

Biaglow, Andrew Dr

Subject: FW: ChemE ABET Advisory Board Meeting Reminders (7 to 8 APR)
Attachments: Bear Mountain Menu.png; Timeline and Logistics for APR22 ABET Advisory.xlsx; Advisory Board 7-8Apr2022 4APR22.pdf

From: Yi, Caspar C MAJ <caspar.yi@westpoint.edu>

Sent: Monday, April 4, 2022 10:55

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Subject: ChemE ABET Advisory Board Meeting Reminders (7 to 8 APR)

Good morning everyone!

We are excited to host and welcome you to West Point in a few days! Just a few reminders/notes:

- For those attending in-person, please send me your cell number as this will be the most efficient form of communication.
- **We will be having dinner at the Bear Mountain Inn at 1730 on 7 April 2022. The TMP will be departing from the Holiday Inn hotel at 1715.**
 - Please RSVP NLT 1600 tomorrow, 05 April 2022. The goal is to have all ABET and ChemE members attend the dinner event!
- **Timeline for In-person attendees (See Schedule):**
 - **7 April, 1730 – 2000:** After conclusion of Professor Liberatore's Seminar on 7 April, we will transition to the Bear Mountain Inn for dinner (ETA 1730). See attached flyer for menu. A salad option will be added and the bar will have 6 beers on tap, all best sellers from local breweries such as Newburgh Brewery, Millhouse, Keegans, Tom's River, Captain Lawrence, and Sloop. They also have the traditional bottled beer Coors, Budweiser, Bud Lite, Sam Adams, Heineken, Stella, Corona.
 - **7 April, 2000:** Transport all ABET Members back to hotel
 - **8 April, 0730:** TMP departs for West Point from Holiday Inn Hotel.
 - **8 April, 0745:** Link-up with LTC Armstrong at Bartlett Hall
 - **8 April, 0800:** Breakfast will be available (juice, coffee, bagels)
- **Transportation:**
 - A 15-pax TMP van has been reserved to transport ABET and CLS members throughout the day.

- If you plan on transporting to West Point in your POV, please be mindful that parking is very limited on post. However, please coordinate with MAJ Jeffrey Chin so that he can pick you up prior to start of ABET events. Your car will most likely need to be parked at *Buffalo Soldier Field* (main gate is Thayer).
- If you are staying at the Holiday Inn in Fort Montgomery, I have printed out and dropped a NY State Tax Exemption form just in case at the hotel. You will need this for checkout.
- **Remote attendees**: For those are joining us remotely, please use the link [here](#). Please coordinate a time with me before Friday to ensure all communications are a “Go”.

As always, please let me know if you have any questions/concerns. My cell is below.

Respectfully,

Caspar Yi
MAJ, EN
Instructor
Operations Officer
Department of Chemistry and Life Science
United States Military Academy
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UNITED STATES MILITARY ACADEMY
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Chemical Engineering



Advisory Board Meeting

7-8 April 2022

United States Military Academy
Department of Chemistry and Life Science



- 1. 100% surveys complete**
- 2. Discussions with chemical engineering faculty and cadets complete**
- 3. Tours of chemical engineering lab, work, classroom space complete**
- 3. Travel paperwork complete**



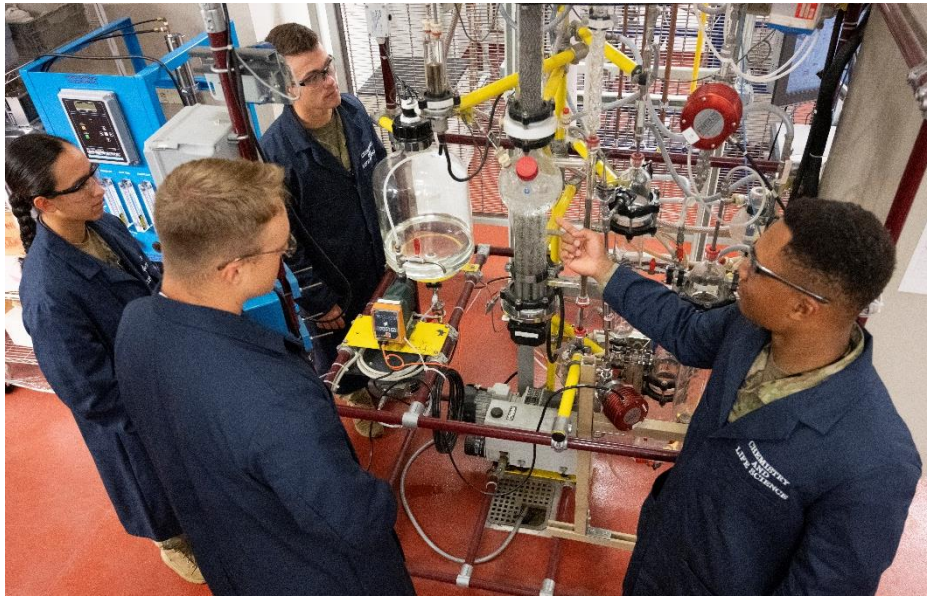
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| Date | Time | Event | Location | OIC | Task |
|------|-------------|---|---|------------------------------|--------------------|
| 7APR | NLT1700 | Pick up 15 PAX van | Motorpool | MAJ Yi/ MAJ Chin | |
| | 1530 | Dr. Matthew Liberatore Chem E. Seminar (abstract to follow) | BH465 (Chair-side) | CPT(P) Bowers/ CPT(P) Mandes | |
| | 1830 - UTC | Dinner | Bear Mountin Inn Fort Montgomery, NY | LTC Armstrong | make reservation |
| 8APR | 0730 | Pick up | Holiday Inn Express 1106 Route 9W Fort Montgomery, NY (845) 446 - 4277 | CPT(Chin) | Drive van |
| | 0745 - 0800 | Arrival and lite breakfast | Bartlett Hall 465 (table side) | LTC Armstrong Dr. Nagelli | Breakfast |
| | 0800 - 0830 | Session1: Introductory remarks and ABET orientation | BH465 | DEPT Head LTC Armstrong | |
| | 0830 - 0920 | Session2: Program Assessment Student Outcomes Assessment Discussion of Program Objectives | BH465 | | |
| | 0920 - 0955 | Board Surveys | BH465 | LTC Armstrong | Survey Parts 1 & 2 |
| | 1000 - 1050 | Career Panel (Cows) | BH465 (chair side) | LTC Armstrong | |
| | 1050 - 1115 | Cadet Discussions (Fisties and Cows) | BH465 (chair side) | | |
| | 1130 - 1300 | Lunch/Firstie Mock Interview Round Robin | BH465 | Dr. Nagelli | |
| | 1300 - 1330 | Board backbrief on cadet interactions | BH465 | LTC Armstrong | |
| | | | | Dr. Nagelli | |
| | 1340 - 1430 | Session 4: Future Challenges | BH465 | LTC Armstrong | |
| | 1430 - 1455 | Admin and Unit Ops Lab Tour | SBBH | Dr. Nagelli | |
| | | | | | |
| | 1500 - 1600 | Wrap up | BH465 | | |



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Lunch – Subs and Wraps



- Lunch:**
1. Cold cut Italian mix sandwiches and wraps
 2. Mixed salad
 3. Chips: regular/barbeque/sour cream & onion/Cheetos/Doritos
 4. Iced tea/soda/water/coffee
 5. **Cookie plate**



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Chemical Engineering

Advisory Board Meeting

7-8 April 2022

1. Introductory Remarks

United States Military Academy
Department of Chemistry and Life Science



- For the opportunity to show you America's Military Academy
- For your service and insights to help our program improve
- For the time you have dedicated to this visit
- For your dedication to the profession





Alumni Highlight: 2LT Ellie Milanese



-Class of 2020, Chemical Engineer

-GPA: 3.87

-Branch: Armor

-AIAD at Sandia National Lab

-Distinguished Cadet Award recipient

-Sandhurst Team

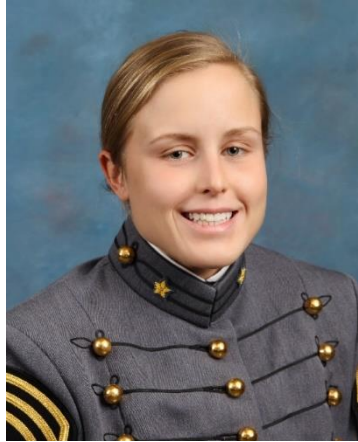
-Research: Development of materials to be used for batteries and hydrogen fuel cells. Familiarity with material synthesis as well as scanning electron microscopy (SEM), preparing electrodes, and running cyclic voltammetry and charge, discharge testing.





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Alumni Highlight: 1LT Taylor England



- Class of 2018, Chemical Engineer**
- GPA:** 4.03
- Branch:** Infantry
- Sandhurst Gold Team
- Walk-on Corps Squad Lacrosse team
- Regimental CSM-Distinguished Cadet Award recipient
- Research:** "Identification of Chemical and Biological Agents through Cell-based Screening"; this study analyzed morphological changes in cells during an interval of time after adding differing agitators





USMA MISSION

To educate, train, and inspire
the Corps of Cadets so that each graduate
is a commissioned *leader of character*
committed to the values of
Duty, Honor, Country
and prepared for a career of professional
excellence and service to the Nation as
an officer in the United States Army.



**Within an Army in transition,
West Point is the preeminent leader
development and academic institution
West Point is the preeminent leader
whose graduates thrive in tomorrow's
development institution in the world.
complex security environments,
and are inspired to a lifetime of service to
our Army and the Nation as leaders of
character.**

"Inspired to serve."



We envision an Army that is prepared for all dimensions of modern warfare, drawing upon disciplined, highly trained chemical engineers to develop solutions to the challenges facing the nation.



The mission of the chemical engineering program is to prepare commissioned leaders of character who are proficient in applying chemical and engineering principles to solve problems in a complex operational environment.



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Engineering
Technology
Accreditation
Commission



Accredited 1 October 2012 to present

Next Record Year: **AY2025-2026**

ABET Visit: **Early September 2026**



- An external certification of quality
- Keeps us in touch with the engineering profession
- Helps USMA (and ChemE) recruiting (2020 – 29; 2021 - 20; 2022 - 29; 2023 -14; 2024 ~25; 2025~36; 2026...)
- Provides important opportunities for graduates
- Allows USMA engineering majors to take the Fundamentals of Engineering Examination
- It is required by Army Regulations (10-87).
- Almost everything that ABET expects us to do is something we should be doing anyway.



- The ABET process is expensive in terms of faculty time
 - USMA is a small undergraduate college with limited human resources (faculty) and high faculty turnover
- The ABET accreditation is important to the institution and to the Army (so we tend to do it well)
- The only way we can be successful with ABET is to orient our program processes around the ABET criteria
 - By doubling up our efforts we obtain some efficiency
 - Much of what follows is oriented around the ABET processes and terminology
 - We need to be strategic in deciding on new initiatives



- **Program Educational Objectives (PEOs)**

- Gleaned by asking *program constituents*
 - For us: Army, profession, graduate schools, other
- **Our external Advisory Board a key resource.**
- Desired professional accomplishments of graduates **5-7 years after graduation**
- Adjust every 3 years or so...

- **Student Outcomes**

- What students should be able to do **at graduation**
- Must be **measurable**
- Designed to lead naturally to the PEOs
- Assess/evaluate some fraction yearly.

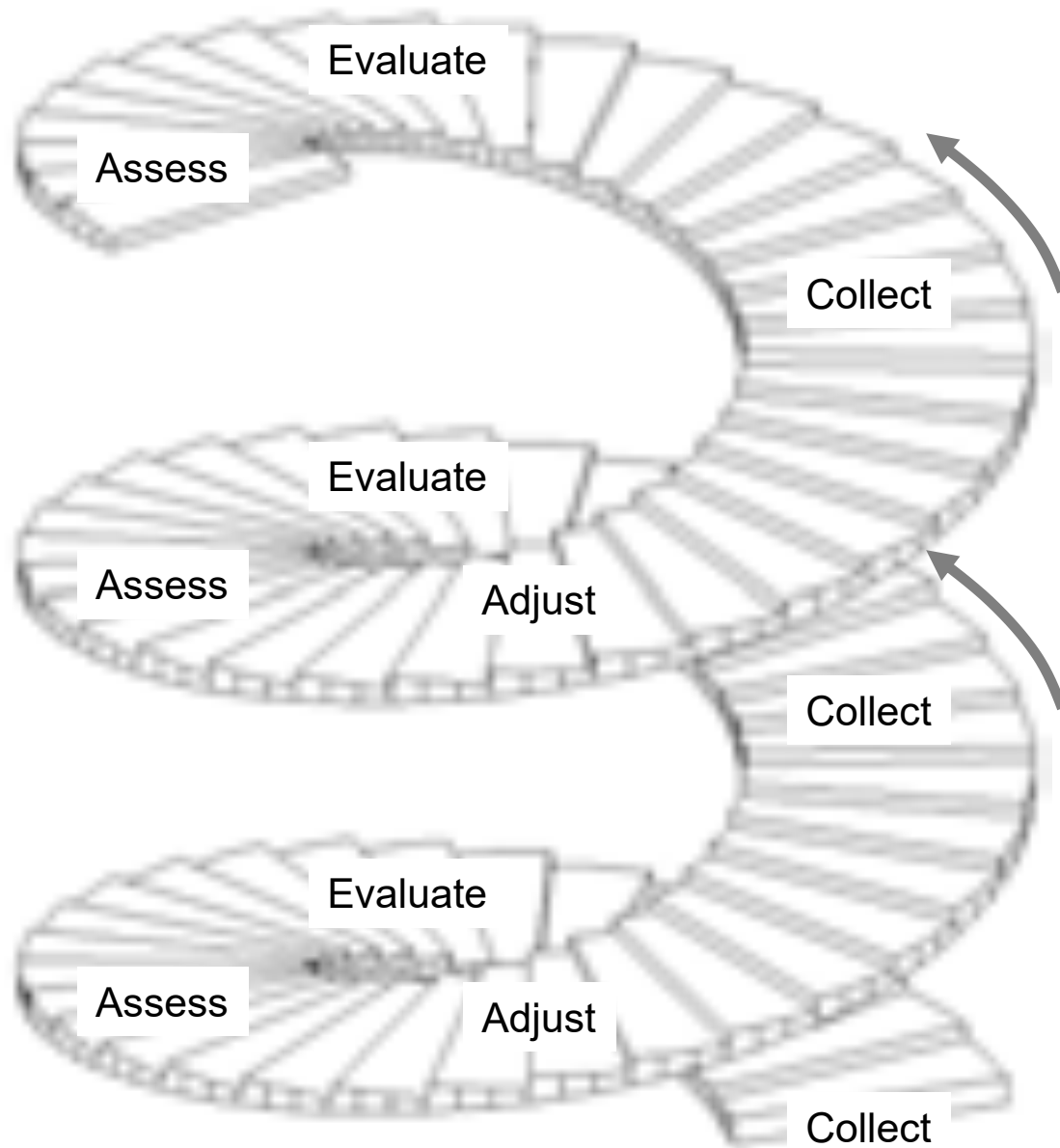
- **Assessment → Continuous improvement**

