

MODULE DESCRIPTOR

Module Title

Safety, Risk and Reliability Management

Reference	EN4801	Version	6
Created	August 2021	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	August 2021	ECTS Points	7.5

Aims of Module

To provide the student with the ability to understand risk and safety management, utilise techniques for system reliability assessment, and evaluate strategies for optimising plant availability.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Use techniques for specifying and assessing the safety integrity level of a given system.
- 2 Identify ways of ensuring safety conforms to the ALARP principle.
- 3 Identify and assess risk, and explain how risk can be managed.
- 4 Derive the reliability of a system and evaluate strategies for optimising plant availability.
- 5 Demonstrate ability in using risk and reliability concepts by conducting a risk and reliability assessment, and provide critical analysis and recommendations.

Indicative Module Content

Causes and outcomes of industrial accidents. Role of design and management. Failure prediction and uncertainty of data. Safety life cycle. Hazard identification and control, HAZOP, Fault Tree and FMEA analysis. ALARP principle. Safety integrity levels, Human factors, Corporate responsibility, safety culture, management issues. Assessment techniques for system reliability. Design for reliability. Redundancy and standby systems. Maintenance and repair strategies.

Module Delivery

This is a lecture-based course supplemented with tutorials and student-centred learning.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	40	40
Non-Contact Hours	110	110
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type: Coursework Weighting: 30% Outcomes Assessed: 5
 Description: Coursework.

Component 2

Type: Examination Weighting: 70% Outcomes Assessed: 1, 2, 3, 4
 Description: Closed book examination.

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

The module has 2 components and to gain an overall pass a minimum D grade must be achieved in each component. The component weighting is as follows: C1 is worth 30% and C2 is worth 70%.

		Coursework:						
		A	B	C	D	E	F	NS
Examination:	A	A	A	B	B	E	E	
	B	B	B	B	C	E	E	
	C	B	C	C	C	E	E	
	D	C	C	D	D	E	E	
	E	E	E	E	E	E	F	
	F	F	F	F	F	F	F	
	NS	Non-submission of work by published deadline or non-attendance for examination						

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 LEITCH, R.D., 1995. Reliability Analysis for Engineers: An Introduction. Oxford:Open University Press.
- 2 O'CONNOR P.D.T., KLEYNER, A., 2012. Practical Reliability Engineering. 5th ed. Hoboken, NJ : Wiley
- 3 BIROLINI, A., 2017. Reliability Engineering: Theory and Practice. Berlin, Heidelberg: Springer Berlin / Heidelberg.
- 4 SMITH, D. J., SIMPSON, K. G. L., 2020. The Safety Critical Systems Handbook A Straightforward Guide to Functional Safety: IEC 61508 (2010 Edition), IEC 61511 (2016 Edition) and Related Guidance Including Machinery and Other Industrial Sections. 5th ed. London : Butterworth-Heinemann.
- 5 THOMSON, J. R., 2015. High integrity systems and safety management in hazardous industries. Oxford : Elsevier.
- 6 OSTROM, L. T., WILHELMSSEN, C. A., 2019. Risk Assessment: Tools, Techniques, and Their Applications. Newark: John Wiley & Sons, Incorporated.