Response to the ETAC-ABET Draft Statement

for the

Bachelor of Science in Mechanical Engineering Technology Program

at

Central Washington University Ellensburg, WA

Visit Dates: October 29-31, 2017
Draft Statement Date: December 11, 2017
30-Day Due-Process Response Date: January 22, 2018
Final Response: May 25, 2018
Accreditation Cycle Criteria: 2017-2018

I. Introduction

A Draft Statement presenting the findings of the Engineering Technology Accreditation Commission of ABET was received on December 11, 2017. This document constitutes the Central Washington University Mechanical Engineering Technology Program's post 30-Day Response supplemental information regarding the two (2) weaknesses identified in the Draft Statement.

II. Criterion 4. Continuous Improvement

This criterion states: "The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations much be systematically utilized as input for the continuous improvement of the program. Other available information may also be used to assist in the continuous improvement of the program."

Status: "This finding remains a Weakness until the program can demonstrate that: (1) the program uses appropriate and documented processes to assess student outcomes and evaluate the extent to which outcomes are attained; and (2) that the results of these evaluations are systematically utilized as input for the continuous improvement of the program."

A. Corrective Actions Taken Regarding Criterion 4. Continuous Improvement:

1. **Enhanced assessment**
   The Draft Statement of findings indicated that the Central Washington University (CWU) Mechanical Engineering Technology (MET) Program's "assessments are very limited in their breadth and do not provide adequate data upon which to make decisions." This statement was based on MET's reliance on the MET 488 FE Practice course and the FE data provided by NCEES. This has been addressed by adding 12 new assessment indicators and metrics in MET course work beginning in AY2017-18. For MET program outcomes 3B a – k, the following assessments were added. They are highlighted in Exhibit 1. Curriculum Mapping of MET Program Outcomes to Criterion 3. (Note: the 10 new Program Criteria assessments Ma – Mh are shown below in Exhibit 2. Curriculum Mapping of MET Program Outcomes to Program Criteria – and are discussed below under section III).

   3a, MET 418 (Mechanical Design I) and MET 419 (Mechanical Design II).
   3b, MET 418 (Mechanical Design I).
   3c, MET 351 (Materials) and MET 426 (Applied Mechanics of Materials).
   3d, MET 418 (Mechanical Design I).
   3e, none as this did not rely on MET 488 or NCEES data.
   3f, MET 351 (Materials) and MET 426 (Applied Mechanics of Materials).
   3g, none as this did not rely on MET 488 or NCEES data.
   3h, MET 387 (Ethics).
   3i, MET 387 (Ethics).
   3j, MET 387 (Ethics).
   3k, MET 489A (Senior Project I)

Six of the 12 new metrics were assessed during fall quarter 2017. These six metrics were reviewed during the first three weeks of January 2018 by the MET Faculty and the MET Industrial Advisory Board (IAB). Documentation of this interaction is included in Exhibit 3. IAB and MET Faculty Review of ABET Continuous Improvement Document January 2018 Meeting Notes.

Four of the 12 new indicators and metrics from the beginning of AY2017-18 were assessed after winter quarter 2018. These four metrics were reviewed during the first week of May 2018 by the MET Faculty and the MET IAB. Documentation of this interaction is included in Exhibit 4. IAB and MET Faculty Review of ABET Continuous Improvement Document May 2018 Meeting Notes.

Beginning in AY2017-18 the course MET 387, Engineering Ethics, was created and required for all students in the MET program. Previously this topic was covered in Senior Project (MET 489) and in the Professional Certification Exam Preparation course (MET 488).

The final two of the 12 new indicators and metrics will be assessed following the end of spring quarter 2018 (June). These two metrics will be reviewed before the end of June 2018 by the MET Faculty and the MET IAB.

2. **Enhanced assessment and continuous improvement using Plan, Do, Check, Act (PDCA):** The CWU MET faculty have adopted the Plan, Do, Check, Act cycle for all student outcomes as a systematic way to guide the program's continuous improvement process. This entails:
    - Plan: Evaluation of assessment data and identification of issues, concerns, and areas for improvement
    - Do: Development of corrective action items to address comments or correct issues, concerns, and areas for improvement
    - Check: Review of results of action items.
    - Act: Determination if action items were effective or if further action is required.

3. **All student work to be included:**
   The CWU MET program is not a large program. This will result in small samples sizes for the metric data being collected. This means the CWU MET program will utilize best practices in assessment and evaluation, and will not inappropriately remove student data.

4. **Documented timeline of PDCA:**
   In the Mechanical Engineering Technology (MET) program the faculty have direct control of curriculum and student outcome development. Review by the faculty, of the Student Objectives (SOs) for ABET Criterion 3 baccalaureate and ABET Program Criteria for Mechanical Engineering Technology baccalaureate program happens at the end of each quarter.

   Throughout each quarter and no later than the end of each quarter, instructors place their

ABET metric data in the appropriate file in the course outcomes data folder on the MET shared drive. These data are then used to generate graphs of each assessment metric. This takes place at the beginning of the next quarter.

At the next MET program coordination meeting, the graphs are reviewed and discussed. The faculty then document the continuous improvement process in the ABET Continuous Improvement document (See Appendices A through K).

The ABET Continuous Improvement document is then placed on a Google drive. An email is sent to the Industrial Advisory Board (IAB) notifying them there is outcome data to review. A review by date is also included.

On the IAB review by date, a telephone conference call is held (MET faculty and IAB) to review the outcome data. The MET faculty provide any additional information the IAB may need, and the IAB provides feedback to the MET Faculty for each of the outcomes being reviewed. The IAB feedback is recorded in the meeting notes and/or included in the Continuous Improvement document. During AY2017-18, the IAB was consulted for feedback at the end of every quarter; however, the review with the IAB will revert to the schedule shown in Exhibit 5. MET Program Outcomes Review Schedule beginning in AY2018-19. The IAB is a major influence and is consulted to provide input and feedback on all MET program outcomes.

After reviewing the data with the IAB, the MET faculty meet to discuss whether, based on the findings about student performance, changes need to be made to the curriculum, courses, assignments, data capture opportunities, etc. These changes (action items) are then put in place as soon as possible (e.g., a changed assignment the next time a given course is taught). Then, post-change/action item data are captured, analyzed, reviewed by the MET faculty and IAB, and a determination is made as to the impact of the change – and whether further corrective action is required.

B. Summary of Corrective Actions Taken Regarding Criterion 4. Continuous Improvement:

The following corrective actions have been completed.

1. **New assessment indicators and metrics have been created and implemented.** Throughout AY2017-18, new assessment indicators, and metrics were created and implemented. The assessment rubrics were also created and executed. The data have been deposited in the appropriate file in the course outcome data folder on the MET shared drive. These data were then used to generate the graphs of each assessment metric. At MET program coordination meetings, the graphs have been reviewed and discussed. The faculty have documented the continuous improvement process in the ABET Continuous Improvement document (See Appendices A through K). The ABET Continuous Improvement document was then placed on the Industry Advisory Board (IAB) Google drive. Email was sent to notify the IAB to review the data prior to the

scheduled conference calls and in-person meetings.

Conference calls and in-person meetings were held (MET faculty and IAB) to review the outcome data. The MET faculty followed up by providing additional information the IAB requested, and the IAB provided feedback to the MET faculty for each of the outcomes reviewed. The IAB feedback was recorded in meeting notes and/or included in the Continuous Improvement document.