- Collect meaningful data to evaluate performance indicators (PIs)
- Assess PIs for outcome attainment → information → COAs for change
- Implement change
- Assess its effects and level of success (“closing the loop”)
- Repeat all the above
- Periodically check and adjust both Student Outcomes and PEOs





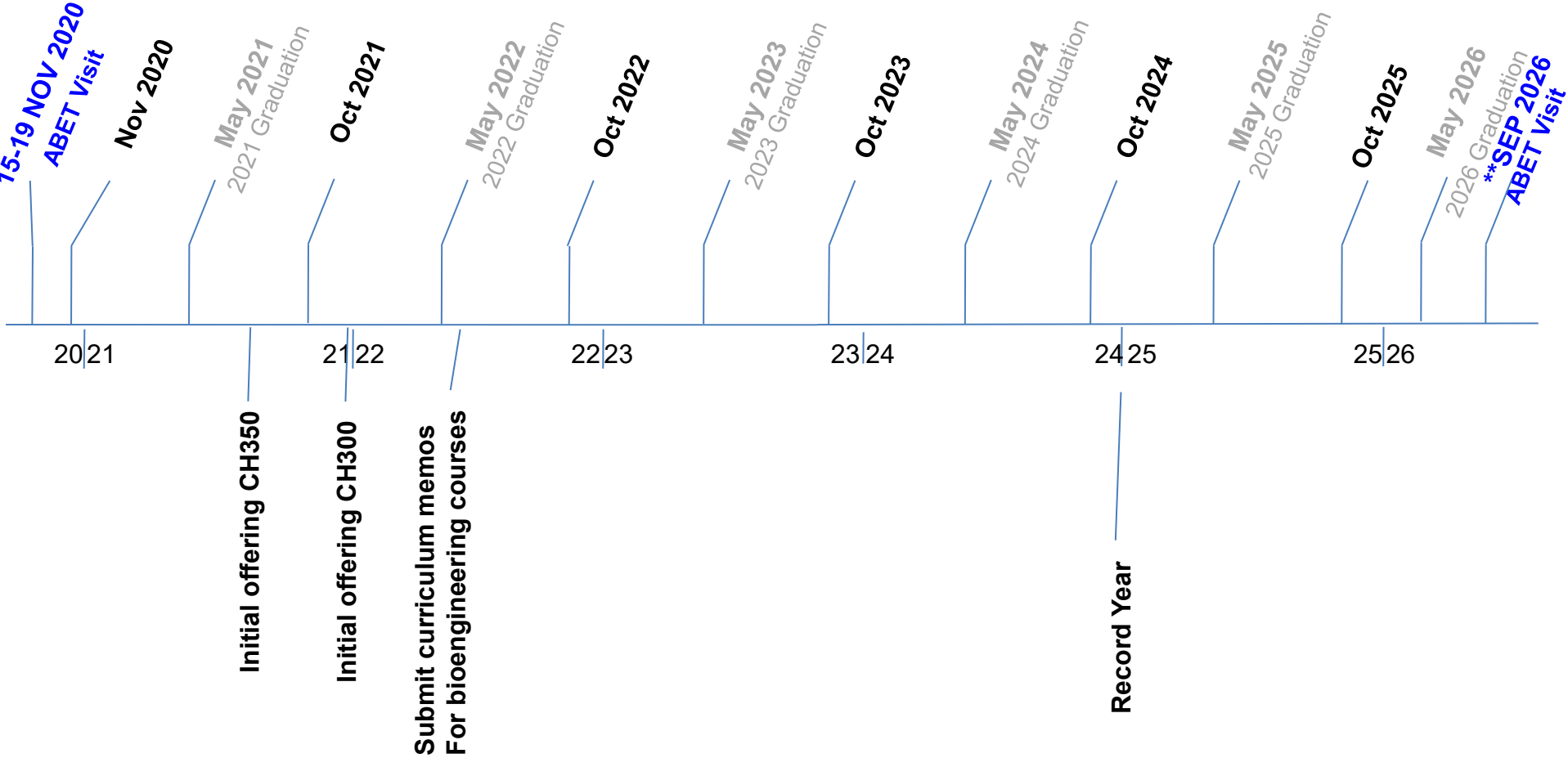
Assessment Cycle





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Timeline of Curricular Actions





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CH300: Introduction to Biomedical Engineering

Course Director: TBD

Course OIC: COL John Burpo

Credit Hours: 3.0 (BS=0, ET=3.0, MA=0)

Prerequisites: CH102, MA205

Co-requisite: None

Lessons: 30 @ 75 min This course provides a basis for understanding the application of engineering principles to problems in medicine and biology. It provides preparation for future graduate work in medical school, biomedical engineering, and chemical engineering. Specifically, the objectives of the course are: (1) to provide an introduction to the field and how it relates to other fields of engineering and science, (2) the develop the ability to apply mathematics, science, and engineering to solve problems, (3) to develop an understanding of the impact of engineering solutions on the medical field and society as a whole, and (4) to understand current topics within the field.

Course Assessment – Items from Section III

Sustain:

TBD

Improve:

TBD

Assessment – Graded Events

| | | |
|-------------------------|------|-------|
| 6 *HWs@ 50 pts each | 300 | 21.4% |
| 2 *WPRs @ 200 pts each: | 400 | 28.6% |
| 1 *Capstone | 200 | 14.3% |
| 1 *TEE | 500 | 35.7% |
| Total: | 1400 | |

| | | |
|----------------------|------|------|
| *Individual Points : | 1400 | 100% |
|----------------------|------|------|

TEXT: Biomedical Engineering, 2nd Edition, by W. Mark Saltzman; Cambridge University Press, 2015.

COA

Block I: Molecular and cellular principles

- Biomolecular principles (Ch. 2)
- Biomolecular principles: Nucleic acids (Ch. 3)
- Biomolecular principles: proteins (Ch. 4)
- Cellular principles (Ch. 5)

Block II: Physiological principles

- Communication systems in the body (Ch. 6)
- Engineering balances: respiration and digestion (Ch. 7)
- Circulation (Ch. 8)
- Removal of molecules from the body (Ch. 9)

Block III: Biomedical Engineering

- Biomechanics (Ch. 10)
- Bioinstrumentation (Ch. 11)
- Bioimaging (Ch. 12)
- Biomolecular Engineering I: Biotechnology (Ch. 13)
- Biomolecular Engineering II: Engineering of Immunity (Ch. 14)



CH350: Introduction to Bioengineering

Course Director: Dr. Simuck Yuk

Credit Hours: 3.0 (BS=0, ET=3.0, MA=0)

Prerequisites:

Co-requisite: None

Lessons: 30 @ 75 min

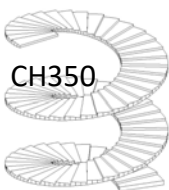
Special Requirements: None

The purpose of this course is to provide the introductory knowledge for understanding the biotechnology/bioprocessing engineering. Topic includes enzyme kinetics, molecular biology, cell growth, bioreactors, and bioprocesses. The bioprocess control and its application to different biological systems are covered in the classroom instruction. An important emphasis is made on the use of kinetics and process controls on the biological systems for engineering application.

Course Assessment – Items from Section III

Sustain:

Improve:



Topics – by Chapter

Bioprocess Engineering Basic Concepts, 3rd Ed., by Michael L. Shulter, Fikret Kargi, Matthew DeLisa, Prentice Hall.

Quantitative Fundamentals of Molecular and Cellular Bioengineering, by K. Dane Wittrup, Brice Tidor, Benjamin J. Hackel, and Casim A. Sarkar, The MIT Press.

- Introduction
- Enzyme Kinetics
- Central Dogma to Molecular Biology
- Cell Growth
- Bioreactor Selection
- Bioprocess Consideration

Assessment – Graded Events

| | | |
|--|------|---------|
| 1 *Capstone Presentation | 200 | 14% |
| 2 *WPRs | 400 | 28% |
| 5 *After-class Problem Sets(20pts/ea.) | 100 | 7% |
| 5 *In-class Problem Sets (50pts/ea.) | 250 | 17% |
| 1 *Term End Exam | 500 | 34% |
| Total: | 1450 | 100.00% |



CH450: Bioengineering Modeling and Analysis

Course Director: COL John Burpo

Credit Hours: 3.0 (BS=0, ET=3.0, MA=0)

Prerequisites: CH102, MA205

Co-requisite: None

Lessons: 30 @ 75 min

Special Requirements: None

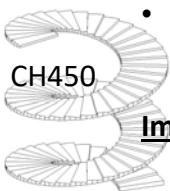
This course provides a broad understanding of bioengineering disciplines to include biomechanics, biomaterials, tissue engineering, biocatalysis, biochemical engineering, and biosensors. Fundamental concepts of molecular kinetics, thermodynamics, and mass transport are applied in problem sets in each bioengineering sub-discipline and capstone design project providing students the opportunity for modeling, analysis, and design from the biomolecular to physiological length scale and across multiple time scales. Modeling software such as MATLAB and Mathematica is extensively used.

Course Assessment – Items from Section III

Sustain:

- Strong instructor personal experience in mathematics, engineering, and chemistry
- Each lesson considers interdisciplinary science and engineering topics –science topics are taught in context of engineering applications

Improve:



Topics – by Chapter

TEXT: Introduction to Biomedical Engineering, 3rd Edition, by John Enderle and Joseph Bronzino; Academic Press, 2012.

- Part I: Biomechanics (Ch. 1 and 4)
- Part II: Biomaterials (Ch. 5)
- Part III: Tissue Engineering (Ch. 6)
- Part IV: Biomedical Enzyme Kinetics (Ch. 7 and 8)
- Part V: Biochemical Engineering (Handouts)
- Part VI: Biosensors (Ch. 10)

Assessment – Graded Events

| | | |
|------------------------------|----------|----------|
| 5 *Problem Sets@ 25 pts each | 500 | 47.2% |
| 6 *Quizes @ 200 pts each: | 180 | 17.0% |
| 1 *Paper | 150 | 14.1% |
| 1 *Presentation | 50 | 4.7% |
| 6 *Discussion | 180 | 17.0% |
| Total: | 1060 | |
| *Individual Points : | 1060 | 100% |



Excerpts from Minutes of 26 April 2019

- CH400 professional practice was discussed at length with cadet panel; and faculty; overall stay on current azimuth
- Desire for continued program improvement; program has good balance between theory and hands-on experience
- Some members of board would like to see more flexibility
- Cadets lamented about lack of chemical engineering electives
- Cadet feedback focused on various courses
- Cadets appreciate going to other departments for some courses (CME)
- General Chemistry discussion
- CH485 tough but useful and important to curriculum



End of Section 1



UNITED STATES MILITARY ACADEMY
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Chemical Engineering



Advisory Board Meeting

7-8 April 2021

2. Program Assessment

United States Military Academy
Department of Chemistry and Life Science



Student Outcomes (new used for AY19 & beyond)

Identical to ABET 1-7 plus one additional outcome (8)

On completion of the chemical engineering program, our graduates will be able to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.
8. Understand the chemical engineering curriculum, including chemistry, material and energy balances, safety and environmental factors, thermodynamics of physical and chemical equilibria, heat, mass, and momentum transfer, chemical reaction engineering, continuous and staged separation processes, process dynamics and control, modern experimental and computing techniques, and process design.



Required Courses * (for classes 2020 and beyond)

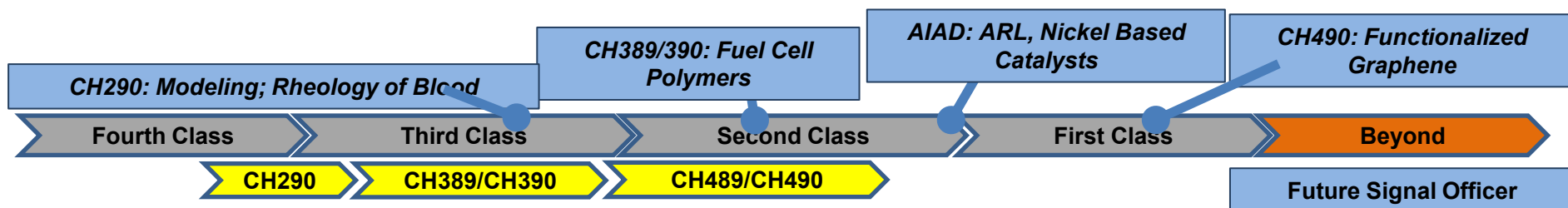
| | |
|-------|---|
| MA364 | Engineering Mathematics |
| CH362 | Mass & Energy Balances |
| CH363 | Separation Processes |
| CH364 | Chemical Reaction Engineering |
| CH367 | Introduction to Automatic Process Control (XE472 2019 and previous) |
| CH485 | Heat & Mass Transfer |
| CH459 | Chemical Engineering 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 |



- Goldwater Scholarship Recipient
- Fullbright Scholarship Semifinalist
- Phi Kappa Phi Honor & Tau Beta Phi Honor Society

Co-Authoring Conference Proceedings and Publications

1. Army Research Lab (ARL) Technical Symposium "Catalysts for fuel cell electronics". (Poster)
2. 1st Place Catalysts and Reaction Engineering, Presentation: "Nickel catalysts and graphene for lithium ion batteries". American Institute of Chemical Engineering Annual Meeting, Orlando, FL, 10-15 NOV19.
2. Manuscript in progress, "Electroless deposition of Noble Metal Nanoparticles onto Silk Fibroin Films", (to be submitted, Spring 2020)



USMA Independent Research

Cadet Dibiase has been working on a Proton Exchange Membrane (PEM) Fuel Cell project; a field of great interest for their efficiency advantages over combustion technology. However, conventional methods of electrolysis to produce H_2 and O_2 gas necessary for PEM fuel cells rely on expensive catalysts, Pt and IrO_2 . Despite exceptional efficiency of these catalysts, their high costs prevent industry scale up and production. We present alternative Ni-based catalysts to replace Pt and IrO_2 . Of the Ni catalysts characterized, NiS and NiFe LDH together provided the smallest total overpotentials of 1.7 V (vs SHE) for Hydrogen Evolution Reactions (HER) and Oxygen Evolution reactions (OER), respectively. However, Linear Sweep Voltammetry illustrated that NiFe LDH had the lowest overpotential of the two, contributing only 0.3 V to the total overpotential. Nevertheless, the total overpotential of 1.7 V is still only 0.2 V above the industry standard of 1.5 V from a combination of Pt and IrO_2 .



