



UNITED STATES MILITARY ACADEMY
WEST POINT®

Chemical Engineering

Course and Program AAR

Dr. Enoch Nagelli and LTC Sam Cowart

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- ☐ **CH362**
- ☐ **CH364**
- ☐ **CH367**
- ☐ **CH400**
- ☐ **CH402**
- ☐ **CH300**
- ☐ **CH450**
- ☐ **Chemical Engineering Program AAR
Comments**



- ☐ **Course average: 85.1 %; TEE average 83.4%**

- ☐ **Maintain major graded event structure**
 - ☐ **3x WPR**
 - ☐ **4x ICPS (ICPS 3 has VLE)**
 - ☐ **Capstone Presentation**
 - ☐ **Research Paper**
 - ☐ **VLE Lab**

- ☐ **Maintain new problem sets every semester**
- ☐ **Maintain ChemCAD focus on labs**

- ☐ **Massage lesson sequence to prevent gaps between concept and problem-solving classes**
- ☐ **Fewer, but more robust problem sets with problems of varying difficulty**
- ☐ **Dimensional analysis and general chemistry throughout**



- ❑ **Course average: 86.8%; TEE average 83.4%**
- ❑ **Maintain working example problems for each lesson (common discussion point with cadets)**
- ❑ **Maintain lab scope – intro and build proficiency with ChemCAD; comparison to analytical solutions**
- ❑ **Capstone design project improved this AY; focus on technical design report**
- ❑ **Dedicated capstone working periods; graded azimuth check, IPR**
- ❑ **Maintain problem set frequency & time commitment**

- ❑ **Develop capstone to include control design; collaborate with CH367 for super-capstone project**
- ❑ **Add 1 or 2 FEE-type questions to WPRs (basic conceptual questions)**
- ❑ **Develop bench of additional PS problems, with increased reliance on numerical solvers and multiple concepts.**
- ❑ **Expand non-isothermal design for flow reactors by one lesson (CSTRs)**
- ❑ **Numerical solver skill still lacking; seems to be declining over past several years**



Sustain:

- ✓ **Lesson 1: Introduce a series of examples to clearly articulate the “so what”. This was done in the sub-basement and had a great effect. Model the level in the absorption column on the spot.**
- ✓ **Continue use of SSI for describing/demonstrating dynamic behavior, stability, controller design, and tuning. The Cadets get a lot out of SSI and it allows you to start relatively simple and scale up.**

Improve:

- ✓ **Potentially re-write the TEE. (2nd year for this, will do it this year)**
- ✓ **To facilitate a deeper understanding and engineering intuition, relate controllers and modeling to electrical circuits learned in EE301.**
- ✓ **Introduce python to model controllers and control loops.**
- ✓ **Combine the capstone with CH364.**



Sustain:

- ❑ 15/19 Cadets Passed the FEE Overall. **78.9% Pass Rate (1st time = 73.6%)**
 - ❑ **1/4 passed on 2nd attempt (Behr passed; Goulet, Weaver, Milanese = No GO)**
- ❑ Continue 2 lessons per topic covered on the FE (1st lesson to go over practice problems and use FE Ref Manual and 2nd lesson for in class quiz)
- ❑ Guest lecture from math department was well received from AAR from cadets
- ❑ Continue “after lesson 21” emphasis on FE Prep for Failures
 - ❑ Created assignments all the way to test date and had cadets work through/submit for practice (**Only Behr finished all requirements**)

Improve

- ❑ Cadets all take FE in early-mid MAR so re-test during the semester is an option
- ❑ Add additional SSI-Simulator Exercises & P&ID Controls Problems
- ❑ Cadets want more in class time to review quizzes and graded events
- ❑ For Failures, make FE test prep the focus – after lesson 21, make cadets take a simulated shortened FE prep Test from PPI2Pass
- ❑ Use Professional Development Lessons for voluntary exercises for cadets in the class – have ChemEs guest lecture on chemE in grad school and Army career.

Sustain:

Capstone project - Use AIChE design problem; recent problems are good fit with curriculum. If possible, use multiple problems for cadet "choice."

Knowledge of control schemes and ability to draw P&IDs was very good (93% course average in 1/0)

Improve:

Communication – 1/4 excellent reports, 3/4 good/fair, 1/4 fair/poor. Always room for improvement!

Control – Some critical control points missing (relief devices, level controllers in columns and vessels).

