8 May 2018

MINUTES OF USMA CHEMICAL ENGINEERING ADVISORY BOARD MEETING

The chemical engineering advisory board met on 4 May 2018 to assess the chemical engineering academic program for USMA undergraduates and to provide guidance to the ongoing efforts for improving the program. The composition of the advisory board is listed in Appendix 1. The agenda for the day is listed below.

Time	Event	Location
0730-0745	Shuttle at 5-Star Parking Lot	5-Star
0745-0800	Arrival – Light Breakfast	CLS Conference room
0800-0830	Session 1: Introductory remarks and ABET orientation	CLS Conference room
0830-0920	Session 2: Program assessment Student Outcomes Assessment Discussion of Program Objectives	CLS Conference room
0920-0930	Board Surveys	Survey Parts 1 and 2
0930-0950	Session 3: CH367 Update	CLS Conference Room
1010-1050	Career Panel	CLS Conference Room
1100-1140	Cadet Discussions	CLS Conference Room
1200-1245	Lunch and Firstie Mock Interview Round Robin	West Point Club
1300-1330	Board backbrief on cadet interactions	West Point Club
1340-1430	Session 4: Future Challenges	CLS Conference Room
1430-1455	Admin and Unit Ops Lab tour	Bartlett Hall (Optional)
1500-1530	Wrap-up	CLS Conference Room

Session 1: Introduction and ABET Orientation.

The chemical engineering program is about 15 months away from beginning our next ABET record year. The next record year is the Academic Year (AY) 2020 (fall 2019-spring 2020). The next ABET visit will be in the fall of 2020 (AY2021). This timeline, in conjunction with the curriculum change timelines of USMA, implies that any curricular changes that would be in effect for the next ABET visit/record year, must already have been approved.

Session 2: Program Assessment.

The board discussed briefly the change to the USMA vision (to the succinct "West Point is the preeminent leader development institution in the world") and whether this change impacted the program's vision or mission. There was consensus that there was no material impact on the program.

The board reviewed the Student Outcomes and Program Objectives for Academic Year 2017 (Fall 2016-Spring 2017). The board reviewed various metrics to assess whether the chemical engineering program is satisfying the outcomes and objectives. USMA chemical engineering graduates are expected to possess the following capabilities (student outcomes) as a result of their academic program.

1. Apply knowledge of mathematics, science, and engineering.
2. Design and conduct experiments, as well as analyze and interpret data.
3. Design a system, component, or process to meet desired needs within economic, environmental, social, political, ethical, health and safety, manufacturing, and sustainability constraints.
4. Function on multidisciplinary teams.
5. Identify, formulate, and solve engineering problems.
6. Understand professional and ethical responsibilities.
7. Communicate effectively.
8. Understand the impact of engineering solutions in a global economic, environmental, and societal context.
9. Recognize the need and develop the skills required for life-long learning.
10. Demonstrate knowledge of contemporary issues.
11. Demonstrate an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

The Chemical Engineering course curriculum at USMA is focused on the following specific areas of math and science. Appendix 2 lists required Chemical Engineering courses. The board was notified that, in addition to CH367 that will begin in AY 19, the math department had changed the required Engineering Mathematics with Applications (MA366) course. As a result, the Chemical engineering program would now be requiring MA364 (Engineering Mathematics) or MA365 (Advanced Math for Engineers and Scientists) for advanced math exposure, beginning with the class of 2020.

a. General, organic, and physical chemistry.
b. Material and energy balances on chemical processes, including safety and environmental factors.
c. Thermodynamics of physical and chemical equilibria.
d. Heat, mass, and momentum transfer.
e. Chemical reaction engineering.
f. Continuous and staged separation operations.
g. Process dynamics and control.
h. Modern experimental and computing techniques.
i. Process design.

Current possible elective concentrations include materials engineering, nuclear engineering, decision analysis, advanced control systems, energy conversion systems, power systems, alternative energy engineering, and industrial engineering. Proposed for the future are concentrations in bioengineering and environmental engineering.

ADVISORY BOARD EVALUATION METRICS

The advisory board reviewed an extensive packet of data from AY2017 in order to provide feedback and consider possible modifications to various aspects of the program. The five main sources of data used by the advisory board to evaluate the extent to which the chemical engineering program satisfies the mission and vision are:

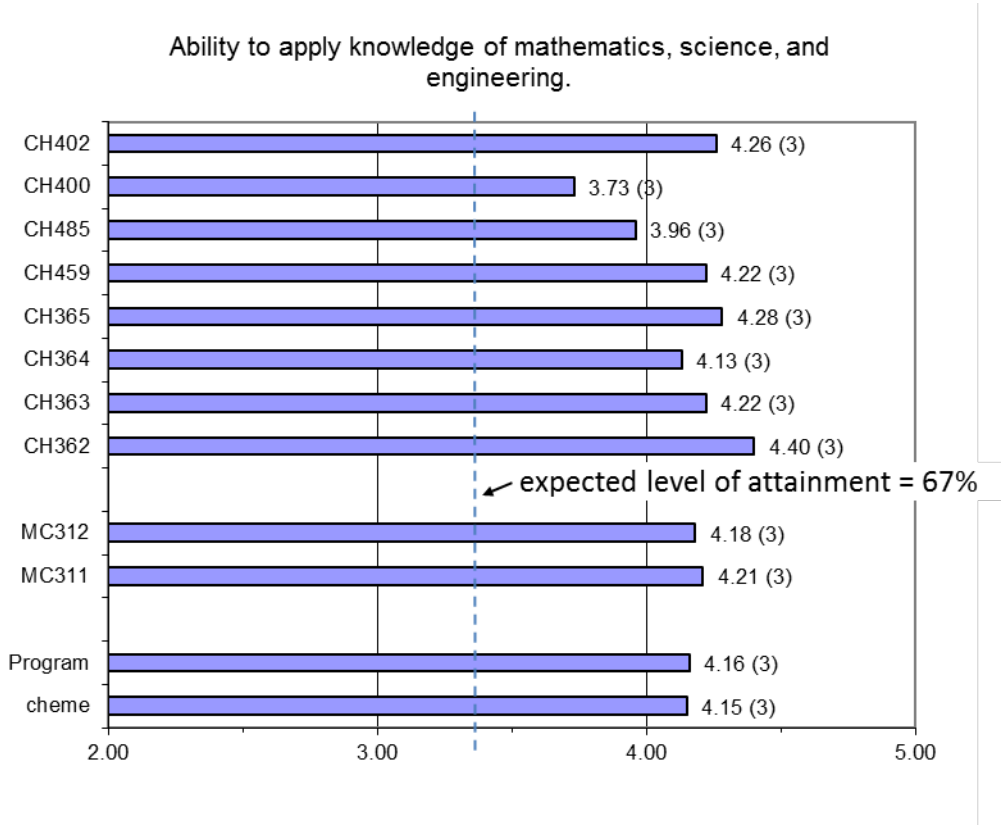
- Cadet course grade performance in chemical engineering classes at the Academy

- Cadet semester end-of-course evaluations
- Cadet assessment of ABET outcomes
- Cadet performance on the 'Fundamental of Engineering (FE)' exam
- Numerical evaluations supplied by the Advisory Board to the program

Other data sources that influence the evaluation of the program include survey results by cadet program exit survey at graduation. Beside the survey results of the advisory board, surveys are also conducted of the program faculty.
Sample data are shown and summarized here.

