

Ministry of Higher Education and Scientific research



Department of Petroleum Technology- Chemical Analyzing

Koya Technical Institute

Erbil Polytechnic University

Subject: Gravimetric analysis

Course Book – Semester 2

Lecturer's name: Yousif Taha Maarroof

Academic Year: 2022/2023

Course Book

1- Course name	Gravimetric analysis
2-Lecturer in charge	Lec: Yousif Taha MaarooF
3-Denartment/ College	Department of Petroleum Technology- Chemical Analyzing
4-Contact	
5-Time (in hours) per week	Theory: 2 Practical:3
6- Office hours	
7-Course code	GRA202
8-Teacher's academic profile	
9-Keywords	

10. Course overview:

- ❖ This course aims to familiarize students with the principles of analytical chemistry and basic analytical techniques including gravimetric analysis. This course is not open to Chemistry or Analytical and Testing Sciences major students.
- ❖ Upon successful completion students should be able to facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations.

11. Course objectives:

- ❖ Experimental practice of quantitative gravimetric analysis.
- ❖ The objective of the determination of the concentration or the mass of the minimum formula from the titrated chemical material composing a pure liquid or a solution.
- ❖ The main objective of gravimetric analysis is to determine the amount of a substance in a given sample. When dealing with gravimetric analysis the concept of concentration cannot be avoided. Molarity i.e. moles per litre or decimeter is widely used unit of concentration.

12. Student's obligation

Students should read ahead and be prepared to ask/answer questions during class on the material as it is covered. gravimetric analysis is a general term for a method in quantitative chemical analysis in which the amount of a substance is determined by the measurement of the mass that the substance occupies. It is commonly used to determine the unknown concentration of a known reactant. In these cases, supplementary course material will be provided to the student either as handouts or as web links. during the academic year besides the assignment;

Pre-final: 50% = (30% exam + 20% activity + quiz)

Final Exam: 50%

13. Forms of teaching

Data show, PowerPoint and white board

14. Assessment scheme

15. Student learning outcome.

- Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries.
- Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
- Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
- Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.
- Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.

Course objectives:

At the end of this unit , the student is expected to be able to :

- 1- Understand the fundamentals of gravimetric analysis .
- 2- Follow the steps of the gravimetric analysis.
- 3- Choose the appropriate precipitating agent for a certain analyte .
- 4- Avoid or at least minimize the contamination of the precipitate.
- 5- Optimize the precipitation conditions in order to obtain a desirable precipitate .
- 6- Do all sorts of calculations related to gravimetric analysis .

17. The Topics:

- 1- The principles of gravimetric analysis
- 2- Properties of gravimetric analysis
- 3- Properties of the Precipitate and mechanism of precipitation
- 4- Steps of gravimetric analysis
- 5- Gravimetric factor (GF) calculations
- 6- Impurities encountered in gravimetric analysis
- 7- Filtration and washing of the precipitate
- 8- Drying, weighing and calculations in gravimetric analysis
- 9- Mathematical examples
- 10-Digestion of the Precipitate

11-Precipitation Equilibria

12-Effect of solubility on gravimetric analysis

19. Examinations:

1. Compositional:

In this type of exam the questions starts with explain? What are the reasons for..?

2. True or false type of exams:

3. Multiple choices.

20. Course reading list and references:

Basic references

1. Skoog, Douglas., Holler F. James., Crouch R. Stanley, 2007. Principles of analytical chemistry.
2. A text-book of volumetric analysis: with special reference to the volumetric processes by W Henry.
3. Scheme and studies of reference materials for volumetric analysis by Toshiaki Asakai

Supplementary literature

1. <http://www.wiredchemist.com/chemistry/instructional/laboratory-tutorials/volumetric-analysis>
2. https://www.izito.ws/ws?q=analytical%20chemistry%20lab&asid=iz_ws_gc4_02&mt=b&nw=g&de=c&ap=&ac=974&cid=10380035402&aid=103530108936&kid=kwd-53784333&locale=en_US&gclid=EAIAIQobChMIwqiJjtXQ7QIVQhN7Ch3rKgKHEAMYAiAAEgIk8vD_BwE

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This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.

(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).