2. **Plan, Do, Check, Act for each outcome:**
   As discussed above, the Plan, Do, Check, Act (PDCA) cycle is the standard for the CWU MET program continuous improvement. An ABET Continuous Improvement document has been or will be created for each MET program outcome 3B a-k. For AY2017-18 every metric has been or will be reviewed each quarter and assessed using the PDCA cycle of documentation. The only remaining outcomes to be documented and reviewed are those for which data capture and analyses will be conducted at the end of the spring quarter in June 2018. (CWU's 2018 spring quarter ends on June 12th). Once the ABET Continuous Improvement document PDCA cycle is updated, all metrics will be presented to the IAB for comment and feedback. After the AY2017-18, the review cycle will be as shown in Exhibit 5. MET Program Outcomes Review Schedule.

III. Program Criteria for Mechanical Engineering Technology and Similarly Named Programs

"The mechanical engineering technology discipline encompasses the areas (and principles) of materials, applied mechanics, computer-aided drafting/design, manufacturing, experimental techniques/procedure, analysis of engineering data, machine/mechanical design/analysis, conventional or alternative energy system design/analysis, power generation, fluid power, thermal/fluid system design/analysis, plant operation, maintenance, technical sales, instrumentation/control systems, and heating, ventilation, and air conditioning (HVAC), among others. As such, programs outcomes, based on specific program objectives, may have a narrower focus with great depth, selecting fewer areas, or a broader spectrum approach with less depth, drawing form multiple areas. However, all programs must demonstrate an applied basis in engineering mechanics/sciences."

Status: "This finding remains a Weakness until the program can demonstrate that: (1) the program uses appropriate and documented processes to assess student outcomes and evaluate the extent to which outcomes are attained; and (2) that the results of these evaluations are systematically utilized as input for the continuous improvement of the program."

A. Corrective Actions Taken Regarding Program Criteria for Mechanical Engineering Technology and Similarly Named Programs:

1. **Enhanced assessment**
   It was recorded in the Draft Statement of findings by the ABET visiting team that Central Washington University (CWU) Mechanical Engineering Technology (MET) program

"assessments are very limited in their breadth and do not provide adequate data upon which to make decisions." This statement was based on MET's reliance on the MET 488 FE Practice course and the data provided by NCEES. This has been amended by adding assessments in MET course work. For MET program outcomes Ma - Mh, the following assessments were added beginning AY2017-18:
Ma, none as this already had two assessments other than MET 488 and NCEES.
Mb, MET 426 (Applied Mechanics of Materials).
Mc, ETSC 311 (Statics) and ETSC 312 (Mechanics of Materials).
Md, ETSC 311 (Statics), ETSC 312 (Mechanics of Materials), and MET 327 (Dynamics).
Me, MET 351 (Materials).
Mf, MET 314 (Thermodynamics) and MET 315 (Fluid Dynamics).
Mg, EET 221 (Basic Electricity).
Mh, none as this did not rely on MET 488 or NCEES data.

There are 10 new metrics that began in academic year 2017-18. The additional metrics are highlighted in Exhibit 2. Curriculum Mapping of MET Program Outcomes to Program Criteria. Five of the new metrics were assessed during fall quarter of 2017-18. These five metrics were reviewed during the first three weeks of January 2018 by the MET faculty and the MET Industrial Advisory Board (IAB). Documentation of this interaction is included in Exhibit 3.

Three of the new metrics were assessed during winter quarter of 2017-18. These three metrics were reviewed during the first week of May 2018 by the MET Faculty and the MET IAB. Documentation of this interaction is included in Exhibit 4.

The final two new indicators and metrics from the beginning of AY2017-18 will be assessed following the end of spring quarter 2018. These two metrics will be reviewed before the end of June 2018 by the MET Faculty and the MET IAB.

2. **Plan, Do, Check, Act implemented for each outcome:**
   The MET faculty and IAB have implemented the same Plan, Do, Check, Act process for program outcomes Ma – Mh as described above for outcomes 3B a – k. See Appendices MA through MH.

B. Summary of Corrective Actions Taken:

The following corrective actions have been taken:

1. **New assessment indicators and metrics have been created and implemented.**
   As is the case with the new MET program outcomes 3B a – k discussed above, new assessment indicators, metrics, and rubrics for MET program outcomes Ma – Mh have also been created and implemented. The data have been deposited in the appropriate file in the course outcome data folder. These data were then used to generate the graphs of each assessment metric. At MET program coordination meetings, the graphs have been reviewed and discussed. The faculty have documented the continuous improvement process in the ABET Continuous Improvement document. (See Appendices MA through

MH). The ABET Continuous Improvement document was then placed on the Industry Advisory Board (IAB) Google drive. Email was sent to notify the IAB to review the data prior to the scheduled conference calls and in-person meetings.

Conference calls and in-person meetings were held (MET faculty and IAB) to review the outcome data. The MET faculty followed up by providing additional information the IAB requested, and the IAB provided feedback to the MET faculty for each of the outcomes reviewed. The IAB feedback was recorded in meeting notes and/or included in the Continuous Improvement document.

2. **Plan, Do, Check, Act implemented for each outcome:**
As discussed above, the Plan, Do, Check, Act (PDCA) cycle is the standard for the CWU MET program continuous improvement. An ABET Continuous Improvement document has been or will be created for each Ma – Mh program outcome. For AY2017-18 every metric has been or will be reviewed each quarter and assessed using the PDCA cycle of documentation. The only remaining outcomes to be documented and reviewed are those for which data capture and analyses will be conducted at the end of the spring quarter in June 2018. Once the ABET Continuous Improvement document PDCA cycle is updated, all metrics will be presented to the IAB for comment and feedback. After the AY2017-18, the review cycle will be as shown in Exhibit 5.

III. Commitment to a Continuous Improvement Cycle:

The new 3B a – k and Ma – Mh program outcome indicators and measures are authentically embedded in the students' course work. Faculty are being asked to teach their classes in ways they view as meaningful – while also providing additional opportunities for data capture about MET program outcomes.

There is an assessment cycle in place that has now been completed for two quarters (Fall 2017 and Winter 2018) and will soon be fulfilled for a third (Spring 2018). That process consists of data capture by the faculty throughout the term and at the end of the term; program coordinator preparation of trend graphs on each program outcome; review, discussion, and reflection by the MET faculty; review and discussion with the IAB; and the determination and implementation of corrective actions when concerns and issues are identified – all following the Plan, Do, Check, Act process – leading to the preparation of term-by-term continuous quality improvement documentation.

There are also dedicated personnel responsible for the completion and documentation of this assessment cycle. The MET program coordinator is responsible for compiling all assessment information and facilitating the PDCA process as stated in the Engineering Technologies, Safety, and Construction department handbook, "Manage and document ongoing program and course assessment, including continuous quality improvement." The College of Education and Professional Studies and the Engineering Technologies, Safety, and Construction department are committed to providing appropriate course release for the program coordinator to fulfill his or her job duties including assessment and evaluation activities.

The university is also committed to supporting the MET faculty throughout the outcomes assessment process. The Associate Provost for Accreditation, Academic Planning, and Assessment continues to provide advice, suggestions, and feedback on the Plan, Do, Check, Act cycle and attends all IAB meetings. In addition, the CWU Assessment Coordinator is working with the MET faculty to devise more efficient ways to capture assessment information from CWU's Learning Management System, Canvas.

Exhibit 1. Curriculum Mapping of MET Program Outcomes to Criterion 3.