Future Faculty





CHEME Coursework Embedded Indicators

MECHE Coursework Embedded Indicators

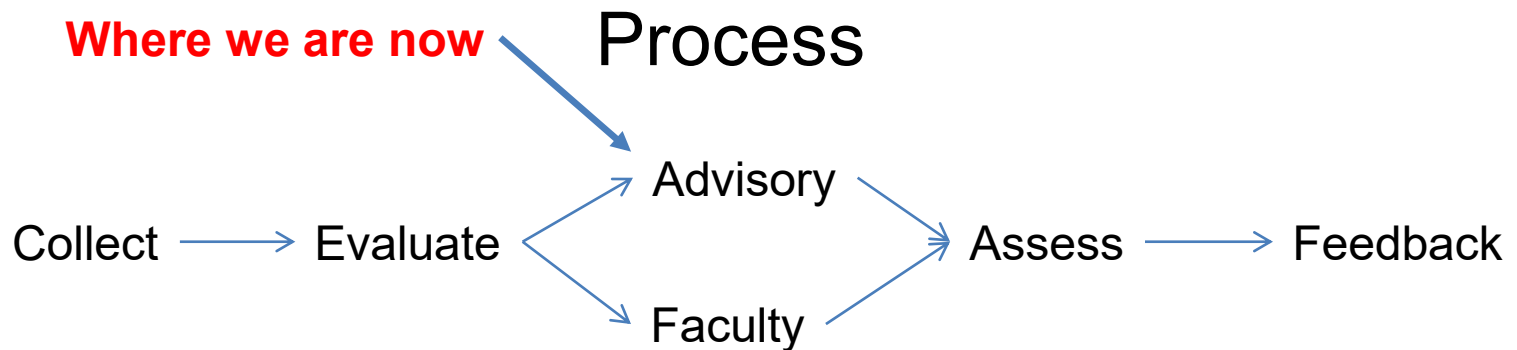
Fundamentals of Engineering Exam Topics

Participation in FE Exam (not pass rate)

Student end of semester surveys

Student CHEME Program Exit Surveys

Course Grades



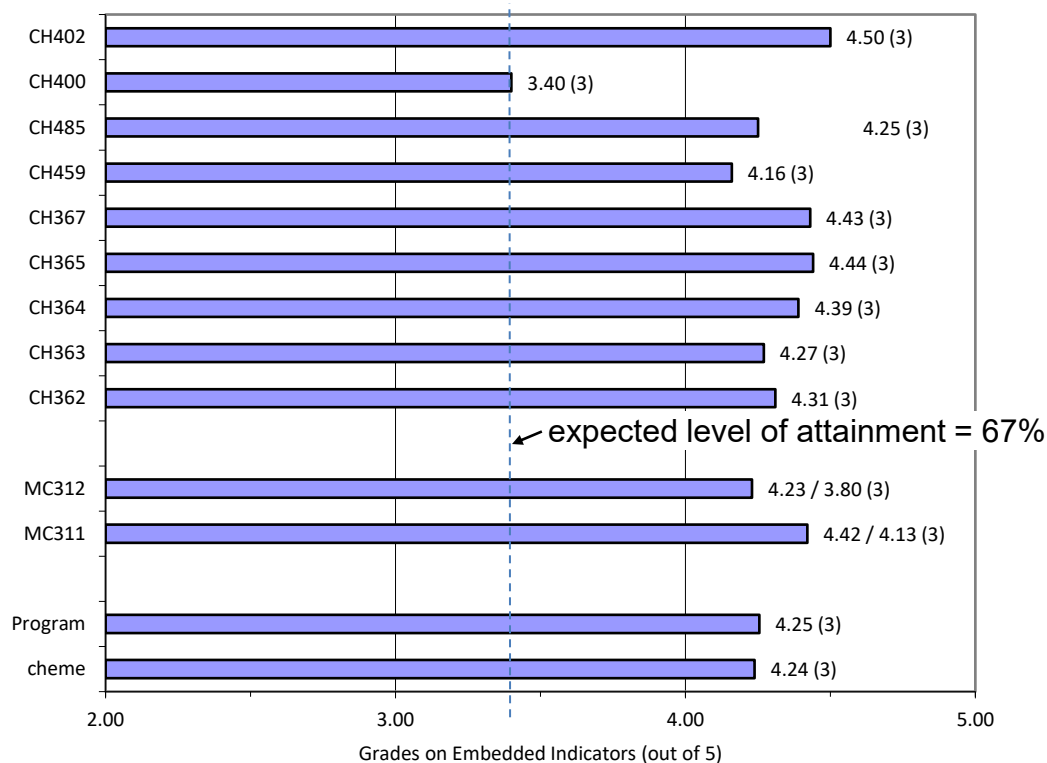


Example Schedule for Chemical Engineering, Classes of 2021 and Beyond

| Fall Term | Course | Credit Hours | Spring Term | Course | Credit Hours |
|------------------|--|-------------------|-------------|---|-------------------|
| 4th CLASS | | | | | |
| MA103 | Math. Modeling & Intro. Calculus | 4.5 | MA104 | Calculus I | 4.5 |
| CH101 | General Chemistry I | 4.0 | CH102 | General Chemistry II | 4.0 |
| EN101 | Composition | 3.0 | EN102 | Literature | 3.0 |
| HI107 | Western Civilization | 3.0 | HI108 | Regional Studies in World History | 3.0 |
| IT105 | Introduction to Computing & IT | 3.0 | PL100 | General Psychology | 3.0 |
| PE11x | Combatives / Boxing / Movement | 0.5 | MS100 | Introduction to Warfighting | 1.5 |
| | | | PE150 | Fundamentals/Personal Fitness | 1.5 |
| 3rd CLASS | | Total 18.0 | | | Total 20.5 |
| MA205 | Calculus II | 4.0 | CH362 | Mass and Energy Balances | 3.5 |
| PH205 | Physics I | 4.0 | MA364 | Applied Engineering Math | 3.0 |
| Lx203 | Foreign Language | 4.0 | PH206 | Physics II | 4.0 |
| SS201 | Economics | 3.0 | Lx204 | Foreign Language | 4.0 |
| PY201 | Philosophy | 3.0 | SS202 | American Politics | 3.0 |
| MS200 | Fundamentals: Army Operations | 1.5 | EV203 | Physical Geography | 3.0 |
| | | | PE 2xx | Lifetime Physical Activity | 0.5 |
| 2nd CLASS | | Total 19.5 | | | Total 21.0 |
| CH363 | Separation Processes | 3.5 | CH364 | Chemical Reaction Engineering | 3.5 |
| EE301 | Fundamentals of Electrical Engineering | 3.5 | CH367 | Introduction to Automatic Process Control | 3.0 |
| CH383 | Organic Chemistry 1 | 3.5 | MC312 | Thermal-Fluid Systems 2 | 3.0 |
| MC311 | Thermal-Fluid Systems 1 | 3.5 | MC300 | Fundamentals of Eng. Mech. & Design | 3.0 |
| PL300 | Military Leadership | 3.0 | SS307 | International Relations | 3.0 |
| MA206 | Probability and Statistics | 3.0 | MS300 | Platoon Operations | 1.5 |
| PE32x | Survival Swimming | 0.5 | PE360 | Combat Applications | 1.5 |
| 1st CLASS | | Total 20.5 | | | Total 18.5 |
| CH459 | Chemical Engineering Laboratory | 3.5 | CH402 | Chemical Engineering Process Design | 3.5 |
| CH365 | Chemical Engineering Thermodynamics | 3.0 | CH400 | Chemical Engineering Prof. Practice | 1.5 |
| CH485 | Heat & Mass Transfer | 3.5 | Elective | Engineering Elective 3 | 3.0 |
| Elective | Engineering Elective 1 | 3.0 | HI302 | History of the Military Art | 3.0 |
| Elective | Engineering Elective 2 | 3.0 | LW403 | Constitutional & Military Law | 3.0 |
| PE450 | Army Fitness Development | 1.5 | MX400 | Officership | 3.0 |
| | | Total 17.5 | | | Total 17.0 |



Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.



Values in parentheses are coverage ratings from Table 5-3 in the 2014 Self Study, page 5-9, updated for 2019.

Rubric:.

3: Unique embedded indicator with clear rubric or cut scale.

2: Outcome was graded but grades are convoluted, or part of the outcome is not covered.

1: Correlation to outcome but no assessment

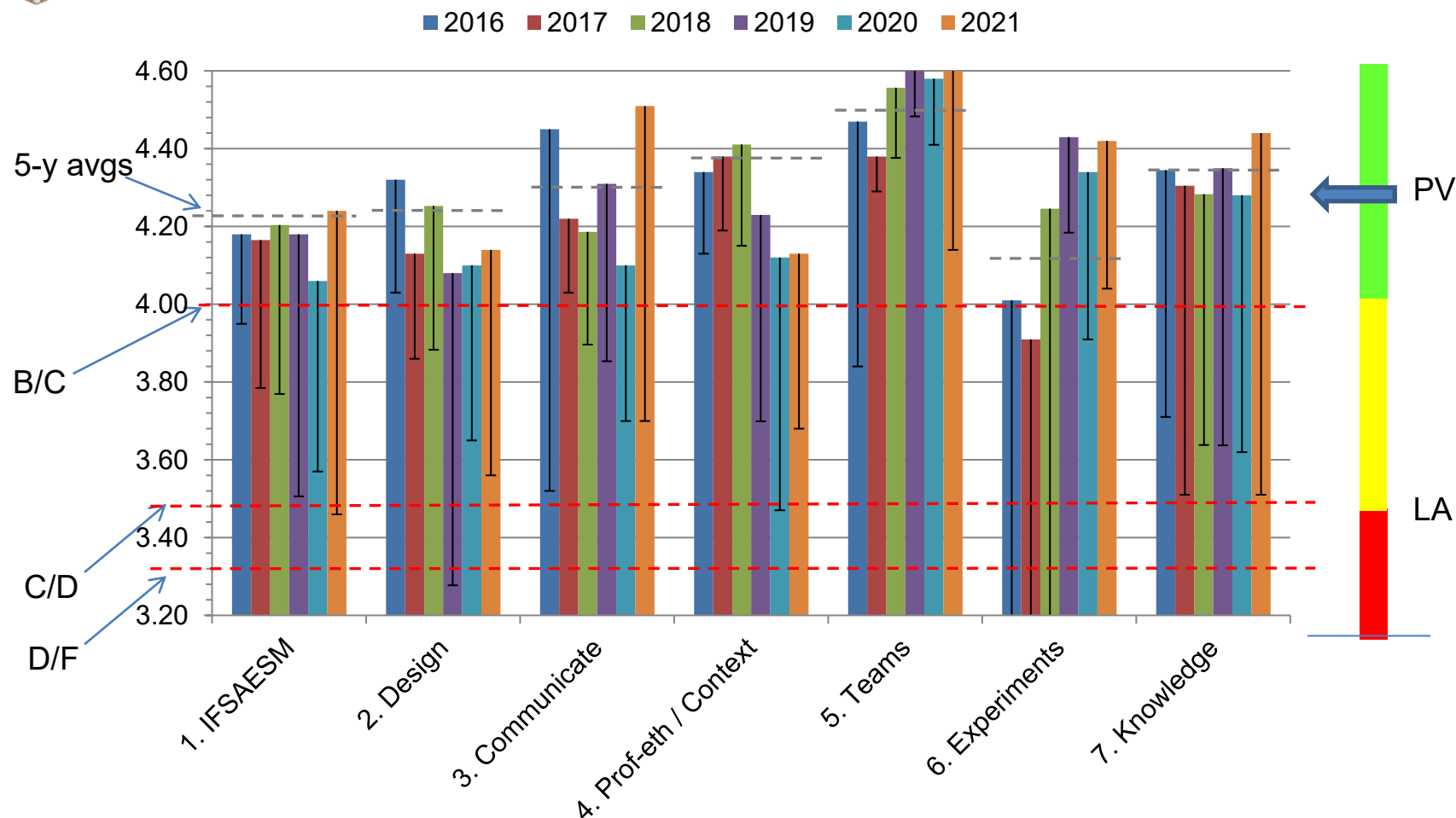
0: No coverage or correlation

Data shown here is for Class of 2021
Similar data is collected for all 7 ABET student outcomes
Summary of all data is shown on next slide



Performance on Embedded Indicators

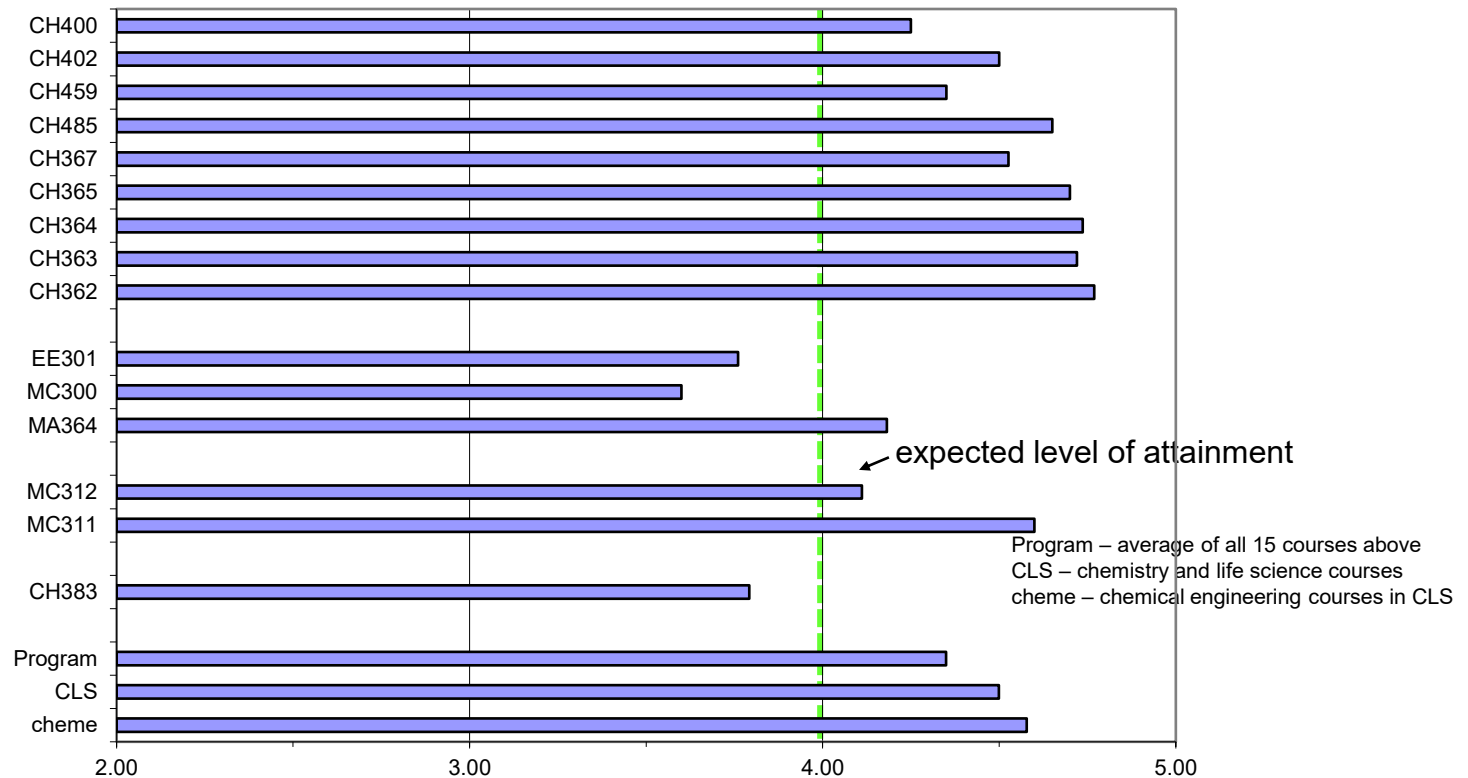
Program Averages AY2016-21



Error bars are minimum scores from courses.



