



زانكۆی پۆلیتیه كنیکی هه ولیر  
ERBIL POLYTECHNIC UNIVERSITY

Kurdistan Region Government  
Ministry of Higher Education and Scientific Research  
Erbil Polytechnic University



## Module (Course Syllabus)

### Catalogue (2022-2023)

College/ Institute	Koya Technical Institute		
Department	Petroleum Technology – Chemical Analysis (Evening)		
Module Name	Separation Technique		
Module Code	SPT402		
Degree	Technical Diploma ✓ Master	Bachelor PhD	High Diploma
Semester	4 <sup>th</sup>		
Qualification	Master		
Scientific Title	Lecturer Assistant		
ECTS (Credits)	8		
Module type	Prerequisite	Core ✓	Assist.
Weekly hours	4		
Weekly hours (Theory)	(2)hr Class	(85)Total hrs Workload	
Weekly hours (Practical)	(2)hr Class	( 90 )Total hrs Workload	
Number of Weeks	16		
Lecturer (Theory)	Sardasht Rifaat Taher		
E-Mail & Mobile NO.	<a href="mailto:Sardasht.taher@epu.edu.iq">Sardasht.taher@epu.edu.iq</a>		
Lecturer (Practical)	Sardasht Rifaat Taher		
E-Mail & Mobile NO.	<a href="mailto:Sardasht.taher@epu.edu.iq">Sardasht.taher@epu.edu.iq</a>		
Websites	<a href="https://academicstaff.epu.edu.iq/faculty/sardasht.taher">https://academicstaff.epu.edu.iq/faculty/sardasht.taher</a>		

## Course Catalogue

<b>Course Description</b>	<p>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 program specification.</p>
<b>Course Objectives</b>	<p style="text-align: center;"><b>Course intended for semester (4<sup>th</sup>) – (2<sup>nd</sup>) stage students in Petroleum Technology- Chemical analyzing department.</b></p> <p>The course provides the student with a basic knowledge and understanding of the theory and applications of separation techniques in analytical chemistry.</p> <p>The main objective of this course is to familiarize students with the fundamental principles of separation processes used in analytical chemistry such as decantation, centrifugations, filtration, extraction, chromatography, various Distillation and electrophoresis.</p> <p>By completion of the course, students are also expected to gain independent laboratory skills in certain separation techniques and they will have the ability to interpret data from analytical separation methods.</p>
<b>Student's obligation</b>	<ul style="list-style-type: none"> <li>⚠ Students must restrict by time of lecture.</li> <li>⚠ Students must participate in lecture by asking and answering question and explaining their opinions and suggestions.</li> <li>⚠ Preparing reports, seminars and other activities.</li> <li>⚠ Preparing weekly homework.</li> <li>⚠ Participate in all quiz, med term and final exams of the subject without absenting.</li> <li>⚠ Discusses students' suggestions, opinions and questions at teacher office hours.</li> </ul>

<b>Required Learning Materials</b>	1 White board.
	2 White board pen.
	3 Data Show.
	4 Power point presentation.
	5 papers.
	6 Posters.

<b>Evaluation</b>	Task	Weight (Marks)	Due Week	Relevant Learning Outcome	
	Paper Review	---	---		
	<b>Assignments</b>	Homework	5		
		Class Activity	2		
		Report	5		
		Seminar	5		
		Essay	---		
		Project	---		
	Quiz	8			
	Lab.	10			
	Midterm Exam	25			
	Final Exam	40			
Total	100				

<b>Specific learning outcome:</b>	1 Importance of separation techniques in Analytical Chemistry in our life.
	2 Importance of introducing different methods for separation Analytical Chemistry.
	3 Study decantation and sedimentation.
	4 Study of types of filtration and centrifugations.
	5 Knowledge about types of distillation and extraction.
	6 Knowledge about types of chromatography.