	3(a) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;	3(b) an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies	3(c) an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes	3(d) an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives	3(e) an ability to function effectively as a member or leader on a technical team	3(f) an ability to identify, analyze, and solve broadly-defined engineering technology problems	3(g) an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature	3(h) an understanding of the need for and an ability to engage in self-directed continuing professional development	3(i) an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity	3(j) a knowledge of the impact of engineering technology solutions in a societal and global context	3(k) a commitment to quality, timeliness, and continuous improvement
EET 221											
ETSC 160											
ETSC 265											
ETSC 301											
ETSC 311											
ETSC 312											
MET 255	*	*				*					
MET 314	*	*	*		*	*	*			*	
MET 315	*	*	*		*	*	*			*	
MET 327	*	*	*	*	*	*	*				
MET 351		*	ABET		*	ABET	*			*	
MET 387	*	*			*			ABET	ABET	ABET	
MET 418	ABET	ABET		ABET	ABET	*					*
MET 419	ABET			*	ABET	*					*
MET 426			ABET			ABET	*			*	
MET 488	ABET	ABET	ABET			ABET		ABET	ABET	ABET	
MET 489A				ABET			ABET				ABET
MET 489B				ABET			ABET				ABET
MET 489C			ABET			ABET	ABET				ABET
NCEES	ABET	ABET	ABET			ABET		ABET	ABET	ABET	

Exhibit 2. Curriculum Mapping of MET Program Outcomes to Program Criteria.

	(a) geometric dimensioning and tolerancing; computer aided drafting and design; and a basic knowledge and familiarity with industry codes, specifications, and standards	(b) selection, set-up, and calibration of instrumentation and the preparation of laboratory reports and systems documentation associated with the development, installation, or maintenance of mechanical components and systems	(c) basic engineering mechanics	(d) differential and integral calculus	(e) manufacturing processes; material science and selection; solid mechanics (such as statics, dynamics, strength of materials, etc.) and mechanical system design	(f) thermal sciences, such as thermodynamics, fluid mechanics, heat transfer, etc.	(g) electrical circuits (ac and dc), and electronic controls	(h) application of industry codes, specifications, and standards; and using technical communications, oral and written, typical of those required to prepare and present proposals, reports, and specifications
EET 221							ABET	
ETSC 160	*							
ETSC 265	*							
ETSC 301								
ETSC 311			ABET	ABET				
ETSC 312			ABET	ABET				
MET 255								
MET 314		*				ABET		
MET 315		*				ABET		
MET 327		*		ABET				
MET 351					ABET			*
MET 387								
MET 418			*	*	*			ABET
MET 419			*		*			*
MET 426	*	ABET	*		ABET			ABET
MET 488	ABET	ABET	ABET	ABET	ABET	ABET	ABET	
MET 489A	ABET				*			*
MET 489B	ABET				*			*
MET 489C					*			ABET
NCEES	ABET	ABET	ABET	ABET	ABET	ABET	ABET	

Note: * = Topic assessed, ABET = Data collected.

Exhibit 3. IAB and MET Faculty Review of ABET Continuous Improvement Document January 2018 Meeting Notes

From: Harmon-III, Charles H <charles.h.harmon-iii@boeing.com>
Sent: Thursday, January 18, 2018 10:31 AM
To: Patrick Kinney; Amanda Hede; Moravec, Bradford A; Bennett, Julie K; rosemary@hobartmachined.com; Charles Pringle; MET; 'ben.t.grogan@gmail.com'; Bernadette Jungblut
Subject: CWU IAB Meeting Minutes 01-17-18
Attachments: Patrick Kinney ABET Outcome Data Review Comments.docx

All,

I believe our meeting last night via 'freeconferencecall' was successful.

Attendees:
Ben Grogan
Charles Pringle
Bernadette Jungblut
Craig Johnson
Chuck Harmon (me)

We reviewed metrics 3a-3f and M{acfgh}. We asked questions and provided comments from our week of reviewing the documents. Charles Pringle captured our comments/markups real-time in the version of documents stored on the "S-Drive."

The suggestion was made to shift to a footnote style of metric description for each figure. Having the description and the figures on different pages was a drawback to the current format.

Minor corrections were made to some metric descriptions, Y-axis labels, and threshold placements, etc. In the future, I think the IAB should take responsibility for proofreading all aspects of the metrics
(Writing and charts). This will also give us more flexibility in developing our own metrics—recommendations of course ;-)

In general, all metrics which contained sufficient data to develop a trend were looked at closer than those which only contained a single data point. Metrics with more than one data point which showed negative sloping trends or below threshold trends had already been identified by faculty. For these metrics "PLAN" and "DO" actions were mostly already complete and the IAB members agreed with both. In some cases we captured additional details which we thought would help clarify the "PLAN" and
"DO."

Metrics which warranted action are as follows:
3b Figure 2 Statics
3b Figure 4 Mechanics of Materials

Mc Figure 3 Statics
Mc Figure 4 Mechanics of Materials
Mf Figure 1 Thermodynamics

Additional comments from Patrick Kinney who missed our meeting are attached this email.

Amanda,
I'm keeping you on the distribution list for the IAB. I think your excuse for bowing out weren't good enough. LOL. In all seriousness, the IAB participation has been weak and I'd like to keep you on the email distributions in case the stars align and you are able to attend a meeting. We value your opinion.

Everyone else,
Please be watching for our next meeting notice. I will be targeting middle to late February. If you have any questions feel free to contact me via email.

Thanks. -CH

Patrick Kinney ABET Outcome Data Review Comments
1.18.2018

General Notes:

- Figures in each metric: the sample size data doesn't appear to line up with the corresponding score data point. I would expect the sample size data point to line up vertically with the CWU scoring data?
- Titles could be renamed along the lines of "CWU ABET Criterion 3B Section A – Continuous Improvement" for additional clarity
- Description of Metrics section is typically a dense wall of text. Suggest bullets to help separate each figures descriptions or spaces added between.
- Figures in various sections often have different line weights/styles.

2017-18_ABET_3a

- Title of document should add missing letter to point to correct ABET criterion section "CWU ABET 3Ba Continuous Improvement"
- Description of metrics could use additional explanations for each figure
    - For example: "Figure 1 shows the average score of the MET 418 (Mechanical Design I) students solving a variety of topic problems ranging from springs to gears"

2017-18_ABET_3b

- I like the level of explanation included in the "Description of Metric" section. This should be carried to ABET 3a.

2017-18_ABET_3c

- Figure 4, since threshold and sample size are measuring the same thing as each other figure their colors should be changed to match (gray threshold, yellow sample size). With different colors it implies different metrics/definitions of measurement.
- Figure 4, the darker line should be moved behind the lighter line (black behind red) to aid in clarity

2017-18_ABET_3d

- In Description of Metrics section, Figure 1 could use added clarity/explanation along the lines of figure 2/3 descriptions. What is the lever? What parameters are they scored on? Etc.

2017-18_ABET_3e

- Figure 2 data points are hard to read when stacked on top of each other. It is clear they all scored the same, but the CWU role and CWU work are completely hidden. Maybe add transparency to a few of the data points to aid in seeing each data point?
- Figure 3, sample sizes are shown for various years without corresponding average score data. Not sure if this adds any detail when there is no score data. At first glance it makes the reader assume something is wrong with the graph the average score data just isn't shown.

