The Hong Kong Polytechnic University

Subject Description Form

Subject Code	AMA3340
Subject Title	Introduction to Blockchain and Cyber Security
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	1. Equip students with a fundamental understanding of the essential concepts and principles in blockchain technology and cyber security. 2. Educate students on various security risk and threats to some blockchain systems and smart contracts. 3. Equip students to develop quantitative and programming skills to analyze some real-life problems and design blockchain-enabled solutions.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Understand some core concepts and technologies in blockchain and smart contract. (b) Understand different types of risk and threats in blockchain technology and cyber security, and be familiar with some common solutions in defence and security mechanisms. (c) Acquire critical thinking, analytical skills and programming skills in analyzing and evaluating the security issues in smart contracts and cyber security problems.
Subject Synopsis/ Indicative Syllabus	1. Overview of Cryptocurrencies and Blockchain Technology: Cryptocurrencies, smart contracts, data blocks, networking, consensus mechanisms, coins and tokens, Bitcoin, distributed applications, decentralized autonomous organizations. 2. Blockchain Applications: Business drivers of blockchain, digital currency and finance, identity, supply chain, healthcare, ownership and property rights, governance and compliance. 3. Blockchain Challenges: Blockchain risks, technology challenges, scalability issues, security and privacy, legal and regulatory problems, social and cultural constraints 4. Principle of cyber security and privacy; security mechanisms in various protocols; web security and major threats to web applications; threats to systems, other issues. 5. Programming and Application Development

<table>
<tr><td>Teaching/Learning Methodology</td><td>The subject will mainly be delivered through lectures and project-based tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of core concepts and quantitative models in blockchain technology and cyber security and at the training of related programming skills. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>1.Assignments/Projects</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Midterm Test</td><td>20%</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>3.Examination</td><td>50%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="3"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The assessment is based on the following:
1. Continuous assessment by assignments and course projects
2. Midterm Examination
3. Final Examination
</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorial</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Assignments/Projects</td><td>58 Hrs.</td></tr>
<tr><td>▪ Self-study</td><td>40 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>137 Hrs.</td></tr>
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Reading List and References	References:

A. Bahga, V. Madisetti	Blockchain Applications: A Hands-On Approach.	VPT, First Edition, 2017
S. Chishti and J. Barberis	The fintech book: the financial technology handbook for investors, entrepreneurs, and visionaries.	John Wiley & Sons, 2016
W. Du	Computer Security: A Hands-on Approach.	CreateSpace In dependent Publishing Platform, 2017
A. Narayanan, J. Bonneau, E. Felten, A. Miller, S. Goldfeder	Bitcoin and cryptocurrency technologies: A comprehensive introduction.	Princeton University Press, 2016