TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION: Petroleum Production Engineering II

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Al-Ayen University
2. University Department/Centre	College of Petroleum Engineering
3. Course title/code	Petroleum Production Engineering II
4. Modes of Attendance offered	Online, classrooms and Tutorial
5. Semester/Year	Academic year 2022/2023
6. Number of hours tuition (total)	60 Theoretical hours
7. Date of production/revision of this specification	2/10/2022

8. Aims of the Course:

A. provides graduating production engineers with some basic knowledge about production systems

B. Presents the practical reservoir engineering equations that are designed to predict the performance of vertical oil wells

C. Predicting the flow pattern that occurs at a given location in a well is extremely important .the empirical correlation or mechanistic model used to predict flow behavior varies with flow pattern

D. Used graphical presentations (working chart) of pressure vs length or depth of flowline or tubing, respectively, for a set of fixed flow and fluid parameters to calculate one of the terminal pressures when the other terminal pressure and the appropriate flow and fluid properties are known

E. Application of horizontal multiphase flow gradient curve for the flowing or artificial lift wells is to determine the necessary flowing well - head pressure to move the fluids to the separator or to determine the optimum surface flow line size.

F. Analysis of surface chokes performance.

G. Derivation and Solutions of Diffusivity Equation and application of Horner solution.

H. analysis the behavior of reservoir by using many methods of well Testing such as

multi - rates test, build - up test, draw - down test.

I. design of Gas lift technology
J. stimulation operations (acidizing and fracturing).

9· Learning Outcomes, Teaching , Learning and Assessment Method

A. Cognitive goals

a. The development of a hydrocarbon reservoir requires a large number of wells to be drilled and completed to allow the structure to be depleted. The drilling and completion operations are crucial to the long-term viability of the well in meeting its specified objectives. The design and completion of both production and injection wells must:
b. Provide optimum production/injection performance.
c. Ensure safety (both pressure and fluid containments).
d. Maximize the integrity and reliability of the completion over the envisaged life of the completed well
e. Minimize the total costs per unit volume of fluid produced or injected, i.e. minimize the total costs of initial completion, maintaining production and remedial measures
f. Other criteria e.g. control sand production depending upon the particular reservoir characteristics or development constraints.
g. Specification of the bottom hole completion technique
h. Selection of the production conduit
i. Assessment of completion string facilities
j. Evaluation of well performance / productivity-injectivity

B. The skills goals special to the course.

a. Simulation
b. Reservoir Management
c. Economic Evaluation

Teaching and Learning Methods

a. Lectures
b. Discussions, dialogues and questions.
c. Group tasks.

Assessment methods

a. Quizzes
b. Monthly exams
c. Homework

d. Final exam
C. Affective and value goals
a. Academic honesty in duties and not use cheating.
b. Get knowledge about the latest technologies.
c. Logic
d. Critical Thinking
Teaching and Learning Methods
d. Lectures
e. Discussions, dialogues and questions.
f. Group tasks.
Assessment methods
e. Quizzes
f. Monthly exams
g. Homework
h. Final exam
D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)
a. Encouraging teamwork and self-confidence to accomplish tasks better.
b. Encouraging creativity, innovation, and modernization.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	4	Petroleum Production System	NODAL Analysis	Theoretical lecture &Tutorial	Assignments and quizzes
3-6	8	Oil Well Performance	IPR	Theoretical lecture &Tutorial	Assignments and quizzes
7-8	4	Mathematical and physical principles for pressure drop calculations	Multi-phase flow calculation	Theoretical lecture &Tutorial	Assignments and quizzes
9-10	4	Flow pattern and Classification in vertical and horizontal wells	Flow Pattern	Theoretical lecture &Tutorial	Assignments and quizzes

10	2	Pressure gradient prediction for vertical well	Poettmann and Carpenter Correlation	Theoretical lecture &Tutorial	Assignments and quizzes
11	2	Pressure gradient prediction for horizontal well	Dukler et al Correlation	Theoretical lecture &Tutorial	Assignments and quizzes
12-13	4	Gradient Curves for vertical and horizontal well	Working Chart	Theoretical lecture &Tutorial	Assignments and quizzes
14-17	8	Flow of fluid through surface chokes	Choke Performance	Theoretical lecture &Tutorial	Assignments and quizzes
18-20	6	Derivation and Solutions of Diffusivity Equation , The Ei function solution, Application of Horner Solution	Solution of Diffusivity Equation	Theoretical lecture &Tutorial	Assignments and quizzes
21-26	12	Analysis the behavior of reservoir by using many methods of well Testing such as multi - rates test, build - up test, draw - down test. Effect of skin factor on well testing	Well Testing	Theoretical lecture &Tutorial	Assignments and quizzes
27-28	4	Increases oil production rate by Gas lift technology	Gas lift operations	Theoretical lecture &Tutorial	Assignments and quizzes
29-30	4	A technique to stimulate wells for improving well inflow performance	Stimulation Operations (Acidizing and Fracturing)	Theoretical lecture &Tutorial	Assignments and quizzes

11. Infrastructure

1. Books Required reading:	THE TECHNOLOGY OF ARTIFICIAL LIFT,VOL.1,KERMIT E. BRWON AND H.DALE BAGGS Production Optimization Using Nodal Analysis, H. Dale Beggs.

	Well Performance Manual, Schlumberger
2. Main references (sources)	
A- Recommended books and references (scientific journals,reports…).	SPE Electronic papers: *www.onepretro.org*
B-Electronic references, Internet:	*www.onepretro.org*

12. The development of the curriculum plan
a. Adding some modern concepts in the oil production technology. b. Adding more technical skills by introducing more problems.