Module (Course Syllabus) Catalogue

2023-2024

College/ Institute	Erbil Technology collage
Department	Renewable energy Technology
Module Name	Fluid Mechanics
Module Code	FLU204
Degree	Technical Diploma [*] Bachelor [ ] High Diploma [ ] Master [ ] PhD [ ]
Semester	2nd , 1st stage
Qualification	MSc.
Scientific Title	Assistant Lecturer
ECTS (Credits)	7
Module type	Prerequisite [ ] Core [*] Assist. [ ]
Weekly hours	4	
Weekly hours (Theory)	(2)hr Class	(171)Total hrs Workload
Weekly hours (Practical)	(2)hr Class	(171)Total hrs Workload
Number of Weeks	12
Lecturer (Theory)	Mayasah Hatem Aswad
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Lecturer (Practical)	Mayasah Hatem Aswad
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Websites	

Course Book

Course Description	The lectures are divided on five weekly hours (two hours theoretically and three hours practically). Mainly, the first two theoretical hours will be dedicated for the topic backgrounds and the main principles. Notes and handouts are given to the students containing the detail of the theoretical topics. Theoretical lectures will be assisted by presentations using white board and copy papers and data show. Discussion time is provided for the students for questions. The first practical hour will be dedicated for how to works in the laboratory, health and safety, how to use equipment, boards, components, and wire connection to do experiments and reports. Students should submit every week a report about the previous experiment.
Course objectives	This course covers important topics in fluid mechanics. It will first cover basics concept in mechanics and fluid mechanics and then it shift to solving particular problems in fluid mechanics. Concept such as surface tension, viscosity and waves will be covered in details. We will discuss steady and unsteady flow.
Student's obligation	Missed classes will not be compensated including the quizzes and the scheduled assignments. The students will lose marks on unattended classes with quizzes unless a legal document or authorized leave is presented which should explain the excuse of the absence. However, the absent student should take the responsibility for making up the missed lecture.

	Required Learning Materials	All lectures prepared in soft and exhibit on data show. Also they are given to students in hard copy. Make about 10 activities and one intermediate exam during annual course.

		Task		Weight (Marks)	Due Week	Relevant Learning Outcome
Evaluation		Paper Review				
	Assignments	Homework	10			
		Class Activity	2			
		Report	14			
		Seminar				
		Essay				
		Project				
	Quiz		4			
	Lab.		14			
	Midterm Exam		16			
	Final Exam		40			
	Total		100			

Specific learning outcome:	1- hydrodynamic limit 2-mass,momentum and energy conservation 3-Euler's and Bernoulli's equations for fluid equations 4-boundary layers and viscosity 5-irrotational flow 6-transport in turbulent flows

Course References:	1. Pritchard, P. J., Fox and McDonald's Introduction to Fluid Mechanics, 8th ed., John Wiley & Sons Inc., 2011 2. Batchelor, G. K., An Introduction to Fluid Dynamics, Cambridge University Press. 3. Oertel, H., et al., Prandtl-Essentials of Fluid Mechanics, 3rd ed., Springer. Van Dyke, M., An Album of Fluid Motion, Parabolic Press, Inc.

Course topics (Theory)	Week	Learning Outcome
Introduction and Fluid Properties Basic definition	1	
Definitions of fundamental concepts of fluid mechanics including.	2	
Pressure gages monometer and mechanical gages	3	
Static pressure Fluid flow continuity	4	
Buoyancy Archimedes statement	5	
Bernoulli equation	6	
Fluid flow continuity	7	
Laminar and turbulent flow	8	
Flow in pipes friction	9	
Pressure drops moody diagram	10	
Water pump , pump characteristic serial and parallel pumps	11	
Flow in open channel Moments and equilibrium	12	

Practical Topics	Week	Learning Outcome
Study of Pressure Measuring devices	1	
Determination of viscosity of liquids and its variation with temperature.	2	
Drawing Flow Net	3	
Laminar and Turbulent flows by Reynolds's apparatus.	4	

Verification of modified Bernoulli's equation.	5	
Determination of minor losses due to pipe fittings	6	
Flow around immersed bodies, point of stagnation,	7	
Determination of "Friction Factor"	8	
Determination of "Friction Factor"	9	

Questions Example Design

Q1/A - What are the dimensions (in the MLT system) of velocity and pressure?   10 Mark

   B - Define   1- Specific Weight   2- Specific Volume 3- Absolute Pressure.   15 Mark

Q2/ A large storage tank contain oil having a density of
917 kg/m^3. As shown in figure 1. Calculate the
pressure in Pa at 3.05 m from the top of the tank and
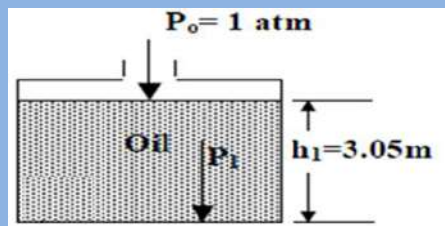at the bottom.   25 Mark

figure1

Q3/ From figure 2, water flows through the pipe the absolute pressure at point A is 200 kPa, the lower section of pipe has a radius of 8 cm and the upper section narrows to a radius of 5cm. find the velocities of the stream at points A and B.
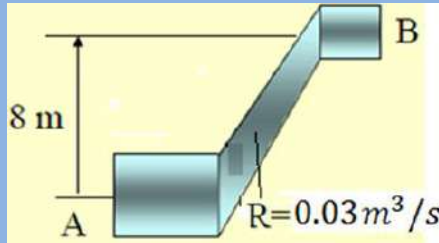
25 Mark

figure 2

Q4/ Water is flowing in a fire hose with a velocity of 1 m/s and a pressure of 200000 Pa. At the nozzle the pressure decreases to 1 atmospheric pressure, there is no change in height. Use the Bernoulli equation to calculate the velocity of the water exiting the nozzle.

Extra notes:

No notes.

External Evaluator

This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.
(A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).