

29917 - Fluid Mechanics

Syllabus Information

Academic Year: 2019/20

Subject: 29917 - Fluid Mechanics

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 435 - Bachelor's Degree in Chemical Engineering

ECTS: 6.0

Year: 2

Semester: Second semester

Subject Type: Compulsory

Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

There are two learning methodologies: (1) learning in the class or in the lab supervised by the teacher (2) individual learning out of the class.

There will be three types of supervised learning activities: (1) big group classes (2) reduced group classes (half of the group) and (3) lab sessions (four groups of three students each).

In each context, the most suited tools will be used to increase the performance of the learning activities.

On the other hand, the student will have to review some readings and videos to supplement his learning outside the class. Besides, the student will have to reply to some questions every week.

In addition, the student will be able to contact the teacher individually to solve specific problems.

4.2.Learning tasks

Big group classes

Each session will be divided into three parts:

1. Brief lecture to give an overview of the main concepts.
2. The students solve an example of the lecture.
3. The example is solved in front of the class and some debate is carried out.

Small group classes

Each session will last for one hour.

- The teacher chooses two exercises.
- The students solve these problems in pairs.
- The teacher walks around the class and replies to questions.
- Finally, the solution is discussed.

Lab sessions

There will be five lab sessions within the term, each one lasting two hours.

In each session, there will be four groups of three students each.

In this context, the teacher will have a wonderful opportunity to explain the most relevant topics of Fluid Mechanics.

Student individual work

The student will have to carry out and submit some short exercises every week. This will encourage the student to keep up the attention on the course throughout the whole term.

On the other hand, to improve communications and autonomous-learning skills, a small project will be carried out in groups involving two more courses from the same term ("Materials Engineering" and "Mechanics"). In this project, the methodology "Problem Based Learning" will be employed.

Clinical tutorials

The teacher will be available to discuss the doubts with the students individually.

4.3.Syllabus

The course will address the following topics:

1. Introduction
2. Kinematics
3. Statics of fluids
4. Conservation equations
5. Dimensional Analysis and Similarity
6. Dimensionless equations
7. Unidirectional flow of viscous fluids
8. Ideal fluids flow
9. Boundary layer
10. Open channel flow
11. Lubrication

4.4.Course planning and calendar

Week		Full group class			Small group	Lab
		Lecture	Individual work	Assessment	Exercises	
1	Introduction. Kinematics	0.67	0.67	0.67	1	
2	Statics of Fluids	0.67	0.67	0.67	1	
3	Conservation equations	0.67	0.67	0.67	1	2
4	Conservation equations	0.67	0.67	0.67	1	
5	Dimensional analysis	0.67	0.67	0.67	1	2
6	Dimensional analysis	0.67	0.67	0.67	1	
7	Unidirectional flow of viscous fluids	0.67	0.67	0.67	1	
	Unidirectional flow of viscous					

8	fluids	0.67	0.67	0.67	1	2
9	Flow of ideal fluids	0.67	0.67	0.67	1	
10	Flow of ideal fluids	0.67	0.67	0.67	1	2
11	Boundary layer	0.67	0.67	0.67	1	
12	Boundary layer	0.67	0.67	0.67	1	2
13	Open channel flow. Lubrication	0.67	0.67	0.67	1	
14	Review	0.67	0.67	0.67	1	
	TOTAL	9.30	9.30	9.30	14	10

4.5. Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=29917&year=2019