



DEPARTMENT OF THE ARMY
UNITED STATES MILITARY ACADEMY
West Point, New York 10996

REPLY TO
ATTENTION OF

MADN-CLS

1 September 2017

FJB

MEMORANDUM THRU COL F. John Burpo, Professor and Head, Department of Chemistry and Life Science, United States Military Academy, West Point, NY 10996

FOR Dean of the Academic Board, United States Military Academy, West Point, NY 10996

SUBJECT: 2017 Executive Summary of Chemical Engineering (CEN1) Program Assessment

1. This memorandum is an executive summary, per *DPOM 5-07 Assessment of Student Learning in the Academic Program*, outlining the changes in the Chemical Engineering Program's assessment and assessment process, as well as curriculum changes, that have occurred since the last executive summary in September 2016.

a. The Chemical Engineering Program made a recommendation for adding one chemical engineering course, CH367 – Introduction to Automatic Process Control, to the Chemical Engineering major. The change was made based on many years of assessment data (predominantly the Fundamentals of Engineering Exam (FEE) results) that indicated that our chemical engineering majors performed below the national average in this topic. The inclusion of CH367 corresponds in the CEN1 8-Term Academic Plan (8TAP) to a removal of XE472, both courses with 3.0 assigned credit hours. This recommendation was submitted and approved by the General Committee in December 2016 for the class of 2020, the first iteration being in term AY19-2. The new standard 8TAP is shown in Appendix 1. Course development is continuing.

b. Course Student Outcomes (SO) Assessment: The analysis of AY17 SOs proceeds from the chemical engineering program assessment process, which includes analysis of an extensive data pack, discussions among faculty members, advisory board members, and students, as well as survey data capturing the opinions of each of these groups. Assessment data for embedded indicators is included in Appendix 2. The full program assessment data and evaluation results, to include survey data, will be included as an Appendix to this document when complete. The performance of cadets on the Fundamentals of Engineering Exam (FEE) during AY17 was 15/16 (93%) cadets passing, well above this year's national chemical engineering average pass rate of 74%. Overall, there were no major changes to the attainment of Student Outcomes compared to the previous year (AY16). Some trends and evaluations of note are as follows.

(1) Data for Student Outcome 12 (FE Exam data) show continued relative weak performance in process control (See Appendix 3 for FEE data comparison to previous years). Paragraph 1a details our ongoing attempt to correct this trend.

(2) AY17 was the second iteration of the CH365 Chemical Engineering Thermodynamics course. This course was introduced to address continual low performance in this topic area on the FEE. For the second year in a row, data for AY17 indicates performance this year was

almost exactly at the national average. Continued assessment will occur in subsequent years as we also evaluate the internal structure of the course to improve scores further.

(3) The largest reversal of performance was in the Safety, Health, and Environment topic area. There was no change in the preparation or topics covered in this area so the reasons for the low performance are unclear. We will continue to require the AIChE SChE certification for Firsties as part of CH459 and incorporate safety analysis into the design work of CH402.

(4) For only the second time, and the first time in 8 years, our majors performed below the national average in the Ethics and Professional Practice topic area. Cadets have routinely said in their AARs that they think this topic doesn't need to be discussed as much as others, and the AY17 CH402 course director commented early in the semester that the class of 2017 majors struggled significantly with the engineering ethics case studies used in that course.

(5) There was a significant improvement in the area of Materials Science. There were no changes or focused discussion within the program on this topic. It could be a result of particular electives cadets have chosen or that the rest of the country did particularly poorly this year.

c. Summary of results of Academic Program Goals and What Graduates Can Do (APG-WGCD) responsibility evaluations conducted during the year.

(1) There are no updates to this mapping APG-WGCD mapping.

