

Academic Year/course: 2022/23

29921 - Mass Transfer

Syllabus Information

Academic Year: 2022/23

Subject: 29921 - Mass Transfer

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 330 - Complementos de formación Máster/Doctorado

435 - Bachelor's Degree in Chemical Engineering

ECTS: 6.0

Year: 435 - Bachelor's Degree in Chemical Engineering: 3

330 - Complementos de formación Máster/Doctorado: XX

Semester: First semester

Subject Type: 435 - Compulsory

330 - ENG/Complementos de Formación

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 process learning is based on:

- Theory Sessions
- Practice Sessions
- Autonomous work and study
- Individual tutorials

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other learning resources.

Further information regarding the course will be provided on the first day of class.

4.2. Learning tasks

The course includes 6 ECTS organized according to:

- **Theory Sessions (40 h):** Theoretical lectures with the resolution of exercises and questions in the classroom.
- **Practice Sessions (20 h):** Students solve problems by himself in the classroom under the supervision of the teacher.
- **Supervised activities in small groups (24 h):** Students form groups of two people. Every group solves two problems proposed by the teacher and one problem proposed by the group. The three works are evaluated with

feedback for the students.

- **Autonomous study (60 h).** The continuous study by the student is recommended.

Lecture notes and a series of problems will be available for the students. At the end of each topic, some of the problems will be solved in a class by the professor and the rest will be done individually.

4.3. Syllabus

The course will address the following topics:

Topic 1: Fundamentals of mass transfer. Diffusion and Convection

Section 1. Diffusion

Topic 2: Stationary State Diffusion

Topic 3: Non-stationary state Diffusion

Topic 4: Diffusion and Convection

Topic 5: Diffusion coefficients estimation

Section 2: Mass transfer across interfaces

Topic 6: Mass transfer models. Individual mass transfer coefficients.

Topic 7: Mass transfer across the fluid-fluid interface. Global mass transfer coefficients.

Section 3: Heterogeneous Chemical Reactions

Topic 8: Fluid-Fluid reactions

Topic 9: Non-catalytic Solid-Fluid reactions

4.4. Course planning and calendar

Theoretical and problems lectures are given following the schedule established by EINA before the beginning of the current academy course. Every teacher will inform the students about the individual tutorial schedule.

	Theoretical + Problems Lectures	Deliverables	Individual Study
Topic 1. Fundamentals	4 h + 1 h		2 h
Topic 2. Stationary state diffusion	8 h + 3 h	Delivarable 1 (4 h)	15 h
Topic 3. Non-stationary state diffusion	6 h + 2 h		10 h
Topic 4. Diffusion in concentrated solutions	4 h + 3 h		2 h
Topic 5. Diffusion Coefficients Estimation	1h + 1 h	Deliverable 2 (4 h)	8 h
Topic 6. Mass transfer models. Individual mass transfer coefficients	2 h + 2 h		5 h
Topic 7. Mass Transfer across fluid-fluid interface. Global mass transfer coefficients	5 h + 4 h		10 h

Topic 8. Fluid-Fluid Reactions	5 h + 2 h	Deliverable 3 (4 h)	10 h
Topic 9. Non-catalytic Solid-Fluid Reactions	5 h + 2 h		10 h
Total hours	40 h + 20 h	12 h	72 h

Duration of lessons is an estimation

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29921>