This course has improved my ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

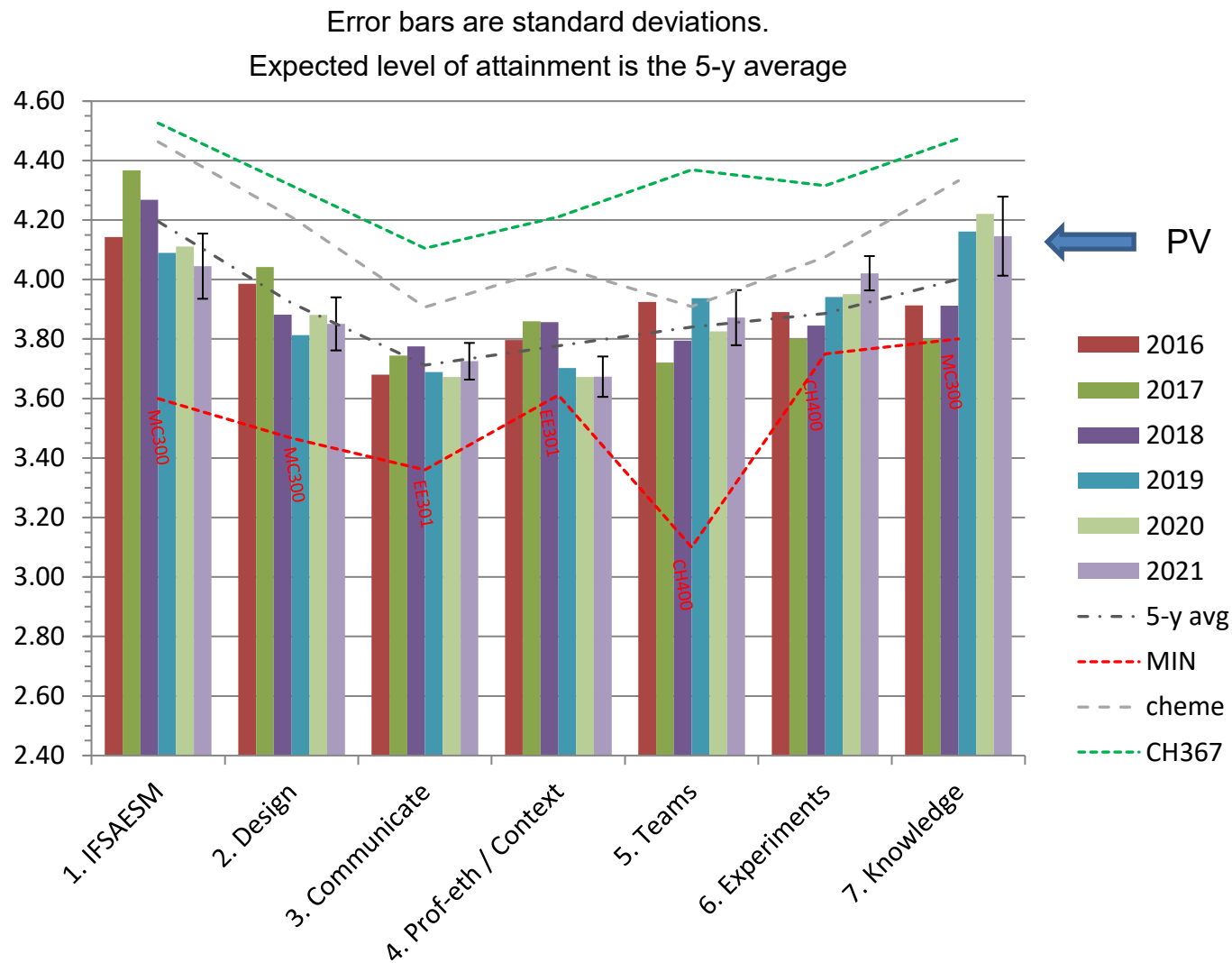


Data shown here is for Class of 2021
Similar data is collected for all 8 ABET student outcomes
Summary of all data is shown on next slide



End-of-Semester Surveys

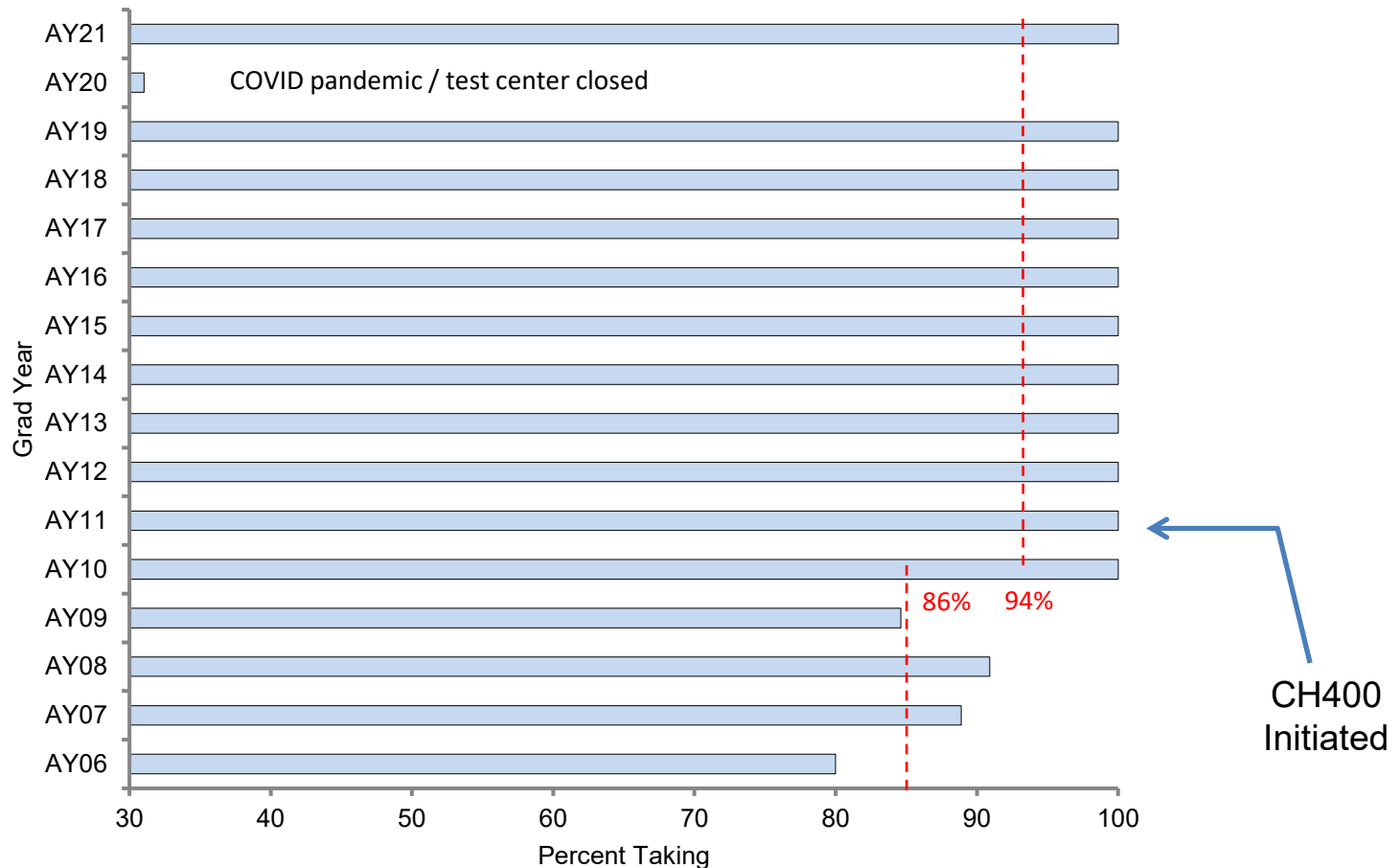
Program Aves. From AY16-AY21





Student Outcome 7: Acquire and apply new knowledge as needed, using appropriate learning strategies

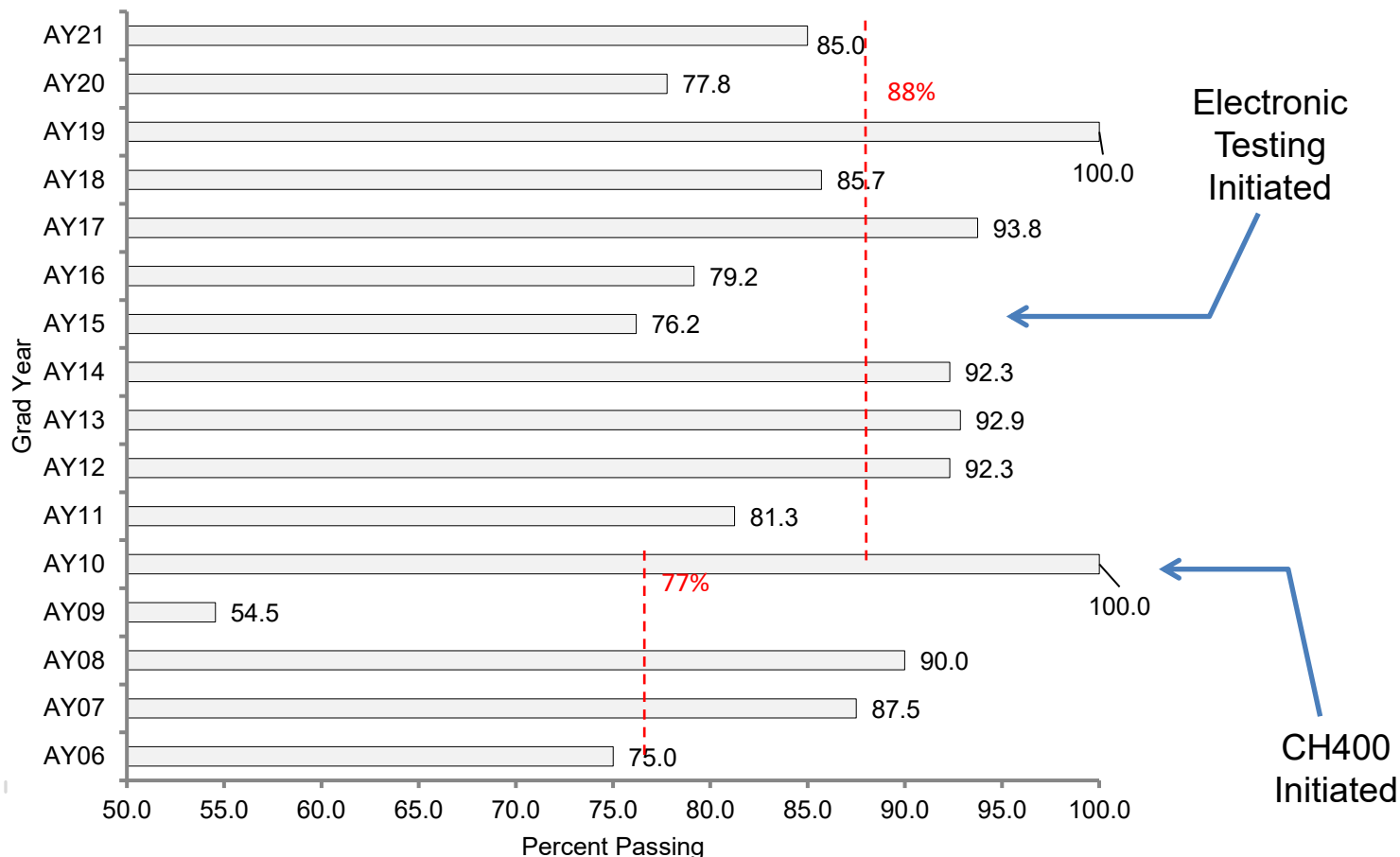
Percent of cadets taking the FE Exam





Student Outcome 7: Acquire and apply new knowledge as needed, using appropriate learning strategies

Percent of cadets passing the FE Exam

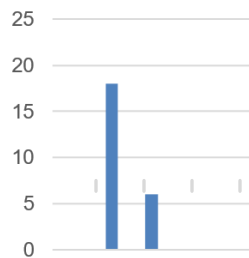


National, (+/- ~1%):

2021 74.0%
2020 74.6%
2019 77.0%
2018 75.0%
2017 74.0%
2016 79.0%
2015 77.4%

2014 89.0%
2013 86.3%
2012 85.1%
2011 87.0%
2010 87.0%
2009 84.0%
2008 87.0%
2007 87.0%
2006 87.0%