Safety and environmental was lower this year (79% in 1/0).

Recommend pinch zone analysis for heat exchangers. Same as last AY. Possible Lab 5. Did not attempt this year.

Research:

Research requirement this year dictated by AIChE:

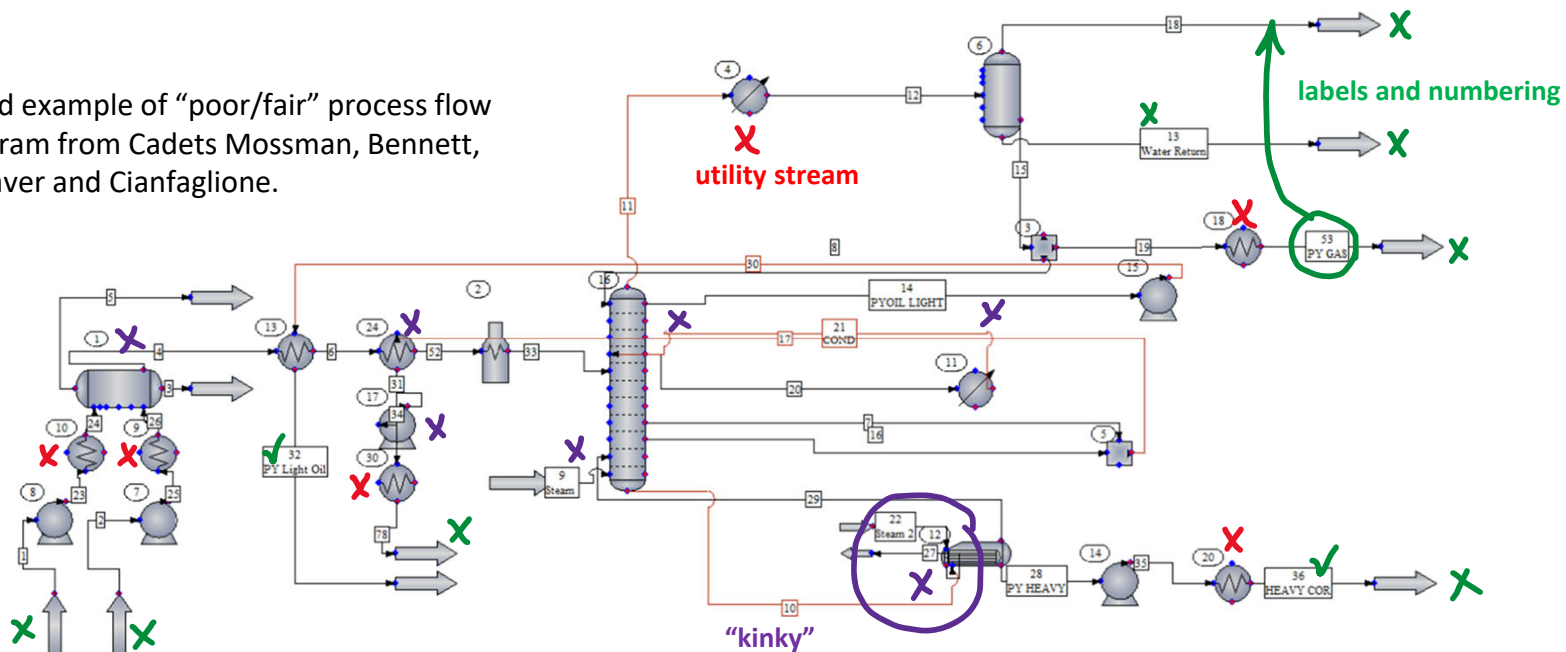
- (1) Removal of chlorides and constraints on on water content.
- (2) General approaches to fractionation (of oil).
- (3) Context and social issues (Indonesia recycling; hydrogen/methanation as a fuel).

Research on removal of chlorides (groups 2,3, 4) was generally poor and these groups did not incorporate this into design.

Knowledge of and research on water content (groups 2,3, 4) and fractionation COAs (groups 2,3, 4) was generally good. \

Research on context and social issues (groups 1-5) was good, but some groups did not fully address this.

