Module (Course Syllabus)

Catalogue 2022-2023

College/ Institute	**Koya Technical Institute**	
Department	**Petroleum Technology – Chemical Analysis (Evening))**	
Module Name	**Analytical Chemistry**	
Module Code	**ANC305**	
Degree	**Technical Diploma ✓ Bachelor High Diploma Master PhD**	
Semester	**3**	
Qualification	**Master**	
Scientific Title	**Lecturer Assistant**	
ECTS (Credits)	**4**	
Module type	**Prerequisite Core ✓ Assist.**	
Weekly hours	**2**	
Weekly hours (Theory)	**(2)hr Class**	**(26)Total hrs Workload**
Weekly hours (Practical)	**(0)hr Class**	**(0)Total hrs Workload**
Number of Weeks	**16**	
Lecturer (Theory)	**Sardasht Rifaat Taher**	
E-Mail & Mobile NO.	**Sardasht.taher@epu.edu.iq**	
Lecturer (Practical)	**---------**	
E-Mail & Mobile NO.	**---------**	
Websites	**https://academicstaff.epu.edu.iq/faculty/sardasht.taher**	

Course Book

Course Description	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.
Course Objectives	**Course intended for semester (3)- second 2nd stage students in Petroleum Technology- Chemical analyzing department.** The course provides the student with a basic knowledge and understanding of the theory and applications of analytical chemistry. Analytical chemistry is the study of the separation, identification, and quantification of the chemical components of natural and artificial materials. Analytical Chemistry is the basic for other fields of Chemistry. Descriptive chemistry, elements and compounds; basic chemical calculations, mole problems, stoichiometry, and solution concentrations. This course include information about Statistical data analysis, equilibrium expressions, pH, pOH, ka, kb,Ksp, buffer pH, buffer pOH calculation and effect of common ion effect on solubility , ionization and acid-base concentration, titrometric methods with other methods of quantitative analysis.
Student's obligation	1. Students must restrict by time of lecture. 2. Students must participate in lecture by asking and answering question and explainingtheir opinions and suggestions. 3. Preparing reports, seminars and other activates. 4. Preparing weekly homework. 5. Participate in all quiz, med term and final exams of the subject without absenting. 6. Discuses students' suggestions, opinions and questions at teacher office hours.

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

		Task	Weight (Marks)	Due Week	Relevant Learning Outcome
Evaluation		Paper Review	---		
	Assignments	Homework	10		
		Class Activity	2		
		Report	8		
		Seminar	8		
		Essay	---		
		Project	---		
		Quiz	8		
		Lab.	---		
		Midterm Exam	24		
		Final Exam	40		
		Total	100		

Specific learning outcome:	1. Importance of Analytical Chemistry in our life. 2. Importance of introducing different methods for chemical analysis. 3. Study calculation of acid and bases constant. 4. Study of preparing buffer solution. 5. Knowledge about types of titration and drawing different types of titration curves. 6. Role of Analytical chemistry in our life.

Course References	Fundamentals of Analytical chemistry Eighth Edition by Douglas A. Skoog, Donald M.West, F.James Holler and Stanley R. Crouch. (2013) Principles and Practice of Analytical Chemistry, F.W. Fifield. (2000) Quantitative Chemical Analysis by Kolthofe- Sanell.(1993) Magazines and review (internet): https://open.umn.edu/opentextbooks/textbooks/486 https://www.slideshare.net/GaneshBhagure/analytical-chemistry-156759597.

Course topics (Theory)	Week	Learning Outcome
Introduction to Analytical Chemistry	1	Definition of Analytical Chemistry, Role of Analytical Chemistry, Sample, Types of analysis, Main steps in chemical analysis,
Acid and Bases	2,3	Acid and Bases, Types of Acids, Acid and Bases Concepts, Strong and weak Acid – Base, Conjugate Acid - Base Pairs , Amphoteric, Substance, pH, pH Scale.
Equilibrium expression	4,5	The Ion-Product Constant of Pure Water, calculating pH, Calculating the Hydronium Ion Concentration from pH, Calculating pOH, Calculating the Hydroxide Ion Concentration from pOH, Relationship Between pH and pOH, Equilibrium expression, Calculating pH of weak Acid, Calculating pOH of weak base, Relationship between Ka, Kb, pKa, and pKb.
Buffer Solution	6,7	Buffer Solutions, Importance of Buffer Solutions, Types of Buffer Solutions, Mechanism Action of Acidic Buffers, Mechanism Action of Basic Buffers, Mechanism Action of phosphate Buffers, BUFFER EQUATION (Henderson – Hasselbalch equation), Significance of Henderson – Hasselbalch equation, The Buffering Capacity, Effective Range of a Buffer Solution, Factors Affecting Buffer Solution.
Solution and Solubility	8,9	Solution, Types of Solution, Types of Solutions: Based on Physical States of Solute and Solvent, Solubility, Mechanism of solid dissolving, Factors Affecting on Solubility, Solubility of Salts, Solubility product Ksp and Solubility Curves

Semester 3 Med Term Exam		
Precipitation	10,11	Precipitation, Properties of Precipitation Reaction, Importance of Precipitation Reactions, Types of Chemical Precipitation, Ionic Product (Q) versus Solubility Product (Ksp), The common-ion effect, Importance of Common Ion Effects, Common Ion Effect of Weak Acids and Bases and Common Ion Effect on Solubility.
Titration	12,13	Titration, Principle of titration, Terms used in titration, Titrimetric calculation, Types of titration, Titration uses, Advantages of titration.
Titration Curve	14	
Semester 3 Final Exam/ 1St Turn		
Semester 3 Final Exam/ 2nd Turn		

Examinations

Q 1/ Define the following: [-----Ⓜ]

Q 2/ Choose correct answer for the following blanks: [-----Ⓜ]

Q 3/ Answer the following: (explain, enumerate calculation and curves) [-----Ⓜ]

Q 4/ Answer the following by (True) or (False) then correct (False) answer: [-----Ⓜ]

Extra notes:

External Evaluator

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

Lecturer: Dr. Kardo Sardar Mohammed