

## Module (Course Syllabus) Catalogue

### 2023-2024

College/ Institute	Koya Technical Institute	
Department	Petroleum Technology / Operation & Control	
Module Name	Oil and Gas processing	
Module Code	OGP302	
Degree	Technical Diploma <input checked="" type="checkbox"/>	Bachelor <input type="checkbox"/> High Diploma <input type="checkbox"/> ster <input type="checkbox"/> hD <input type="checkbox"/>
Semester	Third	
Qualification	PhD	
Scientific Title	Lecturer	
ECTS (Credits)	7	
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> Assist.
Weekly hours	5 hr.	
Weekly hours (Theory)	(2)hr. Class	( 175)Total hrs. Workload
Weekly hours (Practical)	(3)hr. Class	( 175 )Total hrs. Workload
Number of Weeks	14	
Lecturer (Theory)	Rawand Dlashad Abdulla	
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Lecturer (Practical)	Kurdistan Khudhur	
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## Course Book

<b>Course Description</b>	<p>This course provides a comprehensive understanding of the processes and technologies involved in the exploration, production, separation, and refining of oil and gas. Students will delve into the key stages of hydrocarbon processing, from reservoir to end-product, gaining knowledge of the principles, equipment, and challenges associated with the oil and gas industry.</p>
<b>Course objectives</b>	<p>By the end of this course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the entire oil and gas value chain, from exploration to product distribution.</li> <li>2. Identify and describe the different components of crude oil and natural gas.</li> <li>3. Explore the phases and phase behaviour of hydrocarbons in various stages of processing.</li> <li>4. Examine the principles and methods of reservoir engineering, including estimating reserves and optimizing resource recovery.</li> <li>5. Analyse the separation processes involved in separating oil, gas, and water, as well as the removal of impurities.</li> <li>6. Investigate the refining of crude oil to produce various petroleum products, such as gasoline, diesel, and petrochemical feedstock.</li> <li>7. Address challenges and solutions related to flow assurance, including wax and Asphaltenes management.</li> <li>8. Explore enhanced oil recovery (EOR) methods and their impact on oil production.</li> <li>9. Discuss transportation and storage considerations, including pipeline design and tank facilities.</li> <li>10. Analyse real-world case studies and emerging trends in oil and gas processing.</li> </ol>
<b>Student's obligation</b>	<p>Students must restrict by time of lecture or practical lab.          Students must participate in lecture by asking and answering Question and explaining their opinions and suggestions.          Restricted by laws of working in Lab.          Working carefully with Lab. Equipment.          Participate in all exams of the subject without absenting.          Discusses students' suggestions, opinions and questions at Teacher office hours. Preparing reports, seminars and other activates.</p>

<b>Required Learning Materials</b>	1- White board. 2- White board pen. 3- Data Show. 4- Power point presentation. 5-papers.				
<b>Evaluation</b>	<b>Task</b>		<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>
	Paper Review				
	Assignments	Homework	14	4	Learned to know how solve the questions
		Class Activity	2	14	Listen to the class and learn more
		Report	6	3	Learn to write the report and add additional knowledge about his/her subject
		Seminar	6	1	Understanding the subject
		Essay	---	---	
		Project			
		Quiz	8	4	Help to be ready for final exam
	Lab.			doing the practical work in lab and see the instruments	
	Midterm Exam	24	1		
	Final Exam	40	1		
	Total	100	14		

**Specific learning  
outcome:**

1. Describe the Oil and Gas Industry: Explain the key components and stages of the oil and gas industry, from exploration to distribution, and identify the industry's economic and environmental significance.
2. Analyze Crude Oil and Natural Gas: Differentiate between the components of crude oil and natural gas, understanding their chemical makeup and physical properties.
3. Predict Phase Behavior: Utilize phase diagrams and thermodynamics to predict the phase behavior of hydrocarbons under different temperature and pressure conditions.
4. Estimate Reserves: Apply reservoir engineering principles to estimate hydrocarbon reserves and recovery factors, optimizing the exploitation of oil and gas resources.
5. Understand Separation Techniques: Describe the separation processes involved in oil and gas production, including gas-liquid separation, oil-water separation, and impurity removal.
6. Examine Refining Processes: Analyze the refining of crude oil to produce various petroleum products, including gasoline, diesel, and petrochemical feedstock, and assess the quality control measures in place.
7. Address Flow Assurance Challenges: Identify flow assurance challenges and propose solutions related to wax and Asphaltenes formation, corrosion, and pipeline blockages.
8. Explore Enhanced Oil Recovery (EOR): Evaluate different EOR techniques, such as gas injection, chemical flooding, and thermal methods, and understand their application to improve oil recovery efficiency.
9. Optimize Transportation and Storage: Discuss the role of phase behavior in pipeline and transportation system design, and analyze storage tank facilities for maintaining phase stability.
10. Apply Knowledge Through Case Studies: Analyze real-world case studies to understand the practical implications of oil and gas processing in different operational and environmental contexts.
11. Identify Emerging Trends: Recognize and discuss emerging trends in the oil and gas industry, such as sustainability practices, digitalization, and renewable energy integration.
12. Communicate Effectively: Develop the ability to communicate technical concepts and findings effectively, both in writing and

