

FLUID MECHANICS

Introduction



By

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What is Fluids Mechanics ?

- It is the branch of applied mechanics concerned with the **statics** and **dynamics** of fluids.
- The analysis of the behaviour of fluids is based on the **fundamental laws of mechanics**.

Objectives of the Course:

- **Introduce** fluid mechanics and establish its relevance in engineering.
- **Develop** the fundamental principles underlying the subject of the fluid mechanics.
- **Demonstrate** how these are used for the design of simple hydraulic components.

Textbook :

- *Fluid Mechanics*, by Douglas, J.F., Gasiorek, J. M., Swaffield, J. A., Jack, L.B.
- *Fifth Edition*, 2005.

Course Contents:

PART1: ELEMENTS OF FLUID MECHANICS

- **Chapter 1:** Fluid and Their Properties
- **Chapter 2:** Pressure and Head.
- **Chapter 3:** Static Forces on Surfaces – Buoyancy.

PART2: CONCEPTS OF FLUID FLOW

- **Chapter 4:** Motion of Fluid Particles and Streams.
- **Chapter 5:** The momentum Equation and its Applications.
- **Chapter 6:** The energy Equation and its Application.
- **Chapter 7 (Optional):** Water Flow in Pipes

Grading:

- Course works: 45%
- Final: 55%

Attendance :

- Attendance is important.

Homework:

- One of the best ways to learn something is through **practice**.
- Therefore, homework assignments are **extremely important** in this class!
- Doing these will **greatly** improve your exam mark
- Homework problems will be assigned at the end of each chapter (or on weekly bases)

Why are we studying fluid mechanics on a C/E/I/M Engineering course?:

Fluid mechanics is involved in nearly all areas of **C/E/I/M** Engineering either directly or indirectly.

- Sea and river (flood) defences.
- Water distribution / sewerage (sanitation) networks.
- Hydraulic design of water/sewage treatment works.
- Dams.
- Irrigation.
- Pumps and Turbines.
- Water retaining structures.....

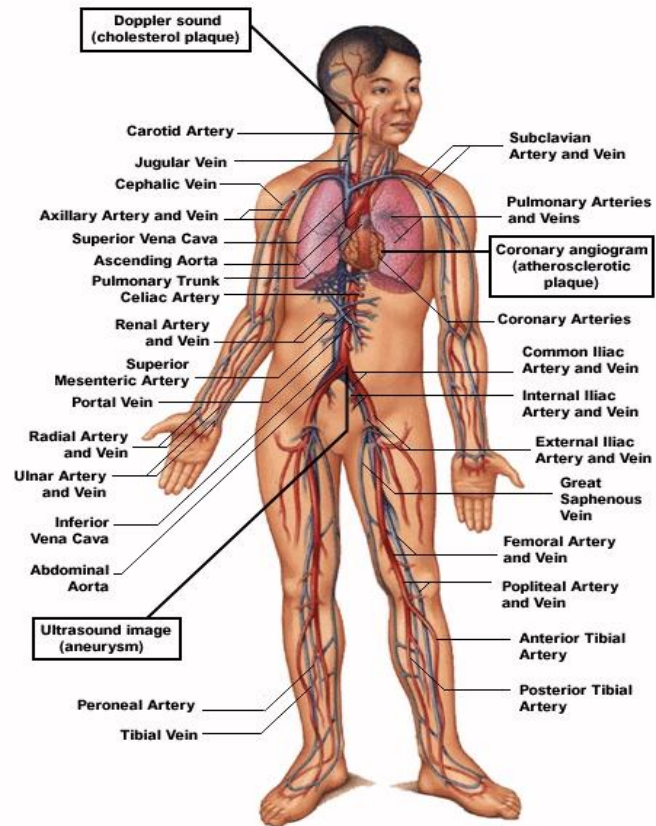
Fluid Mechanics present in:

- Aerodynamics
- Bioengineering and biological systems
- Combustion
- Energy generation
- Geology
- Hydraulics and Hydrology
- Hydrodynamics
- Meteorology
- Ocean and Coastal Engineering
- Water Resources
- ...numerous other fields.

