Course Unit Descriptor

Study Programme: Food Engineering; Biotechnology; Pharmaceutical Engineering; Chemical Engineering; Materials Engineering

Course Unit Title: Selected chapters of heat and diffusion operations

Course Unit Code: DZI18

Name of Lecturer(s): Prof. Branislava Nikolovski, PhD; Assoc.Prof. Marija Radojković, PhD

Type and Level of Studies: Doctoral Academic Studies

Course Status (compulsory/elective): Elective

Semester (winter/summer): Winter and Summer

Language of instruction: English

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

Number of ECTS Allocated: 10

Prerequisites: Unit Operations I, Unit Operations II

Course Aims:

The objective of the course is to provide the student with the latest scientific knowledge and academic skills in the field of the heat and mass transfer phenomenon, balance and calculation of multicomponent multistage devices in which heat transfer operations and / or mass transfer operations take place, as very common chemical engineering operations.

Learning Outcomes:

After completing and passing a course on this subject, students will be able to embark on more complex calculations and design of complex devices in which heat and mass transfer operations take place, both in batch and in continuous devices. On the other hand, by mastering the native material in this subject, students will be more willing to use commercial application software which serve both to balance the equilibrium in multi-component gas-liquid systems, as well as to simulate real heat exchange and separation operations of this type in multipurpose devices.

Syllabus:

Theory

Equilibrium relations between the phases of the steam-liquid, liquid-liquid, gas-liquid, fluid-solid, single-contact contact in the steam-liquid, gas-liquid, liquid-liquid, fluid-tight systems. One-component and multicomponent equilibrium contacts on degrees. Determination of mass transfer coefficients in charge columns. Drying technologies for different products. Heat exchangers. Thermal integration.

Practice

Review of contemporary scientific and professional journals and publications, selection and use of valid information on different heat and diffusion operations. Practical application of theoretically acquired knowledge.

Required Reading:

C.M. Van 't Land: Drying in the process industry, John Wiley & Sons, Inc., Hoboken, New Jersey, 2012.
Cao, E.: Heat transfer in Process Engineering, , McGraw-Hill Education, 2010.
Geankoplis, Ch.: Transport processes and Unit Operations, Prentice Hall, New York, 1993.
Gorak, A. Sorensen E.: Distillation: Fundamentals and principles, Elsevier inc. 2014.
Luyben, W.L.: Distillation design and control using AspenTM Simulation, John Wiley & Sons, 2013.
McCabe. W., Smith., J., Harriott, P.: Unit Operations Of Chemical Engineering, 7th Ed, McCabe And Smith, McGraw Hill international editions, Chemical Engineering series, 2005.
Treybal, R. E.: Mass-Transfer-Operations, McGraw Hill, Tokyo, 1981.
Seader, J.D., Henley, E.J., Roper, D.K.: Separation process principles: chemical and biochemical Operations, John Wiley & Sons, 2011.

Weekly Contact Hours: 6	**Lectures:** 4	**Practical work:** 2

Teaching Methods:

Lectures and students group work

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points

Active class participation	10	oral exam	50
Seminar(s)	40		