<b>Course References</b>	<p>■ Fundamentals of Analytical chemistry Eighth Edition by Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch. (2013)</p>
	<p>■ Chemical Separations: Principles, Techniques and Experiments (Techniques in Analytical Chemistry) 1st Edition by Clifton E. Meloan. (1999).</p>
	<p>■ Magazines and review (internet):</p>
	<p>1 <a href="https://open.umn.edu/opentextbooks/textbooks/486">https://open.umn.edu/opentextbooks/textbooks/486</a></p> <p>2 <a href="https://www.slideshare.net/GaneshBhagure/analytical-chemistry-156759597">https://www.slideshare.net/GaneshBhagure/analytical-chemistry-156759597</a>.</p>

Course topics (Theory)	Week	Learning Outcome
Introduction to Separation Techniques	1	Definition, Role, Importance, Principle and types of Separation Techniques. Magnetic Separation, Decantation and Sedimentation
Sublimation and Filtration	2	Definition, Importance, Principle, advantage and disadvantage of Sublimation. Definition, Role, Importance, Principle, types, advantage and disadvantages of Filtration.
Evaporation and Crystallisation	3	Definition, Importance, Principle, advantage and disadvantage of Evaporation. Definition, Role, Importance, Principle, advantage and disadvantages of Crystallisation.
Centrifugation and Distillation	4	Definition, Importance, Principle, Types of Centrifuge, advantage and disadvantage of Centrifugation. Definition, Importance, Principle, Types of Distillation, advantage and disadvantage of Distillation.
Simple and Fractional Distillation	5	Definition, Importance, Principle, advantage and disadvantage of simple and fractional distillation.
Vacuum and Steam Distillation	6	Definition, Importance, Principle, advantage and disadvantage of vacuum and steam distillation.
Semester 4 <sup>th</sup> mid Term Exam		
Dean Stark Distillation Rotary evaporation	8	Definition, Importance, Principle, advantage and disadvantage of Dean Stark and Rotary evaporation.
Extraction	9	Definition, Importance, Principle, Types, advantage and disadvantage of Extraction.
liquid-liquid, liquid –	10	Definition, Importance, Principle, advantage and disadvantage of liquid-

solid , soild - pahse micro extractions		liquid, liquid – solid , soild – pahse micro extractions.
Chromatography	11	Definition, Importance, Principle, Types, advantage and disadvantage of Chromatography.
Paper and Thin Layer chromatography	12	Definition, Importance, Principle, advantage and disadvantage of Paper and Thin Layer chromatography.
Colum chromatography	13	Definition, Importance, Principle, advantage and disadvantage of Colum chromatography
ion exchange chromatography	14	Definition, Importance, Principle, advantage and disadvantage of ion exchange chromatography
Semester 4 <sup>th</sup> Final Exam/ 1 <sup>st</sup> Turn		
Semester 4 <sup>th</sup> Final Exam/ 2 <sup>nd</sup> Turn		

Course topics (Practical)	Week	Learning Outcome
Sedimentation and Decantation	1	
Centrifugation	2	
Filtration and Vacuum Filtration	3	
Sublimation	4	
Liquid- liquid extraction	5	
Liquid – Solid extraction	6	
<b>Semester 4<sup>th</sup> mid Term Exam</b>		
Soxhlet extraction	8	
Simple Distillation	9	
Fractional Distillation	10	
Vacuum Distillation	11	
Dean Stark Distillation	12	
Paper and Thin Layer Chromatography	13	
Colom Chromatography	14	
<b>Semester 4<sup>th</sup> Final Exam/ 1<sup>st</sup> Turn</b>		
<b>Semester 4<sup>th</sup> Final Exam/ 2<sup>nd</sup> Turn</b>		

## Theoretical Examinations

- Q 1/ Define the following: [-----M]
- Q 2/ Choose correct answer for the following blanks: [-----M]
- Q 3/ Answer the following: (explain, enumerate calculation and curves) [-----M]
- Q 4/ Answer the following by (True) or (False) then correct (False) answer: [-----M]

## Practical Examinations

□ Theoretical – Practical Exam.

- Q 1/ Define the following: [-----M]
- Q 2/ Choose correct answer for the following blanks: [-----M]
- Q 3/ Answer the following: (explain, enumerate calculation and curves) [-----M]
- Q 4/ Answer the following by (True) or (False) then correct (False) answer: [-----M]
- Repeat one of the experiments in the laboratory

## Extra notes:

## External Evaluator

I confirmed that the contents of this syllabus are commonly more explicit and follows the principles and rules in Oil and Gas Properties subjects.

**Lecturer: Dr. Kardo Sardar Mohammed**