Chemical Engineering Course Grade Performance

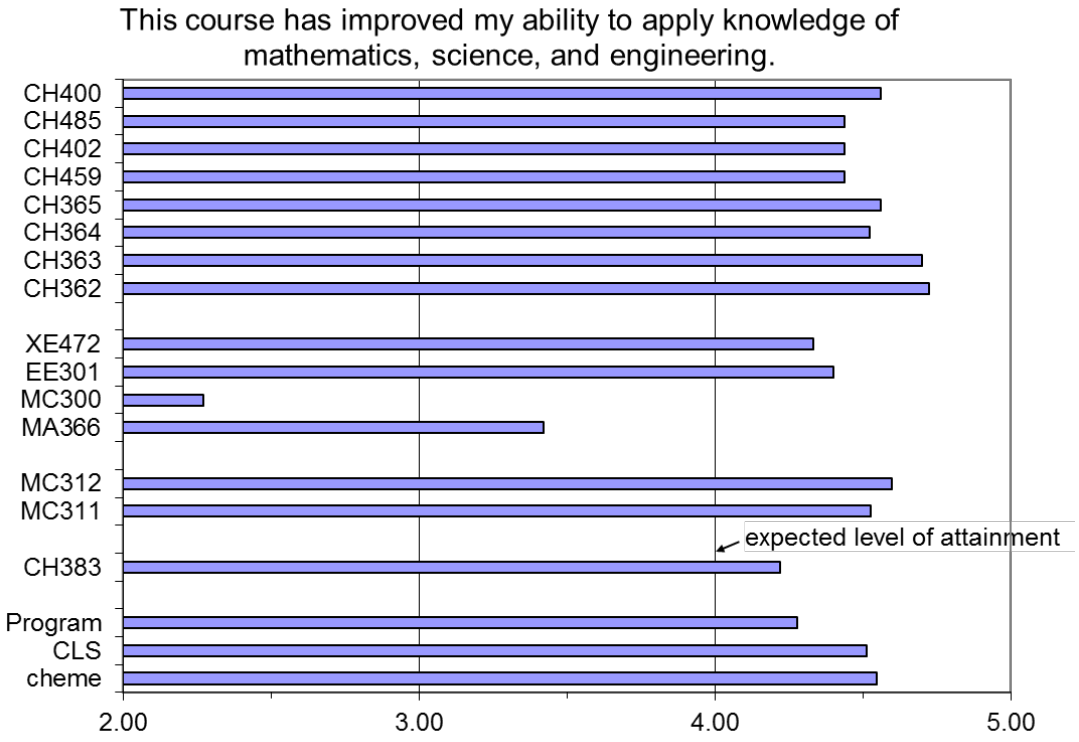
Below are the aggregate course grades achieved by cadets in the Chemical Engineering program for the Class of 2017. Each of the courses resulted in aggregate grades above the expected level of attainment (3.25). The courses with the highest grades were: ChemE Lab (CH459), Mass and Energy Balances (CH362) and Chemical Engineering Process Design (CH402). The lowest grades were: Chemical Engineering Thermodynamics (CH365), Chemical Engineering Professional Practice (CH400), Heat & Mass Transfer (CH485), and Chemical Reaction Engineering (CH364).



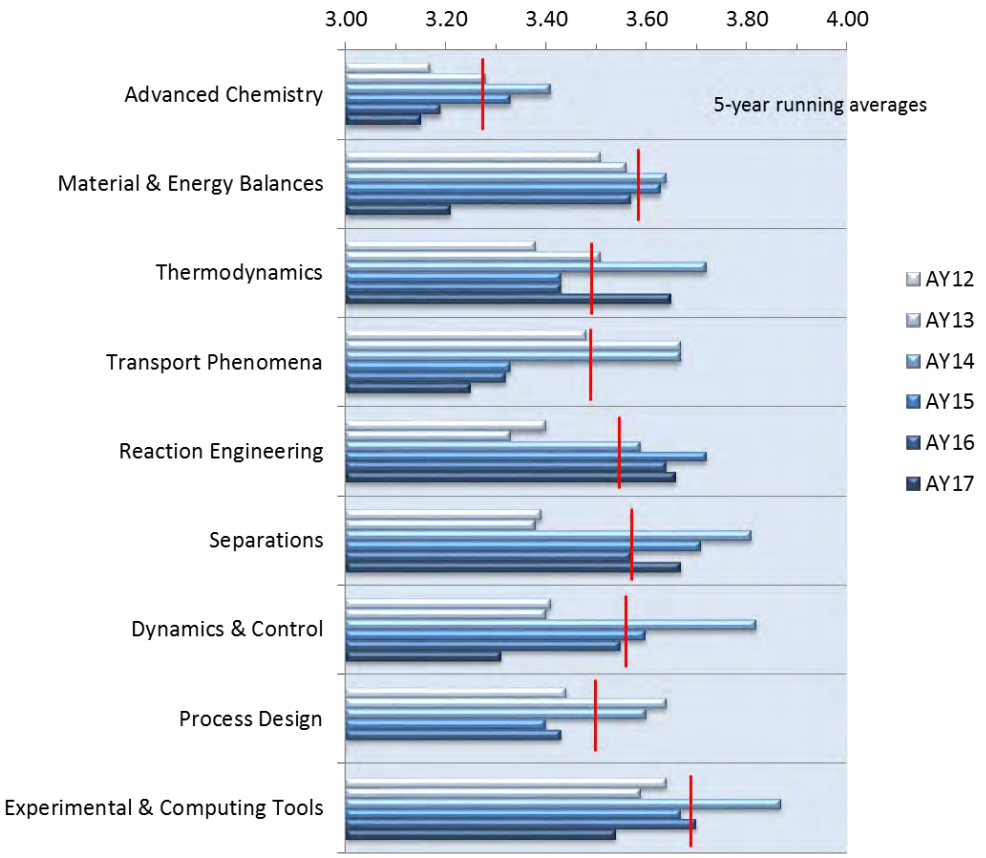
Chemical Engineering End-of-course Student Assessments

The end of course survey of cadets provided information on how well the cadets felt that each course achieved the student outcomes. Sample survey results are plotted in the graph below. The highest ranked courses were Mass and Energy Balances (CH362), Separation Processes (CH363), and Chemical Engineering Thermodynamics (CH365). The lowest ranked scores, which did not meet the expected

levels of attainment, were Fundamentals of Engineering Mechanics and Design (MC300) and Engineering Mathematics with Applications (MA366).

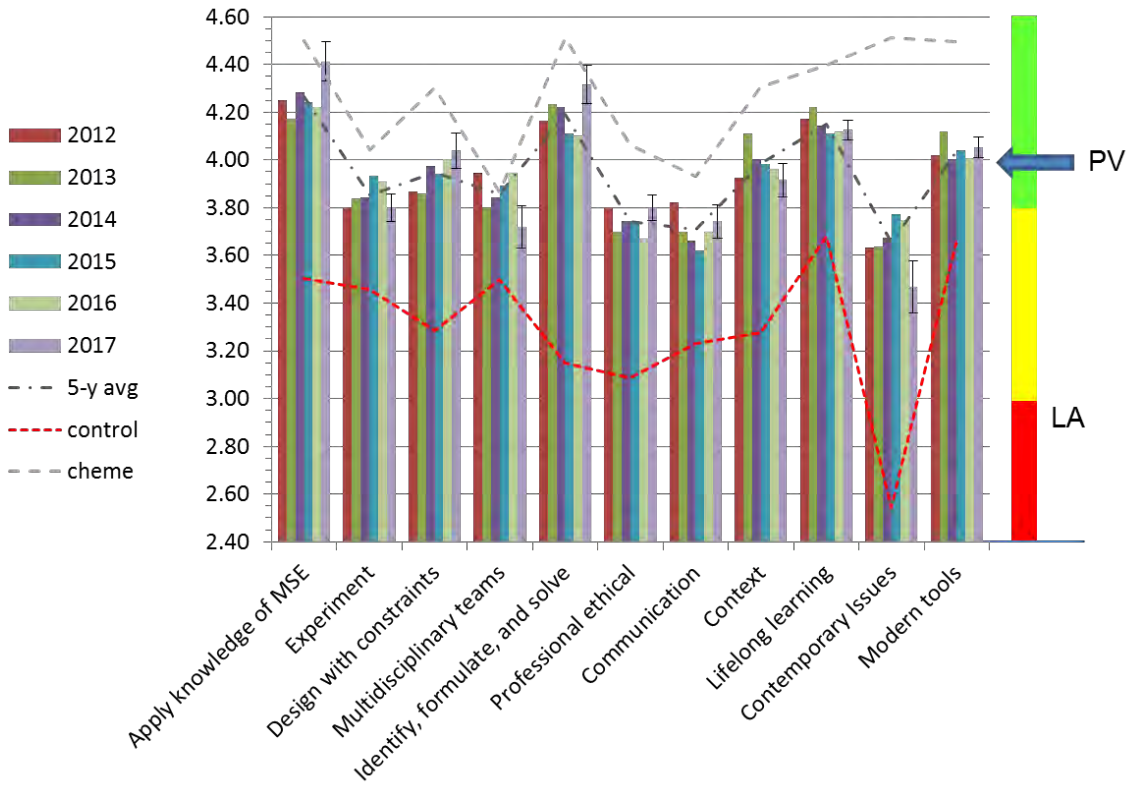


Course GPAs over a 5 year period, parsed from cadet transcripts, are presented in the graph below. Over the period, the highest grades were achieved in: Experimentation and Computing Tools and Material & Energy Balances. The lowest grades were in: Chemistry and Process Design.



