Course title: Fluid mechanics

Course Basic Information	
Academic Unit:	Faculty of Civil Engineering
Course title:	Fluid Mechanics
Level:	BA
Course Status:	Mandatory
Year of Study:	II year/IV Semester
Number of Classes per Week:	2+2
ECTS Credits:	6
Time /Location:	
Teacher:	Prof. asoc. Laura Kusari
Contact Details:	Email: laura.kusari@uni-pr.edu
Course Description:	Dimensions and units, fluid properties. Fluid statics, Pascal's Law and Hydrostatic equation. Forces on plane and curved surfaces, intensity, direction of hydrostatic force. Next chapter will deal with fluid kinematics, fluid flow specification by Lagrange and Euler, classification of flows, continuity equation (one, two and three dimensional forms).Velocity measurement. In the fluid dynamics chapter, the Euler and Bernoulli's equations as well as the application of Bernoulli's equation. Resistances that occur during flow and the calculation of the energy losses. Laminar and turbulent flows through pipes, Darcy-Weisbach formula, Moody diagram. Major and minor losses of flow in pipes. Flow through orifices. Low through pipes and open channel flow.
Course Goals:	To identify and obtain values of fluid properties and relationship between them. To understand the concept of viscosity and its importance to real fluid flow. To understand principles of continuity and energy of fluids in motion. Student is introduced to the principles of fluid statics, kinematics and dynamics. To be able to use the given formulae for the energy loss calculation in different systems.
Expected Learning Outcomes:	On successful completion of this course, student should be able: 1. To define basic terms and laws in the areas of fluids properties, statics, kinematics and dynamics of fluids.

	2. To apply fundamental principles and laws of the Fluid Mechanics. 3. To be able to use the Bernoulli to solve the real situations of fluid flow. 4. To be able to apply The Energy Equation in solving practical problems of fluid flow.

Student Workload (should be in compliance with student's Learnign Outcomes)			
Activity	**Hours**	**Day/ Week**	**Total**
Lectures	2	15	30
Theory/ Lab Work/Exercises	2	15	30
Practical Work	0	0	0
Consultations with the teaher	2	5	10
Field Work	1	5	5
Test, seminar paper	0	0	0
Homework	0	0	0
Self-study (library or home)	2	10	20
Preparation for final exam	2	15	30
Assessment time (test, quiz, final exam)	3	8	24
Projects, presentations, etc.			
Total			149

Teaching Methods:	Frontal lecture, ex cathedra, numerical problems, seminar work in groups,
Assessment Methods:	First evaluation: 45% Second evaluation: 45% Home work: 10% Final exam.
Primary Literature:	1. Kusari, L., (2021), Notes on Fluid Mechanics
Additional Literature:	2. Cengel, Y., Cimbala, J., (2014), Fluid Mechanics-Fundamentals and Applications, Third edition, Mc Graw-Hill Companies Inc. 3. White, F., (2011), Fluid Mechanics, Seventh Edition, Mc Graw- Hill Companies Inc.

Designed teaching plan	
Week	**Title of the Lecture**
Week 1:	Introduction to Fluid Mechanics. The fluid characteristics. Introduction to Viscosity.
Week 2:	Fluid Statics. Pressure and pressure change (distribution) in static fluid. Pascal's Law.
Week 3:	Measurement of Hydrostatic pressure. Hydrostatic force on plain surfaces and on curved surfaces. Illustration by examples

Week 4:	Hydrostatic pressure -cont.
Week 5:	Pressure measurements. Manometers. Examples of Manometers.
Week 6:	Fluid flow kinematics. Fluid Flow classification. Reynold's Transport Theorem.
Week 7:	Fluid Dynamics. Mass Conservation. The Energy Equation.
Week 8:	Hydraulic Grade Line. Energy Grade Line through examples.
Week 9:	Laminar and turbulent pipe flow criteria.
Week 10:	Energy losses in laminar and turbulent flow. Reynold's Number.
Week 11:	Darcy- Weisbach Equation. Friction in pipes. Moody's diagram. Local Losses in pipe flow.
Week 12:	Flow measurements in Fluid Mechanics.
Week 13:	Flow through orifices and nozzles.
Week 14:	Unsteady flow in pipes. Hydraulic hammer
Week 15:	Discussion

Academic Policies and Code of Conduct

We start and finish class on time.
Tools used during class must be cleaned and stored away at the end of class.
Mobile/smart phones, and other electronic devices (e.g. iPods) must be turned off (or on vibrate) and hidden from view during class time.
Laptop and tablet computers are allowed for quiet use only; other activities such as checking personal e-mail or browsing the Internet are prohibited.