

## Liverpool John Moores University

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Title: Oil and Gas and Process Industry Quantitative Risk Assessment (QRA)  
Status: Definitive  
Code: **7535ENGRSK** (118835)  
Version Start Date: 01-08-2012

Owning School/Faculty: Engineering  
Teaching School/Faculty: Engineering

Team	Leader
Alan Wall	

**Academic Level:** FHEQ7  
**Credit Value:** 10.00  
**Total Delivered Hours:** 16.50  
**Total Learning Hours:** 100  
**Private Study:** 83

### Delivery Options

Course typically offered: Runs Twice - S1 & S2

Component	Contact Hours
Lecture	8.000
Online	0.500
Tutorial	8.000

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	Essay	An essay question comprising several component parts, based around a case study, typically 2,000 words long.	75.0	
Technology	QRA		25.0	

### 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:

- LO1 Critically review the use of QRA in the Oil, Gas and Process industries;
- LO2 Be capable of interpreting the legislative and regulatory requirements behind the use of QRA;
- LO3 Apply QRA to simple process industry operations to analyse the risks to personnel, the asset and/or the environment
- LO4 Logically deduce whether risks are ALARP.

## Learning Outcomes of Assessments

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

Essay	LO 1	LO 2	LO 4
Application of QRA	LO 3		

## 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 (ARM) Analysis module 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 lectures, exercises during the taught session, and supported self study.

## References

<b>Course Material</b>	Book
<b>Author</b>	Netherlands Organisation For Applied Scientific Research TNO
<b>Publishing Year</b>	2005
<b>Title</b>	Guidelines for Quantitative Risk Assessment :Purple Book
<b>Subtitle</b>	Purple Book CPR 18E
<b>Edition</b>	1st
<b>Publisher</b>	TNO, <a href="http://www.tno.nl">www.tno.nl</a>
<b>ISBN</b>	

<b>Course Material</b>	Book
<b>Author</b>	UKOOA
<b>Publishing Year</b>	2001
<b>Title</b>	Pipeline and Riser Loss of Containment Data for Offshore Pipelines
<b>Subtitle</b>	PARLOC
<b>Edition</b>	
<b>Publisher</b>	HMSO, <a href="http://www.energyinstpubs.org.uk">http://www.energyinstpubs.org.uk</a>
<b>ISBN</b>	0 85293 404 1

<b>Course Material</b>	Book
<b>Author</b>	NORSOK
<b>Publishing Year</b>	2010
<b>Title</b>	Risk and emergency preparedness assessment
<b>Subtitle</b>	Z-013
<b>Edition</b>	3rd,
<b>Publisher</b>	Standards Norway, <a href="http://www.standard.no">www.standard.no</a>
<b>ISBN</b>	

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## 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 an essay based on a case study and a technological task.

The following modules are pre-requisites:

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

The following module is recommended for prior study:

- Reliability, Availability and Maintainability (ARM) Analysis module