Faculty: Science and Technology

Course: **Fluid Mechanics**

Program: Study Abroad in Engineering

Semester: 1st - Fall

ECTS credits: 6

Duration: 45 hours

Language: English

Teacher: Joaquim Macià

Course Description

This class provides students with an introduction to principal concepts and methods of thermodynamic systems and processes, heat transfer and fluid mechanics.

Topics covered in the course include fluid properties, pressure, hydrostatics and control volume analysis, mass and momentum conservation.

Students will work to formulate the models necessary to study and analyse fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Prerequisites

None

Attendance policy

Regular class attendance is a student obligation. Students are responsible for all of their work, including assessments, tests, and written work, and for all class meetings.

If a student is absent more than the three number of times in class, half a letter grade will be deducted from the final grade for each additional absence.

If a student is absent due to illness or an unforeseen emergency, the student must provide some form of documentation in order to be excused.

Students are encouraged to communicate with their teachers early about potential absences.

Attendance is mandatory for all classes, including field studies. Any presentation or activity missed due to student absence need to be justified with a medical certificate or family emergencies. If a student misses more than three classes in any course, half a letter grade is deducted from for each additional absence. More than seven absences will result in a fail grade.

Learning outcomes

By the end of the course, students should be able to:

Understanding basic laws, principles and phenomena in the area of fluid mechanics, thermodynamics and heat transmission. To be able to solve basic exercises theoretical and practical exercises.

Method of presentation

• Lectures and discussions: Lectures with appropriate visual support provide the theoretical content of the sessions. Promote well-reasoned class discussions to facilitate the students' learning curve and link the theory and concepts.

• Class participation: Students are encouraged to participate with group activities and in the discussions based on the course readings and cases proposed. It is the measure of your engagement in the readings/discussions/lectures of the course. "Participation" is not just a measure of the quality and quantity of your exchanges with your instructor but also with your peers in the class, especially those you might find who will critique, question, or simply seek clarification about your own stances taken or interpretations offered about our the readings in our class.

Field study

Field of study is divided in 3 big topics:

Topic 1: Fluids and pressure distribution in a fluid

Topic 2: Basic Laws of Fluid Mechanics

Topic 3: Heat transfer

Case analysis

Students will cover following topics: Fluids and pressure distribution in a fluid, Basic Laws of Fluid Mechanics and Heat transfer with demonstration problems. A potential teamwork exercise (Team-Base Learning) towards the end of the semester to solve a real problem proposed by the teacher.

Required work and assessment methods

Examination of Fluid Problems (25%).

Examination of Fluid Questions (15%).

Examination of Heat Transfer Problems (25%).

Examination of Heat Transfer Questions (15%).

Teamwork (TW) Participation: One (20%) or Two (10%+10%) TW projects, To be Decided based on course achievements.

Contents (To be confirmed during the curse)

Week 1. Fluids and distribution of pressures in a fluid.

Week 2. Fluids and distribution of pressures in a fluid.

Week 3. Fluids and distribution of pressures in a fluid.

Week 4. Fluids and distribution of pressures in a fluid and Basic laws of mechanics of fluids.

Week 5. Basic laws of mechanics of fluids.

Week 6. Basic laws of mechanics of fluids.

Week 7. Basic laws of mechanics of fluids.

Week 8. Heat transfer.

Week 9. Heat transfer.

Week 10. Heat transfer.

Week 11. Heat transfer.

Week 12 to 15. Review, Teamwork and exams.

Recommended reading

BASIC

- ÇENGEL, Yunus A .; CIMBALA, John M. Fluid Mechanics. Fundamentals and applications.
- McGraw-Hill / Inter-American, 2nd Ed. ÇENGEL, Yunus A .; GHAJAR, Afshin J. Heat and mass transfer. Mexico: McGrawHill / Interamericana, 2011.
- WHITE, Frank M. Fluid Mechanics. Madrid: McGraw-Hill, 2008.

COMPLEMENTARY

- HOLMAN, J.P. Heat transfer. Madrid: McGraw-Hill, 1998.
- ÇENGEL, Yunus A .; CIMBALA, John M. Fluid Mechanics. Fundamentals and Applications (second edition in SI units, McGraw-Hill, 2010.
- MATAIX, Claudio. Fluid Mechanics and Hydraulic Machines, 2nd Edition, Alfaomega, Oxford, 1982.
- STREETER, Victor L .; WYLIE, E. Benjamin; BEDFORD, Keith W. Fluid Mechanics, Santafé de Bogotá: McGraw-Hill, 2003.

Sites:

(to be advised during the course).