Cadet Assessment of Student Outcomes

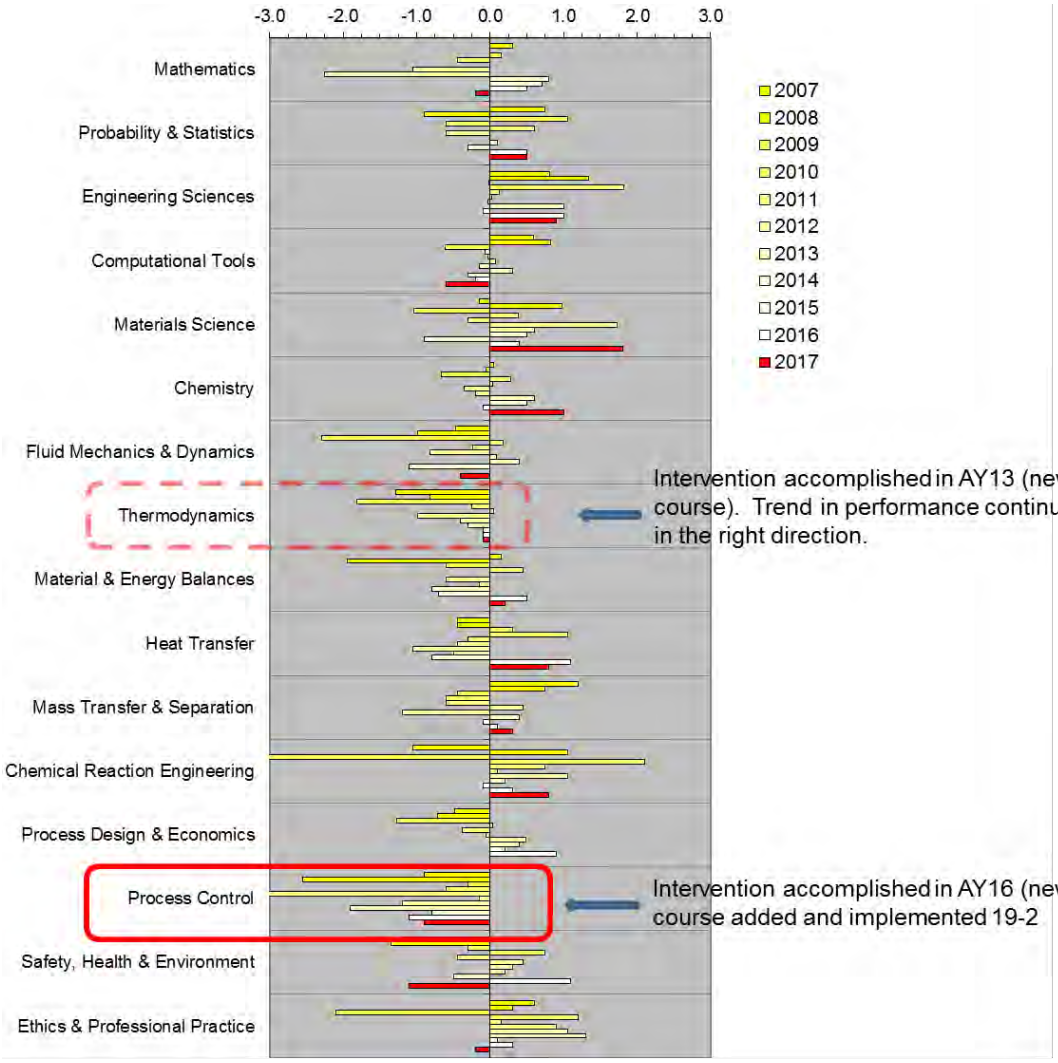
The 5-year summary of cadet assessments concerning their perception of whether the ABET objectives were satisfied is plotted in the graph below. Program averages are shown for all courses containing embedded indicators. The green, yellow, and red bars on the right are meant to mimic a process control indicator, where the 2017 score is the measured process variable, and the 5-year average is our performance goal. In the language of process control, our indicator is "in the green." The "low alarm" is indicated with "LA" and would trigger some kind of process response. None of the expected outcomes were felt to be unmet by the cadets. The ABET objectives that were scored the lowest by the students were: Professional ethics, and Experimentation capability.



Cadet Performance on the Fundamentals of Engineering (FE) Exam

The USMA ChE program encourages students to take the FE exam as the first step in professional licensing and registration, and also as a means for the faculty to compare cadet performance with others throughout the country who take the same exam at the same time.

The cadets who took the 2017 FE exam, in aggregate, had a passing rate of 93% (15/16), which was significantly higher than that of all the people who took the exam in 2017 (74%). The normalized performance of USMA cadets versus others taking the exam is presented in the graph below. Areas in which USMA cadets excelled, compared to their peers, were: Materials Sciences, Heat Transfer, and Chemistry. Areas needing improvement include Process Control and Safety, Health, & Environment.



Advisory Board Discussion of Program Objectives. The Advisory Board reviewed and discussed the Program Objectives. A question was raised about the presence of leadership as a goal of the program during the discussion of the Academy mission and vision. It was pointed out that "leadership" is present in the first of the Program Objectives.

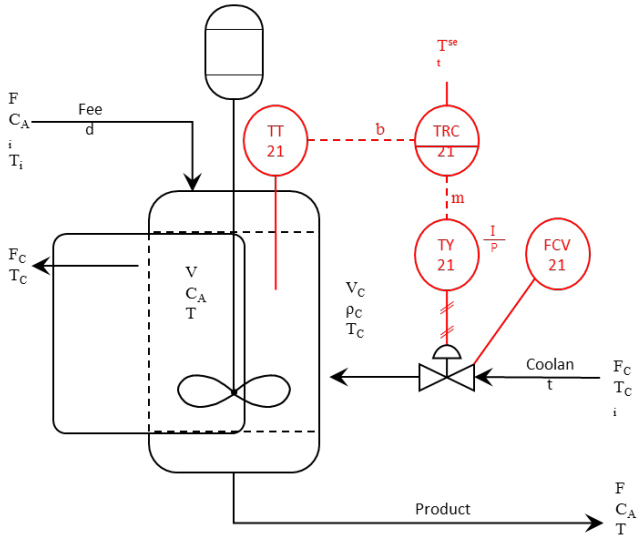
A question was raised as to whether current PO #4 (Advance their careers through clear and precise technical communication.) should be moved up in order to #3, ahead of "Succeed in graduate school or advanced study programs." Though the POs are considered co-equal, after some discussion, the board concluded the level of emphasis within the program may be discerned by the relative placement of the POs and that this change would be an acceptable one. The objectives will remain the same, but listed as:

During a career as commissioned officers in the United States Army and beyond, program graduates:

1. Demonstrate effective leadership and chemical engineering expertise.
2. Contribute to the solution of infrastructure and operational problems in a complex operational environment.
3. Advance their careers through clear and precise technical communication.
4. Succeed in graduate school or advanced study programs.

Session 3: CH367 Overview.

The advisory board was given an update on the new controls course, CH367 Introduction to Automatic Process Control. The new Redbook entry was shown and a review of Capstone project and a proposed 30-lesson sequence was shown to the board for their evaluation and comments. The capstone diagram and proposed objectives are shown below. Advisory board verbal feedback was positive and that the course design was well done. They were looking forward to the results of the first round of teaching.



Proposed CH367 capstone project objectives.

1. Write a descriptive interpretation of each element in a control loop.
2. Draw a complete Laplace block diagram for an actual control loop.
3. Design and implement a PI controller for a chemical reactor, and implement a numerical solution to the equations that describe the process dynamics.
4. Tune a controller.

ADVISORY BOARD INTERACTION WITH CADETS

Advisory board members interacted with the entire 3rd and 4th year classes (Cows and Firsties) of cadets in a session segmented into 3 parts: 1) questions the advisory board addressed to the cadets, and 2) questions the cadets addressed to the advisory board. Advisory Board members then had lunch with chemical engineering First Class cadets at the West Point Club followed by the third part 3) informal interaction of cadets with board members. Key questions addressed by the advisory board to the cadets are listed below. A summary of the discussions/responses between the advisory board and cadets is shown in Appendix 3.

Session 4: Future Challenges

The board was presented with some information on challenges for the program to address in the coming years.

The board was apprised of the impact of the new Academy Schedule to become effective during AY19, including the changing of the current Separations class (CH363) to a 30-lesson sequence. Other impacts, while expected, are difficult to assess until at least one iteration of the schedule has been achieved.

