Mass Transfer

- 1. Course number and name: 020PDTCS2 Mass Transfer
- 2. Credits and contact hours: 4 ECTS credits, 2x1:15 contact hours
- 3. Name of instructor: Malek Msheik

4. Instructional Materials:

- Heat and mass transfer, Yunus A. CENGEL
- Fundamentals of heat and mass transfer, Frank P. INCROPERA
- Mass transfer operations, Robert E. TREYBAL

5. Specific course information

a. Catalog description:

Identification of mass transfer mechanisms-Formulation of rate equations; Estimate diffusion coefficients for gas and liquid phase binary systems; Determine the molar fluxes for steady-state diffusion of A through stagnant B and for equimolar counterdiffusion; List fluxes through porous solids for the two types of diffusion: molecular and Knudsen; Explain the concept of mass transfer coefficient for turbulent diffusion by analogy with molecular diffusion; Calculate interfacial mass transfer rates as a function of local mass; Define and use global mass transfer coefficients; Define and generate minimum and actual operating curves for steady-state co-current and countercurrent processes.

- b. Prerequisites: None
- c. Required/ Selected Elective/Open Elective: Required

6. Educational objectives for the course

- a. Specific outcomes of instruction:
 - Understand the different transport phenomena, their interconnection and the means of mass transfer.
- Being able to identify the type of mass transfer in some engineering situations, which allows to deduce diffusion coefficients and transfer rates.

b. PIs addressed by the course:

PI	1.1	1.3
Covered	Х	Х
Assessed	Х	Х

7. Brief list of topics to be covered

- Identification of mass transfer mechanisms
- Learn velocity equations
- Estimation of diffusion coefficients for binary systems in gas and liquid phases
- Determination of molar fluxes for steady-state diffusion of A through stagnant B and for equimolar counter-diffusion

- Listing fluxes through porous solids for both types of diffusion: molecular and Knudsen
- Explanation of the concept of mass transfer coefficient for turbulent diffusion by analogy with molecular diffusion
- Calculation of interfacial mass transfer rates based on local mass
- Definition and use of overall mass transfer coefficients
- Definition and generation of minimum and actual operating curves for co-current and counter-current processes in steady-state.