Question 4

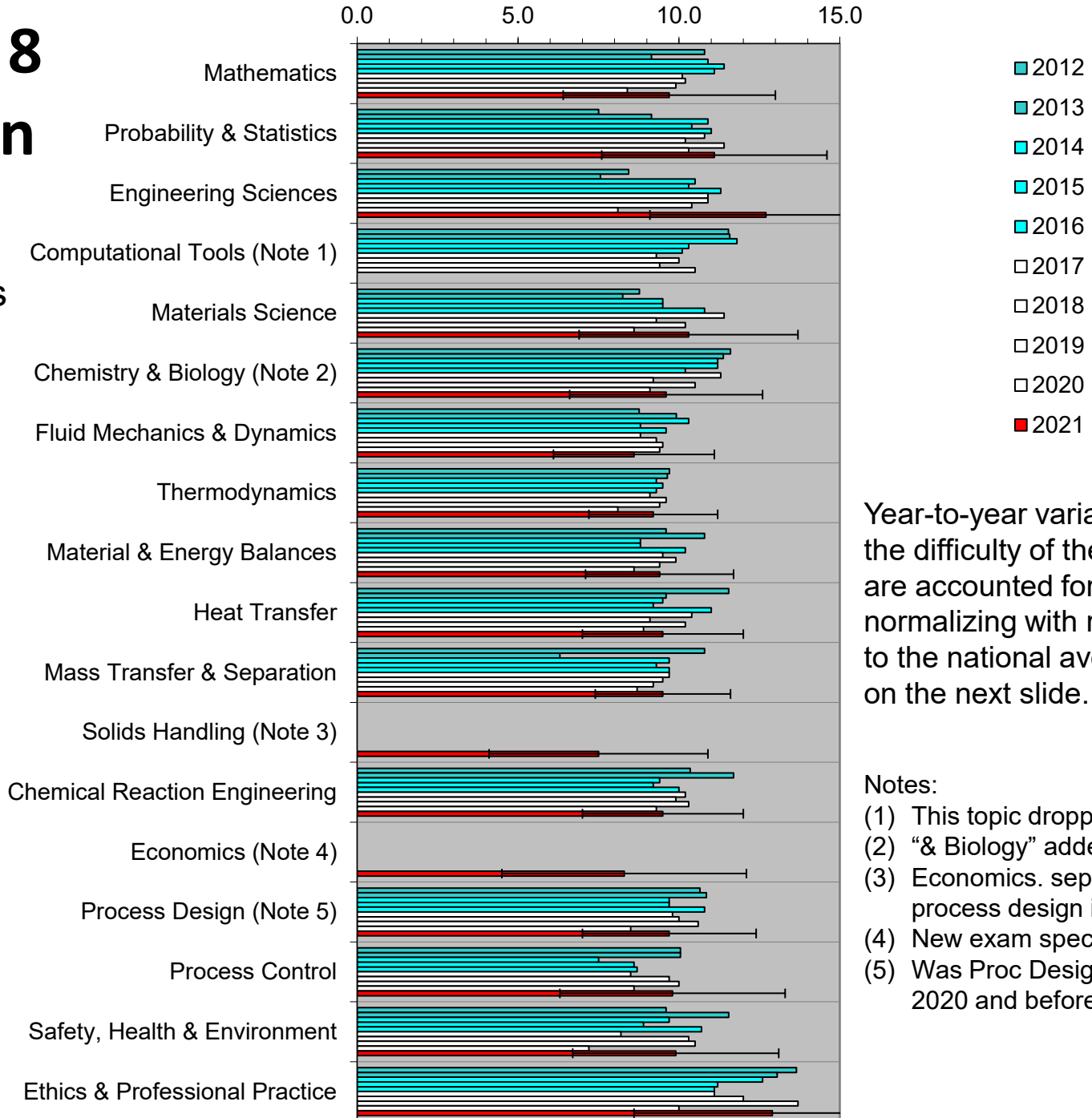


Question 4, Post FEE Survey: For the questions on the exam that seemed new to you, were you able to learn the material on the spot?

Outcome 8 Evaluation

FEE Results by Topic

AY12 to AY21



Year-to-year variations in the difficulty of the exam are accounted for by normalizing with respect to the national average on the next slide.

Notes:

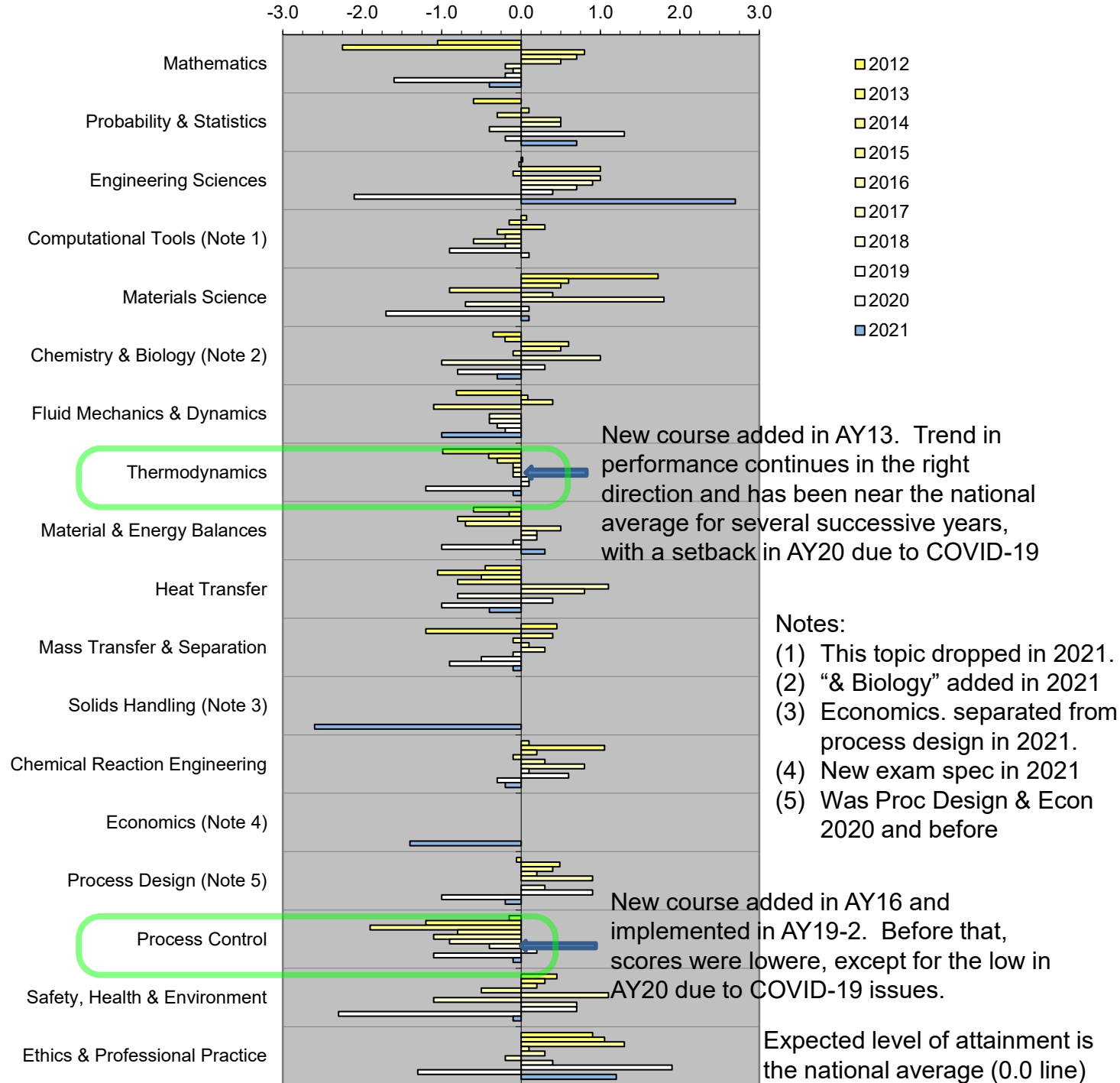
- (1) This topic dropped in 2021.
- (2) "& Biology" added in 2021
- (3) Economics. separated from process design in 2021.
- (4) New exam spec in 2021
- (5) Was Proc Design & Econ 2020 and before

The error bars are the individual standard deviations for the AY21 data.

The average standard deviation over all data is 3.0.

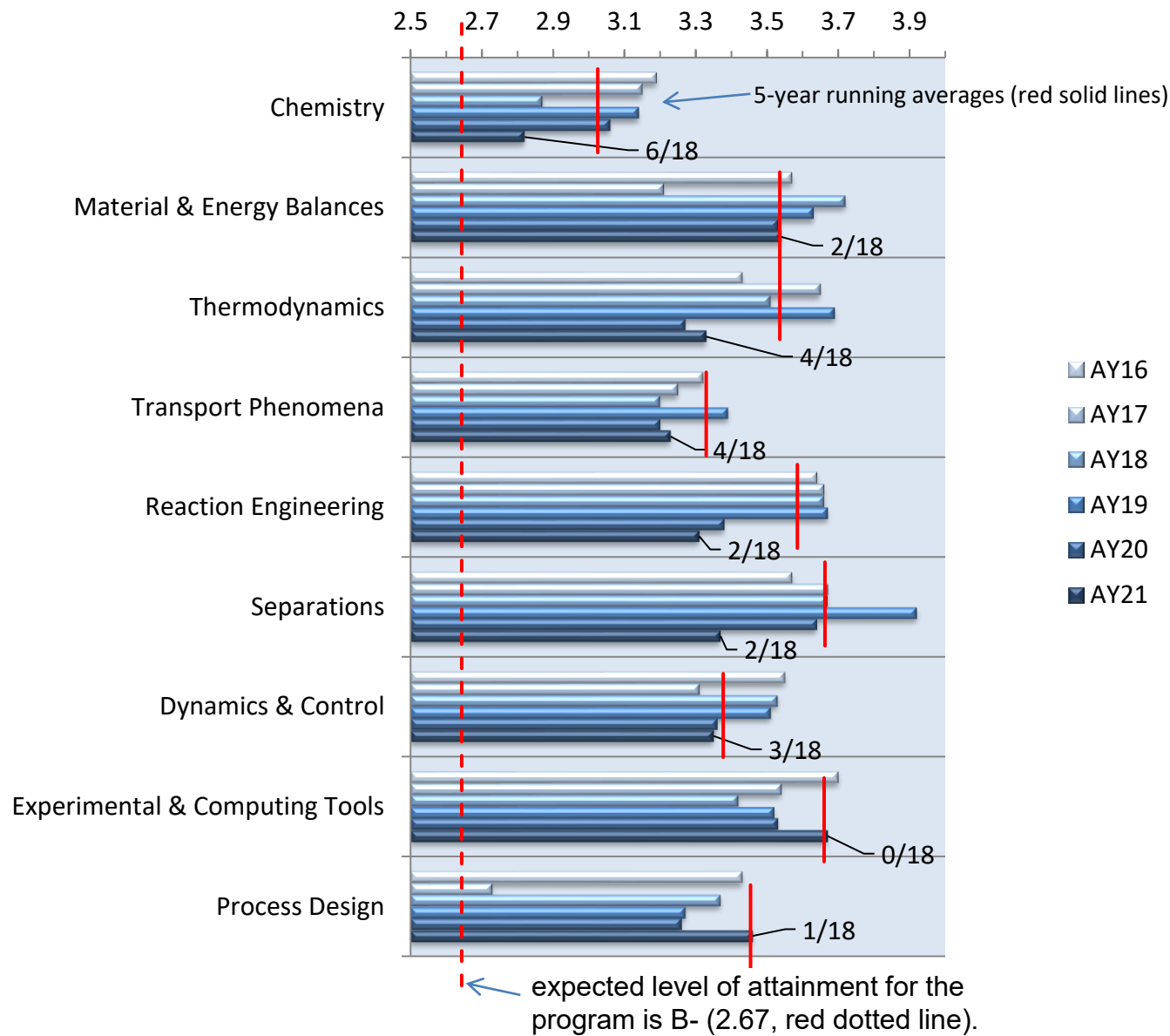
Topical Outcomes Evaluation

Deviations from National Averages
AY12 to AY21





Average GPA from Transcripts, AY2016 to AY2021



| Letter Grade | Grade Point Conversion: |
|--------------|-------------------------|
| A+ | 4.33 |
| A | 4.00 |
| A- | 3.67 |
| B+ | 3.33 |
| B | 3.00 |
| B- | 2.67 |
| C+ | 2.33 |
| C | 2.00 |
| C- | 1.67 |
| D | 1.00 |
| F | 0.00 |

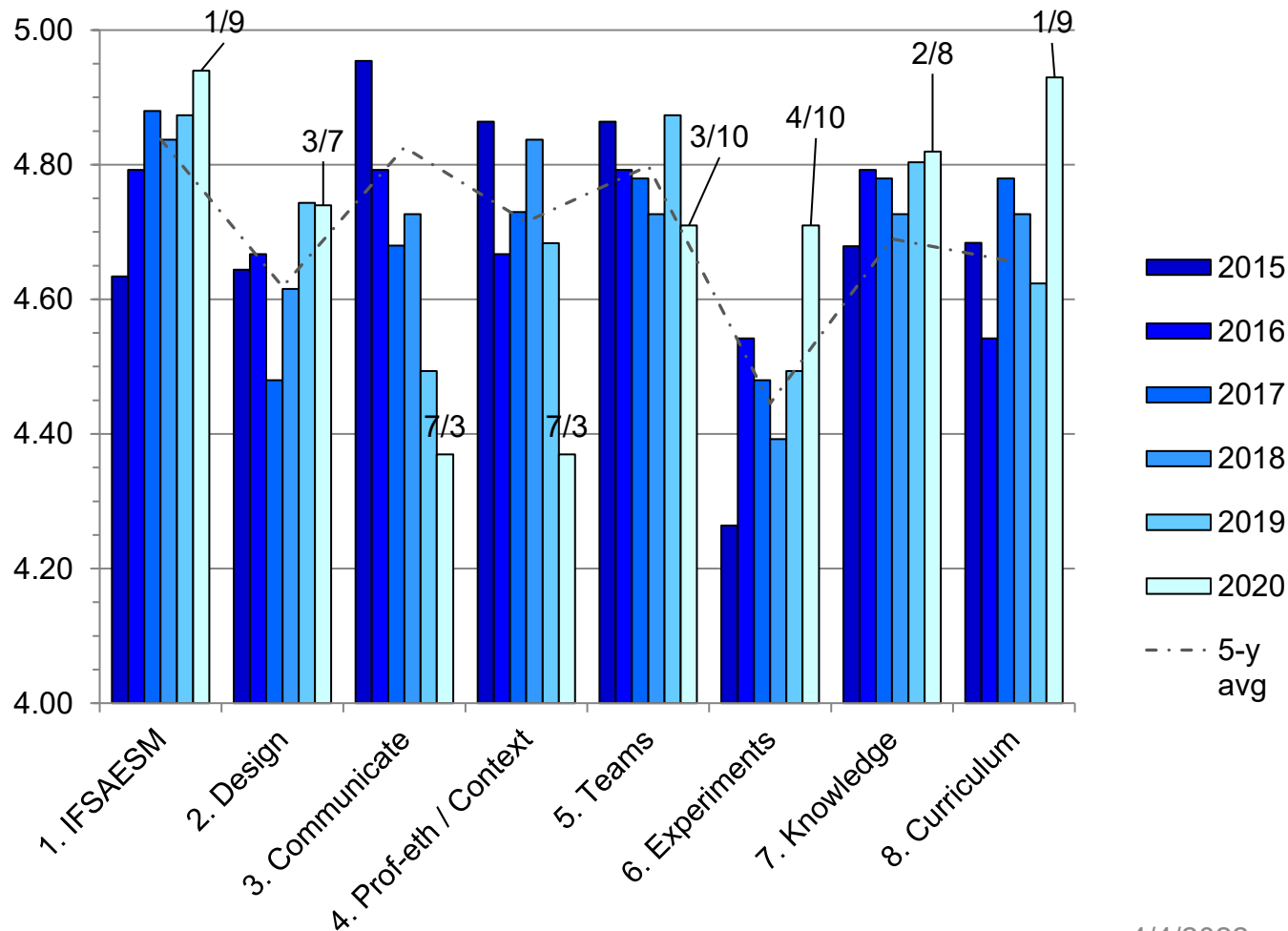


Advisory Board Student Outcomes Surveys

Student Outcomes 1-8

Program Averages from AY15-20

Data labels are response frequencies for 4 or 5 (# of 4s / # of 5s) on the 1-5 Survey Likert Scale
Standard deviations range from .32 to .50