The board was presented with the accreditation changes forthcoming from ABET. These included the consolidation and rewording of some of the Student Outcomes, reducing the number from 11 to 7. The board was informed that the program is already making the changes necessary to accomplish the assessment of the program within the framework of these new SOs. The board was informed, also, that the number of required Engineering Topics credit hours for an accredited program had been reduced from 48.0 to 45.0. Although this may allow some flexibility in the program in the future, the board was informed that the program leadership had decided to keep the program's course of study the same as it currently stands. While some options for the future were presented, full discussion and any decisions would be put off until after the next ABET cycle and visit (Fall 2020). None of the board objected.

The board thoughts were requested on the subject of an increased emphasis on research, both within the department and at USMA more generally, and, specifically, on the potential impact on the program. The merits of both classroom activities and 'independent' research were espoused, but probably best summarized by Dr. Hair's comments that, while research in general is a good thing, significant emphasis would fundamentally "change the character of the institution" and this could not be done well "with the resources you have on hand." Additional thoughts provided by the board members are annotated in Appendix 4.

The board was updated on a set of proposed electives in the general topic of "bioengineering." A review on the role of engineering courses within the general (non-engineering majors) curriculum was conducted (core engineering sequences). With the recognition that both the program and the department are limited in the available resources to dedicate to the prospective courses, the board will remain informed on the status of the proposals as they move through the administrative hurdles needed for approval. In past years, the board has expressed support for more bio-related engineering course options, and electives in general, for the program.

Administratively, the proposed date of the next board meeting was 3 May 2019, to coincide with the USMA Projects Day the following spring. The board was also informed that LTC Armstrong would take over as the Chemical Engineering Program Director in June 2018, replacing LTC Bull. LTC James would be stepping up as the Assistant Program Director.

APPENDIX 1: ADVISORY BOARD COMPOSITION

This year's attendees are designated with a check mark (✓).

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APPENDIX 2: REQUIRED COURSES FOR CHEMICAL ENGINEERS AT USMA

Required Courses * (for classes 2017, 2018, 2019)	
MA366	Engineering Mathematics with Applications
CH362	Mass & Energy Balances
CH363	Separation Processes
CH364	Chemical Reaction Engineering
XE472	Dynamic Modeling & Control
CH485	Heat & Mass Transfer
CH459	Chemical Engineering Laboratory
CH402	Chemical Engineering Process Design
CH400	Professional Practice
MC311	Thermal-Fluid Systems I
MC312	Thermal-Fluid Systems II
EE301	Fundamentals of Electrical Engineering
MC300	Fundamentals of Engineering Mechanics & Design (Statics & Dynamics)
CH365	Chemical Engineering Thermodynamics
CH383	Organic Chemistry 1

Required Courses * (for classes 2020+)	
MA364/MA365	Engineering Mathematics with Applications
CH362	Mass & Energy Balances
CH363	Separation Processes
CH364	Chemical Reaction Engineering
~~XE472~~	~~Dynamic Modeling & Control~~ **CH367 Introduction to Automatic Process Control**
CH485	Heat & Mass Transfer
CH459	Chemical Engineering Laboratory
CH402	Chemical Engineering Process Design
CH400	Professional Practice
MC311	Thermal-Fluid Systems I
MC312	Thermal-Fluid Systems II
EE301	Fundamentals of Electrical Engineering
MC300	Fundamentals of Engineering Mechanics & Design (Statics & Dynamics)
CH365	Chemical Engineering Thermodynamics
CH383	Organic Chemistry 1

APPENDIX 3: ADVISORY BOARD CADET DISCUSSION MINUTES

Notes from the Cadet Sensing Session (Thank you to Andy Pfluger and Tony Hatfield for the notetaking)

Section 1: **Board asks questions of cadets**

1000-1010: faculty gave introductions and backgrounds

Topic 1: Process Control Course

-Cadets were wondering how the course layout would go. Board expressed confidence in LTC Corey James' ability to teach course.

-Board spoke to the importance and practical applications of process controls. Gave several "real-world" vignettes.

-Board asked about cadet feedback for the current controls course

-cadets said that the course uses examples / vignettes that are not applicable to ChemEs. Felt that the course was too theoretical as well – not enough applied examples.

-cadets were universally happy about having the course becoming more ChemE focused.

-CH459 – cadets said this course is where the practical application of controls was really introduced

Topic 2: MC300

-cadets had numerous comments about how it is not applicable for ChemE majors.

-negative comments include:

-course was too basic for college juniors (introductory course)

-course is irrelevant to ChemEs. Course covers statics and bridge design – more for civil engineers. Relevant topics for ChemEs were covered already in physics. Nothing relevant from this course on the FEE. Relevant topics could be included in CH400 instead.

-cadets recommended removing the course from the ChemE curriculum. Would rather see more specific ChemE materials (e.g., additional Separations).

Topic 3: CH400

-several cadets thought that the CH400 class was not useful. Suggested there are other ways to prepare for the FEE. One cadet suggested that they should be able to validate the course by taking the FEE early.

-some cadets suggested that some of the questions in the course were not representative of the FEE questions. Opinions varied, however, as some felt that the questions were useful.

-Specific example one cadet used to illustrate how CH400 questions were not useful was the controls quiz, which you could take several times.

-other cadets suggested that the course is a good forcing function for them to study. There were several cadets that agreed with this point.

-there was some discussion about when to take the FEE after the course was completed. One cadet wanted to take the FEE right after the course was completed so that it was fresh in his mind.

-one cadet appreciated the free hour of time to study for other requirements when there was a course drop.

-board asked the cadets to do a "raise of hands" survey (for firsties):

-about 1/3rd of the cadets liked the course

-only 3 cadets disliked the course

-cadets felt the value of the course was in the content, not in how it prepared them to take the FEE.

Topic 4: comparison to ChemEs at other universities

-board asked if cadets could prepare the curriculum of West Point's ChemE major to content at other universities (based on conversations with their friends). Only one cadet commented. Said that the content is the same, but course ordering is different.

Topic 5: mathematica vs. matlab

-cadets were interested in which of the 2 programs is used more in industry. The board said that the program doesn't matter as much as knowing what programs can do for you in general. Knowing what to model is more important than the program.

-some discussion about how West Point teaches you how to learn.

Topic 6: process safety

-question from the board was whether the cadets understand or get enough process safety in the courses. Should there be a separate course? How is process safety addressed in existing courses?

-cadets mentioned that it was integrated in some sense in several courses. Cadets did not express dissatisfaction with level of process safety included in the curriculum. Cadets did not think there needed to be a separate course on process safety.

Topic 7: cyber security

-Board asked if cadets are learning anything about cyber security and "hardening" of software running controls.

-cadets said that they would like to take a cyber class instead of statics (MC300). Not much further input from cadets.

-the board discussed how cyber security is really important in industry and a hot topic right now. Gave several vignettes about process control engineers not being able to fix problems VPN; must be onsite to make corrections due to security concerns.

Topic 8: tours

-cadets felt the Bayway tour was great. Would like more tours as part of the curriculum.

-cadets said that AIADs are also useful for hands on experiences.

Topic 9: what classes cadets like the best or would be most useful

-board asked what classes cadets like best or would be most useful in the cirruculum.

-heat and mass transfer. Lots of FEE questions from this course.

-chemical engineering thermodynamics. Cadets like that they see basic thermo concepts in a ChemE application

-CH402 was also liked due to course instructor and hands-on experiences.

-thermo-fluids 1 & 2. Cadets liked the first course because it explained temperature and pressure. Other cadets felt that MC311 was more useful than MC312. Cadets felt that MC312 was lots of writing (which is its intent; cadets weren't really sure why they were taking a mech course as their "writing in the major" course tho).

-Not much was said by cows. One cow said that there are too many courses outside of discipline up through the junior year. One firstie then said that this isn't necessarily bad because it exposes them to other teaching styles in other departments. Another firstie agreed that it is good to see other engineering disciplines and the approaches they use.

-One firstie thought that there was a discrepancy between the curriculum and AIAD research opportunities. Would have liked to take physical chemistry.

-Board mentioned that the length of an AIAD is insufficient to gain real experience. Need more than 3 weeks.

-Cadets would like more experiences shadowing real chemical engineers in industry.

Topic 10: AIADs coupled with independent research experience at West Point

-cadets did not have many examples. Most AIADs were individual experiences that were decoupled from long-term research at West Point. Only one or two examples provided (worked with COL Burpo and Enoch). -cadets said that the initiative for research was with the individual cadet.

-board: there is a lot of leg-work that goes into producing a good long-term research experience.

Section 2: Cadets ask board members questions

Question 1: cadet asked what does the board think of the ChemE program?

