

# Process Engineering (6021-M)

5 ECTS

**Lecturer:** I. Golobič, M. Zupančič

Lectures: 30h

| Tutorials: 2h

| Labs: 28h

| Project: 0h

| Lang.: 

## Objectives

The main objective of this course is to provide (i) theoretical background and practical understanding in the field of process engineering, (ii) develop the understanding of the role of process engineering and sustainable development and (iii) strengthen the use of engineering tools for problem solving and consolidation of engineering research approach to problem solving. Most important competences gained by the students include:

- improved capability of critical, analytical and synthetical thinking for problems solving in process engineering;
- improvements of higher cognitive skills, related to the creation of new knowledge in process engineering;
- qualification to use the attained knowledge to autonomously solve technical problems and to acquire new knowledge;
- ability to find sources and critically evaluate information in the field of process engineering;
- ability to perform development, research and organisational tasks in realisation of projects in process engineering.

## Programme

1. Thermal separation processes
2. Processes based on drying, absorption, adsorption and crystallization
3. Pressure-driven, membrane-based processes for liquid separation, water treatment, wastewater treatment, gas cleaning and gas separation
4. Environmental process technologies for carbon capture and storage
5. Research and development in sustainable process engineering including health, food and environmental pollution control
6. Bioprocess technologies and lyophilisation
7. Engineering and management of processes
8. Micro- and nanoscale process systems

## Prerequisites

In order to achieve the objectives successfully, the students must have:

- Basic knowledge in experimental work
- Basics of thermodynamics

## Learning outcomes

After attending this course, the student will be able to:

- Master demanding and complex tasks and methodological tools in process engineering.
- Plan and manage the working process on the basis of creative solving of problems that are linked to process engineering.
- Innovate and critically assess the problem solving cases in process engineering.

## Assessment

Theory understanding based on lectures and exercise problems (60%); Individual/group work at exercises (20%); Practical seminary work (20%)

## Literature

1. Seader, J.D., Henley, E.J., Roper, D.K., Separation Process Principles with Applications Using Process Simulators, 4th Edition, Wiley, 2015.
2. Green D.W., Southard, M. Z., Perry's Chemical Engineers' Handbook, 9th Edition, McGraw-Hill Education; 2018.
3. Basile, A., Comite, A., Current Trends and Future Developments on (Bio-) Membranes: Membrane Technology for Water and Wastewater Treatment - Advances and Emerging Processes. Elsevier, 2020.
4. Jawad, Z.A., Membrane Technology for CO<sub>2</sub> Sequestration. CRC Press; 2019.
5. Lieberman, N., Understanding Process Equipment for Operators and Engineers. Elsevier; 2019.
6. Mersmann, A., Kind, M., Stichlmair, J., Thermal Separation Technology: Principles, Methods, Process Design (VDI-Buch), Springer; 2011.
7. Ullmann's Process and Process Engineering, Vol. 1, 2, 3, Wiley – VCH Verlag, Weinheim, 2004-
8. Basmadjian D., MassTransfer and Separation Processes, 2nd Edition, CRC Press, 2007.