



Module (Course Syllabus) Catalogue 2023-2024

Institute	Erbil Technology College	
Department	Petroleum Technology	
Module Name	Petroleum Industrial Equipment	
Module Code	PIE402	
Semester	4th	
Credits	5	
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/>
Weekly hours	3	
Weekly hours (Theory)	(3)hr Class	(125)hr Workload
Weekly hours (Practical)	(-)hr Class	()hr Workload
Lecturer (Theory)	Revan Akram, PhD. Student Dr Shara Kamal	
E-Mail & Mobile NO.	revan.akram@epu.edu.iq 0750 493 6361 Shara.Mohammed@epu.edu.iq	
Lecturer (Tutorial)		
E-Mail & Mobile NO.		

Course Book

<p>Course Description</p>	<p>10. Course overview: Generally, the purpose of this course is to generalize and provide a primary knowledge about the major tools or equipment that used in petroleum industry especially in the drilling operation. In addition, the same course will cover drilling tools, operation, drilling problems, and a basic view of well control particularly.</p> <p>However, This course provides the student with a basic knowledge and understanding of the oil and gas industry, including its history, technical aspects, business model, and impact on society and the environment.</p>
<p>Course objectives</p>	<ul style="list-style-type: none"> ○ Describe drilling types ○ Describe onshore and offshore-specified rigs and its properties. ○ Describe rig personals per their duties. ○ Discuss how the BOP operates in the field. ○ Discuss how the circulation system works ○ Ability to identify drilling fluids used per operation. ○ Describe casing and its types. ○ Identify drilling bits ○ Calculate hydrostatic pressure for given formations ○ Identify the types of flow diagrams and the specifications of each type. ○ Explain the static and the rotary equipment and the use of each type. ○ Identify production equipment such as subsurface pumps, gas compressors, and storage tanks. ○ Explain Refining and Processing Equipment, Pipeline and Transportation Equipment, Safety and Environmental Equipment, and Environmental Control Devices.
<p>Student's obligation</p>	<ol style="list-style-type: none"> 1. Attendance – is expected at all lectures and it is monitored and recorded. 2. Students in all sections of this course will be required to do the following: 3. Students will participate in lecture activities including discussions, quizzes and in class assignments

	<ol style="list-style-type: none"> 4. Quizzes are designed to assist you in understanding the course materials and to provide you with examples of the type of questions that will be on the exams. 5. Students will turn in assigned homework problems and questions 6. Students may participate in optional cooperative learning groups 7. Students will participate in laboratory experiments and turn in laboratory reports 8. NO CELL PHONES- Cell phones are not allowed to be used as calculators in class or lab
Required Learning Materials	<ol style="list-style-type: none"> 1. First five minutes is to remind students with a previous subject in last lecture. 2. Notes and handout of lecture are given to students containing details of the topics using power point presentation. 3. During the lecture, lecturer explains subject by a written on white board to become more understandable and simple. 4. At the end of the lecture, lecturer allows students ask their questions. 5. Presenting some of the available operations with videos if required for better understanding.
Assessment scheme	<p>24% Mid. Theory exam</p> <p>8% Quiz</p> <p>10% Homework</p> <p>16% Reports and Seminars</p> <p>2% Attendance</p> <p>40% final theory</p>
Specific learning outcome:	<ol style="list-style-type: none"> 1. General idea of the petroleum industry 2. Equipment associated with drilling operation. 3. Operations and procedures runs during drilling operation 4. Some specific operations which is significant in the field.
Course References:	<p>Rabia, H. (2002). Well Engineering & Construction, Entrac Consulting Limited London.</p> <p>Rabia, H. (2000). Drilling optimisation, report on north drilling practices to various companies.</p> <p>Gabolde, G. and J.-P. Nguyen (2006). Drilling Data Handbook 7th, Editions Technip.</p> <p>https://www.glossary.oilfield.slb.com/</p>

	<p>Meyers, R.A., 2004. Handbook of petroleum refining processes. McGraw-Hill.</p> <p>Fahim, M.A., Al-Sahhaf, T.A. and Elkilani, A., 2009. Fundamentals of petroleum refining. Elsevier.</p> <p>Hsu, C. S., & Robinson, P. R. (Eds.). (2017). Springer handbook of petroleum technology. Springer.</p>	
Course topics (Theory)	Week	Learning Outcome
INTRODUCTION AND COURSE OVERVIEW TOOLS USED IN THE DRILLING OPERATION	1	A brief introduction about the course and objectives. Definition and explanation of Drilling rig types, personals, equipment
Drilling Bits and Casing CIRCULATION SYSTEM DRILLING FLUIDS	2	Explanation of varies types of bits, and casing. Definition of Flow lines.
HOW TO COMPUTE PRESSURE (HYDROSTATIC PRESSURE) and BOP	3	Explanation of balanced and underbalanced drilling
BOREHOLE INSTABILITY (PROBLEMS ASSOCIATED WHILE DRILLING)	4	Basic knowledge about problems associated while drilling
Process Diagram: Process flow diagram symbols and elements, Types of Process Diagram, P&ID Codes format, P&ID Piping and Connections.	6	Being able to create and read different types of flow diagrams including the P&ID Codes.
Refining and Processing Equipment: 1. Heat Exchangers: Types of heat exchangers. Double pipe heat exchangers, Shell and tube heat exchangers. Plate heat exchangers. Cooling Towers. Applications of heat exchangers	7	Understanding the function and the design of different types of heat exchangers.
2. Distillation Columns: Types of distillation columns, Batch distillation column, Continuous Distillation Column, Reactive Distillation Column, Steam Distillation Column, Extractive Distillation Column, Molecular Distillation Column	8	Understanding the function and design of different types of distillation columns, as

Applications of Distillation Column		well as the application of each type.
Production Equipment: Subsurface pumps, Separators, Gas compressors, Storage tanks Pipeline and Transportation Equipment: Pipelines, Pumps, Compressors, Metering stations	9	Learn the function of the production, pipeline and transportation equipment.
Safety and Environmental Equipment: Emergency shutdown systems (ESD), Gas detectors, Fire suppression systems, Spill containment systems Environmental Control Devices: Flare systems, Vapor recovery units, Air pollution control equipment	10	Learn about the safety and environmental equipment.
Examinations: Q1/ mention the circulation system parts Answer/ Mud pumps, pits, mixers, chemical products, hose, shale shaker, desander, degaser, desilter, compressors, and centrifuge. Q2/ mention BOP arms and their functions? Answer/ <ul style="list-style-type: none"> • Annular preventer: first remedial action to control the well under low pressure • Pipe ram: to close the well • Blind ram: to close the well when no pipe in the well • Shear ram: to cut off the pipe in critical situations 		
Extra notes: This course require a simulation laboratory. And more preferably field visiting.		
External Evaluator:		