Good example of "poor/fair" process flow diagram from Cadets Mossman, Bennett, Weaver and Cianfaglione.



cadets did not discuss
 b.p. analysis of feed



- ❑ **Course average: 89.6%; TEE average 90.9%**

Sustain:

- ✓ **Capstone projects were repeatedly pointed out as the student's favorite graded activity. They expressed great interest in the biomedical industry and medical applications.**
- ✓ **Field trips reviews were unanimously good. This should be an annual event. Recommend reservist support for coordinating company visits.**

Improve:

- ✓ **Technical writing skills, as illustrated by narrative responses on WPRs, TEEs, and Capstone final reports, need significant improvement.**
- ✓ **The ability to discern credible scientific sources in the literature.**
- ✓ **The ability to critically read the scientific literature**
- ✓ **Textbook selection is difficult in this field because of the rapidly changing nature of the biomedical and biotechnology industries.**



- ❑ **Course average: 90.3%; No TEE is given.**

Sustain:

- ✓ **Lesson 1: Introduce a series of Mathematica examples to lay out the modeling expectation for CH450. A “tutorial” for many non-ChemE cadets who weren’t familiar with the computer simulations and coding.**
- ✓ **Continue use of in-class activities for describing/demonstrating how to set up governing equations and get the quantitative results.**
- ✓ **In-class quiz at the end of each block enables instructor to assess the cadets’ understandings on the learning objectives.**

Improve:

- ✓ **Potentially re-write the problem sets. In-class “mini” problem sets can be implemented as a “check” to reinforce cadets’ understanding and skills to navigate through the problem sets.**
- ✓ **Potentially switch out the last block with bioinstrumentation.**
- ✓ **Find more ways to connect CH300 and CH350 contents into the course.**



1. Course Directors Handbook for all administrative guidance and SOP

- ❑ EXSUM on Dept Sharepoint to include **Course AAR Slides**
- ❑ **Course Assessment Due 30 days** after semester completion

2. CH459 Summer **FDW** (Dr. Nagelli & Dr. Yuk)

- ❑ Round Robin 1/2 (End of 17June-26July; POC: Mr. Mathew on dates)
- ❑ Updating course - incorporate Batch/CSTR to CH364; focus on Big 3 and CTOW/HFC
- ❑ Focus on depth fundamentals!

NOTE: CH101 FDW 01JUL-23JUL: MAJ Frey (LTC Cowart), CPT Rogers (Dr. Yuk), and CPT Golonski

3. **Bioengineering**

- ❑ Curriculum Committee for Minor - Fall Submission; Minor Memo feedback received.

NOTE: Dr. Albena Ivanisevic (PM in Bionic Elec at DEVCOM-ARL) teaching CH350 and CH300 in AY25

4. Conferences

- ❑ **AICHE Fall 2024** in San Diego, CA – Undergrad poster competition for cadets to compete (1 poster per cadet; S: SEP 2024) (**POC: CPT Lowell for OIC**)
 - ❑ Faculty Oral Talk Abstracts Submitted: LTC Cowart, Dr. Yuk, CPT Lowell, and Dr. Nagelli

5. ChemE Collaborative Manuscripts

- ❑ Prof. Biaglow, COL James, Dr. Yuk, LTC Cowart, Dr. Nagelli (CHEMCAD & MMA)
- ❑ Dr. Yuk, LTC Cowart, Dr. Nagelli (Sarin Gas Degradation)
- ❑ MAJ Bowers, MAJ Yi, Maj Chin, Dr. Yuk, and Dr. Nagelli (Metal Cluster/Metal Hydride)

6. **BH331 Computers Lab Update**

- ❑ Mr. Rasheed will update BH331 computers with 24" monitor with 19" (dual screen)
- ❑ New computers scheduled to arrive in JUL. Current computers move to LS program lab.



7. BH136 Maintenance

- ☐ Lab bench spaces assigned to incoming faculty
- ☐ Outgoing faculty – clear bench
- ☐ Lab bench nametags (Walt)

8. CH101 FDW

- ☐ MAJ Frey (Advisor: LTC Cowart)
- ☐ CPT Golonski (Advisor: Dr. Nagelli)
- ☐ CPT Rogers (Advisor: Dr. Yuk)
- ☐ MAJ Hunter running FDW
- ☐ Dr. Biaglow attend/advise as available

9. Program “events”

- ☐ Department tailgate (OIC: CPT Tobergte, AOICs: CPTs Rogers, Golonski)
- ☐ Winter formal (OIC: CPT Lowell, AOICs: CPTs Tobergte, Rogers, Golonski)