London South Bank University
EST 1892

School of Engineering

Division of Chemical and Energy Engineering (CEE)

Module Guide

Module title: **Reservoir Management**
ENG_6_485

Level: 6

Module Leader: Dr Pedro Diaz
Email: diazp2@lsbu.ac.uk
Room Number: FW-318

Assessment of the module

The module is assessed by closed book examination 60% and coursework 40%

Examination

The examination will be held in May/June 2020[1]

Coursework

Component	Hand out date	Hand in date	Feedback date
Team Project 70%	05/03/2020	07/05/2020	27/05/2020
Presentation 30%	05/03/2020	07/05/2020	27/05/2020

FEEDBACK GUIDELINES

Feedback will normally be given to students within 15 working days after the final submission of an assignment or as advised by their module leader.

General feedback, applying to all students, will also be placed on the module VLE site within 15 working days.

EXTERNAL EXAMINER

Details of the external examiner appointed for this module can be obtained from the course director.

[1] The examination timetable will be circulated early March for May/June exams

What skills you will develop in this module

Knowledge and Understanding

- Appreciate, understand and apply key petroleum engineering concepts to evaluate reservoir systems in order to predict reservoir performance and optimise asset management.

Intellectual Skills

- Think critically in the context of open-ended problems to provide solutions for real world problems and typical industrial scenarios

Practical Skills

- Research and apply selected industry-related software and computer labs to a variety of real-world reservoir engineering scenarios in order to choose optimal solutions

  Communicate and explain the results from computer-simulated data and how these results can be improved or modified with changing inputs

Transferable Skills

- Communicate and work effectively in a team to achieve an objective, with due respect and recognition to contribution from other members of the team.

Short description of the module

This module is designed to provide an in-depth understanding of the key concepts of reservoir engineering and management. It further builds upon the introductory aspects and fundamentals of petroleum engineering delivered in the first two years of the course.

The module introduces and applies key reservoir engineering principles and applications including material balances, decline curve analysis, water influx, water and gas coning, inflow performance relationships, water-flooding and enhanced oil recovery. Students will also use Petroleum Experts' MBAL® to model, optimise and forecast reservoir production.

Evaluation of the module

This course is assessed using Module Evaluation Questionaires (MEQs). There is also the opportunity to provide feedback on the module at the student-staff course board meetings.

Learning resources

Reading List

1. Ahmed, T.H. (2006). Reservoir Engineering Handbook (3rd Ed.). Burlington, MA: Gulf Professional. ISBN:0-75067-972-7.
2. Chin, W.C. (2002). Quantitative Methods in Reservoir Engineering. Woburn, MA: Gulf Professional. ISBN: 0-75067-568-3.
3. Dake, L.P. (2001). The practice of reservoir engineering (Revised Edition). Amsterdam: Elsevier Science. ISBN: 0-444-50671-3
4. Lake, L. (2006) Reservoir engineering and Petrophysics. Petroleum engineering handbook. Vol. 5. Society Of Petroleum Engineers, 2006.ISBN: 1-55563-120-8.
5. Archer, J.S. & C.G. Wall. Petroleum Engineering Principles and Practice. Graham Trotman. ISBN 0-86010-665-9.

Additional Information

Module Title:	Reservoir Management
Module Level:	6
Module Reference Number:	ENG_6_485
Credit Value:	20
Student Study Hours:	200
Contact Hours:	60
Private Study Hours:	140
Pre-requisite Learning:	none
Course(s):	BEng/MEng (Hons) Petroleum Engineering
Year and Semester:	2019-20, Sem 2
Module Coordinator:	Dr Pedro Diaz
MC Contact Details:	0207815 7953 diazpe2@lsbu.ac.uk, FW318
Teaching Team & Contact Details:	Dr Maria Centeno, 0207815 7948 centenom@lsbu.ac.uk, FW315
Subject Area:	Chemical and Energy Engineering
Summary of Assessment Method:	Exam 60%, CW 40%
External Examiner appointed for module:	Dr Abubakar Abbas, University of Salford

AIMS OF THE MODULE

The aim of this module is to provide an in-depth understanding of the key concepts of reservoir engineering and management.

1. Evaluate the strengths and limitations of different methods used to estimate oil and gas recovery, and to explain the fundamental principles underlying such techniques.
2. Understand the methods of predicting hydrocarbon reserves and carrying out material balance and/or reservoir simulation calculations.
3. Integrate and analyse different methods used to predict reservoir performance.
4. Appreciate the role and importance of Enhanced Oil Recovery methods such as water and gas injection.
5. Integrate and analyse well testing data and use them to interpret selected reservoir properties and flow potential.
6. Use and apply the understanding of reservoir engineering aspects through practising with available reservoir engineering commercial computer packages.

INTRODUCTION TO STUDYING THE MODULE

Overview of the Main Content

Module curriculum will comprise the following major sub-sections:

- A Review of Key Reservoir Engineering Fundamentals
- Oil Material Balance: Undersaturated and Gas Cap Reservoirs
- Oil Material Balance: Saturated Reservoirs and Water Drive Reservoirs
- Gas Material Balance
- Waterflooding and Primary drive mechanism

- Gas and Water coning
- Decline curve analysis
- Flow Regimes and Oil flow
- Reservoir simulation principles and applications
- Inflow Performance Relationships
- Enhanced Oil Recovery

Overview of Types of Classes

2 x 2.5 h hours sessions combining lectures and tutorials, (please see your timetable).

Importance of Student Self-Managed Learning Time

Student responsibility in the learning and development process will be emphasised.

Students are required to undertake directed self-study and prepare solutions/discussions to questions relative to various topic areas. Students will be encouraged to identify for themselves particular problems of difficulty and to use seminar discussions, where appropriate, for the resolution of these. Students must regularly access the Moodle site for this module. They should download the class/lecture material from the Moodle site, and do the recommended reading, before each lecture/class.

Where appropriate, students are also expected to download the relevant seminar questions and study them in advance of each seminar, in order to derive maximum benefit from seminar time.

The programme of teaching, learning and assessment gives guidance on the textbook reading required for each week, the purpose of which is to encourage further reading both on and around the topic.

Employability

This module aims to meet the expectations of petroleum engineering employers and related disciplines. It will develop techniques for students to be able to demonstrate an awareness of reservoir engineering and their role in petroleum engineering practice. In addition to disseminating key reservoir engineering concepts, the module also attempts to build critical thinking skills and promote team-work amongst peers.