-board had positive comments. Board said that there is a desire for continuous improvement, which is important.

-board thinks the program is well designed and gives cadets skills that translate to the Army.

-board thinks West Point does a good job of balancing theory and hands-on experience.

-ChemE curriculum is very strict at all universities, but even more so at West Point. One board member thinks there needs to be more flexibility with electives but understands the constraints. She said the faculty is proactive and cares, which is great.

-topic of electives came up. One cadet lamented about not being able to take physical chem or more organic chemistry because of the engineering content.

Board then asked if cadets participate in national level competitions.

-ChemE car. Mixed opinions about this.

-discussion delved into interdisciplinary research work and some of the projects available in other departments. There is a need to be cross-functional (board and cadets agreed).

-One cadet said next year trying to do the Solider design competition. Should be able to make this work.

-One cadet mentioned that other departments (Civil, Mech) have more established research agendas.

Note: several cadets felt that there are not independent research opportunities in ChemE. Need to go to other programs to do research. Cadets acknowledge that there are faculty / staff limitations. Idea of having another research faculty member to coordinate AIADs was discussed by the board.

The cadets almost universally said that the general chemistry course is awful. Some cadets lamented that we have ChemE faculty tied up teaching gen chemistry. Almost all the cadets felt the course is poorly run and turns off cadets in becoming majors in the Department.

-Note: the majority of respondents to this question were firsties, who took the class 3 years ago.

Question 2: cadets asked for examples of West Pointers they have interacted with in industry.

-board gave some vignettes (LTC Bozic, etc.).

-Lucy said that the labs usually hire folks with at least master's, but said there are several former military members that have worked in her lab.

-Kevin said that some companies have initiatives that hire military vets.

-Board urged cadet to create a solid resume and keep an "I love me book".

APPENDIX 4: ADVISORY BOARD SURVEY COMMENTS

Based on the assessment data or on your personal opinion, is there a course that the program should add to the curriculum? Please explain.

1: No. But only because the courses are so tightly scheduled already. Otherwise, I'd recommend the 2nd Org. Chem.

2: There was a lot of discussion on adding Physical Chemistry into the program as a required course.

3: Not to the ChemE core curriculum. Enhanced independent study opportunities for an elective, maybe. Not sure that a dedicated communication or technical writing or safety/risk is needed. These are important, but probably are not best placed as individual courses, given faculty constraints & course loading constraints.

4: Feedback from cadets MC300 not related to actual test. Course too simple in level – stresses static objects which are learned in physics. [CH400??] Suggested option to test out of course. Some lesson feedback forced study – feeling online test prep did not help. Some found it was an hour to self-study. Structure of FEE vs content. Felt Heat and Mass Transfer was good (lot of FEE prep). Thermodynamics relates well to real life. Design incorporate why it matters. Some students wanted more ChemE earlier. Some liked more diverse opportunity.

5: None at this time. Perhaps a further look could be taken at adding a ChE process safety course down the road. Including safety in all ChE classes is a popular approach, but often it does not get enough time. A specific safety class plus continuing safety across the department would be very effective. I think the current implementation is viable, just a suggestion for the future.

6: An elective in Process Safety.

7: Many strong opinions from cadets were voiced regarding MC300 – even moving it to an earlier time in their academic career would help. An opinion on the FE prep class was also voiced – making the class optional for a student that has already taken/passed the exam could be an option to free up time for other electives.
New class idea: Something similar to an "Intro to ChE" class. Perhaps more advanced that an Intro class, could be a neat elective that could be opened to students in other departments. This could also be a great forum for bringing in outside speakers and helping students forge outside connections in industry.

8: It will be interesting to evaluate CH367 and whether that helps with the Controls portion of the curriculum. This may also help with the "why" of practical application for the curriculum. CH400 seems to be split with some cadets finding it valuable, and others not. This course needs to ensure its purpose is understood.

Do you have any suggestions to improve the advisory board meeting for next year?

1: Maybe. I think this structure is a good balance of board + cadets. But it suddenly occurred to me that it would be useful to have the faculty talk more about their view of things. We hear from Dr. Biaglow but could hear more from others.

2: Once again great integration with cadets. May consider splitting up the large group into 2 smaller groups so more people get to talk or feel they can talk.

3: I spoke to Enoch about this in conversation, but I would recommend restructuring the BoA (at least consider it). A model I've observed is to have 3 categories of folks on the BoA: (1) Academia, (2) military, (3) industry; each category has 3 people who can only serve 3-4 years. Such a model introduces new ideas from different areas of practice. I am not really clear on how board members align w/these aforementioned areas or how long they can serve.

4: Potential split of cadet class to facilitate feedback. Currently class size is almost too large. Suggest more one on one or small groups. Look for outside programs + former students to detail opportunities for cadets, guest speakers, exposure vs traditional internship. Shadow Experiences. Intercollegiate competitions. Mentoring – 3 weeks. Electronic measures / coms [communications?].

5: N/A. Very well put together. Getting the data beforehand is very helpful.

6: 1 minor suggestion – split the cadet focus group in half.

7: It would be helpful to aggregate student commentary on courses (can be anonymous) prior to the meeting, with commentary shared with or discussed among board members prior to the panel discussion with students. I think this would help streamline and focus the discussion with students and help the board better understand students' views. Also helpful to include in commentary whether students have taken the FE exam yet.

8: Perhaps a split group for the cadet session. As the department grows, it may derail the conversation to have 30+ cadets at the same time.

Please add any additional comments that you would like to make below.

1: I think the 'what + why' portion we discussed today could be handled within class structure + grading. If research is going to become a faculty activity, you need more faculty members.

2: Lots of discussion on CH400 pros and cons on the usefulness of this course.
Seems like a lot of connections being made to ChE from the theory in the class to fundamentals and applications in the field.

3: Agree bioengineering courses developed for life science majors should be accessible by ChemE. Could be great elective if the bioengineering courses are done right
See notes from cadet sensing sessions. Lots of interesting items discussed.

4: Multiple cadets mentioned they felt chem prog [use?] were poor, why do chem eng professors teach Gen Chem. Some feedback to provide Chem E students + keep Gen Chem relevant to Chem Eng. Organic 2 + PE 2 yes or no came up – Students are Split – Think of Shadowing high level managers options. For a focus to research more faculty oversight would be needed and in general most wanted practical vs research. More faculty in Chem Eng as program expands. I do not think research per se fits within the objectives of the USMA to produce LTs for the Army.

5: Excited to see results of CH367.
More full time ChE staff for research opportunities.
Great to see the improvement on Thermo FEE scores.
Preparation for ABET record year and the focus on continuing improvement is impressive.

6: Everything is Great!
Let's discuss adding job shadowing as an AIAD option.

7: More research opportunities at West Point could be beneficial, however it should be prioritized lower than more resources in capstone projects, etc. Students generally felt that chemical engineering faculty are already stretched too thinly.

8: Cadet discussions were much better this year. More engaged and seemed more open to discuss courses and such. They are still trying to figure out the "why" for many courses and objectives. If research is going to be a push, then faculty needs increase in time and resources. Clear goals for AIADs may help secure more opportunities.

Advisory Board 5-4-18

Ed Salek "in honor of" Steve mentioned by Paul D.

Advisory Board Meeting — May 4, 2018

Rick Smith - Renewable Energy Group - visiting advisory bod 1st time

Posters on display - should use labels.

Program mission - Paul asked a question about leadership dimension is adequate. Seemed satisfied with answer.

Process safety ought to be in every thing you do - Culture. Paul Same - Communication ought to be built in.

Writing portion must be integrated. P.
Be able to say what it is and why it is important. A.
"Situational awareness."

Discussion of how to make students more situationally aware
They should be able to explain why they are doing everything they are doing.

→ Recast as shadowing, versus internship — connection / mentorship

Cadets once again complained about the AIADs. More process companies

Objectives - more numbers of to number 3 to allow for ranking of importance.

Companies may be willing to host shadowing — more "Mentoring for shadowing experience"
By shadowing mentors, cadets might see more economics

Advisory Board 5-4-18

~~Feel free to assign this in.~~

MC 300 want an option to test out. They hate the canvas. <It is too basic and the material is covered in physics.

Gen chem program is awful. Chemical engineering faculty are tied up with teaching this and they would rather have them in chemical engineering. <It was "stealing from them."

Changing to a research institution would fundamentally change the institution. <Is this really what you want?

What do the customers want?

Nikki Peppas CH597 Purdue now at UT Austin.
Post it note technology / toothpaste with stripes
Used guest lecturers to tell stories.