(2) No changes to the course responsibilities were recommended for the upcoming academic year. However, potential upcoming changes to ABET criteria (see paragraph 1e) may warrant or require future changes.

d. Significant planned curricular changes. The Chemical Engineering program is not proposing any significant curricular changes moving into AY18.

e. During AY18, we anticipate proposing changes to the Student Outcomes for the program. These changes will reflect upcoming changes to the ABET evaluation criteria. As the ABET criteria are finalized, we will submit corresponding proposed changes.

f. There are no planned changes to the Chemical Engineering program's assessment process.

g. Current assessment schedule. Program assessment for AY17 will be complete by 1 Sep 2018 (following our next advisory board meeting, at which time the board will evaluate the program data of AY2017) and will be added as an Appendix to this Executive Summary. The planned Advisory Board meeting for AY17 will occur in May 2017. The next ABET record year will be AY19-20 with the onsite visit during the fall of 2020.

2. Point of contact for this action is the Chemical Engineering Program Director, LTC Geoffrey Bull, at x2031.

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4 Encls

1. Approved CEN1 8TAP
2. Program Assessment Data AY2016-2017
(due out)
3. FEE Topical Outcomes Evaluation
4. Student Outcome to APG/WGCD Mapping

GEOFFREY R. BULL
LTC, FA52
Chemical Engineering Program Director

APPENDIX 1 to 2017 Executive Summary of Chemical Engineering Program Assessment.
Approved CEN1 8TAP

CEN1 - Class of 2020

4th Class Year Fall Term	Spring Term	3rd Class Year Fall Term	Spring Term	2nd Class Year Fall Term	Spring Term	1st Class Year Fall Term	Spring Term
<i>E</i> MA103 4.0	<i>E</i> MA104 4.5	<i>E</i> MA205 4.5	<i>R</i> CH362 3.5	<i>R</i> CH363 3.5	<i>R</i> CH364 3.5	<i>D,R</i> CH459 3.5	CH402 3.0
<i>/D</i> EV203/ CH101 4.0	<i>D/R</i> CH101/ PH205 4.0	<i>R</i> PH205/ PH206 4.0	<i>R/</i> EV203/ PH206 4.0	<i>R</i> EE301 3.5	CH367 3.0	CH365 3.0	CH400 1.5
EN101 3.0	EN102 3.0	<i>R</i> CH102 4	MA366 3.0	<i>R</i> CH383 3.5	MC312 3.0	<i>R</i> CH485 3.5	Engr Elective 3.0
IT105 3.0	PL100 3.0	<i>E</i> DFL1 4.0	PY201 3.0	<i>D</i> MC311 3.5	<i>D</i> MC300 3.0	Engr Elective 3.0	<i>D</i> LW403 3.5
HI105 3.0	HI108 3.0	<i>R</i> SS201 3.5	<i>E</i> DFL2 4.0	PL300 3.0	SS307 3.5	Engr Elective 3.0	<i>R</i> HI302 3.0
			<i>R</i> SS202 3.5	MA206 3.0			MX400 3.0

