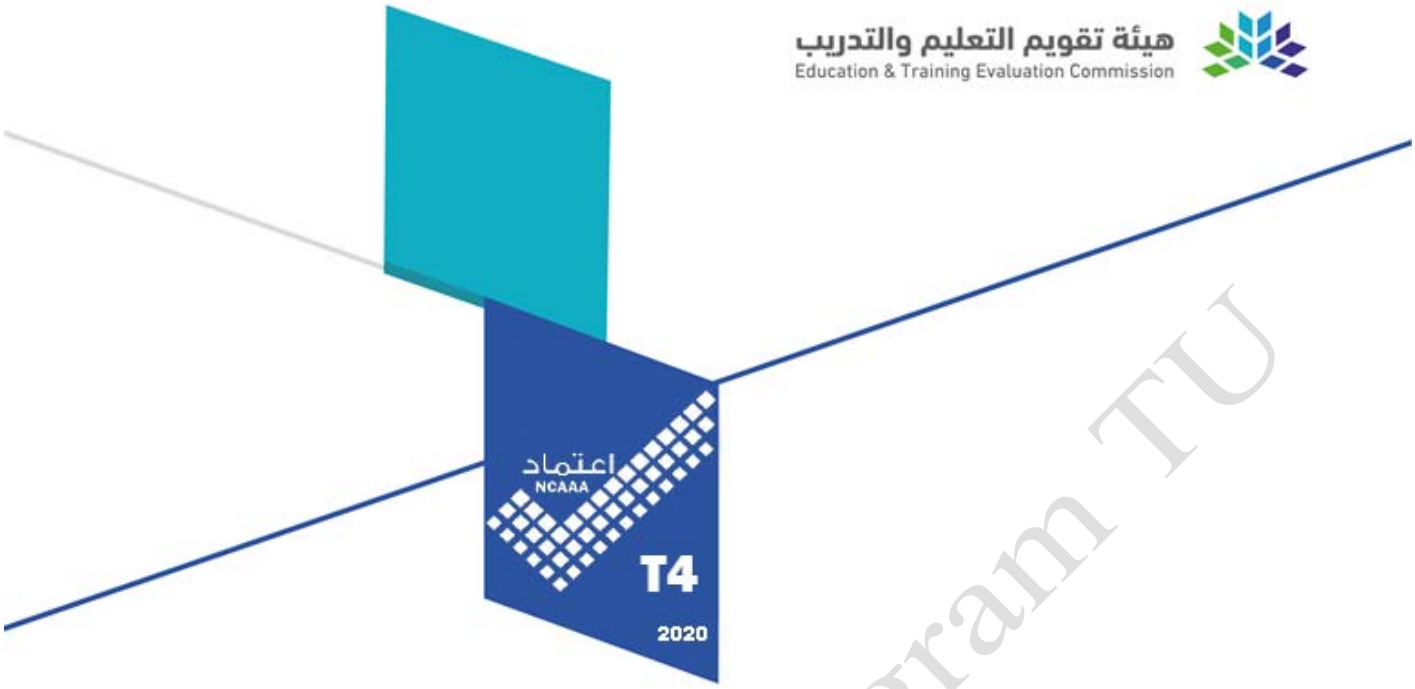
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**General Chemistry 2**
Course Code:	**2042103-3**
Program:	**Bachelor in Chemistry**
Department:	**Department of Chemistry**
College:	**College of Sciences**
Institution:	**Taif University**

Table of Contents

A. Course Identification

1. Credit hours:	**3 (2 Theoretical, 1 Lab)**
2. Course type	
a.	University ☐ College ☐ Department √ Others ☐
b.	Required √ Elective ☐
3. Level/year at which this course is offered:	**3rd Level/ 2nd Year**
4. Pre-requisites for this course (if any)**: General Chemistry 1 (204101-4)**	
5. Co-requisites for this course (if any)**: NA**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	2 Theoretical and 3 Practical/ Week	100 %
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	45
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	**75**

B. Course Objectives and Learning Outcomes

1. Course Description

This course covers principle topics in physical chemistry including: thermochemistry, liquids, solids, solution properties, rate of reaction, transition state theory, electrochemistry and electrolytic conduction, and phase rule.

