

Subject Description Form

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| Subject Code | AMA532 |
| Subject Title | Investment Science |
| Credit Value | 3 |
| Level | 5 |
| Pre-requisite/ Co-requisite/ Exclusion | Nil |
| Objectives | To introduce the basic concepts and techniques of financial modeling and portfolio analysis, with special emphasis on the applications of mathematics and statistics to financial decision-making and the asset allocation. |
| Intended Learning Outcomes | <p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) Understand basic principles and assumptions in different investment models and performance criteria. (b) Describe the advantages and limitations in several investment models and performance criteria. (c) Apply mathematical methods to formulate investment problems and solve the real-life portfolio management problems under various criteria. (d) Understand and quantify the market risk, risk measurement of portfolios and risk preference of investors in portfolio management. |
| Subject Synopsis/ Indicative Syllabus | <p>Simple interest, compound interest, present value.</p> <p>Options and options spread, put-call parity, exotic options, no arbitrage argument.</p> <p>Portfolio return and risk, mean-variance portfolio analysis, market efficiency, portfolio constraints and Lagrange multipliers method.</p> <p>Capital asset pricing model (CAPM), single factor and multi-factors model, arbitrage pricing theory.</p> <p>Risk aversion and utility theory, portfolio choice under utility maximization, indifference curves.</p> <p>Introduction to risk measures, value at risk (VaR) and conditional value at risk (CVaR), portfolio choice based on VaR.</p> |

Teaching/Learning Methodology

The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of mathematical techniques and how the techniques can be applied to solving problems. 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.

| Assessment Methods in Alignment with Intended Learning Outcomes | Specific assessment methods/tasks | % weighting | Intended subject learning outcomes to be assessed (Please tick as appropriate) | | | |
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| | | | a | b | c | d |
| | 1. Assignments | 20% | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Mid-term test | 20% | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. Examination | 60% | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Total | 100 % | | | | | |
| Continuous Assessment comprises of assignments and a mid-term test. A written examination is held at the end of the semester. | | | | | | |
| Student Study Effort Required | Class contact: | | | | | |
| | ▪ Lecture | | | | 26 Hrs. | |
| | ▪ Tutorial | | | | 13 Hrs. | |
| | Other student study effort: | | | | | |
| | ▪ Assignment/Mini-project | | | | 35 Hrs. | |
| | ▪ Self-study | | | | 63 Hrs. | |
| | Total student study effort | | | | | 137 Hrs. |
| Reading List and References | McDonald, R.L. | Derivative Markets, 3rd Edition | Addison-Wesley, 2012 | | | |
| | Luenberger, D.G. | Investment Science, 2nd Edition | Oxford University Press, 2013 | | | |
| | Elton, E.J., Gruber, M.J., Brown, S.J., and Goetzmann, W. | Modern Portfolio Theory and Investment Analysis, 9th Edition | Wiley & Sons, 2014 | | | |
| | Reilly, F.K. and Brown, K.C. | Investment Analysis and Portfolio Management, 11th Edition | South-Western, 2018 | | | |
| | Bodie, Z., Kane, A. and Marcus, A.J. | Investments, 11th Edition | McGraw-Hill, 2017 | | | |