اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Chemistry of Environmental Analysis
Course Code:	2043205-2
Program:	Bachelor in Chemistry
Department:	Department of Chemistry
College:	College of Sciences
Institution:	Taif University

Table of Contents

A. Course Identification

1. Credit hours:	**2 (1 Theoretical, 1 Lab)**

2. Course type

a. University ☐   College ☐   Department √   Others ☐

b. Required √   Elective ☐

3. Level/year at which this course is offered: 6th Level/ 2nd Year

4. Pre-requisites for this course (if any)**: Chemistry of Volumetric and Gravimetric Analysis (2042104-3)**

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	1 Theoretical and 3 Practical hours/ 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	15
2	Laboratory/Studio	45
3	Tutorial	-
4	Others (specify)	-
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

This course designed to give an extensive knowledge of environmental compositions and its analysis. The types of pollutants in air, water and soil including different sampling and analytical techniques used for pollution assessment.

2. Course Main Objective

The course aims to provide students with different concepts and fundamentals of environmental analysis.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding:**	
1.1	Recognize the chemical analysis methods to detect the pollutants in atmosphere, water and soil	K2
1.2	Determine the importance of environmental analysis	K3
2	**Skills :**	
2.1	Apply the critical thinking in environmental issues	S1
2.2	Utilize chemical concepts in environmental pollution	S3

	CLOs	Aligned PLOs
3	**Values:**	
3.1	Represent integrity professional and academic ethics and responsible citizenship in case of environmental issues	V2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and Basic concept of ecosystem and Atmospheric composition. Environmental pollution and the definition of different type of primary pollutants and secondary pollutants.	1
2	Nitrogen cycle - Atmospheric pollution, air pollutants, outdoor pollution and indoor pollution	2
3	Effect of pollutants on the human health. Air pollution sampling and chemical analysis methods	2
4	Atmospheric analysis of particulates and direct Analysis of Particulates	1
5	Water cycle, water natural, water pollution. Sources of water pollutants: Organic, Inorganic, Oils, Pesticides. Analysis of drinking water contamination.	2
6	Soil, chemical properties of the soils, Concept of soil pollution, the impact of human activities on the quality of the soil Inorganic pollutants:	2
7	Organic pollutants, Soil chemical effects of fertilization	2
8	Analysis of air pollutants using recent analytical tools	1
9	Analysis of water pollutants using recent analytical tools	1
10	Analysis of soil pollutants using recent analytical tools	1
	Total	**15**

Lab Content

No	List of Topics	Contact Hours
1	Methods for collecting and analyzing water samples	3
2	Determination of sulfur dioxide (SO_2) in air using titration methods	6
3	Determination of Cd in dust using flame atomic absorption spectroscopy	6
4	Determination of conductivity and total dissolved solids (TDS) in water	3
5	Determination of total hardiness of water	3
6	Determination of dissolved oxygen (DO) in water by Winkler titration	3
7	Determination of Ca and Mg in water	3
8	Determination of copper (Cu) in tea using flame atomic absorption spectroscopy	6
9	Determination of PO_4^{3-} in soil	6
10	Determination of lead (Pb) in gasoline	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	Recognize the chemical analysis methods to detect the pollutants in atmosphere, water and soil	Lecture	Written exam
1.2	Determine the importance of environmental analysis	Lecture	Written exam
2.0	**Skills**		
2.1	Apply the critical thinking in environmental issues.	Discussion	Homework Assignments
2.2	Utilize chemical concepts in environmental pollution.	Problem-Solving	Practical tasks and Exam
3.0	**Values**		
3.1	Represent responsible citizenship in case of environmental issues.	Self-learning	Social activities

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework Assignments	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	• Introduction to Environmental Analysis, Reeve, Roger N (2002). John Wiley & Sons, Inc., Latest Edition. ISBN: 9780471492955.

	• [Handbook of Environmental Analysis, Chemical Pollutants in Air, Water, Soil and Solid Wastes](#), Pradyot Patnaik (2017). Taylor& Francis Group, Latest Edition. ISBN: 9781315151946.
Essential References Materials	• [Environmental Analysis and Technology for the Refining Industry](#), James G. Speight (2005). Wiley (USA), Latest Edition. ISBN: 9780471739852.
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

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