

Course Description Fluid Mechanics

This description provides a brief summary of the most important characteristics of the course and the expected learning outcomes, indicating the maximum benefit from the provided learning methods. Those methods must be linked to the program description.

1. Educational Institution	University of Warith Al-Anbiyaa
2. Department / Center	Civil Engineering Department
3. Course Name/ Level	Fluid Mechanics/ 2nd
4. Lecturer name:	Asst. Lect. Fatima Asaad
5. Teaching Methods	Theoretical and Practical Classes
6. Year/semester	Second semester 2023-2024
7. Number of teaching hours	5 weeks = 75 hours per semester
8. The date the description preparation	19/2/2024
9. Course objectives is to help students to:	<ol style="list-style-type: none">1. Knowing the nature of fluids and their behavior when moving inside pipes, gates, etc.2. Knowing the potential energy acquired by the fluid that helps it move3. Helping the student to know the flow, velocity, and pressures of the fluid4. Knowing the effect of the forces exerted by fluids on pipe networks and gates.5. Knowing the important equations that control the movement of fluid, which are the continuity equation, the energy equation, Euler's equation, Bernoulli's equation and the various applications of those equations.6. Explain the different metrics used to measure fluid speed, pressure, and discharge quantity.7. Identify the types of flow that control the flow of a fluid: laminar flow, turbulent flow, stable flow8. Know how fluids flow within open channels

10. Course outcomes and the teaching, learning and assessment methods.

A. Cognitive goals: the student has to be able to:

- 1 -Knowing the difference between types of fluid flow.
- 2 -To distinguish between flow equations and their applications.
- 3 -The student should know the factors affecting the flow characteristics.
- 4 -Knowing the different types of charge that control the movement of the fluid.
- 5- The student should know the forces generated by fluids when they flow and how to calculate those forces.

B. Acquired skills from the course

- 1 -The ability to design, as well as to analyze and interpret data and data.
- 2 -The ability to apply knowledge in science and engineering
- 3 - -The ability to identify and solve engineering problems using extensive use of mathematical equations to solve complex fluid flow.
- 4- By constantly using various sources to increase understanding of various topics about fluid mechanics.

C. Teaching and Learning methods

- C1. Classic theoretical classes.
- C2. Practical classes and experimental measurements using laboratory equipment.
- C3. E-learning
- C3. Discussion and responding to students' questions.

D. Evaluation Methods

- 1- The initial exam by adopting the method of participating in the lecture
- 2- Continuous evaluation by conducting a set of exams with multiple options
- 3- Diagnostic evaluation through conducting scheduled tests at specific times and assigning students to perform specialized projects.
- 4- -Final exam

E. Disciplinary Objectives: Students have to learn:

- 1 -Creating a spirit of continuing learning and keeping pace with scientific developments in the field of work
- 2 -The ability to use modern engineering techniques, skills, and tools necessary to practice the engineering profession
- 3 -The impact of engineering solutions in the economic, environmental and social context
- 4- Increase knowledge of the professional and ethical responsibility of the engineer
- 5- The ability to communicate effectively

F. General and Qualifying Skills.

- 1-Enabling students to pass professional tests organized by local/regional/international bodies.
- 2 -Enabling students to make the right decision as quickly as possible to manage work matters at the work site.
- 3 -Enabling students to conduct job interviews and demonstrate the required engineer personality at the work site.
- 4- Enabling students to continue self-development after graduation to keep pace with developments in their field of specialization

Course Structure Theoretical Section

week	Main Topic	Subtitles	Notes
1	Fluid Dynamics (Introduction)	1. Real and Ideal flow 2. Compressible and Incompressible flow 3. Steady and Unsteady flow 4. Viscous and Inviscid flow	
3-2	Continuity Equation	1.Derivation of the equation 2.Pipes of different cross sectional areas	
6-4	Bernoulli Equation and applications	1. Derivation of the equation 2. Applying the equation on pumps 3. Applying the equation on turbines 5. Applying the equation on nozzle 6. Applying the equation on large tanks 7. Pitot Tube	
9-7	Momentum Equation	1. Derivation of the equation 2.Impact-momentum fluid flow 3. Impact-momentum on blade 4. Impact-momentum on pipes	
11-9	Dimensional Analysis	1. Major losses 2. Minor losses 3. Applications of Dimensional Analysis	
12	Fluid flow and its types	1. Real and ideal flow 2. Compressive flow 3. Stable and turbulent flow 4. Viscous flow	
16-13	Losses During Fluid Flow	1. Major losses in pipes 2. Minor losses in pipes	

		3. Losses due to change in direction and cross sectional area 4. Losses due elevation	
20-16	Flow in open channels	1 .Characteristics of flow in open channels 2 .Forms of open channels 3. The movement of the fluid and the forces it exerts	

Practical Section

week	Topics
1	Fluid Dynamics
3-2	Flow rate
6-4	Bernoulli equation
9-7	Momentum
11-9	Dimensional analysis
12	Types of flow
16-13	Losses during flow
20-16	Open channels

References	
1. Prescribed books required (textbook)	Streeter V.L. and Wiley E.B., (1985); " Fluid Mechanics", McGraw- Hill, Inc, New York (Eight edition)
2. Main references	Vennard J.k. and Street R.L.,(1982)"Elementary Fluid Mechanics", John Wiley & Sons, New York (Six Edition).
3. Recommended references (journals, articles)	1Rajput R.K. (2008), " A textbook of fluid mechanics", Chand & company LTD, New Delhi, India.
4. Web sites and electronic references.	The university's official website, whose address is https://elearning.uowa.edu.iq From there, you can access the scheduled topics page from the following address: https://elearning.uowa.edu.iq/course/view.p 3563=id?hp .

Course development plan

- 1- Modernization and developing study topics according to the latest edition of international references 2016
- 2- Creating and uploading course resources on the university e-learning website (Moodle) based on the given syllabus.
- 3- Continuous update of the electronic visual library of the course on the internet.