2017-18_ABET_3f

- Figure 4, since threshold and sample size are measuring the same thing as each other figure their colors should be changed to match (gray threshold, yellow sample size). With different colors it implies different metrics/definitions of measurement.
- Figure 4, the darker line should be moved behind the lighter line (black behind red) to aid in clarity

2017-18_ABET_Ma

- Title of the document is non-intuitive for someone unfamiliar with the ETAC document as there is no section "M" in the document. Maybe changing the title to something along the lines of "CWU ABET MET Section A – Continuous Improvement" would be appropriate?
- Description of Metrics needs to be updated for Figures 2 and 3
- Figures 1-4, score/threshold line weights are not consistent

2017-18_ABET_Mc

- Description of Metric section needs to be updated
- Figure 1 threshold data line needs to be changed to gray. The data label also needs to be changed to gray.
- Figure 3 line weight is not consistent with the other figures

2017-18_ABET_Mf

- I like the spacing in the Description of Metric section. Please carry this through on the other documents.
- Review/Plan/Act section could potential benefit in readability if the text after the title was started on a new line or used a bullet.

2017-18_ABET_Mg

- No specific comments

2017-18_ABET_Mh

- No specific comments

Exhibit 4. IAB and MET Faculty Review of ABET Continuous Improvement Document May 2018 Meeting Notes

IAB Meeting Notes 05/07/2018

5 – 6 PM

Attendance

Craig, Charles, Roger, Chuck H., Brad M. Rosemary B., Julie B., Ben G., Patrick K., and Bernadette.

ABET review
Charles provided a review of the four student outcomes that had new data after winter quarter. These were 3a, 3h, 3i, and 3j. All were above the threshold, so no corrective action. Chuck asked to see the questions used in the metrics from the Ethics course. Those will be supplied at the end of the meeting. (See attached). The IAB will provide their feedback about the question via email. Rosemary asked about the demographics in the Ethics course. Craig to look into obtaining this information.

Discussion
The next meeting on May 30th at Hogue and review of the last two new metrics.

IAB
To review the Ethics exam questions and report back via email. The student outcomes are listed at the top of each exam page with the legend for each question.

MET 387 Engineering Ethics EXAM 1

NAME:_____

The following outcomes will be assessed:

ABET 3(h) an understanding of the need for and an ability to engage in self-directed *continuing professional development (CE)*

3(i) an understanding of and a commitment to address professional and *ethical responsibilities including a respect for diversity(RES)*

3(j) a knowledge of the impact of engineering technology solutions in a *societal and global context (GL)*

1) CE T/F Ethical problems may be complex and involve conflicting ethical principles.

2) CE T/F In order for engineers to successfully apply 'judgement' and 'discretion', they must continually practice their skills and improve their knowledge and capabilities.

3) CE (circle best one) A 'professional engineer' must continually apply ethics in their work The goal of ethics education may be best summed up by the engineer having what character trait?

a) analytical expertise
b) moral autonomy
c) visionary creativity
d) honesty

4) CE Both the medical and legal professions have organizations that regulate all schools, standards and behavior (AMA, ABA), while engineers have NSPE and many individual discipline organizations. Not all states even require ABET endorsed training. Explain how states verify engineering competence.

WRITE YOUR ANSWER ON THE BACK OF THIS SHEET

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5) RES T/F Many things that are legal could be considered unethical.

6) RES T/F Many companies in the U.S. use recognized 'amateur engineers'.

7) RES (circle appropriate) Which of the following are 'professions', as opposed to 'occupations'?

a) Physician b)NFL Player c)Senator d)Lawyer e)Engineer

8) RES There are 'conflicts' with codes. For example, NSPE I.4 states that engineers have a 'duty' to their employers, but NSPE I.1 states that engineers must make 'public safety' paramount. Give an engineering example of this conflict.

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9) GL T/F A 'Code of Ethics' is a legal document.

10) GL T/F Ethical principles of the world's major religions and cultures are generally the same.

11) GL (circle all appropriate) Many engineering organizations have 'Codes of Ethics', including:

a) ASME b) NSPE c) ABET d) IEEE

12) GL Describe two 'similar' engineering scenarios (i.e. which reflected similar 'code' infractions), but which occurred in different countries or cultures.

WRITE YOUR ANSWER ON THE BACK OF THIS SHEET

MET 387 Engineering Ethics EXAM 2

NAME:_____

The following outcomes will be assessed:

ABET 3(h) an understanding of the need for and an ability to engage in self-directed *continuing professional development (CE)*

3(i) an understanding of and a commitment to address professional and *ethical responsibilities including a respect for diversity(RES)*

3(j) a knowledge of the impact of engineering technology solutions in a *societal and global context (GL)*

1) CE T/F In solving an ethical engineering problem, there are no formulas and no easy "plug-and-play" methods for reaching a solution.

2) CE T/F A common problem is the question of how long confidentiality extends after an engineer leaves employment with a company.

3) CE (circle all that apply) Company proprietary information include:
- a) designs and formulas
- b) test data
- c) production numbers
- d) scrap yield
- e) business location

4) CE Please describe an example (e.g. names and dates, etc.) of an engineering scenario in which an accident occurred that could have been avoided if the key decision makers had more or better training.

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5) RES T/F The codes of ethics discuss 'professional rights' of engineers.

6) RES T/F Engineers working for a client are frequently required to sign a non-disclosure agreement.

7) RES (circle all appropriate) What might be included in a 'cost-benefit' analysis for environmental ethics?
a) integrity of biosphere b) sustainable design c) loss of species d) landfill siting e) moral beliefs

8) RES Please describe an example (e.g. names and dates, etc.) of an engineering scenario in which a competitive bid occurred with a conflict between an engineer's 'responsibilities' and their 'rights'.

WRITE YOUR ANSWER ON THE BACK OF THIS SHEET

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9) GL T/F All the codes of ethics of the professional engineering societies (including international) stress the importance of protecting the health and safety of the public in the engineer's duties.

10) GL T/F Engineers may have to make decisions that hinge on other areas in which they are not competent. In these cases, one should not depend on the counsel of others, but create your own rationale that you can later defend if needed.

11) GL (circle all appropriate) Aspects of 'safety risk' include:
a) voluntary b) involuntary c) no tolerance d) no threshold e) short and long term

12) GL Please describe an example (e.g. names and dates, etc.) of an engineering scenario in which all four 'safety criteria' were met. Please list each criterion and how it is related to your example.

WRITE YOUR ANSWER ON THE BACK OF THIS SHEET

Exhibit 5. MET Program Outcomes Review Schedule.

	Schedule	
ABET Criterion 3 SO	Year 1,3,5 Fall	Year 2,4,6 Spr
3a.		X
3b.		X
3c.	X	
3d.		X
3e.		X
3f.	X	
3g.	X	
3h.		X
3i.		X
3j.		X
3k.	X	
Program Criterion SO		
Ma.		X
Mb.		X
Mc.	X	
Md.	X	
Me.		X
Mf.		X
Mg.	X	
Mh.	X	

Appendix A. ABET Continuous Improvement, Student Outcome 3a.

