Universidad Zaragoza

Academic Year/course: 2022/23

29625 - Fluid Mechanics

Syllabus Information

Academic Year: 2022/23
Subject: 29625 - Fluid Mechanics
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 430 - Bachelor's Degree in Electrical Engineering
ECTS: 6.0
Year: 3
Semester: Second semester
Subject Type: Compulsory
Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process for this subject relies on the acquisition of a theroretical background, exercise practice and hands on laboratory or computer work. The early and continuing study of the subject is encouraged through the academic semester. One to one mentoring is also provided as an effective means of clearing up difficult points or complex exercises. The key components of the learning process are:

- Lectures. The whole group of students is expected to attend these lectures where the basic theretical principles of the subject will be explained and discussed. Lectures can be classrom or on-line, deppending on circumstances. Also during lectures typical exercises will be solved. Students will be prompted to discuss the theory as well as to participate in the solution of the exercises solved. Lectures will be held 3 hours per week according to the timetable published by the School of Engineering management at the begining of the academic year. Attendance to Lectures is strongly advised for a succesful outcome.
- When possible, hands on laboratory and computer work sessions will be held througout the semester. On lab sessions will take place in smaller groups (between 3 and 12 students on average), are compulsory and will be used in the overall grading of the subject. Work to be performed in each session is described in a written document available to the student in advance.
- Other mentoring and tutoring activities in smaller groups targeting a more detailed or deeper knowledge of particular theoretical questions or practical exercises. The lecturer office hours will be published in the schools e-learning platform at the begining of the semester.
- Autonomous work and self study time. This is the backbone of the learning process and as such enough time must be devoted to it. It is estimated that some 85 hours of self study time is needed on average to pass the subject. It comprises understanding the theoretical concepts, acquire the ability to solve exercises and writing of reports.

4.2. Learning tasks

The course includes the following learning tasks:

LECTURES: 2.4 ECTS (60 hours)

1) Lectures (T1 type activities) (30 hours)

Ordinary lectures addressed to the whole group of students. The main theoretical background of the subject will be explained by the lecturer. Attendance and active participation by the student is fundamental to a successful outcome.

2) Exercise and case solving sessions (T2 type activities) (20 hours)

Sessions in which exercises are posed, solved and discussed by the lecturer. Active participation of students will be encouraged and strongly advised. Open discussions ensuing an exercise or case solution will help get hold of difficult concepts and subtleties.

3) Laboratory and computer work (T3 type activities) (10 hours)

Small group working sessions in the lab or in the computer room under teacher guidance to apply concepts and practice abilities explained during classroom or exercise solving lectures. Should not be possible to assit to lab, working session will be on-line, and then teacher wil explain the activity and the necessary tasks to be developed in order to get physica concepts.

AUTONOMOUS WORK AND SELF STUDY: 3.6 ECTS (90 hours)

4) Self-study (T7 type activities) (83 hours)

5) Assessment tests (T8 type activities) (7 hours)

4.3. Syllabus

The course will address the following topics:

SYLLABUS

1. Introduction to fluid mechanics.
2. Flow kinematics.
3. Forces in fluids.
4. Hydrostatics. Pressure distributions.
5. Fundamental equations of fluid mechanics. Integral and differential relations.
6. Basic applications: Laminar and one-dimensional flows. Bernoulli's equation.
7. Dimensional analysis and similarity.
8. Fluid mechanics instrumentation. Fluid meters.
9. Pipe flow. Primary and minor head losses.
10. Multiple-pipe systems. Pipes in series, pipes in parallel and reservoir junction problems.
11. Boundary layers and aerodynamics.

4.4. Course planning and calendar

Classroom and laboratory sessions follow the schedule set forth by the Engineering School management that is published at the beginning of every academic year. The particular schedule and student grouping of some laboratory sessions will be made available to the students during the course on the e-learning platform and announced in the classroom.

The teacher's contact details and office hours for consultation and tutoring will be published on the e-learning platform at the beginning of the academic year.

Any outstanding activities will be scheduled during the course and published on the e-learning platform and announced in the classroom.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29625&Identificador=14508