

Theoretical and practical course plan form - Ilam University of Medical Sciences

School: Health

Introduction to the lesson

Department: Environmental Health

Course Title: Hydraulic laboratory for students:

Environmental Health Engineering Prerequisite Courses: Fluid mechanics venue:

School of Health in charge of the course (teacher):Dr. Moayed Adiban

Number of credits: 1

Practical Teaching time: Sunday, 1-8

Degree of students: Online bachelor

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**General objective of the course:** Familiarization of students with the practical and basic topics of hydraulic, fluid mechanics courses that they have learned theoretically.

1. Operation of Hydraulic Laboratory. VR Lomax, J. Sol., Translators: Majid Ghiasi, Ali Taghavi., Tehran Regional Water and Electricity Organization. 1993
2. Fluid and hydraulic mechanics. Hassan Madani, Jihad Daneshgahi Publications, 1995
3. Agenda of hydraulic laboratory., Kerman: Sepehr Kerman Engineering Company, 1998

**Student Exam Resources:**

1. Operation of Hydraulic Laboratory. VR Lomax, J. Sol., Translators: Majid Ghiasi, Ali Taghavi., Tehran Regional Water and Electricity Organization. 1993
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**How to evaluate a student during the course:**

- Practical work report
- End of semester exam

**Student assignments during the course:**

- Solve the exercises presented in class
- Participate in answering course questions
- Participate in the evaluations of each session and solve assignments

**Teaching methods and teaching aids used**

The teaching method in this course will be in the form of group discussion, working with hydraulic devices, problem solving, questions and answers, using magic and whiteboards, as well as using other educational media as needed.

### Lesson rules and expectations from students

- 1- Attending the class on time and based on the set time
- 2- Observance of training and disciplinary regulations
- 3- Studying the contents of the previous session and preparing to attend the class
- 4- Solve problems at home and answer on the due date
- 5- According to the educational regulations, unjustified absence in the final exam will be considered as a score of zero and justified absence will cause the removal of that course.

### Schedule of air pollution curriculum for the second semester of the academic year 2020-2021

Session	Specific Objectives (Outline)	Specific behavioral goals	Lecturer	Necessary preparation of students before the start of the class
1	Working with hydraulic table and determining water mass flow	The student should be able to determine the hydraulic characteristics of the water fluid and determine the water mass flow rate with the help of calculations.	Dr. Adiban	
2	Measuring energy loss in a small piping system (including straight pipe, elbows, branches, etc.)	The student should be able to calculate the amount of minor drops due to straight pipes, fittings and elbows with the help of a hydraulic system in action		Review the contents of the previous session
3	Experiment in open channel (object coefficient, channel roughness coefficient, landing number, hydraulic radius, hydraulic jump, specific energy, etc.)	The student must be able to calculate the amount of object coefficients, channel roughness coefficient, landing number, hydraulic radius, hydraulic jump, specific energy, etc.		
4	Wide overflows, converging, diverging and creating a critical state	The student should be able to measure the amount of current in the channels with the help of overflows		
5	Test series and parallel pumps	The student should be able to measure the change in hydraulic characteristics of the flow when closing the pumps in parallel and in series.		
6	Venturi meter	The student must be able to calculate the amount of velocity and flow in the tube with the help of a venturi meter in practice		
7	Current measuring devices (orifice meter and rotameter)	The student should be able to measure the intensity of the current with the help of a rotameter and an orifice		
8	Rams impact test, water jet impact force	The student should be able to measure the impact force of the water jet and the impact		

		characteristics of the water ram in action		
9	Pressure determination test	The student should be able to measure pressure centers at submerged surfaces		
10	wind tunnel	The student should be able to measure the hydraulic characteristics of air speed and volume with the help of a wind tunnel device		
11	Siphons	The student should be able to measure their output current with the help of a siphon		
12	Darcy's law (potential lines and flow lines)	The student should be able to describe the effects of the Darcy relation in practice with the help of lines		
13	Orifas Reynolds pans	The student must measure the changes in the hydraulic characteristics of the fluid with the help of the Orinf Reynoldsf pan.		
14	Application of barometers (such as Bourdon and Torricelli barometers)	The student should be able to determine the amount of pressure change with the help of barometers		
15	Viscosimeter test	The student should be able to measure the viscosity of fluids with the help of a viscometer		
16	Energy drop device in quiet and turbulent currents	The student should be able to determine the amount of energy loss in the smooth and turbulent currents inside the tubes		
17	Bernoulli device and measurement of Bernoulli parameters	The student should be able to measure changes in pressure types with the help of a Bernoulli device		