LONDON SOUTH BANK UNIVERSITY

unit guide

Fundamentals of Petroleum Engineering

Unit Leader: Dr Samuel Larkai

SCE-1-105

This unit guide is designed to help you structure your learning by providing an indicative structure and content for the unit. It is a guide and not a definitive statement of what you will be taught. We will try to follow this published schedule as far as possible, but there may be some variation as the unit develops and as we try to match the pace and content of our teaching to student needs.

Faculty of Engineering, Science & The Built Environment

2007/2008

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1.0 UNIT DETAILS

Unit Title:	Fundamentals of Petroleum Engineering
Unit Level:	1
Unit Reference Number:	SCE-1-105
Credit Value:	1
Student Study Hours:	150
Contact Hours:	58
Private Study Hours:	92
Pre-requisite Learning (If applicable):	Study of chemistry, preferably to A'level
Co-requisite Units (If applicable):	None
Course(s):	BEng (Hons) Petroleum Engineering HND Chemical Engineering
Year and Semester	1, S2
Unit Coordinator:	Dr Samuel Larkai
UC Contact Details (Tel, Email, Room)	020 7815 7913; Email:larkais@lsbu.ac.uk; Room: E244
Teaching Team & Contact Details	Mr Richard Cadbury
Subject Area:	Applied Science
Summary of Assessment Method:	60% Exam; 40% Coursework

2.0 SHORT DESCRIPTION

The unit is a broad introduction to petroleum engineering. It introduces simple concepts of petroleum geology, with an initial study of reservoirs. Also covered are process principles, system design and computer-aided engineering within the context of the petroleum industry.

3.0 AIMS OF THE UNIT

- To convey first principles in science, engineering and economics relating to the availability of petroleum resources, to petroleum exploration and to production of oil & gas.
- To develop skills in engineering systems design, especially those skills needed for design of hydrocarbon process systems.
- To introduce safety and environmental concerns related to the oil and gas industry.

4.0 LEARNING OUTCOMES

4.1 General

- Explain in simple terms the geological principles underlying the formation of hydrocarbons, and the occurrence of petroleum within rocks.
- Understand the basic requirements for well development and production of oil and gas.
- Relate the characteristic properties of crude petroleum resources to their physical and chemical makeup.
- Represent processing requirements in the form of process flow diagrams, material balances and energy balances.

Importance of student self-managed study

Lectures are central to the courses, for passing to you the material you must learn. You should take comprehensive notes of the lecture material, increasing your skill in note-taking as the course progresses. The pace is fast, and in twelve weeks the lectures will usually cover the whole of the unit syllabus. Try not to fall behind, and if you feel you are slipping then speak to your personal tutor or course tutor.

Time management is essential to success. Getting the balance right between study on the one hand, and recreation (often a part-time job as well) on the other, is not easy. For each hour that you spend in the classroom expect to spend a further hour - perhaps more - in home study.

Teaching programme

The programme of classes below is intended only as a guide and is subject to modification according to rate of progress and unforeseen factors.

Week 1 & 2	Basics of material balance	Mr Richard Cadbury
Week 3	Introduction to Petroleum Geology	Dr Samuel Larkai
Week 4 & 5	Chemistry of Petroleum	Dr Samuel Larkai
Week 6	Thermodynamics of Petroleum (1)	Dr Samuel Larkai
Week 7 & 8	Gas Laws Vapour/liquid transition Antoine's equation Partial condensation	Mr Richard Cadbury
Week 9	Thermodynamics of Petroleum (2)	Dr Samuel Larkai
Week 10 & 11	Introduction to prospecting, drilling and production of petroleum	Dr Samuel Larkai
Week 12	Economic and environmental considerations in the petroleum industry	Dr Samuel Larkai

Assessment of taught element (exams)

$1\frac{1}{2}$ hr written closed book examination. Examination paper will consist of three sections, SECTION A will consist of a compulsory question on petroleum science, SECTION B will consist of two questions on process principles and systems design and SECTION C will consist of two further questions on petroleum science. Students will be expected to answer Section A (40%), one question from Section B (30%) and one question from Section C (30%) to give a total of 3 (three) questions.

Learning Resources

Selley R.C., *Elements of Petroleum Geology,* Academic Press, 2nd edition 1997.

Assessment

This sub-unit is assessed by coursework only. Assessment will consist of attendance and participation at classes, simulation exercises and a simulation project with a poster presentation. The final mark will be based on the following components:

Attendance	16% (attendance at each session is worth 2%)
2 assignments	44% (each is worth 22%)
HYSYS project	40% (project report: 25%, presentation: 15%)

The final mark from this sub-unit contributes 40% of the total marks for SCE-1-013.

HYSYS project

The class will be divided into groups (of 4 - 5 students) for the project and a simulation exercise will be allocated to each group. You are encouraged to work together. The project will be assessed by a report – see guidelines below.

Points to be included in the report of any assignment

All reports should be word-processed. Use a spreadsheet where appropriate. You may choose to be creative with the format, but your report should include the following:

1. The front page - the signed title page.
2. Heading and title page showing your name and title of the exercise.
3. A statement of the problem.
4. A process flow diagram of the problem
5. Hand calculation
6. A material balance table and a mole fraction table - with appropriate heading to each column and row; and appropriate units - use a spreadsheet for this, it is quick.
7. An outline of HYSYS procedure used - no detailed description required.
8. A printout from HYSYS, appropriately labelled - this should include the simulation diagram, and the worksheet showing material and energy balances.
9. A brief discussion: compare hand calculation and HYSYS simulation; what unit operations you have simulated; what you have learnt from the exercise, any other comments relevant to the exercise.

HYSYS laboratory guidelines

The HYSYS class is a laboratory session and is subject to the same rules as any other laboratory class. Each session is an inter-active teaching and learning exercise and it prepares and enables you to continue and complete the set tutorial during your private study.

The following laboratory guidelines shall apply to all PSD 2 computing laboratory sessions:

1. The front sheet of your HYSYS tutorial report sheet shall be the Laboratory title page duly completed by student and signed by the class supervisor. This will be a proof of your attendance at the computing lab. The title page will be issued for each coursework exercise. You are responsible for making sure it is signed at the end of the class.
2. All students are expected to carry out the computing exercise, however, a HYSYS coursework will not be graded if the student is absent from the computing session when it was allocated.
3. Students arriving more than 20 minutes late will not be allowed into the class.