Course Outline

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Course Details

Course Code	COMP6452
Course Title	Software Architecture for Blockchain Applications
Convenor	Ingo Weber
Lectures	Monday 9:00am -12:00pm in **K-H6-LG05 Room** (Map) (https://maps.google.com/?q=-33.917446000000%2C151.226608000000) , **Tyree Energy Technology** building
Consultations	After lectures on Mondays
Units of Credit	6
Course Website	https://webcms3.cse.unsw.edu.au/COMP6452/19T1/ (https://webcms3.cse.unsw.edu.au/COMP6452/19T1/)
Handbook Entry	http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP6452.html (http://www.handbook.unsw.edu.au/postgraduate/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 (Ingo Weber, Xiwei Xu, Mark Staples), 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 one'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.

Academic Honesty and Plagiarism

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

Component	Maximum Mark

Assignment 1 (due 24 March, 2019)	12.5
Mid-term Exam (1 hour exam, in class on Monday 25 March, 2019)	25
Assignment 2 (due 15 April, 2019)	12.5
Final Exam (during the exam period: 6-18 May, 2019)	50

To pass the course, your overall mark must be 50 or higher, and your mark in the final exam must be 25 or higher. The overall final mark will be the sum of your marks for each component if you pass the course.

Marking will be done according to this formula:

```
if (final >= 25)
   then total = ass1 + ass2 + mid_exam + final_exam;
else
   total = final_exam * 2;
```

Course Schedule

The following schedule is subject to change.

Week	Date	Lecturer	Lecture Topic	Assignment
1st	18 Feb	Ingo Weber	Introduction	
2nd	25 Feb	Ingo Weber	Existing Blockchain Platforms	Assignment 1 out (Monday before lecture)
3rd	4 Mar	Xiwei Xu	Blockchain in Software Architecture 1	
4th	11 Mar	Mark Staples	Blockchain in Software Architecture 2	
5th	18 Mar	Xiwei Xu	NFPs (Non-Functional Properties) 1	Assignment 1 due on Sunday (24 March 2019)
6th	25 Mar	Mark Staples	NFPs (Non-Functional Properties) 2	Mid-term Exam (1 hour)
7th	1 Apr	Mark Staples	NFPs (Non-Functional Properties) 3	Assignment 2 out (Monday before lecture)
8th	8 Apr	Xiwei Xu	Design Patterns for Blockchain Applications	
9th	15 Apr	Ingo Weber	Model-Driven Engineering	Assignment 2 due (After tutorial)
10th	Easter Holiday			

11th	29 Apr	Guest Lecturer + Mark Staples	Guest Lecture and Summary
Final Exam	6-18 May		

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.

Resource created about a year ago (Monday 03 December 2018, 01:29:12 PM), last modified about a year ago (Monday 11 March 2019, 01:52:20 PM).

Comments

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Vebjoern Fjeldberg (/users/z5229740) about a year ago (Mon Mar 11 2019 23:33:12 GMT+1100 (Australian Eastern Daylight Time)), last modified about a year ago (Mon Mar 11 2019 23:33:58 GMT+1100 (Australian Eastern Daylight Time))

will the mid-term exam be during Lecture or Tutorial??

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Smrita Pokharel (/users/z5125134) about a year ago (Sat Mar 23 2019 10:19:35 GMT+1100 (Australian Eastern Daylight Time))

It will be during Lecture.

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