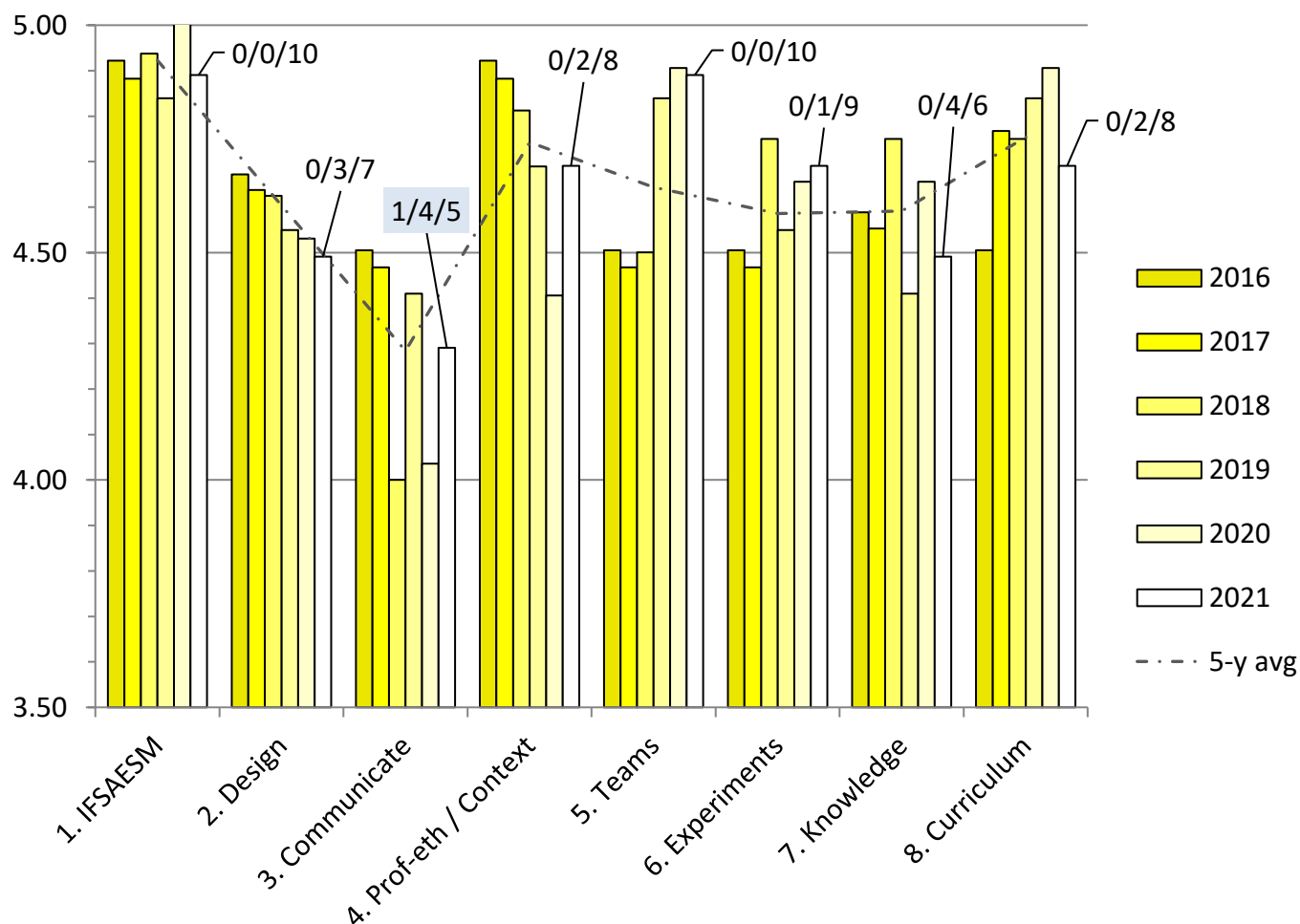




Student Outcomes 1-8

Program Averages from AY16-21

Data labels are response frequencies on the 1-5 Survey Likert Scale (# of 3 / # of 4 / # of 5).
The average standard deviation is 0.46 and ranges from .00 to .70.





Advisory Board Completes Survey Part 1



The program must have published program educational objectives that are consistent with the mission of the institution, the needs of the program's various constituencies, and these criteria.

There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program's constituents' needs, and these criteria.



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. Succeed in graduate school or advanced study programs.
4. Advance their careers through clear and precise technical communication.

Advisory Board Recommended: October 2012



Program Surveys

Program Advisory Board Surveys

Program Faculty Surveys

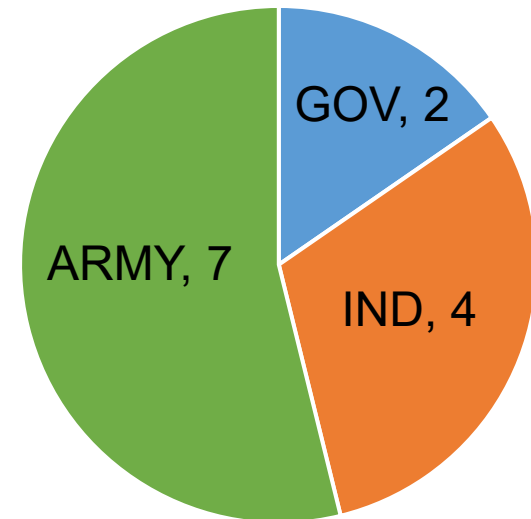
Program Cadet Surveys



Advanced Individual Academic Development (AIAD)



- Lawrence Livermore National Lab
- Sandia National Lab
- Army Research Labs
- Picatinny Arsenal
- BAE Systems – Radford AAP
- BAE Systems – Holston AAP
- Southern Polymer
- Uniform Color Company
- Renewable Energy Group





Advisory Board Completes Survey Part 2



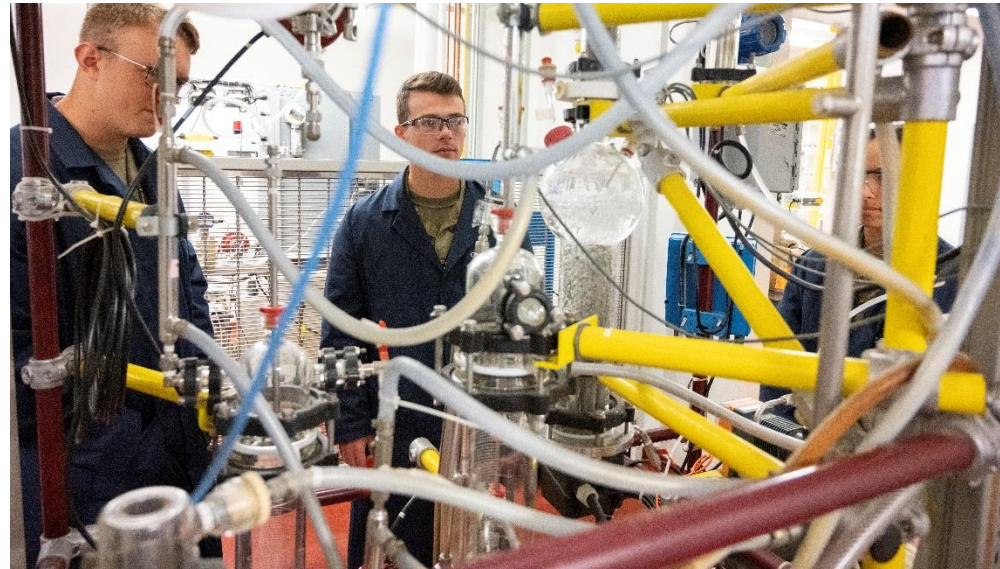
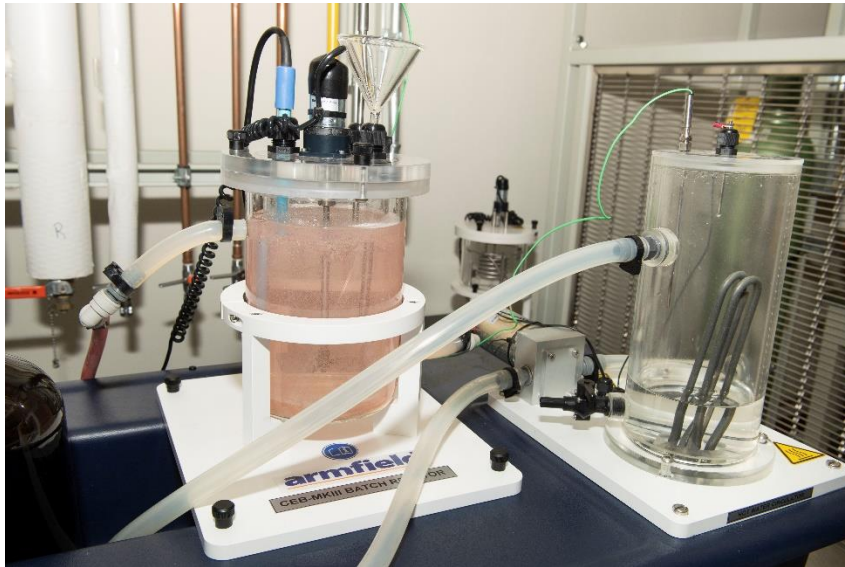
Concept (flexible) of discussions

~ 1000-1045 Board ask questions of cadets

Any courses in curriculum cadets are unhappy with?

Any general issues with the program they would like to discuss?

~ 1045-1115 Cadets ask questions of board



- Lunch:**
1. Cold cut Italian mix sandwiches and wraps
 2. Mixed salad
 3. Chips: regular/barbeque/sour cream & onion/Cheetos/Doritos
 4. Iced tea/soda/water/coffee
 5. Cookie plate



UNITED STATES MILITARY ACADEMY
WEST POINT

Chemical Engineering



Advisory Board Meeting 7-8 APR 2022

4. Future Challenges

**United States Military Academy
Department of Chemistry and Life Science**



- #1 Most Accessible Professors**
- #2 Best College Library**



- #1 Public College in the country**
- #6 Liberal Arts Universities**
- #11 In the Northeast**
- #14 Overall College in the country**

Academic Excellence



- #2 Top Public Schools (Liberal Arts)**
- #3 Best Undergrad Engineering Program**
- #4 Civil Engineering Program**
- #7 Mechanical Engineering Program**
- #19 National Liberal Arts College**



Governmental Strategic Guidance

- President
- Congress
- Department of Defense
- Government Agencies (e.g., NSA, FBI, CIA, ...)

Department of the Army

- Army Goals and Priorities
- Army Regulations
- Army Doctrine

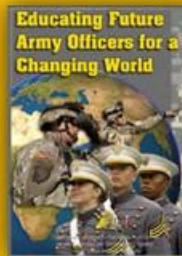
Higher Education Communities

- Professional Societies
- Accreditation Agencies
- Best Practices
- Peer Institutions

West Point Mission and Strategic Plan

Academic Program Vision and Strategic Plan

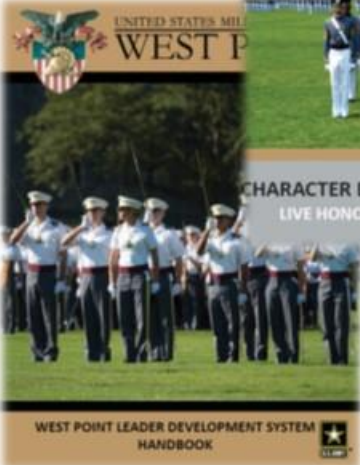
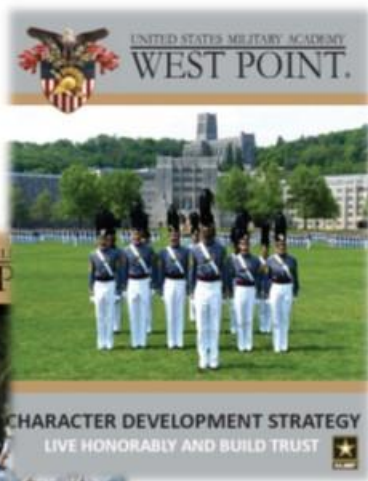
Academic Program Goals



Core Courses

Academic Majors

Enrichment Experiences





- ABET Criteria changed this year, officially
 - Critical change is the reduction of dedicated engineering credit hours from 48.0 to 45.0
- Also, the Student Outcomes, what graduates of programs are expected to be able to do upon graduation, have changed
 - Fundamentally the same, but some consolidation, wording changes, and enhancements that may impact the collection of some assessment data
 - We already leaned forward to include the new SOs in our AY19 assessments, and are currently utilizing during AY20 record year.



| | AY22 | AY23 | AY24 | AY25 | AY26 | AY27 | AY28 |
|------------------|------------|------------|-----------|-----------|-----------|-----------|-----------|
| Burpo | X | X | X | X | X | X | X |
| Biaglow | X | X | X | X | X | | |
| Lachance | ? | ? | ? | ? | ? | ? | ? |
| Nagelli | X | X | X | X | X | X | X |
| James | X | X | X | X | X | X | X |
| Yuk | X | X | X | X | X | X | X |
| Belanger | | X | X | X | | | |
| Cowart | X | X | X | X | X | X | X |
| Armstrong | X | | | | | | |
| Chin | X | X | | | | | |
| Yi | X | X | | | | | |
| Bowers | X | X | X | | | | |
| Mandes | X | X | X | | | | |
| Golonski | | | | X | X | X | |
| Rogers | | | | | X | X | X |
| Totals | 11+ | 11+ | 8+ | 7+ | 7+ | 6+ | 6+ |



