

(Fluid Mechanics) Course Catalogue

2025-2026

College	Erbil technology	
Department	Petroleum technology	
Module Name	Fluid Mechanics	
Module Code	FM205	
Semester	2	
Credit	7	
Module type	Assist.	
Weekly hours	4	
Weekly hours (Theory)	(2) hr Class	(196)hr Workload
Weekly hours (Practical)	(2)hr Class	()hr Workload
Lecturer (Theory)	Dr Shara Kamal Mohammed	
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Lecturer (Practical)	Dr Shara Kamal Mohammed Narin Dlnya Mohammed	
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Course Book

Course overview:

- This course provides a fundamental understanding of Fluid mechanics in the oil industry. It presents a theoretical and practical background, besides modules to calculate fluid flow and behaviours in the operation units. For this reason, problems and solutions are included throughout the course.

Course objective:

The objectives of the course are

1. Understanding basic laws, principles and phenomena in the area of fluid mechanics
2. Solve simplified examples of fluid mechanics
3. Theoretical and practical preparation enabling students to apply the acquired knowledge in the oil and Gas industry.

Student's obligation

Students should be prepared for class discussions, as the lecture will be provided in advance. They will be asked to solve problems during the class and will also be given homework for each subject. In addition, a continuous quiz system will be used throughout the semester to evaluate students' progress. Finally, they will be asked to prepare reports and seminars.

Forms of teaching

- Submit the homework (HW) by the day before the class.
- Attend practical class and actively participate in group worksheet activities.
- Submit your individual worksheet by the end of the practical class.
- Test students' knowledge through quizzes, midterms, and finals.

Assessment scheme

10% Mid. Theory exam

15% Mid. Practical exam

8% Quiz

5% Homework

10% Reports and Seminars

2% Attendance

40% final theory

Student learning outcome:

At the end of the course, students will:

1. define basic terms, values and laws in the areas of fluid properties, statics, kinematics and dynamics of fluids, and hydraulic design of pipes,
2. Describe methods of implementing fluid mechanics laws and phenomena while analysing the operational parameters of hydraulic problems, systems and machines.
3. practically apply tables and diagrams, and equations that define the associated laws
4. calculate and optimise operational parameters of hydraulic problems, systems and machines,
5. Explain the correlation between different operational parameters.
6. select engineering approach to problem solving based on the acquired physics and mathematical knowledge.

- Course Reading List and References:

References

Kundu, P.K., Cohen, I.M., Dowling, D.R. and Capecelatro, J., 2024. Fluid mechanics. Elsevier.

Fang, C., 2019. An introduction to fluid mechanics (Vol. 935). Springer.

Textbooks:

Elger, D.F., LeBret, B.A., Crowe, C.T. and Roberson, J.A., 2020. Engineering fluid mechanics. John Wiley & Sons.

. Source links:

https://www.anits.org/media/dept_calendar/R_23_II_year_civil_syllabus.pdf#page=24

Course topics (Theory)	Weak	Learning Outcome
<p>1. Introduction:</p> <p>Fluid mechanics, fluid dynamics, shear stress, fluid characteristics, difference between liquids and gases, The arrangement of atoms in different phases, fluids properties, density, viscosity, problems and solutions.</p>	1	Understanding the fundamentals of fluid mechanics and learn to solve problems
<p>2. Pressure in Fluids</p> <p>Atmospheric pressure, gauge pressure, vacuum pressure, absolute pressure, pressure differential, Pressure-Density-Hight Relationships, Problems and solutions</p>	2,3	Understanding the deference between different type of pressure and learn how to measure or calculate each type.
<p>3. Fluid Statics</p> <p>Hydrostatic: application of hydrostatics, factors affecting the pressure of the fluid, hydrostatic paradox, hydrostatic lift, force on a plane-side wall, continuity equation, problems and solutions.</p>	4,5	Understanding the application of hydrostatics and learn to solving problems
<p>4. Fluid dynamics</p> <p>Fluid in motion Conversion of energy in flowing</p>		Understanding the principles of flow

liquid, Bernoulli's equation: venture tube flowmeter, Orifice plate flowmeter, liquid draining from a tank, problems and solution.	6, 7	measurements and solving problems
5. Force Summation of force, parallelogram theory, Determination of force component (graphically and analytical methods), resultant of force. Problems and solutions	8,9	Understanding the theory of force determination and learning how to calculate the resultant of force through solving different examples.
6. Moment of force, equilibrium, Moment of force, equilibrium. Problem and solutions.	10	Learn how to calculate equilibrium and the moment of forces
7. Laminar and turbulent flow Laminar flow, turbulent flow, Reynold number, problems and solutions.	11	Introduce different types of flow and learn how to apply the Reynolds number in different cases.
8. Hydrostatic force on a plane surface Hydrostatic force on a plane surface problems and solutions.	12	Understanding the hydrostatics force on a plane surface and solving problems.
Course topics (Practicals)	Weak	Learning Outcome
1. Introduction	1	Lab induction
2. Density	2, 3	Learn how to measure density using two different methods

<p>3. Viscosity</p>	<p>4</p>	<p>Learn how to determine viscosity</p>
<p>4. Rotameter</p>	<p>5</p>	<p>Learn how to calibrate rotometers</p>
<p>5. Flow measurement apparatus (Venturi meter)</p>	<p>6,7</p>	<p>Learn to measure the volumetric flow rate of water by using a venturi meter.</p>
<p>6. Flow measurement apparatus (Orifice meter)</p>	<p>8,9</p>	<p>Learn to measure the volumetric flow rate of water by using an orifice meter</p>