Subject Description Form

Subject Code	AMA304
Subject Title	Financial Computations and Programming
Credit Value	3
Level	3
Pre-requisite	Nil
Objectives	This subject is to finalize students with popular commercial/ statistical software to perform financial computations and to present financial analysis results. Extensive hands-on experience of using commercial database system such as EXCEL will be emphasized.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: a) master the basic functions of financial computations available in popular software packages; b) integrate the knowledge in quantitative methods for investment to develop strategy and new ideas for investment purpose; c) apply investment principles to analyze financial investments; d) define, formulate and solve investment problems in a systemic approach; e) present presumable analysis results; f) communicate effectively in a well-structured manner and build up an open-minded attitude towards enquiry.
Subject Synopsis/ Indicative Syllabus	*Interest Rates and Bonds (12 hours)* Simple interest, compound interest, flat rates and internal rate of return; basic annuities, annuity functions, amortization and amortization schedules; Bond pricing, bond yield, par yield and duration. *Option Pricing (18 hours)* Derivative, Put-Call parity, option pricing: Binomial trees, Random Walks and Markov Processes, Ito's lemma, Black-Scholes Equations, delta and Greek letters, Hedging. Monte Carlo simulations for exotic options such as barrier options, Asian options and lookback options. *Computational Methods for Trend and Pattern Learning (9 hours)* Technical Analysis such as Moving Average Convergence/Divergence, relative strength index, candlestick chart and stochastic oscillator. Use of financial software.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to introduce the basic financial computations and programming concepts in the syllabus, which are then reinforced by learning activities involving demonstration, tutorial exercise and mini-project.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
1. Mini-Project	10%	✓	✓			✓	✓
2. Tests	40%			✓	✓	✓	
3. Examination	50%			✓	✓	✓	
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on knowledge, skill and understanding of **Financial Computations and Programming**, thus, **Exam-based assessment** is the most appropriate assessment method, including 40% test and 50% examination. Moreover, 10% mini-project is included as a component of continuous assessment so as to assess students' ability in constructing financial computations models for real world problems and presenting results of programming analyses.
Continuous Assessment comprises of mini-project and tests. A written examination is held at the end of the semester.

Student Study Effort Expected

Class contact:	
• Lecture	26 Hrs.
• Tutorial	13 Hrs.
Other student study effort:	
• Mini-Project	50 Hrs.
• Self-study	28 Hrs.
Total student study effort:	117 Hrs.

Reading List and References

Textbook:

Benninga, S.	Financial Modeling 4th edition	The MIT Press 2014

References:

Seydel, R.U.	Tools for Computational Finance 5th edition	Springer 2012
Luenberger D.G.	Investment Science 2nd edition	Oxford University Press 2014
Dunis, C.L., Laws, J. & Naïm, P.	Applied Quantitative Methods for Trading and Investment 1st edition	Wiley 2003
Hull, J.C.	Options, Futures, and Other Derivatives 9th edition	Pearson 2015