

## 29921 - Matter Transfer

### Información del Plan Docente

<b>Academic Year</b>	2016/17
<b>Academic center</b>	110 - Escuela de Ingeniería y Arquitectura
<b>Degree</b>	435 - Bachelor's Degree in Chemical Engineering
<b>ECTS</b>	6.0
<b>Course</b>	3
<b>Period</b>	Half-yearly
<b>Subject Type</b>	Compulsory
<b>Module</b>	---

### **1.Basic info**

#### **1.1.Recommendations to take this course**

#### **1.2.Activities and key dates for the course**

### **2.Initiation**

#### **2.1.Learning outcomes that define the subject**

#### **2.2.Introduction**

### **3.Context and competences**

#### **3.1.Goals**

#### **3.2.Context and meaning of the subject in the degree**

#### **3.3.Competences**

#### **3.4.Importance of learning outcomes**

### **4.Evaluation**

### **5.Activities and resources**

#### **5.1.General methodological presentation**

The process learning is based on:

- Participative lectures
- Classes of problems
- Supervised works in small student groups
- Individual tutorials

#### **5.2.Learning activities**

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- **Participative Lectures (40 h)** : Theoretical lectures with the resolution of exercises and questions in classroom.
- **Classes of problems (20 h)** : Students solve problems by himself in the classroom under the supervision of the teacher.
- **Supervised works in small student groups (12 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.
- **Individual study (72 h)** . Continuous study by the student is recommended.

### 5.3.Program

Lesson 1: Fundamentals of mass transfer. Diffusion and Convection

Section 1. Diffusion

Lesson 2: Stationary State Diffusion

Lesson 3: Non-stationary state Diffusion

Lesson 4: Diffusion coefficients estimation

Section 2: Diffusion and Convection

Lesson 5: Diffusion in concentrated solutions

Section 3: Mass transfer across interfaces

Lesson 6: Mass transfer models. Individual mass transfer coefficients

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

Section 4: Heterogeneous Chemical Reactions

Lesson 8: Fluid-Fluid reactions

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Lesson 9: Non-catalytic Solid-Fluid reactions

### 5.4.Planning and scheduling

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 individual tutorial schedule.

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

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Lesson 9. Non-catalytic Solid-Fluid Reactions			
<b>Total hours</b>	40 h + 20 h	12 h	72 h

Duration of lessons are estimation

### 5.5. Bibliography and recommended resources

- BB** Levenspiel, Octave. Ingeniería de las reacciones químicas / Octave Levenspiel ; [con la colaboración en la traducción de Juan A. Conesa ; revisión técnica, Enrique Arriola Guevara] . 3ª ed. México : Limusa Wiley, cop. 2004
- BB** Lobo Oehmichen, Ricardo. Principios de transferencia de masa / Ricardo Lobo Oehmichen México : Universidad autónoma metropolitana, unidad iztapalapa, 1997
- BB** Téllez Ariso, Carlos. Problemas de transferencia de materia / Carlos Téllez Ariso y Jesús Arauzo Pérez . - 1ª ed. Zaragoza : Prensas Universitarias de Zaragoza, 2008
- BC** Basmadjian, Diran. Mass transfer : principles and applications / Diran Basmadjian . - 2nd ed. Boca Raton [Florida] : CRC Press, cop. 2007
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reactores químicos / O. Levenspiel ;  
**BC** [versión española por J. Costa López y L.  
Puigjaner Corbella] . - [1ª ed.], 1ª reimp.  
Barcelona [etc.] : Reverté, 2002  
Treybal, Robert E.. Operaciones de  
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