

Introduction: Lessons: Processes and Operations in Environmental Health Second Semester 2020-2021

School: Health Department: Environmental Health

* Course Name and Number: Processes and Operations in Environmental Health

* Field and Degree: Environmental Health-Bachelor

* Day and time: Sunday 10-8

* Venue: School of Health

* Name of course manager (course instructor): Dr. Nikonhad

* Prerequisite courses: General Chemistry, General Physics, Chemistry and Environmental Microbiology

* Office address: Ilam School of Health - Department of Environmental Health

General purpose of the lesson:

• **Behavioral goals** (behavioral goals have an audience, behavioral verb, degree and criteria and conditions of performance)

1- Familiarity with the nature of the course of processes and operations in environmental health

2- Familiarity and mastery of various chemical reactions and factors affecting it

3- Familiarity and mastery of reactors and their applications

4- Familiarity and mastery of coagulation, flocculation and sedimentation and determining the factors affecting their performance

5- Familiarity and mastery of the concept of surface adsorption and the factors affecting it

6- Familiarity and mastery of ion exchange process

7- Familiarity and mastery of the principles of biodegradation and determination of its reaction kinetics

• **Student duties** (student homework during the semester)

• **Main sources** (observing the principles of source writing and giving an address for their preparation, including library, bookstore, internet ...)

1- Chemistry for environmental engineering, sawyer and MC carty.

2- Water supply and pollution control, visseman and Hammer.

3- Operational and process units in environmental engineering. Ayub Turkian, Mohammad Taghi Jafarzadeh, Publisher: Sharif University of Technology, Scientific Publishing Institute. 2000.

4- Environmental Chemistry, Volume One, translated by Shah Mansouri, Movahedian

• **Teaching method and teaching aids used:** Teaching is done by lecture method (whiteboard and magic) and using teaching aids (slides).

• **Methods and time of assessment and evaluation of the student and the bar related to each evaluation:** (Type of exams in terms of how to design a question - loading - time of exams and assignments should be mentioned)

Method	Score	Date	Time
Discipline and active presence	2	During the semester	
midterm	5	During the semester	
End of semester	13	End of semester	

Lesson rules and expectations from students

- Regular attendance at class
- Observing discipline
- Do homework

Schedule of presentation of the curriculum of processes and operations in environmental health in the first semester 2020-2021

Session	Time	Topic	Necessary preparation of students before the start of the class
1	14-16	LESSON STATEMENT, TEACHING METHOD, EVALUATION METHOD, EXPECTATIONS, CLASSROOM RULES, OVERVIEW, DEFINITION OF CONTAMINATION PROCESSES AND OPERATIONS, TYPES OF CHEMICAL REACTIONS	
2		Types and actions and factors affecting them	Study the contents of the past and get acquainted with the contents of the next session
3		Kinetics of zero, first and second degree	
4		Definition of reactors and types of reactors used in various processes	
5		Sedimentation, effective factors in sedimentation and types of water and wastewater sedimentation systems	
6		The concept of colloidal chemistry, coagulation, flocculation and factors affecting it	
7		Adsorption and factors affecting it	Study the contents of

			the past and get acquainted with the contents of the next session
8		Types of isotherms in adsorption and how to determine it	Study the contents of the past and get acquainted with the contents of the next session
9		Types of adsorbents and how to use them in purification systems	
10		Mid-term and presentation of membrane processes and types of membranes	
11		Mechanisms and properties of RO, NF, UF, MF membranes	
12		Principles and theory of chemical oxidation, effective factors in chemical oxidation reactions (disinfection, AOPs)	
13		- Explain the principles and theory of biological processes, explain the effective factors of biological processes	
14		Principles of suspended and adherent growth in wastewater treatment	
15		Principles and theory of nitrification and denitrification processes	
16		Principles and theory of phosphorus removal processes from wastewater, chemical principles of phosphorus removal and its effective factors, biological principles of phosphorus removal and its effective factors	
17		End of semester exam	