Subject Description Form

Subject Code	COMP 5513
Subject Title	Financial Computing
Credit Value	3
Level	5
Pre-requisite/Exclusion	Nil
Objectives	The purpose of this subject is to provide an introduction to finance and to study the basic computational techniques/tools for finance. This includes the study of computational models and quantitative methods. After completing the subject, students will acquire: 1. fundamental concepts of finance in preparation for related studies 2. basic understanding of various computational techniques (e.g. mathematical methods and/or machine learning-based methods) which have been applied to solve problems in finance (e.g., options, stock price prediction, etc.) 3. experience in financial analysis
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. develop a thorough understanding of the key concepts of finance; b. apply various computational techniques for finance; c. solve related finance problems and evaluate the results; d. evaluate ethical issues in finance; e. practice presentation and communication skills (e.g., through case study report/presentations); and f. develop teamwork skills.
Subject Synopsis/ Indicative Syllabus	• **Introduction to Finance**: Finance Basics (e.g., Finance Industry, Time Value of Money), Debt and Bond, Equity, Derivatives, Other Investments (e.g., Foreign Exchange, Commodities, Hedge Funds), Related Theories (e.g., CAP-M). • **Computational Methods for Finance:** Mathematical, Statistical, Behavioural, Machine Learning-based, Simulation-based Methods etc. • **Other Topics:** FinTech (e.g., Cryptocurrencies), Ethics in Finance, Case Studies etc.
Teaching/Learning Methodology	Formal lectures will be used to present concepts about and mathematical models in finance and to introduce various computational techniques to solve financial computing problems. Students are expected to have a good mathematical background (e.g., knowledge of probability, statistics and calculus). Tutorials and/or labs will be used to discuss more details of computational techniques learned and to solve problems with models/tools. Seminars and/or guest lectures will be used for presentation of assignments and discussions (e.g., journal articles and conference papers on computational finance) as well as experience sharing (e.g., real-life experience).

<table>
<tr><td></td><td>39 hours of class activities including lecture, tutorial, lab, workshop and/or seminar where applicable.</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="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr>
<tr><td>Assignment(s), Test(s) & Project(s)</td><td>55</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Final Examination</td><td>45</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100</td><td colspan="6"></td></tr>
</table>
For the general departmental policy on the use of generative artificial intelligence (GenAI), please refer to the Programme Requirement Document. For this subject, the test(s) (i.e., in-class assessment without the use of GenAI) account(s) for 20%. For the assignment(s) and project(s), GenAI can be used provided that the 3R framework is followed (i.e., following an appropriate reporting mechanism as outlined below):
https://merlot.org/merlot/viewMaterial.htm?id=773417470.
Details will be provided in the assignment(s) and project(s). For the final examination, the use of GenAI is strictly prohibited.
</td></tr>
<tr><td>Student study effort expected</td><td>
<table>
<tr><td>Class Contact:</td><td></td></tr>
<tr><td>Class activities (lecture, tutorial, lab)</td><td>39 hours</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>Assignments, Quizzes, Projects, Exams</td><td>66 hours</td></tr>
<tr><td>Total student study effort</td><td>105 hours</td></tr>
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<tr><td>Reading list and references</td><td>
Books

Bodie, Z., Kane, A., and Marcus, A., 2013, Investments, McGraw-Hill, 10th Edition.
Kosowski, R.L. and Neftci, S. N., 2015, Principles of Financial Engineering, Academic Press.
Hull, J. (2018) Options, futures, and other derivatives. Pearson Education, Inc.
Levy, G., 2016, Computational Finance using C and C#: derivatives and valuation, Elsevier.
Seydel, R.U. 2012, Tools for Computational Finance, Springer London.
Levy, H., Levy, M. and Solomon, S., 2003, Microscopic Simulation of Financial Markets, Academic Press.

Others
IEEE International Conference on Data Mining
Asian Journal of Business and Information System
Journal of Computational Intelligence in Finance
Journal of Computational Finance
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