Student Outcome: 3a. “an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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2. Plan: Comments on assessment data and identification of problem(s).
3. Do: Development of action items to address comments or correct problem(s).
4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

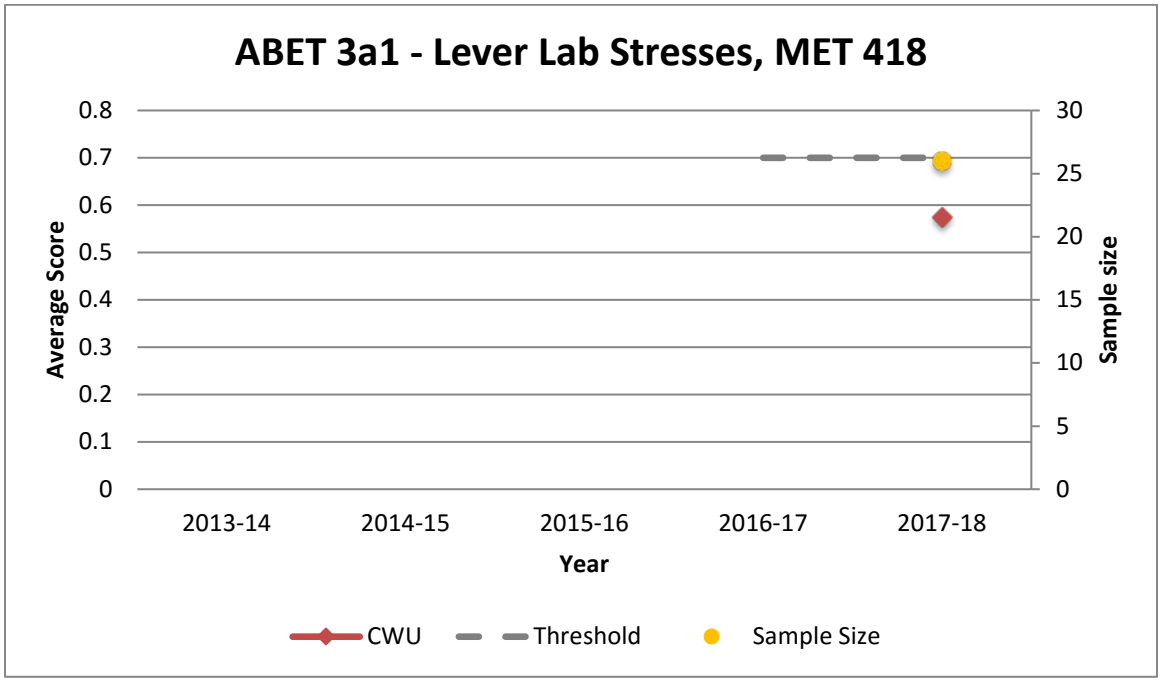

Figure 3a-01. Students Design Solution in MET 418.

Figure 3a-01 comes from the Lever Lab completed in the fall quarter in the MET 418 Mechanical Design I course. The direct measure is an assessment of the students' ability to analyze and solve for the forces and stresses in a device. The students submit green sheets detailing their analysis. A rubric is used to score their ability to solve the problem. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3a-01.

This metric is examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3a-01shows the SO 3a Lever Lab Stresses level of attainment. This is the first time this metric is being used. The students have scored below the threshold. The next time this metric will be assessed will be fall 2018. The MET faculty discussed what might be changed (possible corrective action), but thought it prudent to wait and see what the next data point looks like.

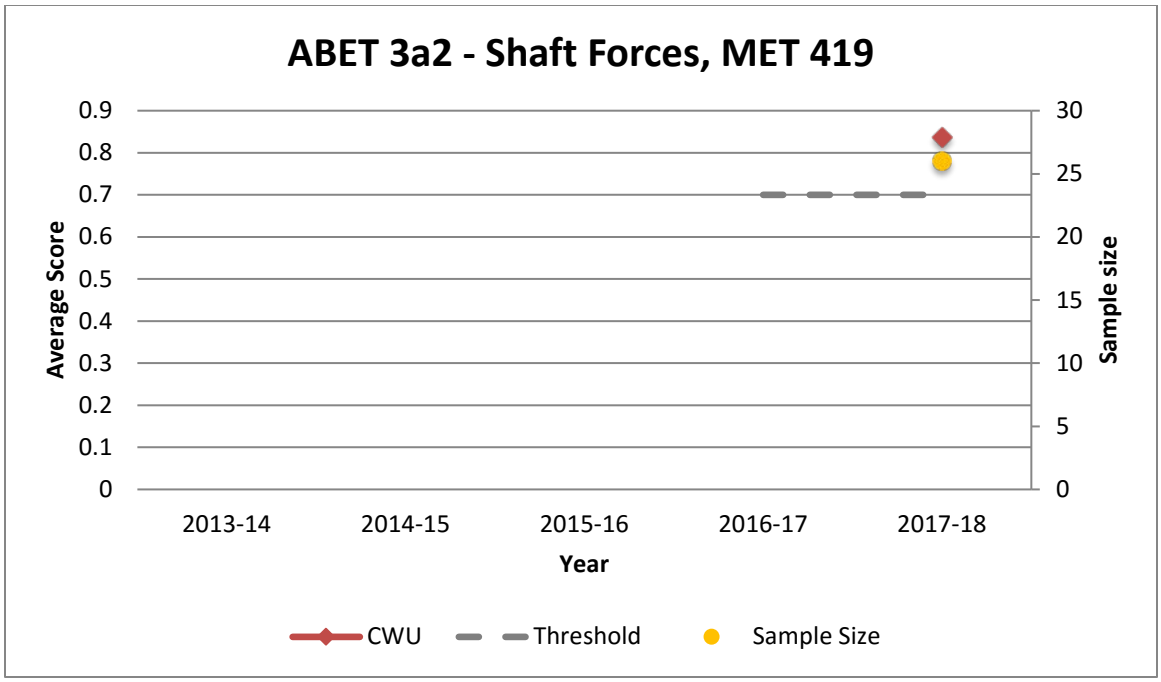

Figure 3a-02. Students Design Solution in MET 419.

Figure 3a-02 comes from the Shaft Design Lab in the MET 419 Mechanical Design II course. The direct measure is an assessment of the students' ability to analyze and solve for the forces on a shaft. The students submit green sheets detailing their analysis. A rubric is used to score their ability to solve the problem. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3a-02.

This metric is also examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3a-02 shows the SO 3a Shaft Design Lab level of attainment. This is the first time this metric is being used. The students have scored above the threshold. The next time this metric will be assessed will be winter 2019. A determination concerning the data will be made when this is reviewed in the spring of 2019.

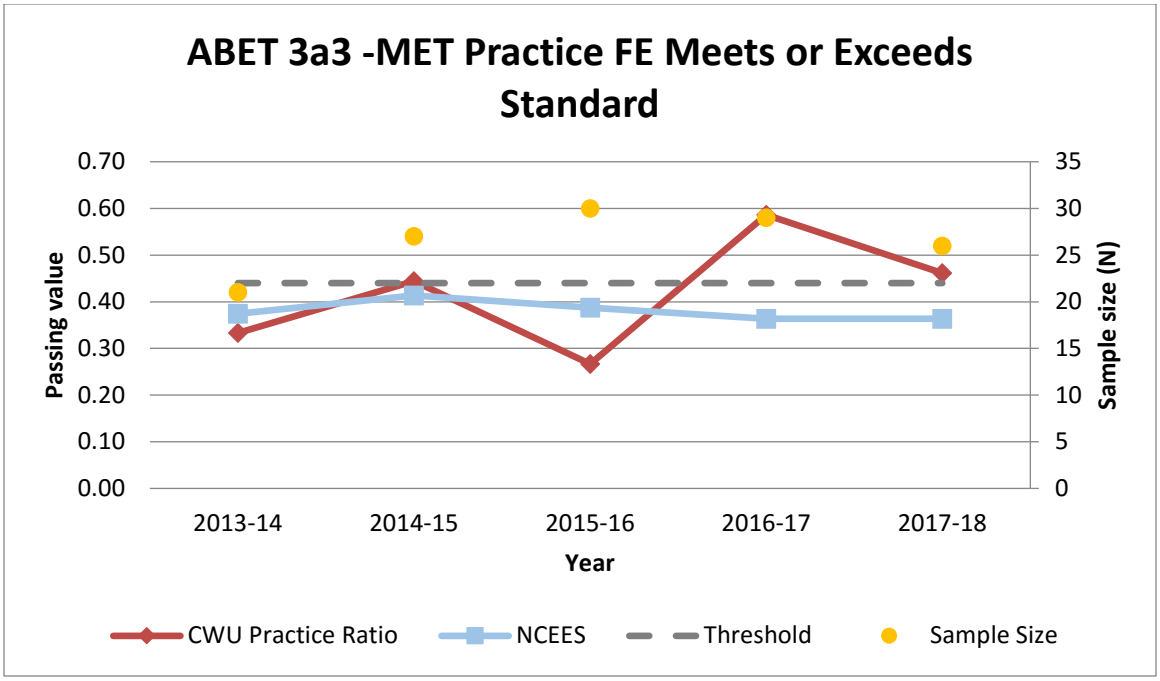

Figure 3a-03. Comparison of CWU practice FE passing to NCEES national passing.