Biaglow, Andrew I CIV USA USMA

From: Andrew Pfluger <apfluger@mines.edu>
Sent: Friday, May 4, 2018 4:17 PM
To: Biaglow, Andrew I CIV USA USMA; Bull, Geoffrey R LTC MIL USA USMA; Armstrong, Matthew J LTC MIL USA USMA; James, Corey M LTC MIL USA USMA
Subject: [Non-DoD Source] Notes from Cadet/BoA Sensing Session
Attachments: Notes from Cadet-BoA Sensing Session.docx

Andy, Geoff, Matt, and Cory,

Please see attached notes from the sensing session at the BoA today. Please let me know if you need anything clarified.

Thanks!
Best,
Andy P.

Andrew R. Pfluger, Ph.D., P.E.

Colorado School of Mines

845.545.2235

Notes from the Cadet Sensing Session

Section 1: Board asks questions of cadets

1000-1010: faculty gave introductions and backgrounds

Topic 1: Process Control Course

-Cadets were wondering how the course layout would go. Board expressed confidence in LTC Corey James' ability to teach course.

-Board spoke to the importance and practical applications of process controls. Gave several "real-world" vignettes.

-Board asked about cadet feedback for the current controls course

-cadets said that the course uses examples / vignettes that are not applicable to ChemEs. Felt that the course was too theoretical as well – not enough applied examples.

-cadets were universally happy about having the course becoming more ChemE focused.

-CH459 – cadets said this course is where the practical application of controls was really introduced

Topic 2: MC300

-cadets had numerous comments about how it is not applicable for ChemE majors.

-negative comments include:

-course was too basic for college juniors (introductory course)

-course is irrelevant to ChemEs. Course covers statics and bridge design – more for civil engineers. Relevant topics for ChemEs were covered already in physics. Nothing relevant from this course on the FEE. Relevant topics could be included in CH400 instead.

-cadets recommended removing the course from the ChemE curriculum. Would rather see more specific ChemE materials (e.g., additional Separations).

Topic 3: CH400

-several cadets thought that the CH400 class was not useful. Suggested there are other ways to prepare for the FEE. One cadet suggested that they should be able to validate the course by taking the FEE early.

-some cadets suggested that some of the questions in the course were not representative of the FEE questions. Opinions varied, however, as some felt that the questions were useful.

-Specific example one cadet used to illustrate how CH400 questions were not useful was the controls quiz, which you could take several times.

-other cadets suggested that the course is a good forcing function for them to study. There were several cadets that agreed with this point.

-there was some discussion about when to take the FEE after the course was completed. One cadet wanted to take the FEE right after the course was completed so that it was fresh in his mind.

-one cadet appreciated the free hour of time to study for other requirements when there was a course drop.

-board asked the cadets to do a "raise of hands" survey (for firsties):

-about 1/3rd of the cadets liked the course

-only 3 cadets disliked the course

-cadets felt the value of the course was in the content, not in how it prepared them to take the FEE.

Topic 4: comparison to ChemEs at other universities

-board asked if cadets could prepare the curriculum of West Point's ChemE major to content at other universities (based on conversations with their friends). Only one cadet commented. Said that the content is the same, but course ordering is different.

Topic 5: mathematica vs. matlab

-cadets were interested in which of the 2 programs is used more in industry. The board said that the program doesn't matter as much as knowing what programs can do for you in general. Knowing what to model is more important than the program.

-some discussion about how West Point teaches you how to learn.

Topic 6: process safety

-question from the board was whether the cadets understand or get enough process safety in the courses. Should there be a separate course? How is process safety addressed in existing courses?

-cadets mentioned that it was integrated in some sense in several courses. Cadets did not express dissatisfaction with level of process safety included in the curriculum. Cadets did not think there needed to be a separate course on process safety.

Topic 7: cyber security

-Board asked if cadets are learning anything about cyber security and "hardening" of software running controls.

-cadets said that they would like to take a cyber class instead of statics (MC300). Not much further input from cadets.

-the board discussed how cyber security is really important in industry and a hot topic right now. Gave several vignettes about process control engineers not being able to fix problems VPN; must be onsite to make corrections due to security concerns.

Topic 8: tours

-cadets felt the Bayway tour was great. Would like more tours as part of the curriculum.

-cadets said that AIADs are also useful for hands on experiences.

Topic 9: what classes cadets like the best or would be most useful

-board asked what classes cadets like best or would be most useful in the cirruculum.

-heat and mass transfer. Lots of FEE questions from this course.

-chemical engineering thermodynamics. Cadets like that they see basic thermo concepts in a ChemE application

-CH402 was also liked due to course instructor and hands-on experiences.

-thermo-fluids 1 & 2. Cadets liked the first course because it explained temperature and pressure. Other cadets felt that MC311 was more useful than MC312. Cadets felt that MC312 was lots of writing (which is its intent; cadets weren't really sure why they were taking a mech course as their "writing in the major" course tho).

-Not much was said by cows. One cow said that there are too many courses outside of discipline up through the junior year. One firstie then said that this isn't necessarily bad because it exposes them to other teaching styles in other departments. Another firstie agreed that it is good to see other engineering disciplines and the approaches they use.

-One firstie thought that there was a discrepancy between the curriculum and AIAD research opportunities. Would have liked to take physical chemistry.

-Board mentioned that the length of an AIAD is insufficient to gain real experience. Need more than 3 weeks.

-Cadets would like more experiences shadowing real chemical engineers in industry.

Topic 10: AIADs coupled with independent research experience at West Point

-cadets did not have many examples. Most AIADs were individual experiences that were decoupled from long-term research at West Point. Only one or two examples provided (worked with COL Burpo and Enoch).

-cadets said that the initiative for research was with the individual cadet.

-board: there is a lot of leg-work that goes into producing a good long-term research experience.

Section 2: Cadets ask board members questions

Question 1: cadet asked what does the board think of the ChemE program?

-board had positive comments. Board said that there is a desire for continuous improvement, which is important.

-board thinks the program is well designed and gives cadets skills that translate to the Army.

-board thinks West Point does a good job of balancing theory and hands-on experience.

-ChemE curriculum is very strict at all universities, but even more so at West Point. One board member thinks there needs to be more flexibility with electives but understands the constraints. She said the faculty is proactive and cares, which is great.

-topic of electives came up. One cadet lamented about not being able to take physical chem or more organic chemistry because of the engineering content.

Board then asked if cadets participate in national level competitions.

-ChemE car. Mixed opinions about this.

-discussion delved into interdisciplinary research work and some of the projects available in other departments. There is a need to be cross-functional (board and cadets agreed).

-One cadet said next year trying to do the Solider design competition. Should be able to make this work.

-One cadet mentioned that other departments (Civil, Mech) have more established research agendas.

Note: several cadets felt that there are not independent research opportunities in ChemE. Need to go to other programs to do research. Cadets acknowledge that there are faculty / staff limitations. Idea of having another research faculty member to coordinate AIADs was discussed by the board.

The cadets almost universally said that the general chemistry course is awful. Some cadets lamented that we have ChemE faculty tied up teaching gen chemistry. Almost all the cadets felt the course is poorly run and turns off cadets in becoming majors in the Department.

-Note: the majority of respondents to this question were firsties, who took the class 3 years ago.

Question 2: cadets asked for examples of West Pointers they have interacted with in industry.

-board gave some vignettes (LTC Bozic, etc.).

-Lucy said that the labs usually hire folks with at least master's, but said there are several former military members that have worked in her lab.

-Kevin said that some companies have initiatives that hire military vets.

-Board urged cadet to create a solid resume and keep an "I love me book".

Biaglow, Andrew I CIV USA USMA

From: Anthony M Hatfield <hatfield_anthony@lilly.com>
Sent: Monday, May 7, 2018 2:17 PM
To: Bull, Geoffrey R LTC MIL USA USMA
Cc: Armstrong, Matthew J LTC MIL USA USMA; Biaglow, Andrew I CIV USA USMA; Miller, April D LTC MIL USA USMA; Nagelli, Enoch A CIV USA USMA; James, Corey M LTC MIL USA USMA
Subject: [Non-DoD Source] RE: Thank you!
Attachments: Cadet Discussion from Advisory Board Meeting 04MAY2018.docx

Geoff,

Thank you to you and the entire staff for another good Advisory Board Meeting.

