Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Risk Engineering
Unit ID:	MREGC5007
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	039999

Description of the Unit:

This is an advanced course on risk engineering that covers industrial hazards and their assessment. Topics include risk engineering terminologies, human perception of risk, ALARP & SFAIRP concepts. It also covers risk and reliability mathematics, system modelling and analysis, hazard Identification, cause-consequence diagrams (CCD), HAZard and OPerability study (HAZOP), Failure Modes, Effects and Criticality Analysis (FMECA), Reliability Block diagram (RBD), Fault Trees Analysis (FTA); Event Trees Analysis (ETA). This is an elective course for students interested in practicing risk engineering and good asset management.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory						
Intermediate						
Advanced					✔	

Learning Outcomes:

Knowledge:

K1. Discern and categorise safety and/or financial hazards through standardised, systematic and structured documentation processes.

K2. Recognise and infer safety issues and/or financial risks in a pro-active way.

K3. Critically review engineering and administrative control measures to manage risk.

K4. Define technical systems in terms of Reliability Block Diagrams.

Skills:

S1. Identify all reasonably foreseeable safety and/or financial hazards (risks).

S2. Analyse causes and consequences of the identified hazards.

S3. Estimate risk through assignment of likelihood frequency and consequence severity to each hazard cause.

S4. Select and apply the most appropriate risk engineering techniques.

S5. Construct models for analysing accidents & consequences through Event Tree Analysis (ETA) and Fault Tree Analysis (FTA) techniques.

Application of knowledge and skills:

A1. Apply risk engineering techniques to risk management.

A2. Choose engineering control measures to manage risk.

A3. Illustrate the management of risk using ALARP/SFAIRP.

A4. Predict risk rating and reliability of technical systems through application of risk engineering tools.

Unit Content:

This course covers risk engineering terminologies, human perception of risk, risk concepts and risk analysis.
Introduction to risk engineering, human perception of risk and risk terminology.
Engineering risk management.
Risk and reliability mathematics.
Hazard identification techniques and analysis.
Modelling of accidents & risk assessment.
Human element in risk assessment.
Industrial hazard and risk assessment case studies.
Emergency planning & documentation.
Recent issues and challenges in risk engineering.
Risk engineering report writing & presentation to stakeholder.

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to

prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly assessed in each Course.*

FEDTASK attribute and descriptor		**Development and acquisition of FEDTASKS in the Unit**	
		Learning Outcomes (KSA)	**Assessment task (AT#)**
FEDTASK 1 Interpersonal	Students at this level will demonstrate an advanced ability in a range of contexts to effectively communicate, interact and work with others both individually and in groups. Students will be required to display high level skills in-person and/or online in: • Using and demonstrating a high level of verbal and non-verbal communication • Demonstrating a mastery of listening for meaning and influencing via active listening • Demonstrating and showing empathy for others • High order skills in negotiating and conflict resolution skills\\ • Demonstrating mastery of working respectfully in cross-cultural and diverse teams.	Not applicable	Not applicable
FEDTASK 2 Leadership	Students at this level will demonstrate a mastery in professional skills and behaviours in leading others. • Creating and sustaining a collegial environment • Demonstrating a high level of self -awareness and the ability to self-reflect and justify decisions • Inspiring and initiating opportunities to lead others • Making informed professional decisions • Demonstrating initiative in new professional situations.	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students at this level will demonstrate high level skills in working in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in: • Reflecting critically to generate and consider complex ideas and concepts at an abstract level • Analysing complex and abstract ideas, concepts and information • Communicate alternative perspectives to justify complex ideas • Demonstrate a mastery of challenging conventional thinking to clarify complex concepts • Forming creative solutions in problem solving to new situations for further learning.	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students at this level will demonstrate the ability to work competently across a wide range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in: • Mastering, exploring, evaluating, managing, curating, organising and sharing digital information professionally • Collating, managing complex data, accessing and using digital data securely • Receiving and responding professionally to messages in a range of professional digital media • Contributing competently and professionally to digital teams and working groups • Participating at a high level in digital learning opportunities.	Not applicable	Not applicable

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 5 sustainable and Ethical Mindset	Students at this level will demonstrate a mastery of considering and assessing the consequences and impact of ideas and actions in enacting professional ethical and sustainable decisions. Students will be required to display skills in: • Demonstrate informed judgment making that considers the impact of devising complex solutions in ambiguous global economic environmental and societal contexts • Professionally committing to the promulgation of social responsibility • Demonstrate the ability to evaluate ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Communicating lifelong, life-wide and life-deep learning to be open to the diverse professional others • Generating, leading and implementing required actions to foster sustainability in their professional and personal life	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, K4, S1, S2, S3, S4, S5, A1, A2, A3, A4	Analysis of hazard and report on identification & management of risks.	Analysis and report	15% - 40%
S1, S2, S3, S4, S5, A1, A2, A3, A4	Analysis and report using tools for preventing technical failures.	Analysis and report	10% - 30%
S1, S2, S3, S4, S5, A1, A2, A3, A4	Examination or online test	Examination or online test	60% - 40%

Adopted Reference Style:

Other (IEEE)

Refer to the library website for more information

Fed Cite - referencing tool