Aerodynamics



Bioengineering



Energy generation



Geology



River Hydraulics



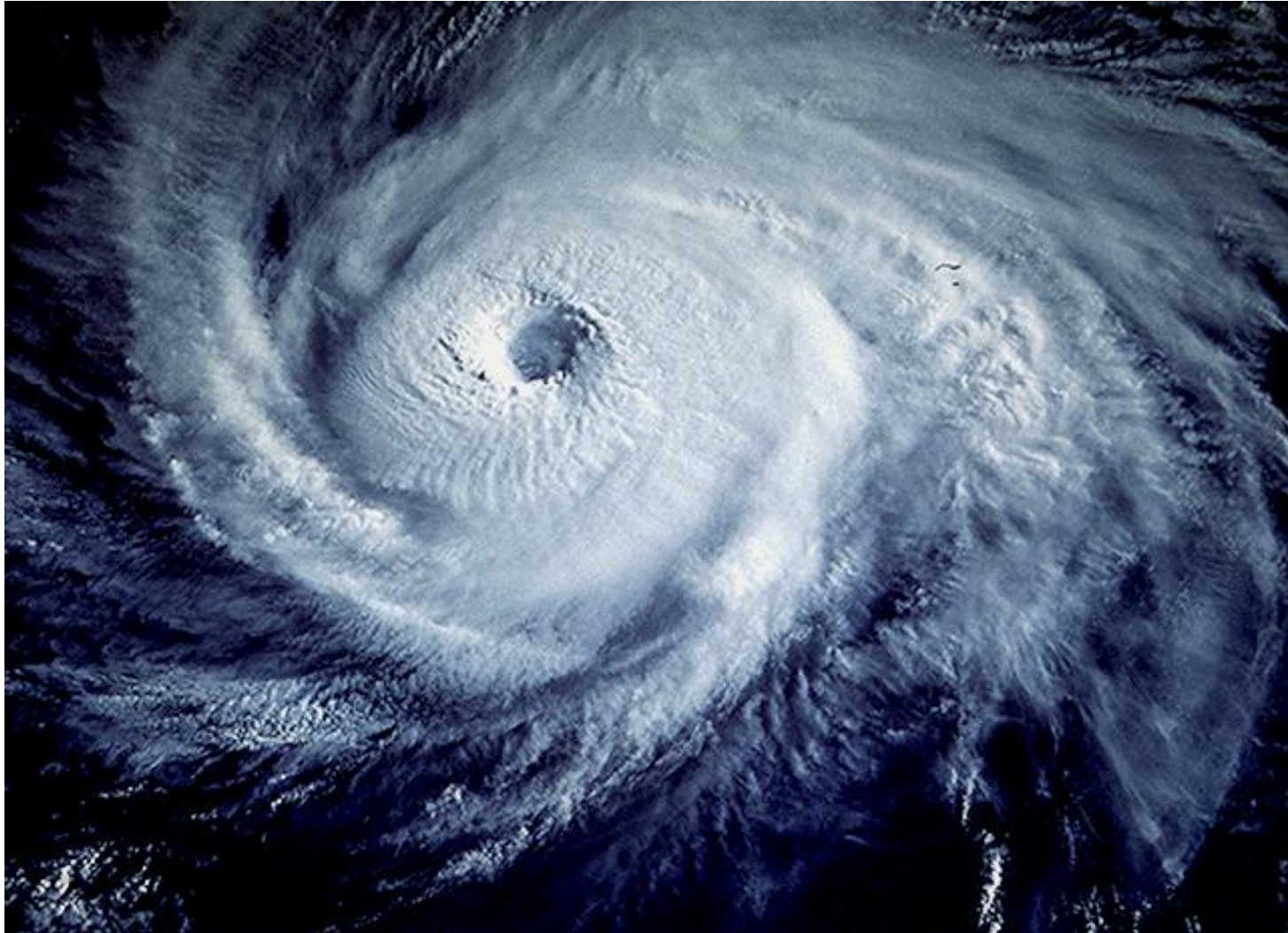
Hydraulic Structures



Hydrodynamics



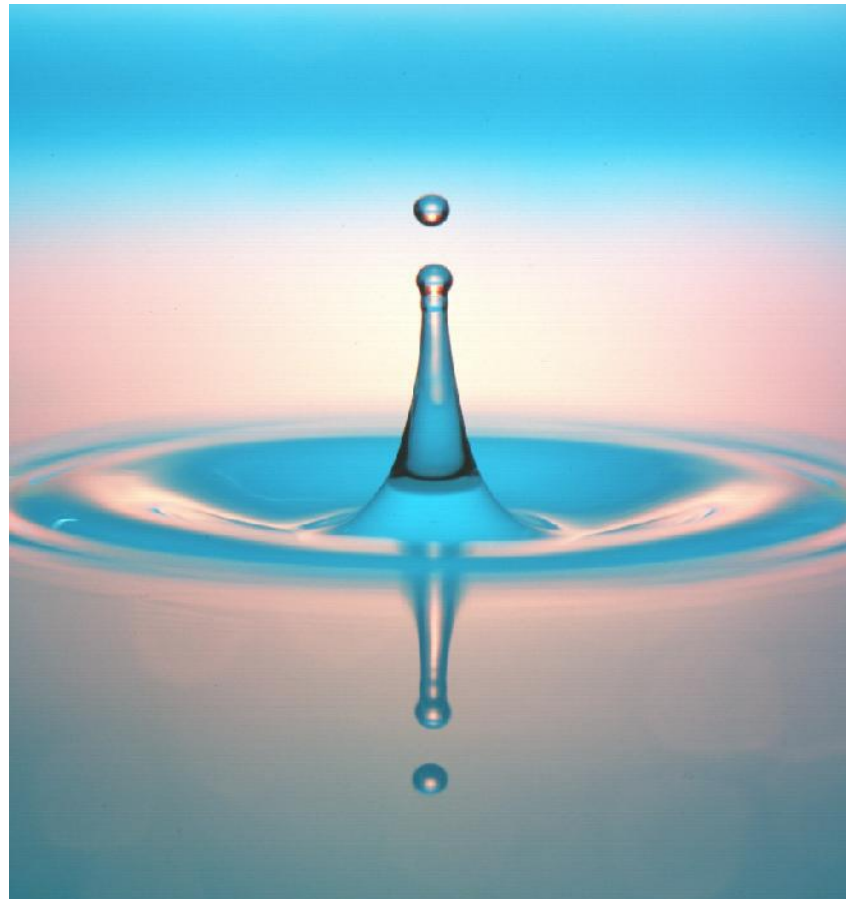
Meteorology



Water Resources



Fluid Mechanics is Beautiful



But



Thank You
For Your Attention