I typed up a brief set of notes/highlight from what I heard and wrote down from the Cadet interactive session for what it is worth. See attached:

Tony Hatfield
Consultant Engineer, IPM Vial Recap Project Eli Lilly and Company
317.655.0429 (office) | 317.374.1499 (mobile) hatfieldan@lilly.com | www.lilly.com

Cadet Discussion from Advisory Board Meeting 04MAY2018

- There was a lot of interest from the Cadets on the make-up and course content of CH367, Introduction to Automatic Process Control. The Board members shared what they had just learned about the course and that it sounded like it was going to be a great course.
- The Cadets mentioned that connections are being made from the theory taught in other courses to how it applies to the Chemical Engineering discipline.
- MC300, Fundamentals of Eng. Mech. & Design
  - The Cadets complained:
    - The course was all about bridge design and static objects.
    - A lot of the material was a repeat of Physics I & II and a waste of time.
    - The course has a lot of homework for the amount of value that they are getting from the course.
    - No question from this course were on the FE exam.
- CH400, Chemical Engineering Prof. Practice
  - The Cadets seemed to be split about done the middle on this course and answers varied greatly:
    - Negatives
      - The course does not do a good job preparing you for the FE exam.
      - They wish that they could Opt to take the FE exam early, even at their own expense, to "test out" of the class.
      - Test pulled from material from old classes not on FE example questions.
    - Positives
      - It forces you to study for the FE exam since they said they probably would not have studied/prepared for it on their own.
      - They could tell the instructor had taken the FE exam and had good examples. It got you used to seeing how long they had to answer the exam questions.
      - Forced study time
- There was some discussion from the Board on Cyber vulnerabilities in the industry and things that were happening on that front.
- The Cadets mentioned that they do like going on the tours of the plant sites.
- CH485, Heat & Mass Transfer – There was general discussion on the course. It was a tough class but was a good class.
- CH402, Chemical Engineering Process Design
  - Very good real life situations presented and studied in class
  - Very good comments about the professor and the teaching of this class
- Since the department is very small, the Cadets saw going to other departments for some of their classes as a plus. They are able to see other professors and learn differently with different teaching styles/philosophies. Saw the diversity as good and a plus.
- There was some discussion on the Cadets wanting more guest speakers and better opportunities like other departments have for interning.
- Some discussion on the need for more instructors.
- Discussion on the General Chemistry class and in general that is was just a bad class.

Biaglow, Andrew I CIV USA USMA

From: Matthew Garvey <MGarvey@simulation-solutions.com>
Sent: Friday, May 4, 2018 7:41 PM
To: Bull, Geoffrey R LTC MIL USA USMA; Biaglow, Andrew I CIV USA USMA
Subject: [Non-DoD Source] ABET Follow Up / Thank You

Hi Andy and Geoff,

I wanted to send a quick note thanking you for allowing me to sit on the ABET advisory board again this year.

I appreciate the unique opportunity and really value the experience I gain from the meetings.

I look forward to getting in touch with Andy soon and coming up to West Point to spend some time with the other faculty members to share some best practices (many of which are already happening at USMA) for use of our simulators in ChE Process Control courses.

I will reach out soon - thank you have a nice weekend.

Matt

Get Outlook for iOS <https://aka.ms/o0ukef>

Biaglow, Andrew I CIV USA USMA

From: Donald C. Glaser <dglaser@simulation-solutions.com>
Sent: Tuesday, May 8, 2018 9:50 AM
To: Bull, Geoffrey R LTC MIL USA USMA
Cc: Armstrong, Matthew J LTC MIL USA USMA; Biaglow, Andrew I CIV USA USMA; Miller, April D LTC MIL USA USMA; Nagelli, Enoch A CIV USA USMA; James, Corey M LTC MIL USA USMA
Subject: [Non-DoD Source] RE: Thank you!

Hi Geoff,

You're welcome!

Matt Garvey and I want to thank you and your West Point colleagues for all your efforts re putting together this meeting and for all of your kind hospitality.

We look forward to receiving the minutes + to continuing to assist as members of USMA's ChE Advisory Board!

Best regards,

Don

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Donald C. Glaser
President

Office:

732 389 5400

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E-mail:

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-----Original Message-----
From: Bull, Geoffrey R LTC MIL USA USMA [mailto:Geoffrey.Bull@usma.edu]
Sent: Monday, May 7, 2018 11:59 AM
To: Bull, Geoffrey R LTC MIL USA USMA
Cc: Armstrong, Matthew J LTC MIL USA USMA; Biaglow, Andrew I CIV USA USMA; Miller, April D LTC MIL USA USMA; Nagelli, Enoch A CIV USA USMA; James, Corey M LTC MIL USA USMA
Subject: Thank you!

Ladies and gentlemen,

Thank you once again for your attendance at this year's chemical engineering advisory board. We very much appreciate your feedback, discussions, and interactions with the cadets. You all remain an invaluable part of our assessment process and we recognize the time commitment you make to help us improve our program. Thank you!

I will have a set of minutes for your review in the near future.

Geoff

Geoffrey R. Bull, Ph.D.

Lieutenant Colonel, U.S. Army

Assistant Professor

Department of Chemistry and Life Science

Bartlett Hall, Room 440B

United States Military Academy, West Point, NY 10996

Geoffrey.bull@usma.edu

(845) 938-2031

https://collab.westpoint.edu/chem/CH364/MainPage/364default.htm

https://collab.westpoint.edu/chem/CHEMENG/MainPage/ChEng.html

https://collab.westpoint.edu/chem/CH101-General%20Chemistry%20I/CH101/default.aspx

Gregory Allen Ritch
253 East Crawford Ave
Connellsville, PA 15425
Date and Place of Birth: 2 November 1950, Connellsville, Pennsylvania
Mobile: 724.984.0607
Email: garitch@cvzoom.net

Chronological Civilian Employment:

Nov 10 - Dec 16, Councilman in the City of Connellsville, Director of Parks and Public Buildings/Streets (Retired)

Oct 08 - Nov 10, 99th Regional Support Command - Director of Emergency Services, Coraopolis, PA, GS12

Apr 05 - Sep 08, Department of Defense - Supervisory Staff Administrator, Johnstown, PA. GS12

Aug 75 - Apr 05, Connellsville Area School District, Teacher/Assistant Principal (Retired), Connellsville, PA (Retired)

RESUME OF SERVICE CAREER

Colonel, Engineer US Army (Retired)

Total Years of Commissioned Service/Enlisted Service: 37 years

Last Military Assignment: Commander, 464th Chemical Brigade, Johnstown, Pennsylvania 15905

Honors: The United States Army Officer Candidate School Hall of Fame Class of 2006

Security Clearance Held:
Top Secret with Sensitive Compartmented Information Clearance (currently no clearance)

Military Schools Attended:
US Army War College
United States Army Command and General Staff College
Officer Candidate School
Infantry School – Basic Course
Engineer School – Basic and Advanced Courses
Military Intelligence School – Basic Course

Educational Degrees:
California University of Pennsylvania, Bachelor of Science in Education, Bachelor's Degree - 5/1973
California University of Pennsylvania, Master of Science in Education, Reading Specialist, Master's Degree - 5/1977
California University of Pennsylvania, Administration Program for Principals, Principal Certification, 12/2000
US Army War College, Master of Strategic Studies, Master's Degree - 7/2003

US Decoration and Badges:
Legion of Merit
Bronze Star Medal
Meritorious Service Medal with Two Oak Leaf Clusters
Army Commendation Medal with Four Oak Leaf Clusters
Army Achievement Medal with Two Oak Leaf Clusters
Army Reserve Components Achievement Medal with Silver and Bronze Oak Leaf Clusters
National Defense Service Medal with 2 Bronze Stars
Iraq Campaign Medal
Global War on Terrorism Expeditionary Medal
Global War on Terrorism Service Medal
Humanitarian Service Medal
Military Outstanding Volunteer Service Medal
Armed Forces Reserve Medal with Gold Hourglass Device and "M" Device

Army Service Ribbon
Overseas Service Ribbon
Army Reserve Overseas Training Ribbon with Numeral 3
Combat Action Badge
Bronze DeFlurey (Army Engineer Association)

Major Duty Assignments:

