

Module Title	Reference ENM233
Materials and Corrosion Science	SCQF SCQF
	Level 11
	SCQF Points 15
	ECTS Points 7.5
Keywords	Created November 2005
Materials, properties, design limitations, corrosion	Approved April 2006
	Amended August 2014
	Version No. 3

This Version is No Longer Current

The latest version of this module is available [here](#)

Prerequisites for Module

Normally a UK 2.2 honours degree or above, in Engineering or a related discipline.
Proficiency in English language for academic purposes, or IELTS score of 6.5 or above.

Corrosion control ? by design and management, Material selection, surfactants and inhibitors, coatings.
Porbaix and Evans diagrams

Failure Analysis. Fatigue life prediction.
Safe life and fail safe design.

Corequisite Modules

None.

Indicative Student Workload

	Full Time	Distance Learning	Blended Learning
<i>Contact Hours</i>			
Laboratories	5	0	0
Lectures	36	0	36
Tutorials and Seminars	5	0	4

Precluded Modules

This module is not suitable for students following an MSc in Professional Studies programme unless they meet the entry qualifications stipulated in

Directed Study

Coursework	20	25	20
Preparation and Review	44	80	40

Private Study

Revision	40	45	50
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the University Regulations on admission and the prerequisites above.

Aims of Module

To develop an understanding of the properties of materials used within the oil and gas industries, their uses, limitations and design constraints.

To develop an understanding of corrosion science and mechanisms, with particular reference to the oil and gas industry.

Learning Outcomes for Module

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

1. Analyse and discuss the properties, design constraints and limitations of the principal materials used within the oil and gas industry.
2. Critically evaluate the properties and characteristics of steels, its phases and its principal alloys.
3. Appraise the principal corrosion mechanisms

Mode of Delivery

This is a lecture and tutorial based full time course, with case study work, plus private study and discussion. The course is available as an online distance learning module with online tutor support. A blend of distance learning and direct attendance is also possible.

Assessment Plan

	Learning Outcomes Assessed
Component 1	1,2,3,4
Component 2	1,2,3,4

Component 2 is a closed book examination. (50%)

Learning outcomes covered in this module represent interrelated elements of the module topic. Coursework and examinations may emphasise some learning outcomes above others without totally divorcing one from the other and while retaining a balanced assessment in total.

Component 1 is a piece of coursework. (50%)

Indicative Bibliography

1. CALLISTER, W., Rethwisch, David G. 2015. Materials Science and Engineering. Wiley

relevant to oil and gas industry equipments and processes.

4. Critically evaluate corrosion prevention and control strategies.

Indicative Module Content

Properties of materials.

Metals and Alloys.

Ceramics, polymers and composites.

Structure of materials, characterisation and classification of materials.

Fundamentals of structures.

Steel composition and properties.

Phase diagrams. Treatment processes.

Alloy compositions

Corrosion principles and mechanisms.

Corrosion management.

Prevention and mitigation,

Cathodic protection

Environmental effects. SSC, SCC.

2. FONTANA, M., 1986. Corrosion Engineering. 3rd ed. McGraw Hill.

3. Ahmad, Zaki, 2006. Principles of Corrosion Engineering and Corrosion Control, 1st ed. Boston, MA : Butterworth-Heinemann. 2006

4. Lazzari, Luciano, 2017. Engineering Tools for Corrosion: Design and Diagnosis San Diego: Elsevier Science