Figure 3a-03 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The score for each question for each student is recorded in an Excel workbook. This provides information on how each student did in each category and how the class did as a whole. These data are then dropped into another Excel workbook for aggregation.

This metric is also examined annually.

The attainment threshold is set at 44%. Historical CWU data show that students who achieved 44%, or higher, on the practice FE exam (the final exam for MET 488) pass the NCEES FE exam. This does not mean that if a student does not score a 44% on the MET practice FE exam s/he will not pass the NCEES FE exam. Occasionally students do.

Figure 3a-03 shows the percentage of CWU students who achieved a score of 44% or higher on the MET practice FE exam. While the 2014-15 students' score was an improvement over the 2013-14 students' score and met the established threshold, the 2015-16 students' performance failed to meet the threshold. The 2016-17 score is above the threshold – as is the 2017-18 score, although the students' performance is back on a downward trend. Continued monitoring is required.

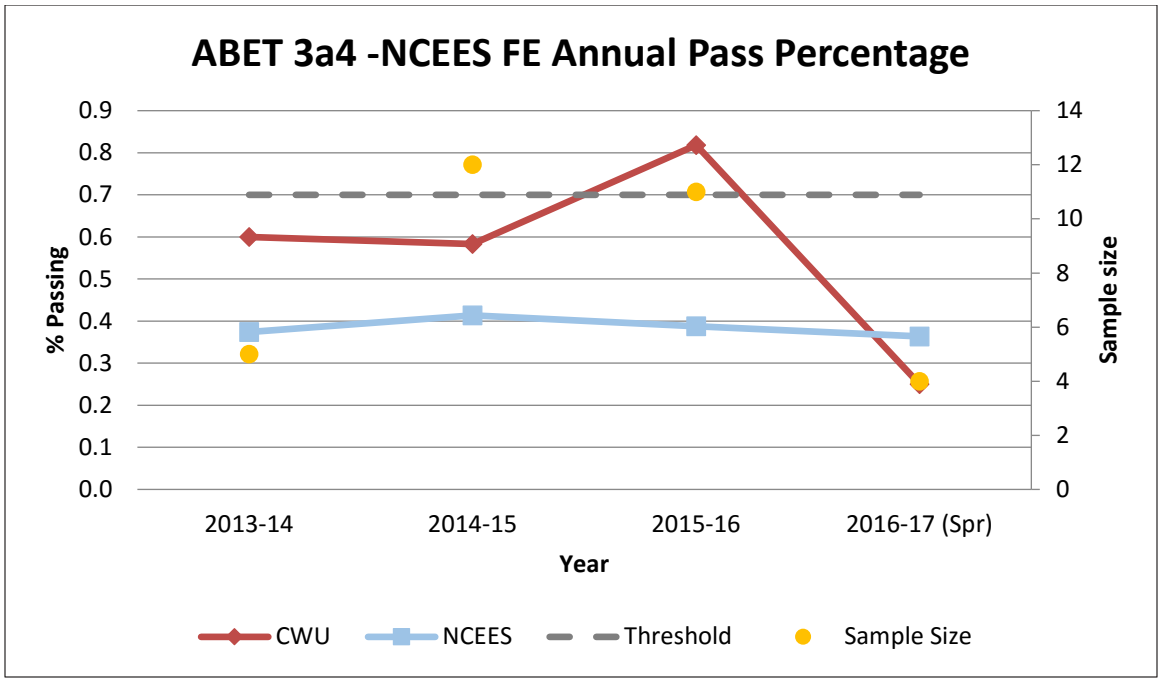

Figure 3a-04. Comparison of CWU FE passing percentage to NCEES Annual passing percentage.

Figure 3a-04 is assessed using the bi-annual reports produced by the NCEES. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3a-04. The graph is produced by taking the number of individuals who passed the FE divided by the total number of individuals who sat for the FE in the two categories.

This metric is also examined annually.

The attainment threshold is 70% of the students who take the FE will pass.

Figure 3a-04 shows the percentage of CWU students who took the FE and passed compared to the percentage of students nationally who took the FE and passed. While the 2015-16 data demonstrate threshold achievement, as noted above, 70% is the threshold the MET faculty and the Industry Advisory Board (IAB) initially selected. As additional data are collected, the MET faculty, in conjunction with the IAB, will need to determine if this threshold will be maintained or adjusted.

2019 Continuous Improvement:

20180105 Continuous Improvement:

Plan

MET 418 data do not meet the threshold.
MET 419 data meet or exceed the threshold.
MET 488 the most recent FE Practice data meet or exceed the threshold.
NCEES FE data only has the spring data (no fall data). Therefore, these are incomplete data.

Do

No corrective action pending a review of the complete data (CWU data from NCEES).
MET Faculty and IAB: Revisit the threshold values after additional data are obtained for MET 418, MET 419, MET 488, and from the NCEES.

Check

There are no results of any previous action items to review.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

Lower limits shown: NCEES National Performance

METRIC

MET 418 – Lever stress all components

MET 419 – Forces on shaft

MET 488 – MET Practice FE pass percentage

NCEES FE – NCEES passing percentage

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET418_1179_rosterTestScores.xlsx, MET418.xlsx

MET418_1179_rosterTestScores.xlsx, MET419.xlsx

MET488.xlsx

NCEES.xlsx

Appendix B. ABET Continuous Improvement, Student Outcome 3b.

