Springer, 2019 (the PDF version of the book is available through UNSW digital library)

Course Evaluation and Development

This course is being continuously improved and we will conduct a survey through UNSW's myExperience process at the end of the session to obtain feedback on the quality of the various course components. Your participation in the survey will be greatly appreciated. Please provide feedback for each lecturer. Students are also strongly encouraged to provide informal feedback during the session and to notify the lecturer-in-charge of any problems as soon as they arise.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Helen Paik					Yes	Yes
	Salil Kanhere					No	No
Administrator	Tim Arney					No	No
Tutor	Evan Krul					No	No
	Eric Naeser					No	No

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.