- Spring AY20-2 transition to remote learning
- Cadets left for Spring Break 6MAR→ came back JUN20
- 10/30 Class of '20 chemical engineers took FEE
- Fall AY21-1 was a combination of in person, fully remote and hybrid
- Fall AY21-1 no TEE in chemical engineering courses
- Spring AY21-2 first 10 days remote
- Hybrid/remote for remainder of Spring AY21-2 semester



Implementing Schedule Change

- Since AY19 the Academy's 1-day/2-day schedule has changed
 - Now 40x 1-days and 30x 2-days
 - **Some courses have shifted to a 30-lesson sequence (CH363; CH485), IOT deconflict cadet schedules**
- The additional 10 2-days are now 'Study Days'
- Biggest impact on Chemical Engineering is CH459 (ChemE Laboratory)
 - Back-to-back sections: experiment reset time?
- Major impacts to core classes, CH101/102
 - Full impact on base knowledge and understanding uncertain



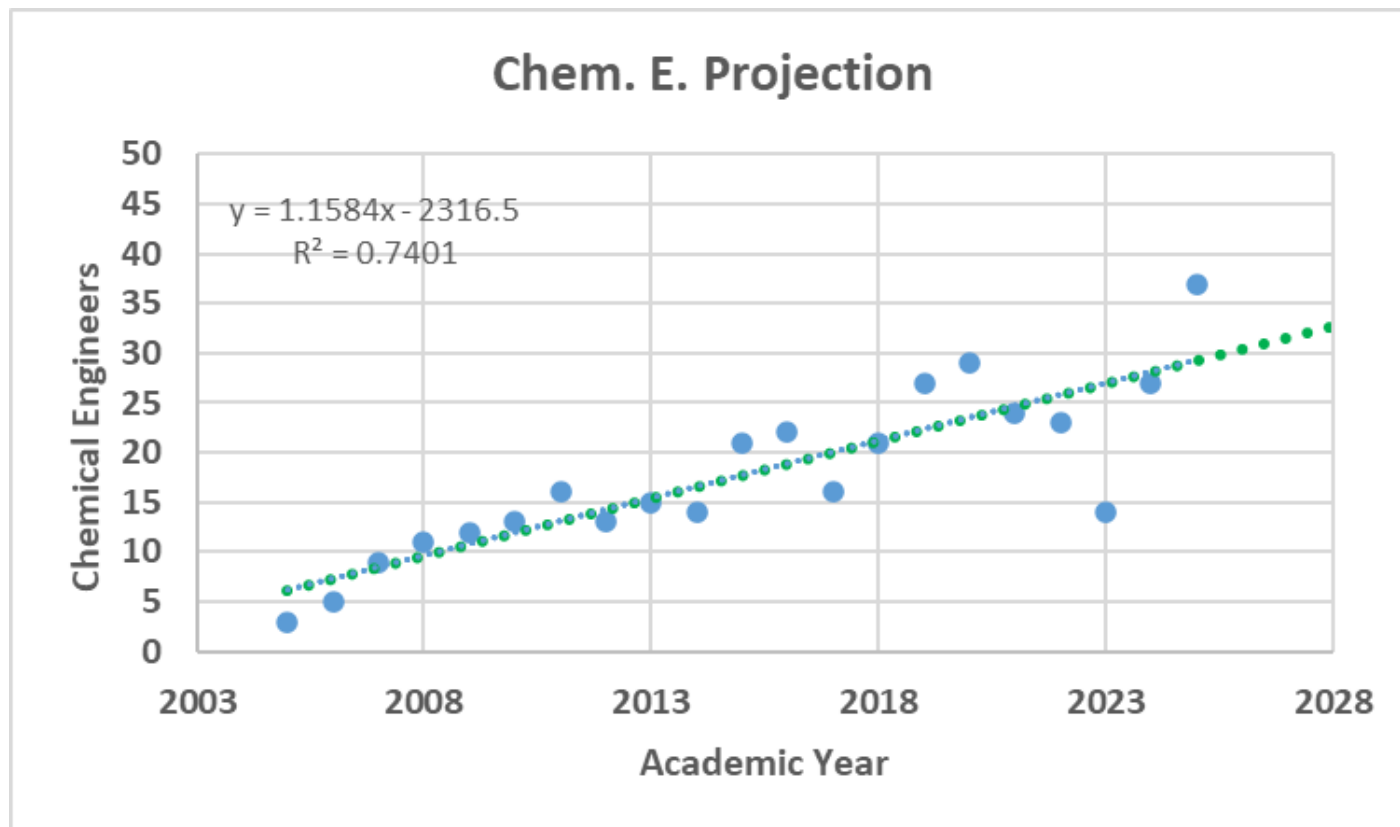
1. **Stabilized** at ~40 +/- (1-5) cadets per class year; if >40 establish OML; Recommended GPA: ~2.3
2. Chemical engineering **faculty**:
 - a. Senior faculty: AP; 2nd time rotators; Associate Professors; Title 10s; PhDs. Teach chemical engineering course 3-6 years in a row.
 - b. Junior faculty: 1st time rotators. Teach CH101/102 (not both); collaborate with Senior Faculty on research. No CH102 without CH101.
 - c. Minimize churn; "Do less better."...Stability; efficiency; optimization; transparency
3. Curriculum:

Bioengineering

 - a. 3x Bio.-Eng. track: CH300, CH350, CH4; validate the ET credit
 - b. Stand up bioengineering sequence
 - c. Stand up bioengineering major
 - d. Currently: Bio.-Eng. AP search; Ongoing Title10 hiring action

Chemical Engineering:

 - a. Expand CH400 to 3.0 credits
 - b. Expand CH459 to 4.0 credits – cadet feedback
 - c. Expand CH402 to 7.0 credits (2 sem.)
 - d. Other Chem E. electives: (Numerical methods; explosives)
4. Pedagogy:
 - a. Intensive problem solving with instructors as coaches and role models
 - b. classroom/lab workshop experience (theory + demo + practice)
 - c. faculty demonstrate proficiency at problem solving as well as depth of knowledge; multi-year faculty development
5. **Ranked** undergraduate program
 - a. ABET recertifications (15-19 NOV20); maintain ABET efforts; assessment; strength use of SSI software/CHEMCAD
 - b. Establish "footprint" at National level conferences: AIChE; SOR; ACS & communicate USMA Chem. E. vision to other Universities
 - c. Get more Chemical Engineers PEV training here (James, Nagelli)
 - d. **Maintain** BH331 computer room; chemical engineering work/research space (Applications Rm.; BH136); Network
6. AIChE Club stability...and consistency of student involvement; strength of last ABET certification in 2014





- Cadets have expressed ongoing interest in more bioengineering electives
- Currently have 3 engineering electives in our major (to meet ABET requirements; 9 credit hours)
- ABET change lowered the required number of strictly engineering credit hours to 45
 - Options: retain engineering elective (at least in short term, will do so)? Chemistry elective? MSE at large? Others?



- **CH450** Bioengineering Modeling and Analysis added to Redbook (*more details next slide*)
- Numerical Methods for Chemical Engineering Problems
 - Enhance cadet experience with computational tools (MMA, Matlab)
 - Ready to execute
 - FEE data seems to support this
- Chemical Explosives
 - Taught before, ready to execute with instructor prep

CH300: Introduction to Biomedical Engineering

Course Director: TBD

Course OIC: MAJ Jeffrey Chin

Credit Hours: 3.0 (BS=0, ET=3.0, MA=0)

Prerequisites: CH102, MA205

Co-requisite: None

Lessons: 30 @ 75 min

Special Requirements: None

This course provides a basis for understanding the application of engineering principles to problems in medicine and biology. It provides preparation for future graduate work in medical school, biomedical engineering, and chemical engineering. Specifically, the objectives of the course are: (1) to provide an introduction to the field and how it relates to other fields of engineering and science, (2) the develop the ability to apply mathematics, science, and engineering to solve problems, (3) to develop an understanding of the impact of engineering solutions on the medical field and society as a whole, and (4) to understand current topics within the field.

COA 1

Block I: Molecular and cellular principles

- Biomolecular principles (Ch. 2)
- Biomolecular principles: Nucleic acids (Ch. 3)
- Biomolecular principles: proteins (Ch. 4)
- Cellular principles (Ch. 5)

Block II: Physiological principles

- Communication systems in the body (Ch. 6)
- Engineering balances: respiration and digestion (Ch. 7)
- Circulation (Ch. 8)
- Removal of molecules from the body (Ch. 9)

Assessment – Graded Events

| | | |
|-------------------------|------|-------|
| 6 *HWs@ 50 pts each | 300 | 21.4% |
| 2 *WPRs @ 200 pts each: | 400 | 28.6% |
| 1 *Capstone | 200 | 14.3% |
| 1 *TEE | 500 | 35.7% |
| Total: | 1400 | |

| | | |
|----------------------|------|------|
| *Individual Points : | 1400 | 100% |
|----------------------|------|------|

TEXT: Biomedical Engineering, 2nd Edition, by W. Mark Saltzman; Cambridge University Press, 2015.

COA 2

Block I: Molecular and cellular principles

- Biomolecular principles (Ch. 2)
- Biomolecular principles: Nucleic acids (Ch. 3)
- Biomolecular principles: proteins (Ch. 4)
- Cellular principles (Ch. 5)

Block II: Physiological principles

- Communication systems in the body (Ch. 6)
- Engineering balances: respiration and digestion (Ch. 7)
- Circulation (Ch. 8)
- Removal of molecules from the body (Ch. 9)

Block III: Biomedical Engineering

- Biomechanics (Ch. 10)
- Bioinstrumentation (Ch. 11)
- Bioimaging (Ch. 12)
- Biomolecular Engineering I: Biotechnology (Ch. 13)
- Biomolecular Engineering II: Engineering of Immunity (Ch. 14)

CH350: Introduction to Bioengineering

Course Director: Dr. Simuck Yuk

Credit Hours: 3.0 (BS=0, ET=3.0, MA=0)

Prerequisites:

Co-requisite: None

Lessons: 30 @ 75 min

Special Requirements: None

The purpose of this course is to provide the introductory knowledge for understanding the biotechnology/bioprocessing engineering. Topic includes enzyme kinetics, molecular biology, cell growth, bioreactors, and bioprocesses. The bioprocess control and its application to different biological systems are covered in the classroom instruction. An important emphasis is made on the use of kinetics and process controls on the biological systems for engineering application.

Topics – by Chapter

Bioprocess Engineering Basic Concepts, 3rd Ed., by Michael L. Shulter, Fikret Kargi, Matthew DeLisa, Prentice Hall.

Quantitative Fundamentals of Molecular and Cellular Bioengineering, by K. Dane Wittrup, Brice Tidor, Benjamin J. Hackel, and Casim A. Sarkar, The MIT Press.

- Introduction
- Enzyme Kinetics
- Central Dogma to Molecular Biology
- Cell Growth
- Bioreactor Selection
- Bioprocess Consideration

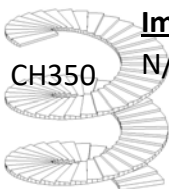
Course Assessment – Items from Section III

Sustain:

N/A at this point.

Improve:

N/A at this point.



Assessment – Graded Events

| | | |
|--|------|---------|
| 1 *Capstone Presentation | 200 | 14% |
| 2 *WPRs | 400 | 28% |
| 5 *After-class Problem Sets(20pts/ea.) | 100 | 7% |
| 5 *In-class Problem Sets (50pts/ea.) | 250 | 17% |
| 1 *Term End Exam | 500 | 34% |
| Total: | 1450 | 100.00% |

CH450: Bioengineering Modeling and Analysis

Course Director: COL John Burpo

Credit Hours: 3.0 (BS=0, ET=3.0, MA=0)

Prerequisites: CH102, MA205

Co-requisite: None

Lessons: 30 @ 75 min

Special Requirements: None

This course provides a broad understanding of bioengineering disciplines to include biomechanics, biomaterials, tissue engineering, biocatalysis, biochemical engineering, and biosensors. Fundamental concepts of molecular kinetics, thermodynamics, and mass transport are applied in problem sets in each bioengineering sub-discipline and capstone design project providing students the opportunity for modeling, analysis, and design from the biomolecular to physiological length scale and across multiple time scales. Modeling software such as MATLAB and Mathematica is extensively used.

Topics – by Chapter

TEXT: Introduction to Biomedical Engineering, 3rd Edition, by John Enderle and Joseph Bronzino; Academic Press, 2012.

- Part I: Biomechanics (Ch. 1 and 4)
- Part II: Biomaterials (Ch. 5)
- Part III: Tissue Engineering (Ch. 6)
- Part IV: Biomedical Enzyme Kinetics (Ch. 7 and 8)
- Part V: Biochemical Engineering (Handouts)
- Part VI: Biosensors (Ch. 10)

Course Assessment – Items from Section III

Sustain:

- Best looking Dept Head/ CD/ Prof at the academy
- Strong instructor personal experience in mathematics, engineering, and chemistry
- Each lesson considers interdisciplinary science and engineering topics –science topics are taught in context of engineering applications

Improve:

Assessment – Graded Events

| | | |
|------------------------------|------|-------|
| 5 *Problem Sets@ 25 pts each | 500 | 47.2% |
| 6 *Quizes @ 200 pts each: | 180 | 17.0% |
| 1 *Paper | 150 | 14.1% |
| 1 *Presentation | 50 | 4.7% |
| 6 *Discussion | 180 | 17.0% |
| Total: | 1060 | |
| *Individual Points : | 1060 | 100% |



- **Bio-Engineer Title 10 Ph.D. Spring 2020**
- **Bioengineer Academy Professor Spring 2021**
- **Stand up bioengineering track (1-2 years)**
 - CH300
 - CH350
- **Bioengineering sequence (2-5 years)**
- **Bioengineering minor/ major (7 – 10 years)**



- Fullbright Scholarship Semifinalist
- Anna Sobol Levy Scholarship
- Rotary Scholarship – Semifinalist
- Tau Beta Phi Honor Society

Co-Authored Conference Proceedings and Publications

- F. John Burpo*, **Anchor R. Losch**, Enoch A. Nagelli, Stephen J. Winter, Stephen F. Bartolucci, Joshua P. McClure, David R. Baker, Jack Bui, Alvin R. Burns, Sean F. O'Brien, Brittany Aikin, Kelsey Healy, Alexander N. Mitropoulos, J. Kenneth Wickiser, Greg Forcherio, and Deryn D. Chu "Salt-Templated Synthesis Method for Porous Noble Metal Platinum-based Macrobeams and Macrotubes." *J. Vis Exp.* (Invited Paper)
- Burpo, F., Nagelli, E., **Losch, A.**, Bui, J., Forcherio, G., Baker, D., McClure, P., Bartolucci, S., Chu, D. "Salt-templated Cu-Pt Alloy Macrobeams for Ethanol Oxidation." *Catalysts*, 2019, 9(8), 662.
- Burpo, F., Nagelli, E., Bartolucci, S., Mitropoulos, A., McClure, J., Baker, D., **Losch, A.**, Chu, D. "Salt-Templated Platinum-Palladium Porous Macrobeam Synthesis." *MRS Communications*, 2019, 9(1), 280-287.



