

School of pharmacy

Department Medicinal Chemistry

Course title: *Analytical Chemistry*

Credit (Theory): 2

Prerequisite: *General Chemistry*

Course lecturers: *Dr. Asadi, Dr Mokhtari, Dr Golsanamlou*

Responsible lecturer: *Dr. Asadi*

- 1- Seminars and projects: *20% of whole mark*
- 2- Mid-term Exam: *40% of whole mark*
- 3- Comprehensive Written Examination: *40% of whole mark*

Course Description:

Course objectives:

Explain the fundamentals of analytical chemistry and steps of a characteristic analysis. expresses the role of analytical chemistry in science. compare qualitative and quantitative analyses. expresses the quantitative analysis methods.

Student Learning Objectives:

- 1- explain the fundamentals of analytical chemistry and steps of a characteristic analysis.
- 2- expresses the role of analytical chemistry in science.
- 3- compare qualitative and quantitative analyses.
- 4- expresses the quantitative analysis methods.
- 5- expresses the qualitative analysis methods.
- 6- evaluate the analytical data in terms of statistics.
- 7- estimates kinds of errors in chemical analysis.
- 8- evaluates the effects of systematic errors on analytical results.
- 9- compare of the experimental mean with a true value and two experimental means.
- 10- determine the detection limits.
- 11- interpret the statistical tests.
- 12- interpreted the sources of random errors and effects of random errors on analytical results.
- 13- explain the sources of random errors.
- 14- specifies the standard deviation of calculated results.
- 15- expresses the significant figures and rounding of data.
- 16- define the general properties of volumetry
- 17- employ the volumetric calculations.
- 18- identify quality of experimental measurements.
- 19- explain the confidence level and confidence limit.

- 20- identifies the detection limit.
- 21- interprets statistical tests.
- 22- describe the salts and the buffer solutions
- 23- define the different gravimetric methods.
- 24- defines the properties of precipitate and precipitating reagent.
- 25- uses the gravimetric calculations.
- 26- interpret the complexometric titrations.
- 27- interpret the redoks titrations.
- 28- express the titrimetric analysis methods.
- 29- expresses the terms such as standard solution, titration, back titration, equivalence point, end point, primary and secondary standard.
- 30- solves volumetric calculations.
- 31- defines the gravimetric titrimetry.
- 32- interpret aqueous solution chemistry.
- 33- expresses the terms such as electrolyte, acid, base, conjugate acid/base and autopyrolysis.
- 34- explains the chemical equilibrium and equilibrium constant types.
- 35- describes the activity coefficient and properties of activity coefficient.
- 36- apply the equilibrium calculations to complex systems.
- 37- determines systematic method for solving the multiple-equilibrium problems.
- 38- identifies the solubility by the systematic method.
- 39- solves the problems related to ion separation by control of the concentration of the precipitating reagents.

References:

- 1- Basics of Analytical Chemistry – Skoog, 9th edition,**
- 2- Basics of Analytical Chemistry, 7th Edition, Gary D. Christian,**
- 3- Laboratory Techniques in Electroanalytical Chemistry, 2nd Edition, Marvin.D**

	Subject	Lecturer	Presentation Method	Date	Time
1	Analytical Objectives, or: What Analytical Chemists Do	<i>Dr. Asadi</i>	Attendance class	Mon. 23 Feb. (4 Esfand)	8-10
2	Basic Tools and Operations of Analytical Chemistry	<i>Dr. Asadi</i>	Attendance class	Mon. 2 Mar (11 Esfand)	8-10
3	Statistics and Data Handling in Analytical Chemistry	<i>Dr. Asadi</i>	Attendance class	Mon. 9 Mar (18 Esfand)	8-10
4	Stoichiometric Calculations: The Workhorse of the Analyst, GLP and QA	<i>Dr. Asadi</i>	Attendance class	Mon. 16 Mar (25 Esfand)	8-10
5	General Concepts of Chemical Equilibrium	<i>Dr Mokhtari</i>	Attendance class	Mon. 6 April. (17 Farvardin)	8-10
6	Acid-base Equilibria	<i>Dr Mokhtari</i>	Attendance class	Mon. 13 April. (24 Farvardin)	8-10
7	Acid-base titrations (2)	<i>Dr Mokhtari</i>	Attendance class	Mon. 20 April. (31 Farvardin)	8-10
8	Acid-base titrations (2)	<i>Dr Mokhtari</i>	Attendance class	Mon. 27 April (7 Ordibehesht)	8-10
9	Solving special exercises	<i>Dr Mokhtari</i>	Attendance class	Mon. 4 May. (14 Ordibehesht)	8-10
10	Complexometric Reactions and Titrations (1)	<i>Dr. golsanamlou</i>	Attendance class	Mon. 11 May (21 Ordibehesht)	8-10
11	Complexometric Reactions and Titrations (2)	<i>Dr. golsanamlou</i>	Attendance class	Mon 18 May. (28 Ordibehesht)	15-17
12	Gravimetric Analysis and Precipitation Equilibria,	<i>Dr. Asadi</i>	Attendance class	Mon. 25 May. (4 Khordad)	8-10
13	Precipitation Reactions and Titrations	<i>Dr. Asadi</i>	Attendance class	Mon. 01 June. (11 Khordad)	15-17
14	Oxide-reduction titration	<i>Dr. golsanamlou</i>	Attendance class	Mon. 08 June. (18 Khordad)	8-10
15	Application in classical analytical methods in pharmaceuticals and synthesis	<i>Dr. golsanamlou</i>	Attendance class	Mon. 15 June (24 Khordad)	8-10
16	Solving special exercises	<i>Dr. golsanamlou</i>	Attendance class	Mon. 22 June (31 Khordad)	8-10

The contribution of the grade of the professors of the course

Professors	Exercise	Theoretical Final Exam	Sum
Dr Asadi	1.2	6	7.2
Dr mokhtari	1	5.4	6.4
Dr golsanamlou	1	5.4	6.4