2. Course Main Objective

The course provides students with different concepts and fundamentals of physical chemistry.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding:**	
1.1	State laws of gases, solution, and equilibrium, Vander Waal correction factors and basic nuclear reactions	K1
1.2	Recognize the differences between reactions rates	K2
2	**Skills:**	
2.1	Drive the laws of gases, solution, and equilibrium	S1
2.2	Apply gases, solution, and equilibrium laws in real live problems	S2

CLOs		Aligned PLOs
3	**Values:**	
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Intermolecular forces, phase changes, hydrogen bonding, Phase diagrams, solids, unit cells, semiconductors.	2
2	Solution processes, concentration, colligative properties. Boiling point elevation, osmosis, colloids.	4
3	Kinetics, Integrated rate laws, activation energy, catalysts.	4
4	Reaction quotient, calculating equilibrium constant, Le Chatelier's principle.	4
5	Acids and bases, auto-ionization of water, pH, Ka and Kb, Lewis acid and base, common ion effect and buffers.	2
6	Titrations and solubility equilibria.	2
7	Thermochemistry: Entropy, laws of thermodynamics, Gibbs free energy.	4
8	Gibbs and K, balancing redox reactions, Voltaic cells.	4
9	Galvanic cells, cell EMFs, Nernst equation, electrolysis, electrolytic cells,	2
10	Free energy, nuclear equations, nuclear stability, nuclear kinetics, Fission, fusion, radiation health and safety	2
Total		**30**

Lab Content

No	List of Topics	Contact Hours
1	Introduction to the course and lab safety guidance	3
2	Chemical equilibrium	3
3	Exploring the Properties of Gases and Crystalline Lattice Structures	3
4	Synthesis of Alum	6
5	Spectrophotometric Determinations of Food Dyes	6
6	Determining Molar Mass by Freezing Point Depression	3
7	Determining Reaction Rate by the Initial Rate Method	6
8	Determining the Acid Dissociation Constant of a Weak Acid	6
9	Standardization of HCl solution	3
10	Potentiometric titration	6
Total		**45**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	State laws of gases, solution, and	Lecture	Written exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	equilibrium, Vander Waal correction factors and basic nuclear reactions.		
1.2	Recognize the differences between reactions rates.	Lecture	Written exam
2.0	**Skills**		
2.1	Drive the laws of gases, solution, and equilibrium	Problem-Solving	Practical tasks and Exam
2.2	Apply gases, solution, and equilibrium laws in real live problems	Discussion	Homework Assignments
3.0	**Values**		
3.1	Illustrate the concept of personal responsibility for achieving duties by teamwork.	Collaborative Learning	Individual presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework Assignments (Electronic)	Throughout Semester	5%
2	Individual presentations	Throughout Semester	5%
3	Periodical Exam	7/8	20%
4	Mid Term Exam	11/12	10%
5	Practical tasks	Throughout Semester	15%
6	Final practical Exam	15	5%
7	Final exam	16	40%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

Commitment to the rules of the Academic Advising Department at the university in accordance with the academic guidance manual approved by the university and the attached forms, there are different arrangements made by teaching staff to support student consultations including;
- Office hours: 8 hours per a week for each academic member.
- Academic guidance: an academic member has a number of students to guide them throughout degree journey.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	• CHEMISTRY, Raymond Chang (2012), McGraw-Hill Education (USA), Latest Edition. ISBN: 9780077141752.
Essential References Materials	• CHEMISTRY, John E. McMurry and Robert C. Fay (2015), Pearson Education, Latest Edition. ISBN: 9781292092805. • Physical Chemistry, P. W. Atkins (1978), Freeman & Company, W. H. (USA), Latest Edition. ISBN: 9780716701873.
Electronic Materials	• Saudi Digital Library (SDL)

Other Learning Materials	• Learning Management System (Blackboard)

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Lecture hall with 100 seats. • Equipped Lab with essential instrumentations.
Technology Resources (AV, data show, Smart Board, software, etc.)	• Blackboard access.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	--

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and assessment	Students	Survey (indirect method)
Extent of achievement of course learning outcomes	Program leader	Reports (Direct method)
Quality of learning resources	Peer referees Students	Reports (Direct method) Survey (indirect method)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Department Council/ Quality assurance committee**
Reference No.	7-3-1445
Date	27/2/1445 HJ 12/09/2023 G