

Subject Description Form

Subject Code	AMA538
Subject Title	Principles of Risk Analysis
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	Enable students to understand the principles, modeling and techniques in quantitative risk analysis, and to familiarize with system analysis, risk modeling and measurement.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (a) Conduct accurate and effective risk analyses. (b) Identify an appropriate model and technique for risk measurement. (c) Apply the mathematical and statistical knowledge and techniques to quantify and analyze risk. (d) Analyze and interpret results when applying relevant concepts for real problems.
Subject Synopsis/ Indicative Syllabus	<p>Review of Probability Theory and Related Mathematics: Elementary probability theory, Discrete and continuous distributions, Basic probability operations and properties.</p> <p>Bivariate exponential (BVE) distributions, Basic Engineering Reliability Risk Analysis, Default (credit) risk in finance.</p> <p>Statistical inference in risk analysis, Modeling Failure Rates (Weibull Analysis): Parameter fitting and estimation: Rank order methods, Suspended or Censored data, The Kaplan-Meier (KM) estimator.</p> <p>Risk Representation and System Analysis: Event and fault tree analysis, Dependent failure models, Competing risk models.</p> <p>Uncertainty Modeling and Risk Management: Utility theory, Decision tree, Bayesian inference and information value, Influence diagrams, Belief networks.</p>
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials, plus some case studies. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of mathematical and statistical techniques and how the techniques can be applied to solving practical problems in the fields of engineering, business, finance and economics.

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
	1. Assignments/Mini-Project	10%	✓	✓	✓	✓
	2. Tests	30%	✓	✓	✓	✓
	3. Examination	60%	✓	✓	✓	✓
Total	100 %					
(a), (b), (c) and (d) will be assessed by assignment/test, case study/project and final examination.						
Student Study Effort Required	Class contact:					
	▪ Lecture		26 Hrs.			
	▪ Tutorial		13 Hrs.			
	Other student study effort:					
	▪ Assignment/Project		42 Hrs.			
	▪ Self-study		56 Hrs.			
	Total student study effort		137 Hrs.			
Reading List and References	Bedford, T. and Cooke, R.	Probabilistic Risk Analysis: Foundations and Methods	Cambridge University Press, 2001			
	Ross, S.	Introduction to Probability Models, 10th Edition	Academic Press, 2010			
	Ericson, C.A.	Hazard Analysis Techniques for System Safety	Wiley, 2005			