D = Double blocked course

R = RSTU lab course

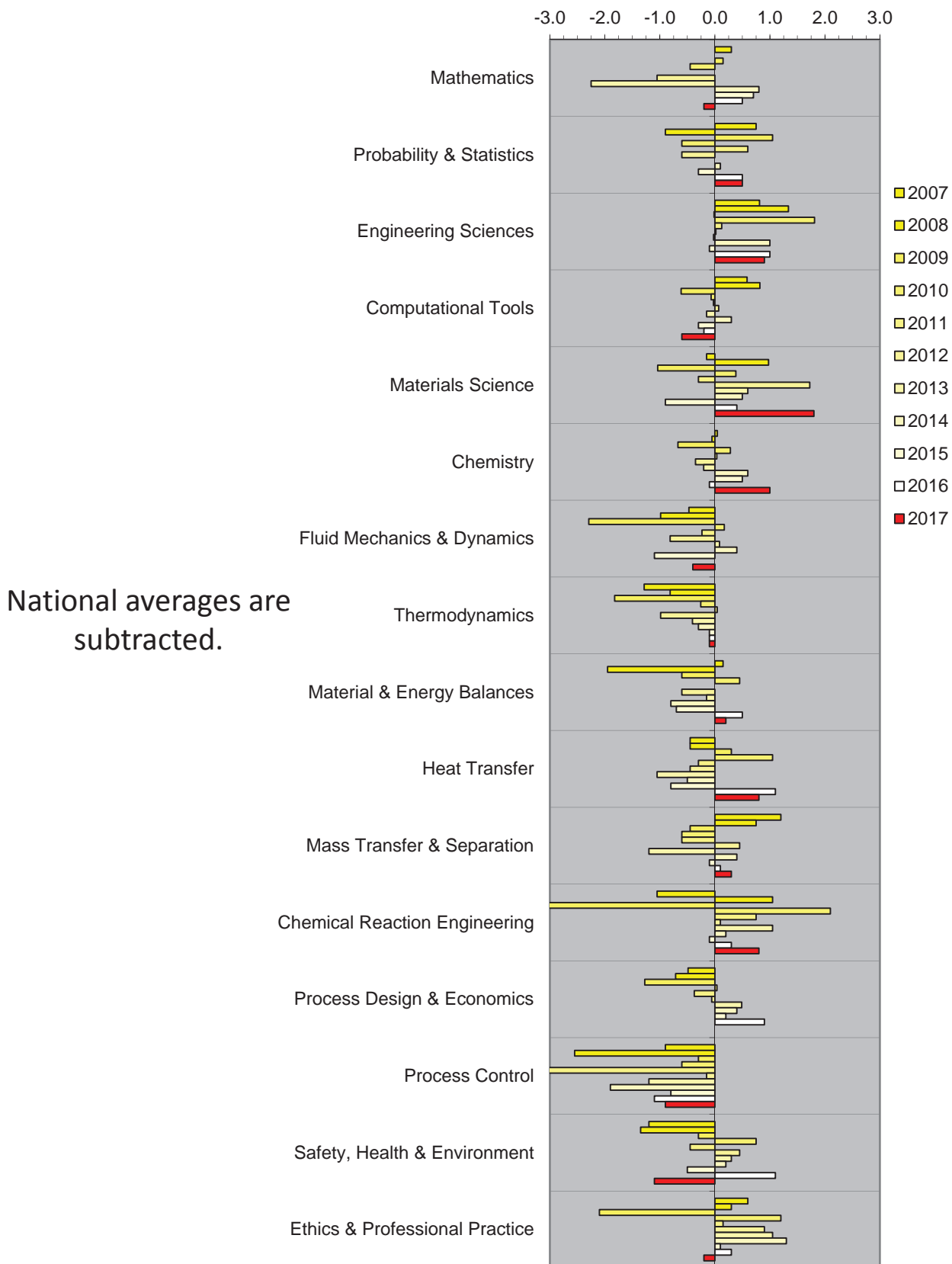
E = Meet every day for 55 minutes

	Course should not be moved from that year or term
	Course may be scheduled in the fall or spring of that academic year
	Complementary Support Courses
	Core Engineering Sequence (not applicable)
	Course 3 Science Depth
	Course 9 STEM Depth
	other electives - most popular electives are templated

**APPENDIX 2 TO 2017 Executive Summary of Chemical Engineering Program
Assessment: Program Assessment Data**

To be published o/a 1 September 2018.

Appendix 3 to 2017 Executive Summary of Chemical Engineering Program Assessment. FEE Topical Area Performance, Normalized to National Average



APPENDIX 4 TO 2017 Executive Summary of Chemical Engineering Program
Assessment: Student Outcome to APG/WGCD Mapping.

Student Outcome	Communication					Critical/Creative Thinking						Lifelong Learning				Disciplinary Depth				
	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	7.1	7.2	7.3	7.4	7.5
a																XX	XX	XX	XX	
b						XX			X							XX		X		
c						XX				XX	X					XX		X	X	
d	X		X		X	XX	XX						X					XX	XX	XX
e					X	X										XX	X	X		
f										X						X		X		
g	XX	XX	XX													X			X	X
h			X		X						X				X			X	X	X
i												XX	XX					X		
j			XX		X							XX	X			XX	X			
k							XX			X		X	X			XX	XX	X		X
Total	XX	XX	XX		X	XX	XX		X	XX	X	XX	XX		X	XX	XX	XX	XX	XX