	<p>through oral presentations.</p> <p>13. Collaborate in Teams: Collaborate with peers in group projects to solve complex problems related to oil and gas processing.</p>
<p><b>Course References:</b></p>	<ol style="list-style-type: none"> <li>1. "Oil and Gas Production Handbook" by Havard Devold - This comprehensive handbook covers all aspects of oil and gas production, from reservoir engineering to refining, making it an excellent resource for an introductory course.</li> <li>2. "Petroleum Refining in Nontechnical Language" by William L. Leffler - A user-friendly introduction to the basics of petroleum refining, suitable for students with a limited technical background.</li> <li>3. "Natural Gas Engineering: Production and Storage" by Ikoku C. - This book provides a detailed understanding of natural gas production and storage processes, which are critical components of the oil and gas industry.</li> <li>4. "Handbook of Natural Gas Transmission and Processing" by Saeid Mokhatab, William A. Poe, and James G. Speight - A comprehensive reference covering the transmission and processing of natural gas, including separation, gas conditioning, and transportation.</li> <li>5. "Petroleum Production Engineering" by Boyun Guo, William C. Lyons, and Ali Ghalambor - This textbook is an excellent resource for understanding the principles of petroleum production engineering, including well design and production optimization.</li> <li>6. "Oil and Gas Pipelines in Nontechnical Language" by Thomas O. Miesner and William L. Leffler - A useful introduction to the world of pipelines, transportation, and distribution of oil and gas.</li> <li>7. "Applied Petroleum Reservoir Engineering" by Ronald E. Terry, J. Brandon Rogers, and J. H. R. Oliver - A valuable resource for students interested in reservoir engineering and estimating hydrocarbon reserves.</li> <li>8. "Petroleum Refining and Petrochemical Processes" by James G. Speight - This book covers the refining processes and petrochemical production methods associated with oil and gas processing.</li> <li>9. "Enhanced Oil Recovery" by Larry W. Lake - An in-depth exploration of enhanced oil recovery (EOR) techniques, including gas injection, chemical flooding, and thermal methods.</li> <li>10. "Flow Assurance for Subsea and Deepwater Petroleum Exploration and Production" by Shoham, O. and Johansen, H. - A key reference</li> </ol>

- for understanding flow assurance challenges and solutions in oil and gas production, including wax and asphaltene management.
11. "Oil and Gas Corrosion Prevention: From Surface Facilities to Refineries" by Abdullah M. Al-Sahli - A comprehensive guide to corrosion prevention in the oil and gas industry, an essential aspect of maintaining equipment integrity.
  12. "Handbook of Liquefied Natural Gas" by Saeid Mokhatab, John Y. Mak, and David A. Wood - An important resource for understanding the liquefied natural gas (LNG) production and distribution process.

Course topics (Theory)	Week	Learning Outcome
Introduction to the Oil and Gas Industry	1	Students will understand the oil and gas value chain, industry terminology, and the economic and environmental significance of the sector.
Components of Crude Oil and Natural Gas	2	Students will be able to differentiate between the various components of crude oil and natural gas and understand their chemical makeup and physical properties.
Phase Behavior and Phase Diagrams	3	Students will predict the phase behavior of hydrocarbons using phase diagrams and thermodynamics under different temperature and pressure conditions.
Reservoir Engineering and Resource Estimation	4	Students will apply reservoir engineering principles to estimate hydrocarbon reserves, optimizing the exploitation of oil and gas resources.

Separation Processes and Impurity Removal	5,6	Students will describe the separation processes involved in oil and gas production, including gas-liquid separation, oil-water separation, and impurity removal.
Refining and Product Quality	7,8	Students will analyse the refining of crude oil to produce various petroleum products, including gasoline, diesel, and petrochemical feedstock, and assess quality control measures.
Flow Assurance and Wax Management	8,9	Students will identify flow assurance challenges and propose solutions related to wax and Asphaltenes formation, corrosion, and pipeline blockages.
Enhanced Oil Recovery ((EOR))	10	Students will evaluate different EOR techniques, such as gas injection, chemical flooding, and thermal methods, and understand their application to improve oil recovery efficiency.
Transportation and Storage	11	Students will discuss the role of phase behaviour in pipeline and transportation system design and analyse storage tank facilities for maintaining phase stability.
Case Studies and Industry Trends	12	Students will analyse real-world case studies to understand the practical implications of oil and gas processing in different operational and environmental contexts and recognize emerging trends in the industry.
<b>Practical Topics</b>	<b>Week</b>	<b>Learning Outcome</b>
Standard method for measuring flash point by Open Cleveland method.	1	
Standard method for pour point of lubricating oil.	2	
Standard method for determining carbon residua by Ramsbottom method	3	

Standard method for measuring water in crude oil by Dean Stark Distillation.	4	
Standard method for measuring petroleum products kinematic viscosity.	5	
Standard method for measuring lubricating oil viscosity index	6,7	
Standard method for measuring lubricating oil cloud point	8,9	
Standard method for measuring lubricating oil sulfur content	10	
Standard method for measuring asphalt and bitumen softing point	11	
Standard method for measuring grease dropping point	12	

### Questions Example Design

1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for...?, Why...?, How....?

With their typical answers

Examples should be provided

2.True or false type of exams:

In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided

3. Multiple choices:

In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.

4. Definition: In this type of exam the questions some terms should be defined