

UEC Charge 2007/08

[Radke (chair), Wallman, Bell]

1. The UEC has some challenges and opportunities this year. First, the introduction of a course in computation and chemical engineering is to be launched with Carlo Carrero as the lecturer.
2. Second, I would like the UEC to look broadly at the requirements for the B.S. degree and consider using a less-prescribed scheme for fulfilling our graduation requirements.
3. Third, the UEC should consider the disassembly of the current 162 lab, and moving whatever experiments/processes to be preserved to either the 154 space or the 157 space.
4. Participate in upcoming ABET review and provide support as requested by chair.
5. Conduct usual ABET reporting reviews (Honor's Tea, AIChE luncheon etc).

J Reimer

September 25, 2007

Charge 1: Exp. Computation Course (195C)

- 195C was offered in Sp 08 by Professor Carrero to about 15 students.
- Course utilized Finlayson text supplemented by instructor notes. Programming involved MATLAB. Coverage was extensive through PDE's and stability analyses.
- Course was well received. Some students commented that maths level was too advanced.
- As currently designed, adoption of computation course into curriculum is not feasible because of lack of resources.
- ChE 195C will not be offered in 2008/09. Students are to take Eng. 7 in spring of their sophomore year.

Charge 2: Streamline Curriculum (120 su) (especially for transfer students)

1. Adopt Eng 7 in the spring of sophomore year.
2. Move ChE 141 to spring of sophomore year.
3. Change pre-requisites for ChE 142 to ChE 141 and ChE 150B and rearrange course sequence appropriately.
4. Institute Eng 190 as a replacement for ChE 185.
5. Add ChE 170A/B to curriculum and to bio-option.
6. Update college announcement and include sample curriculum for transfer students

Charge 2: Streamline Curriculum (120 su) (especially for transfer students)

Representative Undergraduate Chemical Engineering Program								
Freshman		Sophomore		Junior		Senior		
Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	
4A 4B Chemistry		112A Organic		Engineering 7	Biology 1A	Chemistry 120A or Physics 137A	Science Elective	Engineering Elective
1A 1B Mathematics		53 54		EECS 100	Engineering 45	Chemical Engineering Elective	Engineering Elective	
Reading and Composition	7A 7B Physics		141 Thermo- dynamics	Engineering 190	142 Kinetics	154 Lab 160 Design Chemical Engineering		
Breadth Electives		140 Process Analysis		150A Transport Processes	150B	157 Transport Processes Lab	162 Process Control	Breadth Elective
Chemical Engineering C96						Breadth Elective		

Charge 2: Streamline Curriculum (120 su) (especially for transfer students)

Representative Chemical Engineering Program for Transfer Students				
Junior		Senior		
Fall	Spring	Fall	Spring	Fall
Chemistry 112A	Biology 1A	Chemistry 120A or Physics 137A	Science Elective	Engineering Elective
Engineering 45	Engineering 190	EECS 100	Chemical Engineering Elective	Engineering Elective
140 Process Analysis	141 Thermodynamics	157 Transport Processes Lab	142 Kinetics	154 Lab
Breadth Elective	<p align="center">Chemical Engineering</p> 150A Transport Processes 150B 162 Process Control 160 Design			
		Breadth Elective		

Charge 3: Revamp ChE 162

Eliminate hardware experiments. TA-run computer simulation/control laboratory is to substitute.
Professor Balsara is designing and implementing the new course content in Fall 08.

Charge 4: ABET

- Thanks to the Herculean effort of Chairs Bell and Reimer, the Fall 2007 ABET review went well. However, we eventually did need to respond to a program deficiency.
- To meet this deficiency, UEC developed quantitative program-outcome templates for each course.
- A ½ staff person was hired to evaluate collected ABET information and to help improve the teaching enterprise. Available program-outcomes from Spring 08 were sent to ABET in July. To date, no feedback has been forthcoming from ABET.
- How to evaluate, collate, update, and disseminate ABET-collected data remains a challenge.
- Faculty are reminded that at the beginning of each semester they must set and implement the specific measure gauges for each course with the TAs.

Charge 4: ABET Course Outcomes

ChE 140 Students Evaluation of Course Outcome

Indicate the number (1 to 5) that best describes your ability to do the following, where 1 is for strong ability and 5 is for weak (or no) ability

Comprehend complex flow sheets and the roles of the equipment and unit operations.

Perform steady species/element mass balances on chemical processes including multiple reactions, recycle and purge to establish overall conversion, yield, and selectivity.

Solve simple unsteady mass and energy balances including numerical solution of coupled, nonlinear transient ordinary differential equations.

Solve simple analytic first order differential equations by integrating factors and numerical solution multiple nonlinear algebraic equations by Newton iteration.

Establish the thermodynamic properties of water from the steam tables.

Calculate separation efficiency for equilibrium multistage separation processes

Perform enthalpy balances on reacting chemical processes.

Establish the design compromise for setting the temperature in a BSTR, CSTR or a PRF.

Charge 4: ABET Program Outcomes

Program Outcome	Evaluation Data Source	Scoring I = fail; II = pass; III = distinction		
		No. of students with score of:		
	I	II	III	
1) Comprehend complex flow sheets and the roles of equipment and unit operations.				
2) Perform steady species/element mass balances on chemical processes including multiple reactions, recycle and purge to establish overall conversion, yield, and selectivity.				
3) Solve simple unsteady mass and energy balances including numerical solution of coupled, nonlinear transient ordinary differential equations.				
4) Solve simple analytic first order differential equations by integrating factors and numerical solution multiple nonlinear algebraic equations by Newton iteration.				
5) Establish the thermodynamic properties of water from the steam tables.				
6) Calculate separation efficiency for equilibrium multistage separation processes.				
7) Perform enthalpy balances on reacting chemical processes.				
8) Understand the design compromise for setting the reactor temperature in a BSTR, a CSTR or a PFR.				

Charge 5: Student Feedback

AIChE Student Chapter (F); Honor's Tea (Sp); Senior Survey; Advising

1. Not a lot new is learned from the students each year.
2. ChE 96 is universally disliked, year after year.
3. Coop concern did not arise this year. Apparently jobs are available
4. Preparation in computation remains inadequate. Students avoid programming exercises. They would appreciate more training by MatLab integration and instruction in later courses. Further, they feel that their math education is poor (e.g., no DE in Math 54).
5. Keep the ChE 154/157/162 labs! Here is where engineering becomes real to students.
6. Students strongly wish more application and integration of ethics, social justice, etc. They also chafe at cut-course grades.

Comment: Student Enrollment

Table 1. Freshman Fall 08 Admissions in the CoC

Major	Application	Admits	%
Chemistry	583	143	24.5
ChemBio	991	157	15.8
ChemEngr	502	176	35.1

Chemical engineering basically has little input to admissions numbers