Universidad Zaragoza

Year : 2020/21

29917 - Fluid Mechanics

Syllabus Information

Academic Year: 2020/21
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)

Option 1 (continuous evaluation):
To pass, it is mandatory:

Attend the class of eight unforgivable knowledge problems.
Approve the eight problems delivered during the semester.
Attend all laboratory practices.
Average calculation: 15% laboratory + 40% problems (20% in class and 20% problem for home) + 25% theory + 20% work "Problem Based Learning" (ABP). If ABP cannot be performed, this percentage would be passed to problems and theory (10% each).

Students who fail a problem in the continuous assessment can recover it in the global exam (option 2).

Option 2 (Global Assessment):
Those students who do not want to follow the continuous assessment, can choose to sit for the exam (100% of the final grade). This exam will have the eight unforgivable knowledge problems plus some laboratory questions.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process will take place in two contexts: (1) in class / laboratory supervised by the teacher and (2) outside of class and autonomously.

For the classes / laboratory, the students will be divided into four groups. In the laboratory, each small group will be divided, in turn, into 4 subgroups.

The methodology of the classes will be "flipped classroom". In this methodology the places where the tasks occur are exchanged: (1) The master class is seen by the student at home (2) Homework is done in the class.

Additionally, the student will be able to contact the teacher through the tutorials to solve their doubts in a personalized way.

4.2.Learning tasks

Class activities (small group)
(1) Theory: Students will take turns answering questions about the study topic (video or book chapter).
(2) Problems: Students will perform a certain problem simultaneously. The teacher will pass the word to each student so that they carry out part of the problem.

In both cases, the teacher will assign each student a qualitative grade according to their participation in the class.

Laboratory sessions
Throughout the semester, five laboratory practices of two hours each are carried out.
In each session, four groups of three students will be formed.
In this context, the teacher will have an excellent opportunity to explain the phenomena of Fluid Mechanics.

Student's personal work
(1) Theory: you must watch a video or read a chapter of a book. To stimulate your work, the teacher will prepare a list of questions to investigate.
(2) Problems: the student will see some videos of solved problems. Then it will try to do problems from the problem sheet.
(3) After the problem class, the student must solve a new problem at home and send it to the teacher.

On the other hand, to promote communication and autonomous learning, a group work will be carried out that may involve other subjects in the same semester of the degree (Automatic Systems, Materials Engineering and Mechanics). In this work the methodology of "Problem Based Learning" will be used.

Tutoring
The teacher will be available to the student to answer questions in a personalized way.

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

Semana	Tema	Horas casa	Horas clase	Lab
1	*Kinematics - T*	3	1	
2	Kinematics - CI	3	1	
3	*Statics of fluids - T*	3	1	
4	Statics of fluids - CI	3	1	
5	*Conservation equations - T*	3	1	2
6	Conservation equations - CI	3	1	
7	*Dimensional Analysis and Similarity - T*	3	1	2
8	Dimensional Analysis and Similarity - CI	3	1	
9	*Unidirectional flow of viscous fluids - T*	3	1	2
10	Unidirectional flow of viscous fluids - CI	3	1	
11	*Viscous stress - T*	3	1	
12	Viscous stress - CI	3	1	
13	Ideal fluids flow - CI	3	1	2

14	*Open channel flow. Lubrication - T*	3	1	
15	Boundary layer - CI	3	1	2
	TOT	45	15	10
	The exact dates will be shown in EINA's website			
	CI = Mandatory skill			
	T = Theory			

4.5.Bibliography and recommended resources

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