Student Outcome: 3b. “an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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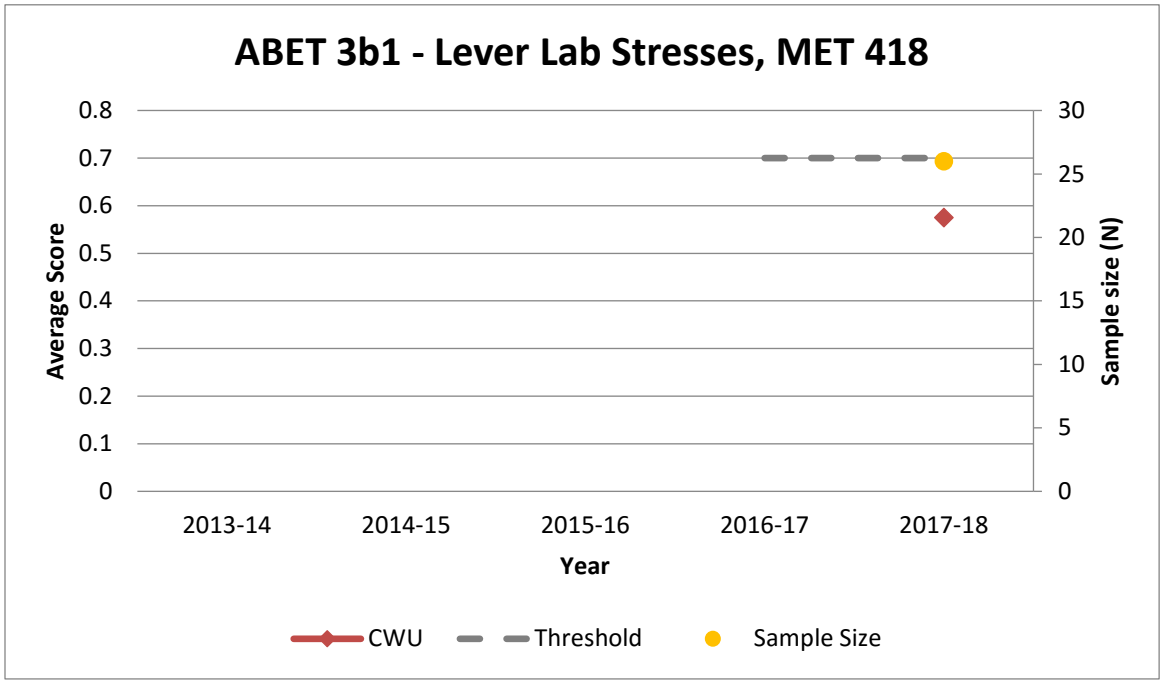

Figure 3b-01. Students Knowledge of Calculating Stresses.

Figure 3b-01 comes from the Lever Lab completed in the fall quarter in the MET 418 Mechanical Design I course. The direct measure is an assessment of the students' ability to identify and calculate the various stresses (i.e., Normal, flexure, direct shear) on a device. The students submit green sheets detailing their analysis. A rubric is used to score their ability to solve the problem. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3b-01.

This metric is examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3b-01shows the SO 3b Lever Lab level of attainment. This is the first time this metric is being used. The students have scored below the threshold. The next time this metric will be assessed will be fall 2018. The MET faculty discussed what might be changed (possible corrective action), but thought it prudent to wait and see what the next data point looks like.

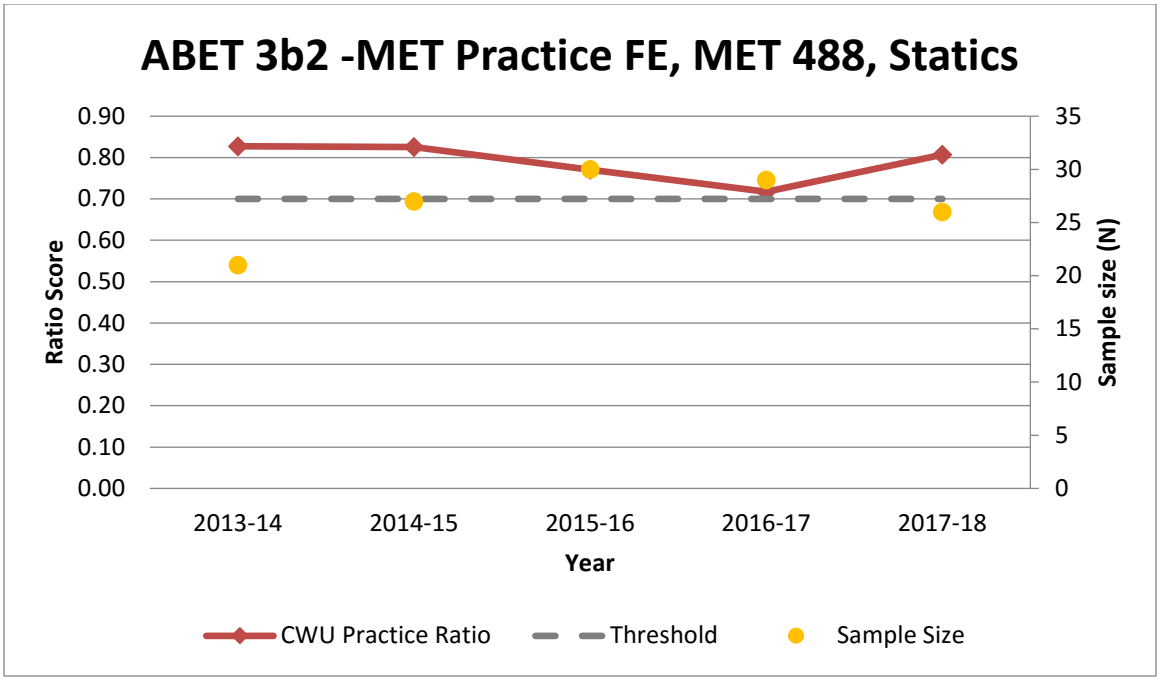

Figure 3b-02. Practice FE Ratio Score in Statics.

Figure 3b-02 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Static, Dynamics Kinematics and Vibrations, and Mechanics of Materials categories of the MET practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graphs shown in Figure 3b-02, Figure 3b-03, and Figure 3b-04. These graphs are produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET practice FE will be .70 or higher.

Figure 3b-02 shows CWU ratio scores for Statics. The statics scores for all five student groups exceed the threshold; however, the 2016-17 students' score showed a decrease from the 2013-14, 2014-15, and 2015-16 students' scores. The MET faculty will continue to monitor students' performance on this metric and take corrective action if necessary.

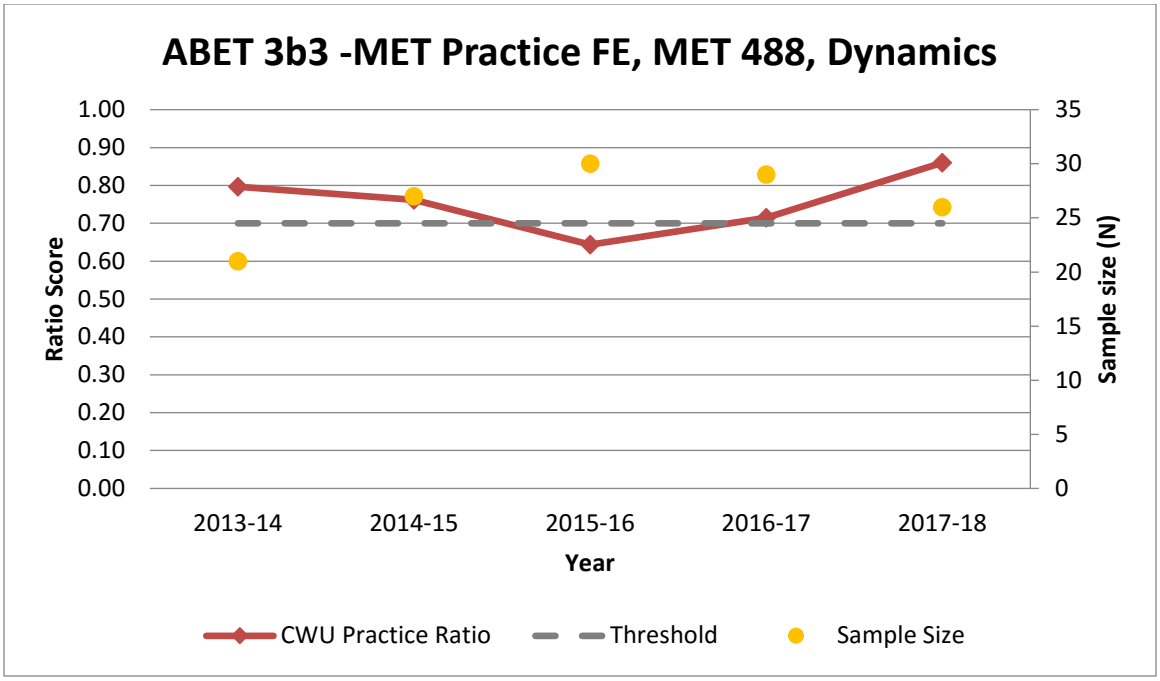

Figure 3b-03. Practice FE Ratio Score in Dynamics.

