

Course Name	Code\No.	Number of Credits			
		Theo.	Lab.	Train.	Credit
Fluid Mechanics	HWR 212	2	2	-	3
Pre-Requests	MATH 110				

Course Objectives:

This course aims to teach students the basics of physical properties of water as an introduction to study the static and dynamic states of flow. In addition, students will learn the application of the governing mathematical equations in the calculation of pressure, forces and its point of application and more. In the laboratory session, students will conduct experiments related to course content.

Course Contents:

1. Units and dimensional analysis: Introduction to units system; International units; Unit conversion; dimensional analysis.
2. Liquid properties: Density; Specific density; Viscosity; Surface tension; Pressure; Elasticity coefficient; Static forces.
3. Static fluid: Hydrostatic forces on surfaces; Point of application of force; Horizontal and vertical component of forces; Methods of measurements and calculations of pressure; forces of submerged surfaces.
4. Fundamentals of fluid flow: Fluid flow content; Uniform flow; Steady state flow; Volumetric, weight, and mass rate of flow; Continuity equation; Bernoulli equation and its applications; Hydraulic grade line and total energy line; Flow in pipes; Pumps and Turbines.
5. Laboratory experiments: Weekly experimental session related to applications of course contents' topics.

Course outcomes:

It is expected that the student would get acquainted to the following topics:

- The importance of liquid properties and its methods of determination.
- Static and dynamic fluid flow equations.
- Calculations of forces and pressure due to fluid action under different conditions.
- Application of Bernoulli equation.
- Ability in conducting laboratory experiments.

Evaluation Method:

Student can be evaluated upon mid-term exams, final exam and class homework, class discussions as well as lab experiments and lab reports

References:

- **Munson, B.R., Alric, P.R. and Okiishi, T.H.** (2015) Fundamentals of Fluid Mechanics, John Wiley & Sons; 5th edition.
- **Cengel, Y and Cimbala, J.** (2013) Fluid Mechanics: Fundamentals and Applications, 3rd edition, McGraw Hill Book Company.
- **Streeter, V.L.** (1979) Fluid mechanics, 7th edition, McGraw Hill Book Company.