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MODULE DESCRIPTOR

Module Title

Production System Modelling

Reference	ENM204	Version	8
Created	March 2020	SCQF Level	SCQF 11
Approved	April 2006	SCQF Points	15
Amended	June 2020	ECTS Points	7.5

Aims of Module

This module aims to develop skills in integrated asset management with the aid of production optimisation and modelling software.

Learning Outcomes for Module

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

1	Demonstrate an analytical understanding of the principal and limitations of the material balance method and the influence of drive mechanisms on the recovery factor.
2	Build a material balance model for a new field development in an analytical manner.
3	Deep understanding of the concepts of reservoir fluid composition, properties and modelling. Prove from first principles the limitations of using correlations and Equations of State.
4	Critically appraise the range of possible inflow and outflow performance relationships for wells including the selection of key artificial lift techniques for improving outflow performance. With clear understanding of how nodal analysis is used to predict well performance.
5	Formulate an original conceptual development for a new field with the aid of software for modelling wells and reservoirs. Consider timing/number of wells and utilisation of artificial lift to examine and optimise the recovery factor.

Indicative Module Content

1) Material Balance Reservoir Modelling 2) Single Well Nodal Analysis 3) Artificial Lift System Selection & Design 4) Network Production System Optimisation 5) Integrated Asset Modelling

Module Delivery

This module may be delivered by means of lectures, tutorials and student-centred learning activities supplemented by industrial visits/industry speakers.

Module Ref:	ENM204 v8

Indicative Student Workload	Full Time	Part Time
Contact Hours	54	54
Non-Contact Hours	96	96
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

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

Component 1

Type:	Coursework	Weighting:	50%	Outcomes Assessed:	2, 5
Description:	Component 1 is a coursework which will involve the preparation of a short report presenting results and may also require the use of appropriate technical applications software.				

Component 2

Type:	Examination	Weighting:	50%	Outcomes Assessed:	1, 3, 4
Description:	Component 2 is a closed book examination.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

In order to pass, students should achieve a mark of at least 40% in each component (which has a weighting of 30% or more) and an overall grade D or greater.

Module Grade	Minimum Requirements to achieve Module Grade:
A	Greater than or equal to 70%
B	In the range 60% to 69%
C	In the range 55% to 59%
D	In the range 50% to 54%
E	In the range 40% to 49%
F	Less than 40%
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Normally a UK honours degree, or equivalent, in Engineering or related discipline at class 2.2 or above and proficiency in English language for academic purposes (IELTS minimum score of 6.5 or equivalent).
Corequisites for module	ENM205 Production Operations & Flow Assurance.
Precluded Modules	This module is not suitable for students following an MSc in Professional Studies programme unless they meet the entry qualifications stipulated in the University Regulations on admission and the prerequisites above.

INDICATIVE BIBLIOGRAPHY

1	Economides, M.J., Hill, A.D., Ehlig-Economides, C. and Zhu, D., 2012. Petroleum production systems. Pearson Education
2	Clegg, J. and Lake, L., 2007. Petroleum Engineering Handbook. Richardson, TX: Society of Petroleum Engineers.
3	Dake, L.P.,1983. Fundamentals of reservoir engineering. Elsevier
4	Dake, L.P., 2001. The practice of reservoir engineering (revised edition). Elsevier
5	McCain, William D., Jr., 1990. Properties of petroleum fluids (2nd Edition). PennWell
6	Pedersen, K.S., Christensen, P.L. and Shaikh, J.A., 2014. Phase behavior of petroleum reservoir fluids. CRC Press
7	Lea, James F. Nickens, Henry V. Wells, Mike R., 2008. Gas well deliquification (2nd Edition). Elsevier
8	Epstein, L.C. and Edge, R., 1985. Thinking physics is gedanken physics. American Journal of Physics