

Subject Description Form

Subject Code	COMP5521
Subject Title	Distributed Ledger Technology, Cryptocurrency and E-Payment
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<p>The objectives of this subject are to:</p> <ol style="list-style-type: none"> 1. introduce the concepts of distributed ledger technology, cryptocurrency and e-payment; 2. enable students to understand the key techniques in distributed ledger technology and cryptocurrencies; 3. introduce various applications of distributed ledger technology beyond cryptocurrencies; 4. study various forms of electronic payment.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. develop a thorough understanding of distributed ledger technology and cryptocurrencies, including technical and legal/social issues; b. understand the key techniques that enable these new technologies; c. be aware of the latest trend in electronic payment; d. demonstrating leadership in group work, presentations, and communication skills.
Subject Synopsis/ Indicative Syllabus	<ul style="list-style-type: none"> • E-payment: Introduction to e-payment, cryptography primitives, SET and 3D credit card payment protocols, existing electronic payment and the future of cryptocurrencies; • Cryptocurrency: Introduction to cryptocurrencies, number theory, group concept, cryptography, digital signature, elliptic curve, Bitcoin, Ethereum, mechanics of cryptocurrencies, DeFi, NFT; • Distributed Ledger: Introduction to distributed ledger technology, consensus mechanisms and decentralization, smart contract, the multi-disciplinary nature of distributed ledger technology, applications of distributed ledger technology beyond cryptocurrencies, case studies.
Teaching/Learning Methodology	<p>39 hours of class activities including lectures, tutorials, lab(s), workshop(s) and seminar(s) where applicable. Practitioners and industry partners shall be invited to deliver Guest lectures to discuss practical aspects of cryptocurrency and e-payment, including professional ethics, responsibilities, legal and social issues. There will be a mix of lectures, discussions and case study analysis. Recent research articles and white paper of distributed ledger technologies and cryptocurrencies will be reviewed and discussed in lectures.</p>

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
			a	b	c	d
	Assignments, Labs & Projects	55	✓	✓	✓	✓
	Final Examination	45	✓	✓	✓	
	Total	100				
<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Assignments are traditional way for the instructor to measure students' ability in technical writing and understand the subject content. Labs give students a chance to practice and give ways to access students' practical capabilities. Projects allow the teamwork component to be measured, and at the same time provide a way to assess students' presentation skill and ability to put what have been learnt in a larger scale.</p>						
Student Study Effort Expected	Class contact:					
	▪ Class activities		39 Hrs.			
	Other student study effort:					
	▪ Self-study, assignment, project, exam		66 Hrs.			
	Total student study effort		105 Hrs.			
Reading List and References	<ol style="list-style-type: none"> Narayanan, A., Bonneau, J., Felten, E., Miller, A. and Goldfeder, S., <i>Bitcoin and Cryptocurrency Technologies</i>, Princeton University Press, 2016. Antonopoulos, Andreas M., <i>Mastering Bitcoin: Unlocking Digital Cryptocurrencies</i>, O'Reilly, 2014. Stallings, W., <i>Cryptography and Network Security: Principles and Practice</i>, 7th Edition, Prentice Hall, 2017. Mostafa Hashem Sherif, <i>Protocols for Secure Electronic Commerce</i>, ISBN 9781138586055, CRC Press, 2018. Henning Diedrich, <i>Ethereum: Blockchains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations</i>, Wildfire Publishing ISBN 9781523930470. Andreas M. Antonopoulos, <i>Mastering Bitcoin: Programming the Open Blockchain</i>, O'reilly, 2nd Edition ISBN 9781491954386. 					