FROM	TO	ASSIGNMENT
Mar 78	May 78	Student, Officer Candidate School, Fort Benning, GA
May 78	Feb 79	Platoon Leader, Company A, 1st Battalion, 110th Infantry, Mt. Pleasant, PA
Feb 79	Mar 79	Student, Infantry Officer Basic Course, Ft Benning, GA
Mar 79	Sep 79	Platoon Leader, Company A, 1st Battalion, 110th Infantry, Mt. Pleasant, PA
Oct 79	Dec 80	Commander, Det 1, Company A, 1st Battalion, 110th Infantry, Mt. Pleasant, PA
Dec 80	Nov 81	Platoon Leader, 630th Transportation Company, Washington, PA
Nov 81	Mar 82	S-1, HHC, 429th Engineer Battalion (Combat) (Heavy), Uniontown, PA
Mar 82	Sep 83	Construction Officer, HHC, 429th Engineer Battalion (Combat) (Heavy), Uniontown, PA
Sep 83	Sep 86	Executive Officer, (AGR) Company D, 429th Engineer Battalion (Combat) (Heavy), Greensburg, PA
Sep 86	Jun 90	Company Commander, Company D, 429th Engineer Battalion (Combat) (Heavy), Greensburg, PA
Jun 90	Jun 92	Readiness Officer, Deputy Chief of Staff of Operations, 99th Army Reserve Command, Oakdale, PA
Jun 92	Apr 94	S-3, 336th Military Police Battalion, Oakdale, PA
Apr 94	Jan 95	Engineer Team Chief, 2/312th, 6th Brigade, 78th Division, Combat Support, Field Exercise, Washington, PA
Jan 95	Feb 97	S-3, 3/312th LANES Battalion, 6th Brigade, 78th Division, Uniontown, PA
Feb 97	Apr 00	Battalion Commander, 458th Engineer Combat Battalion, Johnstown, PA
May 00	Jan 03	S-3, 464th Chemical Brigade, Johnstown, PA
Jan 03	Feb 03	Deputy Brigade Commander, 464th Chemical Brigade, Johnstown, PA
May 04	Oct 07	Deputy Brigade Commander, 464th Chemical Brigade,Johnstown, PA
Oct 07	Oct 08	Commander, 464th Chemical Brigade,Johnstown, PA
Active Duty		
Feb 03	May 03	Deputy Brigade Commander, 455th Chemical Brigade, Fort Dix, New Jersey
May 03	May 04	Deputy 455th Task Force Commander D & E, Iraq Survey Group, Baghdad, Iraq

Promotions	Dates of Appointment
2LT	22 May 78
1LT	21 May 81
CPT	20 May 85
MAJ	19 May 92
LTC	30 Sep 98
COL	5 Dec 02

Enlisted Service:
USAR 7 January 1970 - 21 May 1978

Source and Date of Commission or Appointment:
Officer Candidate School, Ft Benning, GA, 22 May 1978

Addendum A: Selected Civilian Career Responsibilities:

Additional as required.

99th Regional Support Command - Director of Emergency Services, Coraopolis, PA, GS12

Exercises oversight and serves as the senior program manager, through subordinate supervisors, for security programs and antiterrorism (AT). Served as the Antiterrorism Officer (ATO) for the Commanding General. Establishes and maintains effective and efficient security programs for the BASOPS Command and supported organizations. Interprets higher-level guidance and disseminates directives and guidance. Provide definitive technical advice and assistance to commanders, local leadership, and workforce. Evaluated resources and initiates programming, budgeting, and manpower actions. Established oversight policy, practices, and metrics that reflect the security posture of the RSC and supported organizations. Oversees and/or conducts studies and analyses to identify program issues and develops/implements remedial actions. Advised the US Army Reserve Command (USARC) Security Office of recommended policy/procedural changes. Supervises RSC security office personnel, plans & assigns work, approves leave, and provides performance rating input. Provide guidance for establishing and implementing plans, policies, and procedures for conducting Force Protection, Physical Security activities and crisis management. Collect, analyze, and disseminate data concerning physical security for RSC supported units and facilities/centers/activities. Determines specific AT contract security requirements, Understand and comply applicable Department of Defense (DoD) and Service Federal Acquisition Regulation (FAR) guidance, determine scope of work, incorporate contract requirement(s) for all contracts and procurement, establish and incorporate security measures into written contract, screen and select contractors, inspect AT contract security measures. Input items into PRWeb. Prepares comprehensive written reports evaluating the adequacy of organizational physical security practices, identifying critical areas requiring special protective measures, and recommending practical solutions to physical security deficiencies. Develops presentations; adapting presentations to specific audiences; speaking extemporaneously to a variety of audiences. Conducted necessary liaison with superior and other headquarters to ensure proper understanding of physical security requirements/needs. Handled requests for and inspections of Intrusion Detection Alarm Systems. Knowledgeable in the usage of Microsoft Office including Word, Excel, and Power Point for command, staff, and Force Protection/Antiterrorism training presentations. Ability to communicate in writing, such as contracts, reports, letters, or documents.

Department of Defense (04/03/2005 - 09/30/2008) - Supervisory Staff Administrator, GS12

Principal advisor to the Brigade Commander serving as the Supervisory Staff Administrator for a diverse Major Subordinate Command responsible in facilitating command and control of assigned battalions across five states. Experience in demonstrating a fundamental knowledge in administrative specialties such as contracting and procurement, management analysis, human resource management, budget and financial management, facilities operations, support services and work measurement. Manages and provide day-to-day guidance and supervision of the administrative, logistical, and operational tasks and support missions for the command. Observes and evaluates staff performance. Supervised budget preparation, monitored all standards to ensure compliance, and provided quality assurance supporting all command interest items. Principle duties included fund manager of all Command monetary accounts, prepared budget estimates and forecasts for inclusion in command operating budget. Principal advisor to Commander on Equal Employment Opportunity (EEO) matters; provided advice in resolving EEO complaints to both soldiers and civilian workforce; Knowledge of federal EEO policies, laws, and regulations; Demonstrated ability to develop recommendations to all staff levels regarding changes and/or improvements to

command policies. Demonstrated knowledge of civilian personnel management to include recruiting selection, position classification, adverse actions, and training. Knowledge of office admin to include personnel, budget, and problem resolution. Supervised of civilian workforce hiring providing command continuity for base operations of 22 locations within the command; coordinated actions for all civilian, Active Duty, and Troop Program Unit Soldiers. Manages Alcohol & Drug Abuse Prevention & Control Program. Prepares Alcohol & Drug Abuse & the Drug Demand Reduction budgets & distributes &/or recommends distribution of funds. Experience in planning, managing, and implementing alcohol and drug prevention and education programs for military and civilian employees. Experience in travel card issuance and delinquency report, vouchers, and schedule certification. Experience in establishing program goals, objectives and internal operating policies and procedures; Principal advisor to critical long-range facility planning activities as the Army Reserve Center Facility Manager, Public Affairs, Center Safety and Environmental Manager. Encourages creative tension and differences of opinions. Anticipates and takes steps to prevent counter-productive confrontations. Manages and resolves conflicts and disagreements in a constructive manner. Fosters an inclusive workplace where diversity and individual differences are valued and leveraged to achieve the vision and mission of the organization. Held self and others accountable for measurable high-quality, timely, and cost-effective results. Determined objectives, set priorities, and delegated work. Accepted responsibility for mistakes. Complied with established control systems and rules. Identified and analyzed problems; weighed relevance and accuracy of information; generated and evaluated alternative solutions; made recommendations. Possesses ability to analyze analytical and anecdotal information to develop systems for an efficient operation supporting field activities.

Connellsville Area School District (8/1975 - 4/2005) - Teacher /Assistant Principal (Retired),

Worked in a classroom environment at the Junior High and Elementary school levels teaching Scientific Method, as well as, organizational skills, study techniques, work ethic, accountability, and responsibility. Served in the capacity as administrative assistant to the Principal conducting evaluations of classroom teachers, budgetary and ordering of school supplies, and discipline. Prepared, administered, and evaluated tests score, keep attendance, and grade records. Developed innovative Science curriculum instructing students in the Scientific method course of study. Review and create numerous classroom assessment methods and techniques and adopted effective tools that were used in a team teaching combination. Prepared objectives and outlines for courses of study and assisted in curriculum development. Assisted in negotiating contractual items as part of a collective bargaining team. Developed educational enrichment programs as part of the Social Studies curriculum and Science Curriculum. Formulated and processed budgetary items and managed the ordering of school supplies as part of a Principal Internship Program. Experienced in fund raising, grant writing, and program development. As a Committee Chairperson, Union Representative, and Vice President, inspired and fostered team commitment, spirit, pride, and trust. Facilitated cooperation and motivated team members to accomplish group goals. Developed the ability of others to perform and contribute to the organization by providing ongoing feedback and by providing opportunities to learn through formal and informal methods. Provided a long-term view and built a shared vision with others; acted as a catalyst for organizational change. Influenced others to translate vision into action. Experienced in developing and making presentations; adapting presentations to specific audiences; speaking extemporaneously to a variety of audiences.