

T6. Course Specification (CS)

Quantitative Analysis (250 chem-4)

Institution	<i>Najran university</i>	Date	<i>:1438/9/12</i>
College/Department	<i>Science and Arts</i>	<i>Chemistry Department</i>	

A. Course Identification and General Information

1. Course title and code : <i>Quantitative Analysis (250 chem-4)</i>			
2. Credit hours : <i>4 hrs:(4 hours per week (3+1)(Theoretical + practical)</i>			
3. Program(s) in which the course is offered. <i>Educational Chemistry Program</i> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course : <i>Dr. Hawa Mohamed Khalil</i>			
5. Level/year at which this course is offered : <i>Third Level</i>			
6. Pre-requisites for this course (if any) : <i>101 chem-4</i>			
7. Co-requisites for this course (if any) : -----			
8. Location if not on main campus : <i>College of Science and Arts</i>			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input type="checkbox"/>	What percentage ?	<input type="checkbox"/>
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	What percentage ?	<input type="text" value="100%"/>
c. e-learning	<input type="checkbox"/>	What percentage ?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments <i>Due to the southern region conditions, lectures were given using e-learning as well as actual lectures for those who can attend the college</i>			

B. Objectives

1. What is the main purpose for this course?

After studying this course, the student is expected to be able to:

1- Identification of different concentration units, and terms used in volumetric analysis with achieving different calculation methods for pH calculation of strong and weak acid and base solutions - various salts and buffered solutions

2-Formation of neutralization curves and identification of basis of redox reactions with achieving the theoretical basis using practical experiments for all types of reactions in this course (neutralization - oxidation and reduction - precipitation - complex formation)-

3- Knowledge of indicators used in the reactions of neutralization, oxidation, reduction, precipitation, composition of complexities, characteristics and conditions of use

4-Identify methods of analysis based on weight difference and Identify the factors affecting the solubility of the precipitation, the solubility constant K_{sp} and its relationship with the solubility of the precipitate

5-Identification of ways to improve precipitant characteristics

6- • Identification of organic and inorganic reagents.

7-Acquiring the skill of dealing with tools and devices used and preparation of samples for analysis and preparation of standard solutions.

8- • Use of computer skills, information technology and the Internet in the search for scientific material related to what is learned. And when carrying some calculations and practical experiments

2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

The use of different scientific sites for the development of chemical reactions, materials used and the types of evidence that can be used with increasing practical applications to help understand the theoretical part

C. Course Description (Note: General description in the form used in the Bulletin or handbook should be attached)

Course Description

The course includes the identification of some scientific terms and theories of quantitative analysis, the study of the different types of chemical reactions, the factors influencing them, and methods of detection of the end point using different indicators (Neutralization reactions, precipitation, formation of complexes, oxidation and reduction – Gravimetric analysis)

The various laws in chemical calculations are also known and applied some experiments for Theoretical content

1. Topics to be Covered :		
List of Topics	No. of Weeks	Contact Hours
<i>1-Introduction on quantitative analysis (Ionization, hydrolysis, types' of acids-basis- buffer solution –salts). knowledge with different concentration units and calculate the equivalent weight. Calculations and applying of pH for different solutions</i> <i>• Calculate the equivalent weight Methods of quantitative analysis</i>	1	3
<i>2- Preparation of the sample for analysis (pre-analysis steps)</i> <i>Principles of using neutralization reactions- properties of visual indicators used(types- chemical str.-transition range of visual indicators)</i> <i>Titration curves for different strong and weak acids and bases and vise versa</i>	1	3
<i>3- Application on neutralization reactions(different acids HCL- H₃PO₄- HAC- H₃BO₃. Amino acids- mixtures of different acids)</i> <i>Salts (carbonates- bicarbonates- borax- sod. Acetate- ammonium chloride and mixture of salts) Evaluate measurements and results, the limits of volumetric analysis</i>	2	6
<i>4-Precipitation reactions: General principles for precipitation and calculation of solubility and solubility product for sparingly soluble salts</i> <i>Different methods for detection of end points (Mohr's-Fagan's and Volhard methods. Evaluate measurements and results, the limits of volumetric analysis)</i>	2	6
<i>5- Complexion reactions: condition and how complex formed with studying types and characters of ligand used</i> <i>Indicators used and applications on complexion reactions</i>	2	6

6-Redox reactions: Balancing of redox equations, calculation of redox potential , electrochemical series ,differentiation of redox reagents, titration curves ,indicators used, reactions used permanganate as oxidizing agent. Reactions used iodine solution (direct and indirect)	3	9
7-Gravimetric analysis: How to obtain the weight - the steps used to obtain weight using chemical precipitation – precipitant pollution and how to reduce the pollution process-Homogenous precipitation –Types of precipitant (Organic and inorganic)	3	9
8- • Using the computer when applying some calculations and practical experiments. And revision	1	3
	15	45
EXPERIMENTAL PART:		
1 • Explanation of safety rules in the laboratory and • Demonstrate the skill of handling and using different tools	1	2
2 • Training on the methods of preparation of solutions and the use of different forms of concentration (molar - molality - the proportion of the volume and weight).-	1	2
3- • Acid and base titrations	4	8
4-Oxidation –Reduction titrations(permanganate-Dichromate-Iodine)	2	4
5-Precipitation titrations ((Mohr's-Fagan's and Volhard methods.)	2	4
6- complexon titration (using monodentate and polydentate ligands)	2	4
7- • Determination of crystallization water in a sample of crystallized barium chloride	1	2
8- Gravimetric analysis: (deter. Of calcium- bismuth- aluminum- lead – iron and copper)	2	4
	15	30

1.Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory or studio	Practical	Other:	Total
Contact Hours	45		30			75
Credit	3		1			4
3-Additional private study/learning hours expected for students per week					10	

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table)

Second, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes.

Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain).

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Know the scientific terms for quantitative analysis, concentration units and neutralization reaction	Lecture-E-learning- Cooperative learning Practical Training	Quarterly Test - Short Test - Duties - Final Test
1.2	Remember the oxidizing and reducing factors and types of ligands and conditions of complex formation and the most important basis of precipitation reactions (Mohr - vollhard - Fajan)	Lecture-E-learning- Cooperative learning Practical Training	Quarterly Test - Short Test - Duties - Final Test
1.3	Classify the gravimetric analysis and factors affecting precipitate formation and steps for chemical precipitation-	Lecture-E-learning- Cooperative learning Practical Training	Final Test
2.0	Cognitive Skills		
2.1	Conclude the laws, methods and indicators used in different reactions	Lecture-E-learning- Cooperative learning Practical Training	Quarterly Test - Short Test - Duties - Final Test

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
2.2	<i>Apply different quantitative analysis methods are used to determine different samples and mixtures</i>	<i>Lecture-E-learning- Cooperative learning Practical Training</i>	<i>Quarterly Test - Short Test - Duties - Final Test</i>
3.0	Interpersonal Skills & Responsibility		
3.1	<i>Participate in team work to carry out practical experiments through the laboratory and Depend on itself to carrying practical experiments</i>	<i>Cooperative learning Self learning</i>	<i>Duties- Final Test</i>
4.0	Communication, Information Technology, Numerical		
4.1	<i>Communicate through the net to solve some problems, analyze data and write the report</i>	<i>E-learning Self-learning</i>	<i>Short Test- Duties</i>
5.0	Psychomotor		
5.1	<i>Develop the manual skills needed to carry out experiments and laboratory activities</i>	<i>Practical Training</i>	<i>Final Test</i>
5.2	-----	-----	-----

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, Quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	<i>Quarterly test(Theoretical)</i>	6	15%
2	<i>Quarterly test(Practical)</i>	9	15%
3	<i>Short tests + duties</i>	<i>All weeks</i>	10%
4	<i>The final practical test of the course (practical)</i>	<i>Sixteen week</i>	20%
5	<i>Final theoretical test</i>	<i>Seventeen week</i>	40%

D. Student Academic Counseling and Support :

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- 1- The presence of faculty members for advice.
- 2- Office hours recorded in the table of each faculty member and advertised for students
- 3- Hours of academic guidance recorded in the schedule of each faculty member and advertised for students (6) hour per week

E. Learning Resources

1. List Required Textbooks :

Volumetric analysis (Ibrahim Zamil) King Saud University, Saudi Arabia, Riyadh (2005).

- *General Chemistry Practical. Ahmed Abdul Aziz Al Owais and others (1415)*

2. List Essential References Materials (Journals, Reports, etc.)

- *Vogel, Arthur I., ((A Text- Book of Quantitative Inorganic Analysis)) Revised by Jeffery, G.H. : Bassett, J.; Mendham, J.; Denney, C. 6th Edition, Longman Publisher, England, 1989.*
- *.Analytical Chemistry: An Introduction (Saunders Golden Sunburst Series)- by Douglas A. Skoog, Donald M. West, F. James Holler, and Stanley R. Crouch, 8th*

3. List Electronic Materials Web Sites, Facebook, Twitter, etc.

Digital Library through the Najran University

4. Other learning material such as computer-based programs/CD, professional standards or regulations and software

- .Presentations.*
- Educational-videos*

- Blackboard

F. Facilities Required :

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

-Laboratories equipped with glass necessary for the practical part.

-Library connected to the Internet

Classroom with internet connection

2. Computing resources (AV, data show, Smart Board, software, etc.)

Providing a Data Show projector in the laboratory and another for the teaching room.

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) -----

G. Course Evaluation and Improvement Processes :

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching

1- tests results.

2- Periodic evaluation that is filled by students about the course

2. Other Strategies for Evaluation of Teaching by the Instructor or by the department.

-System of evaluating the performance of faculty members

- Self-assessment of the faculty member

- Course file

3. Processes for Improvement of Teaching:

1- Training in modern teaching strategies.

2-Training in assessment methods in e-learning

4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

1-Exchange the correction of a sample of assignments or tests periodically with another faculty member for the same course in another department.

2- Correction of a random sample of student response papers according to the answer form prepared by the instructor with a member of the same specialization

or the closest to the specialization

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement :

Completion of the course report by the end of each semester based on the feedback provided by:

- *Annual review of the contents of the course and its development according To the developments.*
- *Results of the evaluation questionnaires by the students*
- *Design and implementation of the improvement plan based on the Evaluation of the student performance of the faculty member.*
- *Performance indicators for the verification of learning outcomes In view of the results of the quarterly and final tests*
- *Improvements in the report of the course*

Name of instructor : _____ Dr/Hawaa Mohamed Khalil

Signature التوقيع: _____ Date Report Completed: 3/6/12017 _____

Name of field experience teaching staff: _____

Program coordinator منسق البرنامج: Dr/ Amal Fathy_ Saliem _____

Signature التوقيع: _____ Date received التاريخ الاستلام: 6/6/2017