

Faculty of Engineering & Technology

Secondary Recovery of Petroleum

Information :

Course Code :	PE 503	Level	:	Undergraduate	Course Hours :	3.00- Hours
Department :	Department of Petrole	um Engineei	ring			

Instructor Information :

Title	Name	Office hours
Professor	Ahmed Ahmed Mohammed Elgibaly	2
Associate Professor	Dr. Adel Mohamed Salem Ragab	4
Teaching Assistant	Abdelrahman Adel Abdullah Abdelghany Kandil	
Teaching Assistant	Mennat Allah Lotfy Muhammad Abuelfetouh Muhammad	

Area Of Study :

The main objective of the course is to acquaint the students with the secondary recovery methods and their applications and is to give a solid background to the students on course of water flooding. Moreover, it provides a complete review of all aspects of water flood schemes being the most proven, lowest cost, and applicable to various types of reservoirs.

Description :

Oil recovery by water injection. Effects of wettability, capillary pressure, relative permeability, mobility ratio on displacement, sweep, and recovery efficiencies. Piston-like and Buckley-Leverett models. Fractional flow and frontal advance equation. Oil recovery prediction methods for linear and pattern water floods in single and multi-layered reservoirs.

Course outcomes :

a.Knowledge and Understanding: :

1 -	Describe recovery expectations from reservoirs under primary depletion or pressure maintenance utilizing water or immiscible gas injection		
2 -	Describe reasons and causes for less than theoretically possible recovery		
3 -	Describe appropriate methods (with their target applications, benefits, and limitations) for improving oil recovery from reservoirs under primary depletion or pressure maintenance utilizing water or immiscible gas injection		
4 -	Select mechanisms responsible for recovery improvement in various IOR		
b.Intellectu	al Skills: :		
1 -	Select the suitable flooding patterns for water flooding operations		
2 -	Calculate the overall recovery efficiency: displacement, areal, and vertical efficiencies		
3 -	Predict the recovery performance for layered reservoir		
4 -	Compare EOR methods using screening criteria		



c.Professional and Practical Skills: :

1 -	Apply appropriate methods (with their target applications, benefits, and limitations) for improving oil recovery.		
2 -	Select a chemical (surfactant, polymer/micellar) etc. for chemical flooding, on the basis of their known properties		
3 -	Select the suitable flooding patterns for water flooding operations		
d.General and Transferable Skills: :			
1 -	Collaborate effectively within multidisciplinary teams.		
2 -	Acquire entrepreneurial skills.		
3 -	Refer to relevant literature.		

Course Topic And Contents :

Торіс	No. of hours	Lecture	Tutorial / Practical
Introduction to secondary recovery and EOR Screening criteria	10	6	4
Secondary Oil Recovery: Water Flooding	10	6	4
Overall Recovery Efficiency	8	6	2
Displacement Efficiency, Buckley and Leverett	10	6	4
Areal Sweep Efficiency	8	4	4
Vertical Sweep Efficiency	8	5	3
Methods of Predicting Recovery Performance for Layered Reservoirs	9	6	3
Chemical EOR, Thermal EOR, and Miscible/Immscible EOR	6	3	3
Technical Challenges and Futures Techniques	6	3	3

Teaching And Learning Methodologies :

Interactive lecturing Problem solving Experiential Learning

Course Assessment :				
Methods of assessment	Relative weight %	Week No	Assess What	
Assignment	10.00			
Final Exam	40.00			
Mid- Exam	30.00			
Participation	10.00			
Quizzes	10.00			



Recommended books :

James J. Sheng, Ph. D.: "Modern Chemical Enhanced Oil Recovery, Theory and

Practice," Gulf Professional Publishing is an imprint of Elsevier, Elsevier Inc., 2011.

2. Teknica Petroleum Services Itd :"Enhanced Oil Recovery," Calgary, Alberta, 2001.

 Aurel Carcoana : "Applied enhanced oil recovery," Prentice-Hall, Inc., 1992.
Erle C. Donaldson, George V. Chilingarian, and The Fu Yen: "Enhanced Oil Recovery II, Processes and Operations," Elsevier science Publishers B.V., 1989.

5. Van Poollen, H. K., and Associates : "Fundamentals of Enhanced Oil Recovery," Penn Well Publishing company, Tulsa, Oklahoma, 1980.

6. Marcel Latil, et. Al. : "Enhanced Oil Recovery," Institut Francais du Petrole, 1980.

(Translated from the French bu Paul ELLIS)