UAB
Universitat Autònoma de Barcelona

2020/2021

Transport Phenomena

Code: 102398
ECTS Credits: 6

Degree	Type	Year	Semester
2500897 Chemical Engineering	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Gloria González Anadón

Email: Gloria.Gonzalez@uab.cat

Teachers

David Gabriel Buguña

Use of Languages

Principal working language: catalan (cat)

Some groups entirely in English: No

Some groups entirely in Catalan: Yes

Some groups entirely in Spanish: No

Prerequisites

Have completed and passed the subjects of the degree in the areas of mathematics, physics, chemistry, as well as macroscopic balances and computer applications.

Objectives and Contextualisation

Stablish the mathematical model that describes a system from the equations of change of momentum, mass and energy.

Solve the system model by analytical or numerical means, and analyze and discuss the solution.

Competences

- Apply relevant knowledge of the basic sciences, such as mathematics, chemistry, physics and biology, and the principles of economics, biochemistry, statistics and material science, to comprehend, describe and resolve typical chemical engineering problems.
- Communication
- Develop personal work habits.
- Develop thinking habits.
- Understand and apply the basic principles on which chemical engineering is founded, and more precisely: balances of matter, energy and thermodynamic momentum, phase equilibrium and kinetic chemical equilibrium of the physical processes of matter, energy and momentum transfer, and kinetics of chemical reactions

Learning Outcomes

1. Apply relevant knowledge of mathematics, physics and chemistry to the preparation and resolution of transport models.
2. Apply the basic principles of chemical engineering to the preparation and resolution of transport models.
3. Communicate efficiently, orally and in writing, knowledge, results and skills, both professionally and to non-expert audiences.
4. Develop critical thinking and reasoning
5. Manage available time and resources. Work in an organised manner.
6. Practice the fundamental laws of thermodynamics in chemical process engineering problems.
7. Prevent and solve problems.

Content

1.- Introduction to transport phenomena: transport mechanisms of properties

2.- Mathematical expressions of the equations of change

3.- Mass balance: continuity equation

4.- Momentum balance

5.- Energy balance: total, mechanical and calorific

6.- Mass balance for a component.

7.- Transport at interfaces: transport coefficients

8.- Turbulence

Methodology

The subject is developed through theory classes, problems and seminars.

Theory classes: Classroom classes
Problems classes: Resolution of problems corresponding to the subject. Discussion with the students about the solution strategies and their execution.
Seminars: Seminars on the use of software for the resolution of problems with differential equations with partial derivatives (EDP)
During the course, homework is proposed that use analytical or numerical methods to solve the problem.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	30	1.2	1, 2, 4
Problems solving	15	0.6	1, 2, 5, 6, 7
seminars	5	0.2	1, 2, 3, 4, 5, 6, 7
Type: Supervised			
Homework	40	1.6	
exam	4	0.16	

Type: Autonomous			
Study, problems solving	56	2.24	1, 2, 4, 5, 6, 7

Assessment

Distribution of the grade: 30% works and 70% exams (partial written tests).

Continuous evaluation: minimum score of each part to pass the continuous assessment 3/10
1st partial test (PP1): 25% note.
2nd partial test (PP2): 45% note.
Work delivered (TR): 30% note.

Retaking Final test : There will be a final test for those students who have not passed the continuous assessment.

See more details the Catalan version of the guide

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Writing exams	70	0	0	1, 2, 3, 4, 5, 6, 7
homework	30	0	0	1, 2, 3, 4, 5, 6, 7

Bibliography

R.B. Bird, W.E. Steward, E.N. Lighfoot, "Transport Phenomena", revised 2nd ed. Wiley, 2007

Christie J. Geankoplis, "Transport Processes and Separation Process Principles", 4th ed. Prentice-Hall, 2003

Joel Plawsky, "Transport Phenomena Fundamentals", 3rd ed., CRC Press, 2014

Ismail Tosun, "Modeling in Transport Phenomena. A conceptual Approach", 2nd ed., Elsevier, 2007