

Theoretical and practical courses-Ilam University of Medical Sciences

Introduction to the course: Water treatment in the second semester of the 2020-2021 academic year

School: Health

Department: Environmental Health Engineering

Course and degree: Bachelor of Environmental Health Engineering

Day, time and place: Monday 12-12

Number and type of unit (theoretical): 2

Names of the person in charge of the course (teacher of the course): Faragh Kazem Beigi

Prerequisite courses: Environmental Microbiology, Environmental Chemistry, Processes and Operations in Environmental Health Office Address: School of Health

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**General purpose of the lesson:**

Familiarity with the principles of various physical and chemical methods of water treatment and identifying the principles of unit design

**Specific or partial objectives of the course:**

At the end of this course, the student is expected to be able to:

- 1- Know the objectives of the lesson, the chapter, the sources of water supply, generalities about water purification and drinking water standards in Iran.
- 2- Know the preliminary treatment, waste collector and its types and type 1 and 2 sedimentation.
- 3- Know the methods of removing suspended and colloidal materials (coagulation and flocculation.
- 4- Know the types of filters, the way of working and the advantages and disadvantages of each.  
Know chemical purification, chemical precipitation and ion exchange.
- 6- Know the membrane methods, reverse osmosis and electro dialysis.
- 7- Know the methods of removing iron and manganese.
- 8- Know fluoridation and fluoridation of water.
- 9 - Know the methods of removing silica, nitrate, dye and odor and organic compounds such as VOCs and THMs.
- 10 - Know the methods of disinfection (ozone, ultraviolet, chlorine and its compounds).

11- Know the principles of purification and improvement of water resources in small communities (improvement of springs, wells, aqueducts and water reservoirs).

Student duties (student homework during the semester):

1- The student is obliged to have the necessary preparation in each session to answer the questions related to the previous sessions in written and oral form.

2- Attending class on time

3- The students of the class are divided into groups of 3 people and the topics of the course are divided between the groups in order to collect the necessary materials about the topics from the introduced sources and present them in the class. It is necessary for each group to coordinate the materials related to the desired session with the teacher up to two days before the class and provide a copy of the prepared materials to the other groups so that other groups can be ready to participate in the discussion in class. . The readiness of the presenter group and the syntax of the participation of other groups in the discussion are evaluated and scored.

**The main sources of the lesson:**

1- Mahmoud, Peykari; Arjmand, Mehrabani, (2004), "Fundamentals of Water Treatment, Arkan Publications, Isfahan.

2- Vali, Alipour; Idris Bazrafshan, (2002), "Water Purification", Soroush Sepahan Company Publications, Tehran, first edition.

3- Forough, preacher; Abdolmutallab, Seid Mohammadi, (2004), "Regulations on water disinfection and operation of disinfectants, Tehran.

4- AWWA, (2003), "Water Treatment - Third edition", AWWA.

**Teaching methods + teaching aids used:**

Questions and answers about the material presented in previous sessions and written or oral exams. The teaching method is implemented in the form of lectures, questions and answers and group discussions in the form of critical thinking using the facilities of appropriate educational technology (PowerPoint, virtual and video and whiteboard, etc.).

**Methods and time of assessment and evaluation of the student and the bar related to each evaluation:**

- Class 2 written and oral exams

- Prepare material and present in class 1 score

- Prepare visit report 1score

- Intermediate exam 4score

- End of the semester exam 12 score

**Lesson rules and expectations from students:**

1- The active participation of the student along with observing the relevant order and principles, respecting the manners of the class and other students, as well as the correct use of teaching aids and materials are essential.

2- The presence of students in extraordinary classes is essential. The time of the mentioned classes will be informed in advance to the class representative and the education department of the faculty.

3- According to the current regulations of the university, absence from more than 4 sessions of the classroom is not allowed. Obviously, this figure also includes justified absence.

### **Schedule and predicted contents of each theory session**

Session	Topic	Necessary preparation of students before the start of the class
1	Introduction and awareness of students' knowledge about the subject, introduction and objectives of the course, course topic, water supply sources, general information about water treatment and drinking water standards in Iran	
2	Water treatment methods, preliminary treatment, waste collector,	Written and oral questions and answers from the material presented in previous sessions
3	Type 1 and 2 sedimentation	
4	Removal of suspended and colloidal materials (coagulation and flocculation)	
5	Types of filters, slow sand filters, fast and diatomaceous earth filters	
6	Chemical purification, chemical deposition	
7	Ion exchange	
8	Membrane methods, reverse osmosis	
9	Electrodialysis	
10	Removal of iron and manganese, fluoridation and fluoridation of water	
11	Silica removal, nitrate removal,	
12	Dye and odor removal, methods of removing organic compounds such as VOCs and THMs	
13	Disinfection methods (ozone, ultraviolet, chlorine and its compounds)	
14	Chlorination and chlorination	
15	Principles of water purification and improvement in small communities (improvement of springs, wells, aqueducts and reservoirs)	
16	Visiting Ilam Water Treatment Plant	
17	End of semester exam	