

MEMBRANE SEPARATIONS



- 3 Credits

- Professors

Name: Josep Font

Room: 305

Office hours:

Tuesday and Thursday, 16:00-19:00

Name: Ricard Garcia

Room: 310

Office hours:

Tuesday and Thursday, 10:00-13:00

- Schedule

Monday, 11:00-13:00

Room 116

Membrane Separations

- Instructional objectives

- List and describe the fundamentals of the different membrane processes.
- Determine the membrane technology to use according to the characteristics of the species to be separated.
- Differentiate between industrial membrane processes and bench scale membrane processes.
- Establish the suitable range of operating conditions for every process and separation problem.
- Select the right material and membrane structure according to the properties of the involved compounds.
- Connect the type of module with the application and membrane material.
- Evaluate the flux of water and solute through a membrane, under fixed operating conditions, from transport equations or supplier information.
- Get membrane characteristics from experimental data.
- Foresee the influence of concentration polarisation, fouling or ageing on membrane performance.

Membrane Separations

- Course development

Lectures and problem session: 12 hours

Individual assignment: 18 hours

- Evaluation (date due)

- Problems and Exercises: 20%**
- Individual work: 50%**
- Oral presentation: 10%**
- Final Exam: 20%**

GOOD LUCK!

SYLLABUS

1. Introduction; classification; definitions

2. Membranes

2.1. Materials

2.2. Preparation

2.3. Modules

2.4. Characterisation

2.5. Transport Mechanisms

3. Membrane Processes

3.1. Microfiltration

3.2. Ultrafiltration

3.3. Nanofiltration

3.4. Reverse Osmosis

3.5. Dialysis

3.6. Electrodialysis

3.7. Pervaporation

3.8. Gas Permeation

3.9. Liquid Membranes

3.10. Others Techniques

3.11. Membrane Reactors

Membrane Separations

Bibliography

- **Mulder**, M. “Basic principles of membrane technology”, Kluwer Academic, Dordrecht (1996)
- **S.P. Nunes** and **K.-V. Peinemann** (eds.) “Membrane technology in the chemical industry”, Wiley-VCH, Weinheim (2001)
- **M. C. Porter** (ed.) “Handbook of industrial membrane technology”, Noyes Publications, Westwood (1990)
- **Bitter**, J. G. A. “Transport mechanisms in membrane separation processes”, Plenum Press cop., New York (1991)

(in Spanish)

- **American Water Works Association** “Tratamiento del agua por procesos de membrana. Principios, procesos y aplicaciones”, McGraw-Hill, Madrid (1998)
- **Fariñas Iglesias**, M. “Ósmosis inversa. Fundamentos, tecnología y aplicaciones”, McGraw-Hill, Madrid (1999)

