Liverpool John Moores University

Title:	Oil and Gas and Process Industry Quantitative Risk Assessment (QRA)
Status:	Definitive
Code:	**7535RSKDL** (118803)
Version Start Date:	01-08-2019
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Alan Wall	Y

Academic Level:	FHEQ7	**Credit Value:**	10	**Total Delivered Hours:**	16.5
Total Learning Hours:	100	**Private Study:**	83.5		

Delivery Options
Course typically offered: Runs Twice - S1 & S2

Component	Contact Hours
Lecture	8
Online	.5
Tutorial	8

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	Essay		70	
Technology	Tech		25	
Reflection	Test&refl		5	

Aims

To enable students to understand and apply QRA techniques with particular relevance to the oil & gas and process industries.

Learning Outcomes

After completing the module the student should be able to:

1 Critically review the use of QRA in the Oil, Gas and Process industries;
2 Be capable of interpreting the legislative and regulatory requirements behind the use of QRA;
3 Apply QRA to simple process industry operations to analyse the risks to personnel, the asset and/or the environment
4 Logically deduce whether the risks generated are ALARP.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Essay	2	4
Technological task	3	
Online test and Reflection	1	

Outline Syllabus

 Introduction to safety and risk assessment;
 Regulatory regimes & use of QRA;
 Hazard Identification – The Hazard Identification module is a pre-requisite. This part of the module will summarise the hazard identification techniques which are relevant to the QRA process;
 Consequence Analysis – The Physical Effects Modelling module is a pre-requisite. This part of the module will summarise the most commonly used consequence analysis techniques and describe how these techniques are applied to the QRA process;
 Frequency Analysis – The Fault Tree and Event Tree module is a pre-requisite. This part of the module will summarise the frequency analysis techniques which are relevant to the QRA process;
 Reliability of Safety Systems – The Reliability, Availability and Maintainability module (ARM) is recommended for prior study. This part of the module will summarise the reliability techniques which are relevant to the QRA process;
 Quantitative Risk Assessment for process systems;
 Transportation QRA (helicopter, marine & road);
 Risk criteria;
 Application of the ALARP principle;
 Sensitivity Analysis;
 Cost Benefit Analysis;
 Bibliography, sources of further study and common abbreviations; and
 Module conclusions and close out.

Learning Activities

A combination of slides and notes, exercises, discussions, interactive web activities and supported self study.

Notes

The purpose of this module is to enable students to understand and apply QRA techniques with particular relevance to the oil & gas and process industries. The module includes an introduction to QRA-related regulatory requirements in the industry and the use of QRA. Students will be given an opportunity to conduct QRA for example oil & gas / process facilities. The module also covers risk criteria, application of the ALARP principle, sensitivity analysis and cost benefit analysis. Assessment is a combination of technological task, an essay based on a case study and online activities (e.g. tests, discussions, etc.).
The following modules are pre-requisites:

- Hazard Identification
- Physical Effects Modelling
- Fault Tree and Event Tree Analysis

The following module is recommended for prior study:

- Reliability, Availability, Maintainability (ARM) Analysis