**Study Programme:** Chemical engineering

**Course Unit Title:** Separation processes

**Course Unit Code: DHMI05**

**Name of Lecturer(s):** Svetlana Popović, Associate Professor

**Type and Level of Studies:** Master Academic Degree

**Course Status (compulsory/elective):** Elective for Chemical-process Engineering and Eco-energetic Engineering

**Semester (winter/summer):** Winter

**The language of instruction:** English

**Mode of course unit delivery (face-to-face/distance learning):** Face-to-face

**Number of ECTS Allocated:** 7

**Prerequisites:** Unit operations

**Course Aims:**

The aim of the course is systematization and broadening of the knowledge related to the processes and devices used for purification and separation of the mixtures of various kinds. The aim of the course is to introduce advanced separation processes (novel technologies going beyond classical approaches based on thermodynamic equilibria), to discuss the selection of separation processes and to demonstrate new trends in separation technology.

**Learning Outcomes:**

In this course, students gain skills to categorize, compare, and differentiate between the various types of separation processes. Further, they will be capable to evaluate, choose or design separation process taking care about characteristics and energetic requirements of a separation process and the whole process site.

**Syllabus:**

*Theory*

This course covers the general principles of separation using equilibria and rate controlled processes. Separation of homogeneous and heterogeneous mixtures. Topics include staged cascades and applications in absorption, adsorption, and membrane contactors as an advanced process. Separation gas-solids in cyclones, scrubbers, electrostatic precipitators and bag filters. Membrane processes for solid-liquid or solution separation such as microfiltration, ultrafiltration, nanofiltration and reverse osmosis. Equilibria processes distillation versus membrane pervaporation and membrane distillation.

*Practice*

Solving problems related to the theory presented during lectures. Laboratory practicum related mainly to the membrane processes.

**Required Reading:**

1. Coulson, J.M., Richardson, J.F., Chemical Engineering (Vol. II), Particle Technology and Separation Processes (R.K. Sinnott), Pergamon Press, NY, 2002.
2. J. King, Separation Processes, McGraw Hill Chemical Engineering Series, 1980.
3. SEADER, J. D.: Separation Process Principles, New York: John Wiley and Sons, 2006

| **Weekly Contact Hours:** 6 | **Lectures:** 3 | **Practical work:** 3 |
|---|---|---|

**Teaching Methods:**

Lectures, solving problems and laboratory practicum students group work

**Knowledge Assessment (maximum of 100 points): 100**

| **Pre-exam obligations** | points | **Final exam** | points |
|---|---|---|---|
| Test I and Test II | 50 | oral exam | 30 |
| Seminar(s) | 20 | | |