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## MODULE DESCRIPTOR

### Module Title

Oil and Gas Engineering B

Reference	EN4581	Version	6
Created	August 2021	SCQF Level	SCQF 10
Approved	March 2004	SCQF Points	15
Amended	September 2021	ECTS Points	7.5

### Aims of Module

To provide the student with the ability to apply the fields of petroleum geology, petroleum fluid properties, flow dynamics and production technology to the theory and practice of reservoir engineering.

### Learning Outcomes for Module

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

- 1 Evaluate essential tools available for finding and characterizing hydrocarbon accumulations and apply essential knowledge related to reservoir's economics' potential valuation parameters and conditions.
- 2 Relate the phase behaviour of the reservoir fluids to the production characteristics of the reservoir.
- 3 Apply material balance methods to predict production behaviour and relate fluid and reservoir properties to drive mechanisms.
- 4 Predict reservoir and wellbore flow rates and flow regimes. Relate these to well test data.
- 5 Select and apply well completion and sub surface equipment.

### Indicative Module Content

Principles of geology and their application to the origins of petroleum and its entrapment; geophysical survey methods and sub-surface mapping. 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. 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. Flow dynamics of reservoirs. Steady-state and unsteady-state flow, pressure distributions, formation damage, stimulation. Completion methods and their selection and application, perforating, sub-surface packers and safety valves. Field processing, vapour-liquid equilibria. Flash calculations, separator systems, hydrate formation and prevention, dehydration and sweetening.

### Module Delivery

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

**Indicative Student Workload**

	Full Time	Part Time
Contact Hours	55	N/A
Non-Contact Hours	95	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:	30%	Outcomes Assessed:	1
Description:	Coursework.				

**Component 2**

Type:	Examination	Weighting:	70%	Outcomes Assessed:	2, 3, 4, 5
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	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.