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Fluid Mechanics

Goal: To extend the physical knowledge in the field of fluid mechanics

Contents:

Lectures 1 + 2  
**Introduction to Fluid Mechanics**
- Definition of a fluid-fluid as a continuum.
- The mathematical model, some definitions, pressure, viscosity, friction, ideal flow, surface tension, compressible and incompressible flow.
- Velocity field, stress field, viscosity.
- Description and classification of fluid motions.

Lectures 3 + 4  
**Fluid Static's**
- Pressure
- Hydrostatic force on submerged surfaces
- Buoyancy and stability
- Dimensionless Analysis,
- Dimensionless numbers: Reynolds number, Ma, Sr, Fr, Eu
- Mathematical models of Fluid Motion
- Integral equations, differential equations,
- Ideal-Fluid Flow

Lectures 5 + 6  
**Basic equations**
- Conservation of mass
- Newton’s Second Law
- The angular momentum principle

Lectures 7  
The first and second law of thermodynamics

Lectures 8 + 9  
**Motion of a fluid element**
- Incompressible in viscid flow
- Momentum equation for frictionless flow
- Euler equation
- Bernoulli equation

Lectures 10 + 11  
**International incompressible viscous flow**
- Fully developed laminar flow
- Flow in pipes and ducts
- Turbulent flow

Lectures 12 + 13  
Boundary theory, Turbo machinery
- External incompressible viscous flow
- Flow in open channels
- Introduction to compressible flow

Lectures 14  
**Flow measurement (short introduction)**