CH289/CH290: Multi-Functional Materials

CH489: Multi-Functional Materials

Fourth Class

Third Class

Second Class

First Class

Beyond

CH290

CH389/CH390

CH489/CH490

Future Engineer Officer

USMA Independent Research and Activities

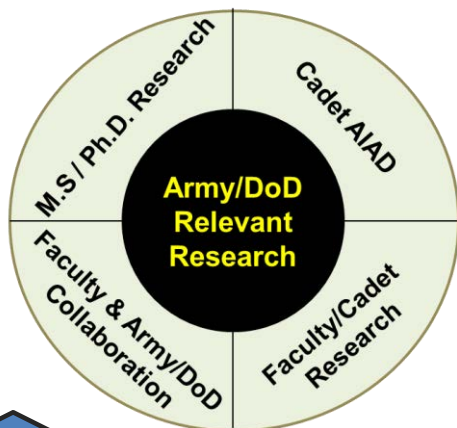
Cadet Losch researches in the Multi-Functional Materials Laboratory. She has completed synthesis work on Salt-Templated Platinum-Palladium and Copper-Platinum Alloy Porous Macrotubes, and presented at the Inter-Academy Chemistry Symposium and Projects Day. Outside of class and research, Anchor is a conductor in the Cadet Spirit Band, and President of the Model Arab League and American Institute of Chemical Engineers. As a part of the Peace and Dialogue Leadership Initiative, she has traveled to Israel and Palestinian territories to participate in a nuanced conversation about the US role in the Middle East, with a focus on Israeli-Palestinian relations, society, and culture. She studied Arabic abroad in Morocco, where she taught English at a local NGO. She travelled to Qatar with the National Council on U.S-Arab Relations on a cultural exchange program between U.S. and Qatari servicemembers. She also has completed service work in Viet Nam, Mongolia, Papua New Guinea, and the Galapagos Islands.



Future Faculty



Securing external resources through collaborations



Funded Collaborations:

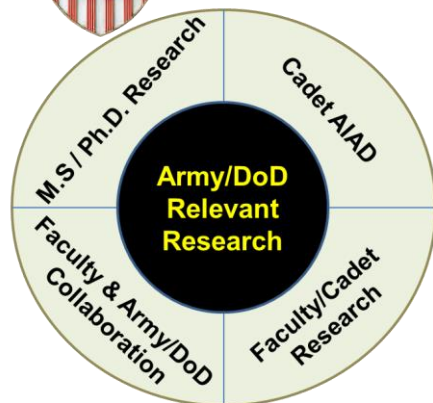
UC Santa Barbara

Florida Institute of Technology

Cornell

University of Michigan





Faculty and Cadet Developmental Model

Principal investigators with DoD supporting projects, funding, and collaborators facilitate cadet research through a progressive series of courses – **CH290** (1 CR), **CH389/390** (1.5 CR), **CH489-492** (3 CR). This course progression allows cadets to begin research as early as their first year and participate in a multi-year project. Every effort is made to link research AIAD's with the collaborating DoD labs.

*Promoting Research and Scholarship

- 10 Cadet co-authored papers in AY20
- 24 Cadet conference proceedings AY20
 - AIChE; SOR; ACS
 - 200/300/400 level research

*Modeling Institutional Values:

- Department Character development strategy
- 3 Leadership Challenge Facilitators
- 3 PL300 Mentors (25 cadets)
- 3 SLDP Developmental Coaches

*Instituting **research-based instructional practices** to support APGs and WPLDS outcomes

*Engaging with Cadets:

- Club Affiliations: 3 Faculty/2 Clubs (1 OIC)
- USMA Chapters: AIChE and ACS
- ODIA Sport: 4 Faculty/ 4 Teams
 - 1 Head OR- Men's Hockey
 - 3 Asst. OR-Swimming & Diving Rifle
 - Men's Basketball
- First-year Sponsorship Program: ~53 Cadets
- Unofficial Sponsor: >25

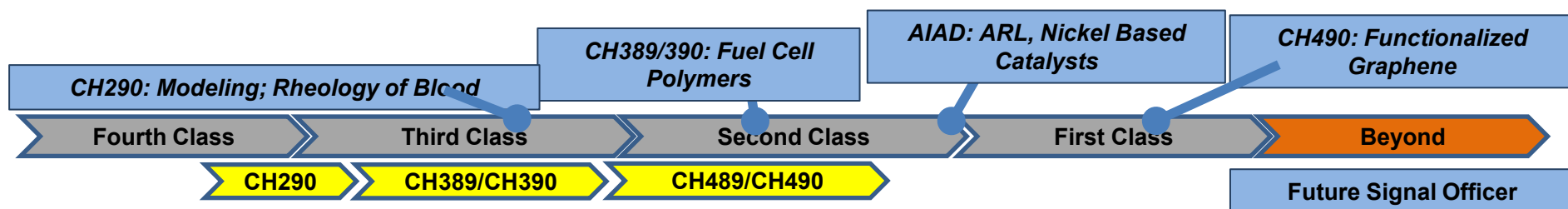
Every interaction is a developmental event



- Goldwater Scholarship Recipient
- Fullbright Scholarship Semifinalist
- Phi Kappa Phi Honor & Tau Beta Phi Honor Society

Co-Authored Conference Proceedings and Publications

1. Army Research Lab (ARL) Technical Symposium "Catalysts for fuel cell electronics". (Poster)
2. 1st Place Catalysts and Reaction Engineering, Presentation: "Nickel catalysts and graphene for lithium ion batteries". American Institute of Chemical Engineering Annual Meeting, Orlando, FL, 10-15 NOV19.
2. Manuscript in progress, "Electroless deposition of Noble Metal Nanoparticles onto Silk Fibroin Films", (to be submitted, Spring 2020)



USMA Independent Research

Cadet Dibiase has been working on a Proton Exchange Membrane (PEM) Fuel Cell project; a field of great interest for their efficiency advantages over combustion technology. However, conventional methods of electrolysis to produce H_2 and O_2 gas necessary for PEM fuel cells rely on expensive catalysts, Pt and IrO_2 . Despite exceptional efficiency of these catalysts, their high costs prevent industry scale up and production. We present alternative Ni-based catalysts to replace Pt and IrO_2 . Of the Ni catalysts characterized, NiS and NiFe LDH together provided the smallest total overpotentials of 1.7 V (vs SHE) for Hydrogen Evolution Reactions (HER) and Oxygen Evolution reactions (OER), respectively. However, Linear Sweep Voltammetry illustrated that NiFe LDH had the lowest overpotential of the two, contributing only 0.3 V to the total overpotential. Nevertheless, the total overpotential of 1.7 V is still only 0.2 V above the industry standard of 1.5 V from a combination of Pt and IrO_2 .



Future Faculty

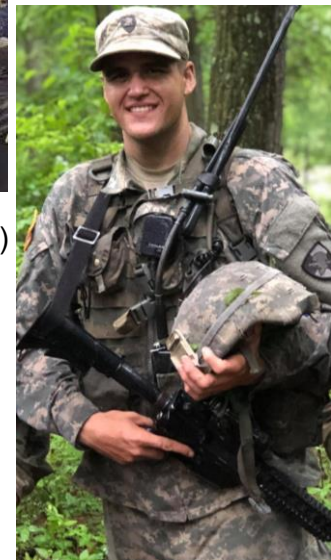




- Won Stamps Scholarship
- Won Goldwater Scholarship
- Tau Beta Pi Honor Society
- Phi Kappa Phi Honor Society
- Phi Sigma Iota Society
- Won Churchill Scholarship

Co-Authored Publications

1. Cellulose Nanofiber Biotemplated Palladium Composite Aerogels. *Molecules*, 23(6)
2. Gelatin biotemplated platinum aerogels. *MRS Advances*, 1-6.
3. A Rapid Synthesis Method for Au, Pd, Aerogels Via direct Solution-Based Reduction. *Journal of visualized experiments: JoVE*, (136).
4. Direct solution-based reduction synthesis of Au, Pd, and Pt Aerogels. *Journal of Materials Research*, 32(22).



**Australia; Renewable Energy Lab
Sweden: Water NEXUS conference**

**Harvard AIAD; Disease
biophysics groups**

Fourth Class

Third Class

Second Class

First Class

Beyond

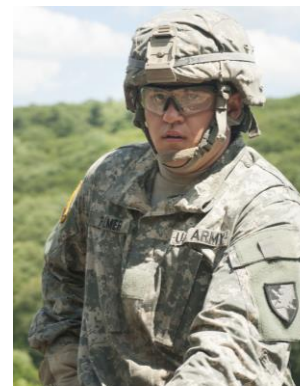
CH290

CH389/CH390

CH489/CH490

USMA Independent Research

Jesse has collaborated with the Army Research Labs (ARL) in Adelphi, MD to produce biosensors and has developed novel Kevlar-cellulose composites with Harvard's Disease Biophysics group. As a recipient of Goldwater and Stamps Scholarships Jesse has used his academic funding to attend World Water Week in Stockholm, Sweden and visit the University of New South Wales in Sydney, Australia to pursue his interest in water desalination. Jesse is also completing a minor in Eurasian Studies. He plans on attending graduate school to develop batteries to enhance prosthetic limbs serving wounded veterans.



Field Artillery Officer



Future Faculty



**Pre-approved elective sequences,
but ultimately cadet choice (can choose any 3)**

Materials Engineering

MC364 Mechanics of Materials
MC380 Engineering Materials
Open Elective

Nuclear Engineering

NE300 Nuclear Reactor Analysis
NE350 Nuclear Reactor Design
NE450 Nuclear Systems Design

Decision Analysis

SE301 Foundations of Engineering Design
& Systems Management
SE 481 Systems Simulation
EM484 Dynamic Systems Analysis

Advanced Control Systems

EE360 Digital Computer Logic
EM484 Dynamic Systems Analysis
XE475 Mechatronics

Energy Conversion Systems

EE377 Electrical Power Generation
ME472 Energy Conversion Systems
ME480 Heat Transfer

Power Systems

ME306 Dynamics
ME491 Mechanical Power Plants
EE377 Electrical Power Generation
XE442 Alternative Energy Engineering

Industrial Engineering

SE301 Foundations of Engineering Design
& Systems Management
EM411 Project Management
EM420 Production Operations Management

Other Advanced Engineering Electives

Satisfy prerequisites
Engineering Science or design = 3.0 credits
Program director approval



- Next Advisory Board on-site
 - Late April/Early May 2023...close out Class of '22
- Travel Paperwork/Dinner settle
- Tour of Unit Operations Lab...UTC



End of Section 4



UNITED STATES MILITARY ACADEMY
WEST POINT

Chemical Engineering



**Advisory Board Meeting
7-8 APR 2022**

Thank you!

United States Military Academy
Department of Chemistry and Life Science



UNITED STATES MILITARY ACADEMY
WEST POINT

Back Up Slides

Restaurant
19|15
and Blue Roof Bar

M E N U

CLASSIC FRENCH ONION SOUP \$8

Beef broth, Madeira, Gruyere

CHEESE & CHARCUTERIE BOARD \$18

*Local & Imported Cheeses, Artisan Meats, Honeycomb,
Olives, Fig Cake, Toasted Baguette, Grissini*

OPEN FACE STEAK SANDWICH \$15

*Beef Tenderloin, Caramelized Onion & Blue Cheese Relish,
Toasted Sourdough, au Jus*

CRISPED CHICKEN QUESADILLA ROLL \$8

Pepper Jack, Tomatillo Salsa

ANGUS BEEF BURGER \$12

*5 Spoke Creamery Cheddar (Goshen NY), Brooklyn Pickle,
Potato Bun, Hand Cut Fries*

PORK BACK RIBS \$12

Ginger & Soy Marinade, Pickled Vegetable Salad

| Date | Time | Event | Location | OIC | Task |
|-------|-------------|---|---|--|---|
| 13APR | NLT1700 | Pick up 15 PAX van | Motorpool | MAJ Yi/ MAJ Bowers | |
| | 1730-1745 | Pick up Board Members From Hotel | Holiday Inn Express | MAJ Yi/ MAJ Bowers | Transport of Board Members to Bear Mountain Inn |
| | 1800 - UTC | Dinner | Bear Mountain Inn Fort Montgomery, NY | Dr. Nagelli | Reservation (MAJ Mandes) |
| 14APR | 0730 | Pick up Board Members From Hotel | Holiday Inn Express 1106 Route 9W Fort Montgomery, NY (845) 446 - 4277 | MAJ Yi/MAJ Bowers | Pick Up Board (Yi/Bowers) Escort to BH465 (Dr. Nagelli) |
| | 0745 - 0800 | Arrival and Coffee/Light Breakfast Items | Bartlett Hall 465 (table side) | Dr. Nagelli, LTC Cowart | Light Breakfast Items (Dr. Yuk) |
| | 0800 - 0830 | Session 1: Introductory remarks and ABET orientation | BH465 | COL Burpo & COL James, Dr. Nagelli/LTC Cowart | |
| | 0830 - 0920 | Session 2: Assessment & Program Objectives Feedback from Board, Future Challenges I | BH465 | Prof. Biaglow | |
| | 0920 - 0935 | Board Surveys | BH465 | Dr. Nagelli/LTC Cowart | Survey Parts 1 & 2 |
| | 0935 - 0950 | Session 3: Bioengineering Electives | BH465 (table side) | Dr. Yuk | |
| | 1000 - 1050 | Career Panel (Cows) | BH465 (chair side) | LTC Cowart | |
| | 1050 - 1130 | Cadet Discussions (Fisties and Cows) | BH465 (chair side) | | |
| | 1135 - 1300 | Lunch/Firstie Mock Interview Round Robin | BH465 | Dr. Nagelli | Available Faculty Pick Up Lunch from IKE Hall to BH Loading Dock |
| | 1300 - 1330 | Board feedback on cadet interactions | BH465 | Dr. Nagelli/LTC Cowart | |
| | | | | | |
| | 1340 - 1430 | Session 4: Program Updates/Board Survey II | BH465 | LTC Cowart | |
| | 1430 - 1500 | Session 5: Future Challenges II | SBBH | Dr. Nagelli/LTC Cowart/ LTC Belanger | |
| | 1500 - 1600 | Wrap up/Lab Tour/Return to Hotel | BH465 | MAJ Yi/Dr. Nagelli | |
| | | | | | |

Dr. Enoch Nagelli. Cell: (630) 452 3653