Course Outline

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Course Details

Course Code	COMP6452
Course Title	Software Architecture for Blockchain Applications
Convenor	Helen Paik (/users/z2181240)
Lecturer	Helen Paik (https://webcms3.cse.unsw.edu.au/users/z2181240) Xiwei (Sherry) Xu (/users/z3226188) Dilum Bandara
Classes	**Lectures** : **Online** Wednesday 10am-12pm, Thursday 10am-12pm
Consultations	... fill in the times/locations of consultations...
Units of Credit	6
Course Website	https://moodle.telt.unsw.edu.au/course/view.php?id=52788 (https://moodle.telt.unsw.edu.au/course/view.php?id=52788)
Handbook Entry	http://www.handbook.unsw.edu.au/undergraduate/courses/current/COMP6452.html (http://www.handbook.unsw.edu.au/undergraduate/courses/current/COMP6452.html)

Course Summary

A new course in a popular area, which complements the other new course in this space (COMP6451 Cryptocurrency and Distributed Ledger Technologies). It will be taught initially by the blockchain group from Data61, who have established a strong reputation for their work in this area.

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.

Assumed Knowledge

Before commencing this course, students should

- have solid programming background
- have basic software engineering (and software architecture) knowledge

Student Learning Outcomes

After successfully completing this course, students will:

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

Teaching Rationale

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.

Student Conduct

The **Student Code of Conduct** (Information (https://student.unsw.edu.au/conduct) , Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer (mailto:ethics-officer@cse.unsw.edu.au) , Grievance Officer (mailto:grievance-officer@cse.unsw.edu.au) , or one of the student representatives.

Plagiarism is defined as (https://student.unsw.edu.au/plagiarism) using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity (https://student.unsw.edu.au/plagiarism)
- UNSW Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and 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.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism (https://student.unsw.edu.au/plagiarism)

The pages below describe the policies and procedures in more detail:

- Student Code Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)
- Student Misconduct Procedure (https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)
- Plagiarism Policy Statement (https://www.gs.unsw.edu.au/policy/documents/plagiarismpolicy.pdf)
- Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/policies/essential-advice-for-cse-students)

Assessment

Item	Topics	Due	Marks
Quiz 1	Lecture 1 -3	Week 2	10%
Quiz 2	Lecture 4 - 7	Week 7	10%
Project 1	Smart contract programming	Week 3	15%
Project 2	System design and analysis	Week 10	30%

Final Exam	Exam period	35%

Course Schedule

Week	1st Lecture	2nd Lecture	Projects	Quizzes
1	Introduction Blockchain Basics Problem Definition	Blockchain Platforms Smart Contract Basics	Project 1 release	
2	Software Architecture Basics Blockchain in Software Architecture	Blockchain Taxonomy 1/2		Quiz 1
3	Blockchain Taxonomy 2/2 Blockchain Application Design Process	Blockchain Suitability Evaluation Project 2 Release Laava ID project (Guest Lecture)	Project 1 due Project 2 release	
4	Blockchain Application Patterns	Advanced Blockchain Patterns		
5	Performance	Project 2 Presentation 1		
6	Break			
7	Smart Contract Testing	Security Reliability		Quiz 2
8	Model-driven Engineering (MDE)	Privacy Data Governance Data Management		
9	Cost Self-sovereign Identity (Guest lecture)	Project 2 Presentation 2		
10	Data61 Real-world Projects (Guest lecture)	Summary Sample Questions	Project 2 due	

Resources for Students

The recommended books associated with this course are

- Xiwei Xu, Ingo Weber, Mark Staples, *Architecture for Blockchain Applications* , Springer, 2019.

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 session to obtain feedback on the quality of the various course components. Your participation in the survey will be greatly appreciated, especially since this is the first time that this course uses the C programming language and is run in the new format outlined above. 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.

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Comments

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There are no comments yet.