CVEN30008 Risk Analysis

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	This subject is not offered in 2014.
Time Commitment:	Contact Hours: 48 hours (Lectures: 2 hours per week, Tutorials: 1 hour per week, Consultations: 1 hour per week) Total Time Commitment: 170 hours
Prerequisites:	Admission to Master of Engineering OR one of the following subjects:

Subject	Study Period Commencement:	Credit Points:
MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50
MAST10008 Accelerated Mathematics 1	Semester 1	12.50

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students cannot enrol in and gain credit for this subject and:

Subject	Study Period Commencement:	Credit Points:
ECON10005 Quantitative Methods 1	Semester 1, Semester 2	12.50
ECON20003 Quantitative Methods 2	Summer Term, Semester 1, Semester 2	12.50
MAST20005 Statistics	Semester 2	12.50
MAST20006 Probability for Statistics	Semester 1	12.50
MAST30020 Probability and Statistical Inference	Semester 1	12.50

Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Objectives, Assessment and Generic Skills sections of this entry.It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and the Disability Liaison Unit: http://www.services.unimelb.edu.au/disability/
Contact:	Dr Lihai Zhang **lihzhang@unimelb.edu.au (mailto:lihzhang@unimelb.edu.au)**
Subject Overview:	**AIMS** This subject will focus on how risk analysis and management principles and techniques can be applied to engineering projects. The subject introduces basic concepts of probability and statistical analysis that are the basis of quantitative risk management. These are put in the context of engineering projects and analysis using the framework of the risk standard. Risk is a fundamental concept that is applied to every engineering project, whether it be ascertaining the risk of health impacts of water treatment processes, prevention of loss of life by flood mitigation projects, or catastrophic losses caused by the failure of structure in earthquakes or storms.

	The subject is of particular relevance to students wishing to establish a career in Engineering management, but is also of relevance to a range of engineering design disciplines where design for the total life cycle of the product or infrastructure should be considered. **INDICATIVE CONTENT** Topics covered include: probability, random variables and their probability distributions and simulation techniques; confidence intervals and significance testing; parameter estimation, least squares modelling; an introduction to the history of engineering failures; the forms of risk and risk identification; the sociological implications of acceptable risk; approaches to risk management, monitoring for compliance, risk perception and design implications.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** On completion of this subject the student is expected to: 1. Identify information sources and risks for engineering projects 2. Identify and develop a plan for managing risks and opportunities 3. Use statistical methods to analyse empirical data and develop a risk based simulation model. Undertake a sensitivity analysis to identify critical variables that have the potential for threatening the success of a project 4. Develop a Monte-Carlo simulation model to determine the likelihood a project will be financially viable 5. Implement a risk management framework based on AS/NZS/ISO 31000: 2009 including the context establishment, risk identification, risk analysis, risk evaluation, risk treatment 6. Identify and classify risk in terms of their severity and likelihood 7. Use tools to diagrams to assist in identifying and representing risks 8. Define a range of performance metrics for an engineering system
Assessment:	2-hour examination held at the end of semester (60%) Assignments totalling 3000 words, due mid-semester and end of semester (30%) Attendance and contribution to discussion in tutorials, during semester (10%) Intended Learning Outcomes (ILOs) 1 - 8 are assessed in the assignments and contribution in tutorials. ILOs 3, 4 and 5 are assessed in the end of semester examination.
Prescribed Texts:	Vose, David Risk Analysis: A Quantitative Guide 3rd Edition, John Wiley & Sons Ltd 2008 Navidi, William Statistics for Engineers and Scientists 2nd Edition, McGraw-Hill 2007
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2014/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2014/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2014/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2014/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	# Ability to apply knowledge of science and engineering fundamentals # Ability to undertake problem identification, formulation, and solution # Understanding of social, cultural, global, and environmental responsibilities and the need to employ principles of sustainable development # Ability to utilise a systems approach to complex problems and to design and operational performance # Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member # Ability to communicate effectively, with the engineering team and with the community at large
Notes:	**LEARNING AND TEACHING METHODS** Learning and teaching methods include lectures with the involvement of experienced industry professionals who present case studies in their area of expertise, computer laboratory based tutorials and consultation sessions. **INDICATIVE KEY LEARNING RESOURCES**

	Prescribed texts AS/NZS/ISO 31000: 2009 Risk Management Standard. Engineers Australia Risk Management Strategies Guide **http://www.engineersaustralia.org.au/membership/risk-management-strategies-guide (http://www.engineersaustralia.org.au/membership/risk-management-strategies-guide)** **CAREERS / INDUSTRY LINKS** This subject uses examples from professional practice to illustrate the assessment items.
Related Majors/Minors/ Specialisations:	B-ENG Civil Engineering stream Civil (Engineering) Systems major Civil Systems Environmental Engineering Systems major Environments Discipline subjects Geomatics Geomatics (Geomatic Engineering) major Master of Engineering (Civil) Master of Engineering (Environmental) Master of Engineering (Geomatics) Master of Engineering (Structural) Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED