

MODULE DESCRIPTOR

Module Title

Oil and Gas Engineering B

Reference	EN4581	Version	7
Created	March 2023	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	August 2023	ECTS Points	7.5

Aims of Module

To provide the student with the basic knowledge and skills in petroleum geology, petroleum fluid properties, flow dynamics and the application to the practice of reservoir engineering and production technology.

Learning Outcomes for Module

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

- 1 Examine essential tools available for finding, characterising, quantifying and appraising hydrocarbon reserves throughout a field lifecycle.
- 2 Examine fundamental concepts and principles of fluid flow in porous media and pipe conduits as they relate to oil and gas flow behaviour in reservoir formation and other components of a composite production system.
- 3 Appraise the phase behaviour of the reservoir fluids in relation to evaluation of production characteristics of the reservoir.
- 4 Justify the material balance methods in relation to evaluation of production behaviour and fluid and reservoir properties drive mechanisms.
- 5 Justify the selection and application of subsurface equipment and components for well completion.

Indicative Module Content

1. Principles of geology and their application to the origins of petroleum and its entrapment; geophysical survey methods and sub-surface mapping. 2. Composition of oil and gas; properties of hydrocarbon gases and liquids; behaviour of real gases, compressibility factors, equations of state; phase behaviour of hydrocarbon systems. 3. Production facilities. Oil and gas reservoirs; properties of reservoir rocks, fluid distributions, formation volume factors, drive mechanisms, primary, secondary and enhanced recovery; evaluation of reserves; application of material balance methods. 4. Flow dynamics of reservoirs. Steady-state and unsteady-state flow, pressure distributions, formation damage, stimulation. 5. Completion methods and their selection and application, perforating, sub-surface packers and safety valves.

Module Delivery

This is a lecture-based module supplemented by tutorials and student-centred learning.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	35	N/A
Non-Contact Hours	115	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
<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: Examination Weighting: 100% Outcomes Assessed: 1, 2, 3, 4, 5
 Description: Closed book examination

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Offshore Engineering (EN3581)
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 Lyons, William, Plisga Gary J. and Lorenz Michael, 3rd edition 2015. Standard Handbook of Petroleum and Natural Gas Engineering. Houston, Texas: Gulf Publishing.
- 2 Selley, Richard C., Third edition 2015. Elements of Petroleum Geology. San Diego, CA : Academic Press, [2015]
- 3 DAKE, L. 2001. The Practice of Reservoir Engineering. Amsterdam: Elsevier.
- 4 JAHN, F., COOK, M. AND GRAHAM, M., 2nd ed. M. 2008. Hydrocarbon Exploration and Production. Amsterdam: Elsevier.
- 5 ECONOMIDIES, M. J., HILL, A. D and EHLIG--ECONOMIDIES, C., 2nd edition 2013. Petroleum Production Systems. Upper Saddle River, NJ : Prentice Hall, c2013.