Template of Course Specification

Name and Scientific title of the subject instructor: Dr. Raed H. Allawi

Name of Course: Drilling Engineering I

Course Specification

1.	**Teaching Institution**	**Al-Ayen University / Petroleum Engineering College**
2.	**University Department / Center**	Petroleum Engineering College
3.	**Course Title / Code**	Drilling Engineering I
4.	**Program(s) to which it contributes**	B.Sc.
5.	**Modes of Attendance offered**	Class attendance
6.	**Semester/Year**	1st and 2nd, 2022-2023
7.	**Number of hours tuition (total)**	90
8.	**Date of production/revision of this Specification**	Oct. 2022
9.	**Aims of the Course: The student will know the following:**	
	1	Introduction of Drilling Engineering
	2	Classification of drilling operations
	3	Drilling Fluid.
	4	Properties and functions of drilling fluid
	5	Types and properties of clay in water.
	6	Types of drilling fluids.
	7	Drilling hazards dependent on mud control
	8	Drilling mud calculations
	9	Drilling methods (cable tool drilling, rotary drilling), basic component of rotary drilling equipment.
	10	Drilling string and accessories
	11	Types of bits
	12	Drilling Hydraulics
	13	Casing of oil wells, Functions of casing, types of casing, strings, parameters of casing design, selection of casing and bit types, design of string, graphical design of casing.
	14	Cementing of oil wells, classification and properties of cements, classification of cementing operations, cementing equipment, methods and calculations of cementing
	15	Hydraulics of primary cementing operations.
10.	**Learning Outcomes, Teaching, Learning and Assessment Methods**	
	A	**Knowledge and understanding:** This course aims to explain the

	principle of drilling engineering in detail so the student can analyze drilling problems and develop appropriate solutions.
B	**Subject-specific skills:** The student will have sufficient skills to manage successful drilling operations, diagnose drilling problems, and deal with them according to international standards.
C	**Assessment methods:** The assessment method are divided into three parts; quizzes, monthly exams, and final exams.
D	**Thinking Skills:** Providing a skilled staff to the scientific community that can effectively contribute to develop and tackle the relevant engineering problems.
E	**Teaching and learning methods:** The teaching is performed theoretically based on theoretical concepts of Drilling Engineering and laboratory testing.
F	**General and Transferable Skills (other skills relevant to employability and personal development):** The most important skills are the knowledge and capability to provide scientific proposals to tackle a given engineering problem.

11.	**Course Structure**				
Week	**Hours**	**Required Teaching Outputs**	**Unit/Module or Topic Title**	**Teaching Methods**	**Assessment Methods**
1.	3	Student will understand	Introduction of Drilling Engineering	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
2.	3	Student will understand	Classification of drilling operations	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
3.	3	Student will understand	Drilling Fluid.	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
4.	3	Student will understand	Properties of drilling fluid	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
5.	3	Student will understand	functions of drilling fluid	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
6.	3	Student will understand	Types and properties of clay in water	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams

7.	3	Student will understand	Types of drilling fluids.	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
8.	3	Student will understand	Drilling hazards dependent on mud control	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
9.	3	Student will understand	Drilling mud calculations	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
10.	3	Student will understand	Mud density	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
11.	3	Student will understand	Shear stress and shear rate	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
12.	3	Student will understand	Plastic viscosity and apparent viscosity	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
13.	3	Student will understand	Effective viscosity and Yield point	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
14.	3	Student will understand	Gel strength	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
15.	3	Student will understand	PH of drilling Mud	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
16.	3	Student will understand	Drilling methods	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
17.	3	Student will understand	cable tool drilling	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
18.	3	Student will understand	rotary drilling	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
19.	3	Student will	Basic component	Class	Lab. Report,

		understand	of rotary drilling equipment	attendance and Laboratory	Quizzes, monthly exams, and final exams
20.	3	Student will understand	Drilling string and accessories	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
21.	3	Student will understand	Types of bits	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
22.	3	Student will understand	Drilling Hydraulics	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
23.	3	Student will understand	Casing of oil wells,	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
24.	3	Student will understand	Functions of casing	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
25.	3	Student will understand	Types of casing and casing design	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
26.	3	Student will understand	Cementing of oil wells	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
27.	3	Student will understand	classification and properties of cements	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
28.	3	Student will understand	classification of cementing operations	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
29.	3	Student will understand	cementing equipment, methods and calculations of cementing	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams
30.	3	Student will understand	Hydraulics of primary cementing operations.	Class attendance and Laboratory	Lab. Report, Quizzes, monthly exams, and final exams

12.	Infrastructure
Required reading: **·CORE TEXTS** **·COURSE MATERIALS** **· OTHER**	• Well Engineering and construction, Hussain Rabia. • Drilling Engineering Workbook, Baker Hughes, 1995. • Petroleum engineering handbook, Drilling and well completions, C.Gatlin. • Applied driling engineering, A.T.Bourgoyne & F.S. Young JR. SPE text book series , vol.2. • Hydrocarbon exploration and production, J.Frank, Pub. Elsevier, 1st edition, 1988. • Formulas_and_Calculations_for_Drilling_Production_and_Workovr, Norton J. Lapeyrouse. • Oil and Gas Field Development Techniques, Barbara Brown Balvet
Community -based facilities) include for example, guest Lectures, internship, field studies)	Scientific collaboration with other academic staff in the relevant field is one of our future plan to develop the program.

13.	Admissions
Pre-requisites	
Minimum number of students	10
Maximum number of students	30