



Membrane Separation Fundamentals and Applications CM4990/CM5900 Spring Semester, 2018

About the Course

Membrane technology provides the process industries with novel methods of separation for purification, effluent control, water reuse and recovery of valuable components in applications ranging from chemical/petrochemical to environmental and biotechnology. Membrane solutions often lead to process intensification and are building blocks to address the grand societal challenges of energy, water, food, health and climate change, i.e. sustainability. This course will enable students to understand and solve membrane-based separation problems by acquiring in-depth knowledge in membrane processes/separation mechanisms, transport models, membrane permeability computations, membrane types, properties and modules, membrane reactors, system design, industrial applications and economics.

Who should enroll?

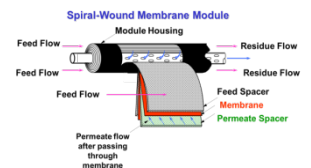
Seniors and Graduate Students from the following Engineering Majors: Chemical, Environmental, Biomedical, Mechanical and Materials Science & Engineering.

You'll learn:

- About membranes, materials, modules/housings and processes: theory, system design, applications and economics
- How to make membranes
- How do non-porous membranes work vs. porous membranes
- Why a big molecule may travel faster through a membrane than a smaller one and why a particle smaller than a membrane pore may be rejected
- About the advantages of membranes over conventional separation processes, their challenges and research needs
- How to calculate membrane process performance and analyze membrane separation characteristics
- How membranes are used for desalination of sea or brackish water to supply potable water to communities
- How millions of patients benefited from membranes used as artificial kidneys, blood oxygenators and controlled drug delivery devices
- How to select membrane processes for solving separation problems in the following applications:
 - Water and Wastewater



- Environmental and Energy
- Biotechnology/Pharmaceuticals and Biomedical Engineering
- Food, Dairy & Beverages
- Chemical/Petrochemical
- Gas Separations
- Membrane Contactors and Reactors



About the Instructor:

Dr. Andre R. Da Costa, Professor and Herbert H. Dow Chair in Chemical Process Safety

Dr. Da Costa is a scholar with multi-functional, multi-industry and multi-geography executive experience in technology development, engineering and process safety; named co-inventor on 14 US patents.

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