

## Module (Course Syllabus) Catalogue

### 2022-2023

<b>College/ Institute</b>	Erbil Technology collage	
<b>Department</b>	Mechanics and Renewable energy	
<b>Module Name</b>	Fluid Mechanics	
<b>Module Code</b>	FLU204	
<b>Degree</b>	Technical Diploma <input checked="" type="checkbox"/> *	Bachelor <input type="checkbox"/>
	High Diploma <input type="checkbox"/>	Master <input type="checkbox"/>
		PhD <input type="checkbox"/>
<b>Semester</b>	2 <sup>nd</sup> , 1 <sup>st</sup> stage	
<b>Qualification</b>	MSc.	
<b>Scientific Title</b>	Assistant Lecturer	
<b>ECTS (Credits)</b>	7	
<b>Module type</b>	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> *
		Assist. <input type="checkbox"/>
<b>Weekly hours</b>	4	
<b>Weekly hours (Theory)</b>	( 2 )hr Class	(171 )Total hrs Workload
<b>Weekly hours (Practical)</b>	( 2 )hr Class	(171 )Total hrs Workload
<b>Number of Weeks</b>	12	
<b>Lecturer (Theory)</b>	Mayasah Hatem Aswad	
<b>E-Mail &amp; Mobile NO.</b>	mayasah.aswad@epu.edu.iq	
<b>Lecturer (Practical)</b>	Mayasah Hatem Aswad	
<b>E-Mail &amp; Mobile NO.</b>	mayasah.aswad@epu.edu.iq	
<b>Websites</b>		

# Course Book

<b>Course Description</b>	<p>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.</p>
<b>Course objectives</b>	<p>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.</p>
<b>Student's obligation</b>	<p>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.</p>

<b>Required Learning Materials</b>	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.				
<b>Evaluation</b>	<b>Task</b>	<b>Weight (Marks)</b>	<b>Due Week</b>	<b>Relevant Learning Outcome</b>	
	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			
<b>Specific learning outcome:</b>	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				
<b>Course References:</b>	<ol style="list-style-type: none"> <li>1. Pritchard, P. J., Fox and McDonald's Introduction to Fluid Mechanics, 8th ed., John Wiley &amp; Sons Inc., 2011</li> <li>2. Batchelor, G. K., An Introduction to Fluid Dynamics, Cambridge University Press.</li> <li>3. Oertel, H., et al., Prandtl-Essentials of Fluid Mechanics, 3rd ed., Springer.</li> </ol> Van Dyke, M., An Album of Fluid Motion, Parabolic Press, Inc.				

<b>Course topics (Theory)</b>	<b>Week</b>	<b>Learning Outcome</b>
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	4	
Fluid flow continuity		
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	12	
Moments and equilibrium		
<b>Practical Topics</b>	<b>Week</b>	<b>Learning Outcome</b>
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  $917 \text{ kg/m}^3$ . 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

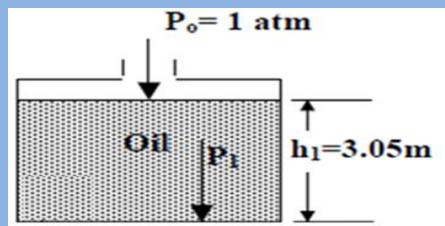


figure1

**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

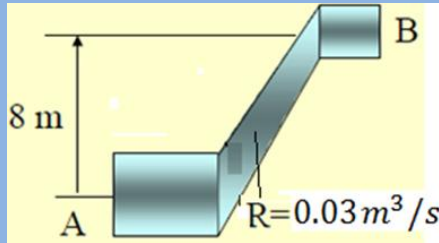


figure 2

**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).*