Course Syllabus

FLUID MECHANICS I

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Program: Oceanographic Engineering

1. Course number and name
MECG1005 - FLUID MECHANICS I

2. Credits and contact hours
3 credits and 4 contact hours

3. Instructor's course or coordinator's name
JUAN MANUEL PERALTA JARAMILLO

4. Text book, tittle, author, and year
• Munson, Young and Okiishi. Fundamentals of Fluid Mechanics (8th Edition)

a.Other supplemental materials

• Frank M. White. Mecánica de Fluidos (Sexta Edición)

• Frank M. White. Fluid Mechanics (8th Edition)

• Yunus A. Cengel, John M. Cimbala. Fluid Mechanics: Fundamentals and Applcations (3rd Edition)

• Fox and McDonald's. Introduction to Fluid Mechanics (9th Edition)

• Donald F. Elger, Barbara C. Williams, Clayton T. Crowe, John A. Roberson. Engineering Fluid Mechanics (10th Edition)

5. Specific course information
a. Brief description of the content of the course (catalog description)

This vocational training course develops the application of the concepts, laws and equations of conservation of mass, amount of movement and energy, and of the methods of integral analysis, differential and dimensional, for the resolution of problems of the Mechanics of fluids in the field of engineering. It describes the fundamental concepts and properties of fluids, pressure distribution through resting fluids and their applications, integral analysis techniques, differential and dimensional for the analysis problems, and the study of viscous flow Incompressible in piping.

b. Prerequisites

PHYSICS II - FISG1002

DIFFERENTIAL EQUATIONS - MATG1004

NUMERICAL ANALISYS - MATG1013

c. This course is: Required

6. Specific goals for the course
a. Specific outcomes of instruction

1.- Determine the pressure distribution in a compressible and incompressible static fluid for calculating hydrostatic forces and moments occurring on flat and curved surfaces and in

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submerged bodies.

2.- Calculate mass and volumetric flows, forces, moments and powers in hydraulic systems and devices using the equations in an integral form of mass conservation, amount of movement and energy.

3.- Analyze the field of speed and pressure of simple flows and simple geometries using equations in differential form of conservation of mass and linear momentum balances.

4.- Predict the behavior of a prototype through experimental studies in models applying the dimensional analysis.

5.- Establish pressure drops in piping by calculating friction losses and in accessories for laminar and turbulent flow problems.

   b.   Explicity indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

• An ability to apply Mathematics, including Multivariate Calculus and Differential Equations, and Basic and Engineering Sciences to model and solve mechanical engineering problems.

• An ability to identify, formulate, and solve naval engineering problems

7. Brief list of topics to be covered

1.- Fundamental Concepts and Fluid properties.

2.- Fluid Statics

3.- Integral analysis

4.- Differential analysis

5.- Differential analysis

6.- Incompressible viscous flow in pipes