CHE 520 Chemical Process Modelling and Simulation, Winter 2023
Chemical Engineering, University of Waterloo

Instructors:
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Office Hours: T 11:00-12:00[1]

Teaching Assistant:

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Course Description: An integrated view of process flowsheet synthesis, analysis and optimization, emphasizing the use of computer aids to perform steady-state mass and energy balancing on chemical processes. Application of relevant chemical engineering concepts, including mass and energy balances, thermodynamics of mixtures and unit operation models, to process simulation. Process simulation modes, numerical solution of relevant non-linear equation systems, recycle partitioning, and tearing. Applications including heat exchanger networks, multistage separation processes, and chemical reactor networks. Practical skills will be developed through the application of available process simulation software.

Course References:

Required Textbook - Biegler, Lorenz T., Ignacio E. Grossmann, and Arthur W. Westerberg. "Systematic methods for chemical process design." (1997).

Course website - `http://learn.uwaterloo.ca`, will be used as the main means of communication outside of lectures and tutorials.

Course Schedule:

Lectures	T 13:00-14:20	E6 2024
Tutorial/Practical	F 12:30-14:20	CPH 1346

Evaluation: The course grade will be based on 2 homework assignments (40% total) and 3 lab assignments (60% total).

Course Responsibilities:

Academic Integrity, Grievance, Discipline, Appeals and Note for Students with Disabilities: see

[1] Also by appointment.

http://www.uwaterloo.ca/accountability/documents/courseoutlinestmts.pdf. The text for this web site is listed below:

- **Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check http://www.uwaterloo.ca/academicintegrity/ for more information.]

- **Online Academic Integrity:** All students are expected to work individually and submit their own original work. Under Policy 71, the instructor may have follow-up conversations with individual students to ensure that the work submitted was completed on their own. Any follow up will be conducted remotely, as the University of Waterloo has suspended all in-person meetings until further notice.

- **Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

- **Discipline:** A student is expected to know what constitutes academic integrity [check http://www.uwaterloo.ca/academicintegrity/] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm. For typical penalties check Guidelines for the Assessment of Penalties, http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

- **Appeals:** A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.

- **Note for Students with Disabilities:** The Office for persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

Tentative Lecture Schedule:

Week (starting)	*Lecture Topic*	*Chapter*	*Additional Notes*
1	Course Introduction		
	Linear Process Models: Introduction	1, 2	
2	Linear Process Models: Unit Models	3.1-2	
3	Linear Process Models: Mass Balances	3.3	
4	Linear Process Models: T/P Levels	3.4-6	
	Linear Process Models: Energy Balances		
5	Nonlinear Process Models: Thermodynamics	7.1-2	
6	Nonlinear Process Models: Flash Calculations	7.3	
7	Nonlinear Process Models: Distillation Calculations	7.4	
8	Nonlinear Process Models: Other Unit Operations	7.5-7.6	
9	Nonlinear Process Models: Other Unit Operations	7.5-7.6	
10	Process Simulation Methods	8.1-2	
11	Process Simulation Methods	8.3-4	
12	Process Simulation Methods	8.5-6	