Course Package

Membrane Technology - 1A + 1B

Name module	Membrane Technology – 1A + 1B
Educational programme	MSc Chemical Engineering
Period	First semester (block 1A + 1B)
Study load	30 ECTS
Coordinator	A.S. Elbersen - Grote

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Required preliminary knowledge: Equilibria, Physical Chemistry, Fluid Dynamics, Heat and Mass Transfer, Separation Technologies, Matlab.

201800083 - Advanced Colloids & Interfaces
Description of colloids, surfaces and interfaces. All kinds of interfaces between different phases are treated. Thermodynamic descriptions of these interfaces are deduced. Several techniques for characterizing interfaces are discussed. During contact hours, the contents of will be presented and discussed, and exercises will be made and discussed. For each topic, a case assignment will be offered. Topics include: Lifshitz-van der Waals Interactions, Polar/Acid-Base Interactions, Wetting and Contact Angles, Electrostatics, Electrokinetic Phenomena, Electrostatic and Polymeric Stabilization of Colloids, Colloidal Phenomena (Marangoni-Effect, Ouzo effect, etc.)

Electrochemistry

The modules are tentative and subject to change. Please check the website regularly.

No course description available yet.

Multi-component Mass Transport in Water Treatment
This course aims at understanding the mass transport in multi-component mixtures, based on a simplified version of the theory of Maxwell and Stefan. The main aim is for students to be able to understand the basic principles of diffusion in mixtures containing various different species, driven by a combination of different driving forces, and to apply this understanding in specific relevant chemical technology applications. Within the course a lot of attention is paid to contemplation and discussion, in order to consolidate the new knowledge and insights. Within this context, students are requested to give a lecture on one of the chapters in the book and to answer a relevant case study, in which the multi-component characteristics of transport are evident. The case study involves the use, and stepwise extension, of an existing Matlab code, allowing the students to gradually and relatively independently simulate and study an eventually complex problem.

201200117 - **Membranes for gas separations**
Membranes for Gas Separation is a course on membranes with a strong focus on membrane materials and molecular interactions. In most membrane based Gas Separations, the gas molecules will need to absorb in the membrane material, to be able to diffuse to the other side. In the absorption process affinity between membrane material and the gas can play an essential role. For other membranes, membrane pore sizes are so small that we achieve Molecular Sieving. In this course we teach how membranes are prepared and optimized for gas separation applications, how gas is transported through a variety of membranes, and how membrane materials and membrane processes can be strongly linked. This is done by a combination of lecturing and practical work.

201200118 - **Membrane process plant design**
The design and evaluation of an industrial scale (membrane) process plant based on a limited amount of information. The method taught for the analysis and design of chemical processes uses methods for ‘conceptual design’ and ‘process systems design’ which have been developed in the last twenty years. The lectures use fundamentals of this approach and translate them into applications in this case with a special focus on membrane processes.

Capita Selecta
Selected Topics in Chemical Engineering concern a specific assignment to investigate, explore or research a specific topic in this field. The assignment has to be concluded by a written report. The topic will be selected and tutored by a scientific staff member of a relevant research group. The duration of the assignment is 140 hours.