Figure 3b-03 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Static, Dynamics Kinematics and Vibrations, and Mechanics of Materials categories of the MET practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graphs shown in Figure 3b-02, Figure 3b-03, and Figure 3b-04. These graphs are produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET practice FE will be .70 or higher.

Figure 3b-03 shows the CWU ratio scores for Dynamics. These scores had been trending downward, and while the 2013-14 students and the 2014-15 students exceeded the .70 threshold, the 2015-16 students failed to meet the threshold. The most recent scores, for the 2016-17 and 2017-18 students, have met or exceeded the threshold and are trending upward. No corrective action is required at this time. The MET faculty will continue to monitor students' performance.

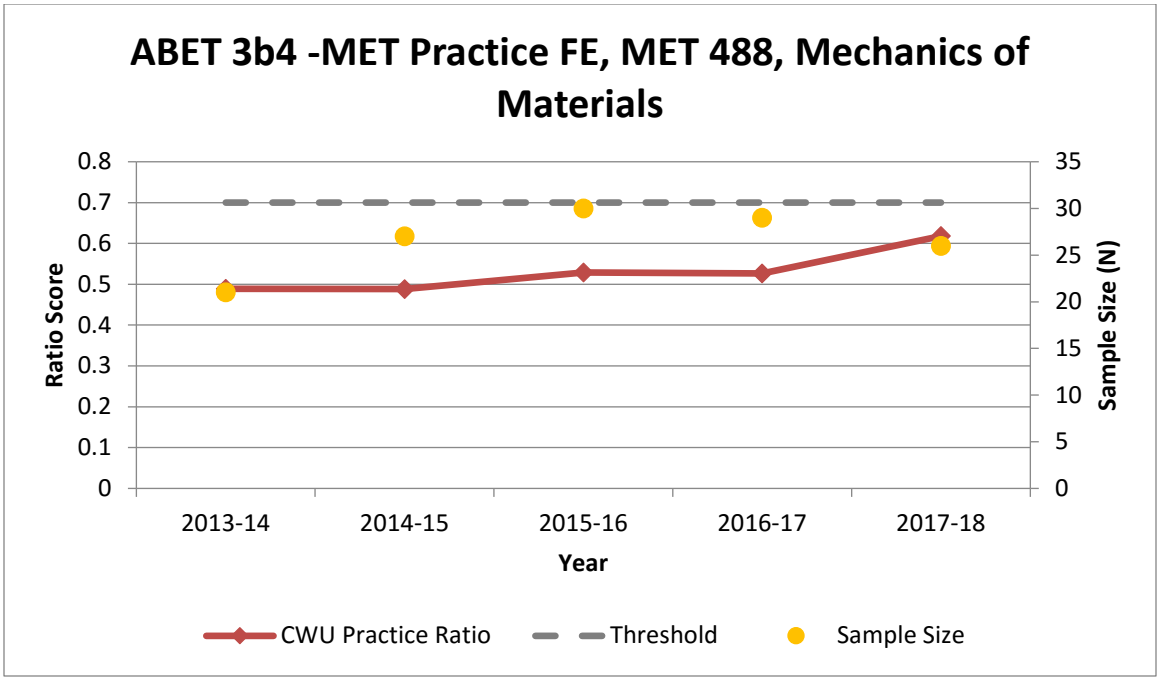

Figure 3b-04. Practice FE Ratio Score in Mechanics of Materials.

Figure 3b-04 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Static, Dynamics Kinematics and Vibrations, and Mechanics of Materials categories of the MET practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graphs shown in Figure 3b-02, Figure 3b-03, and Figure 3b-04. These graphs are produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET practice FE will be .70 or higher.

Figure 3b-04 shows the CWU ratio scores for Mechanics of Materials. While these scores show some improvement, all five student groups failed to meet the .70 threshold. Corrective action is required.

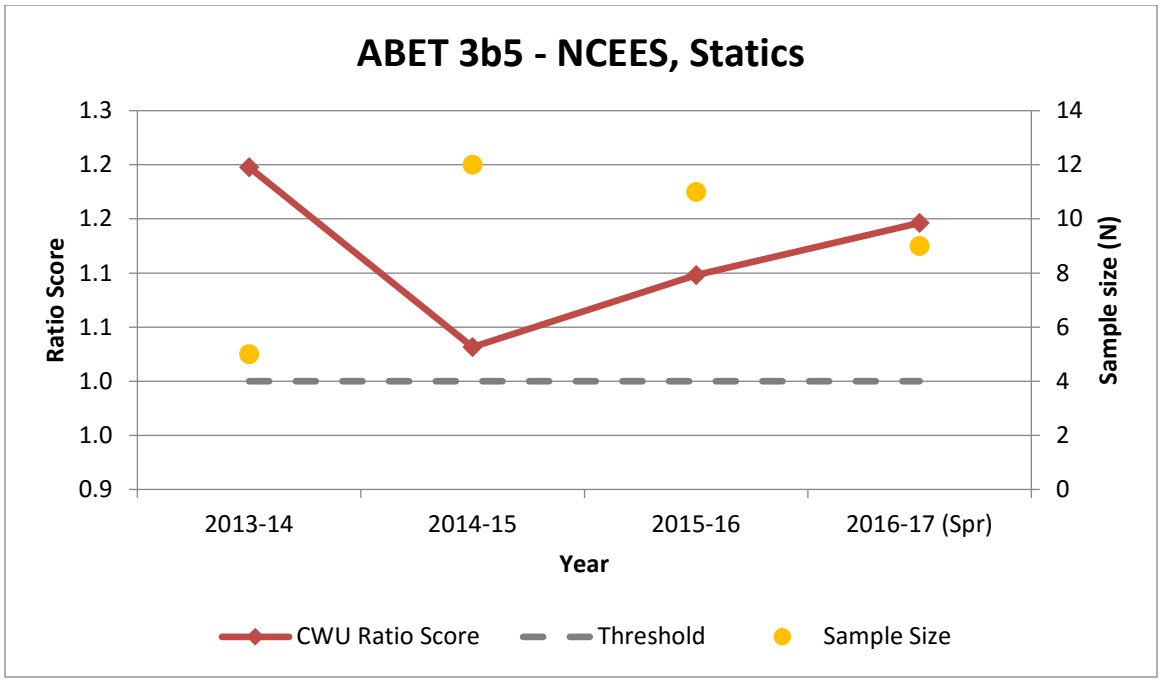

Figure 3b-05. CWU Ratio Score in Statics.

Figure 3b-05 is the bi-annual reports produced by the NCEES. The data come from the Static, Dynamics Kinematics and Vibrations, and Mechanics of Materials categories of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graphs shown in Figure 3b-05, Figure 3b-06, and Figure 3b-07. These graphs are produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the NCEES FE exam will be 0.70 or higher.

Figure 3b-05 shows CWU ratio scores for Statics. The CWU students are doing well in the Statics category. If this trend continues, the threshold may need to be adjusted upward.

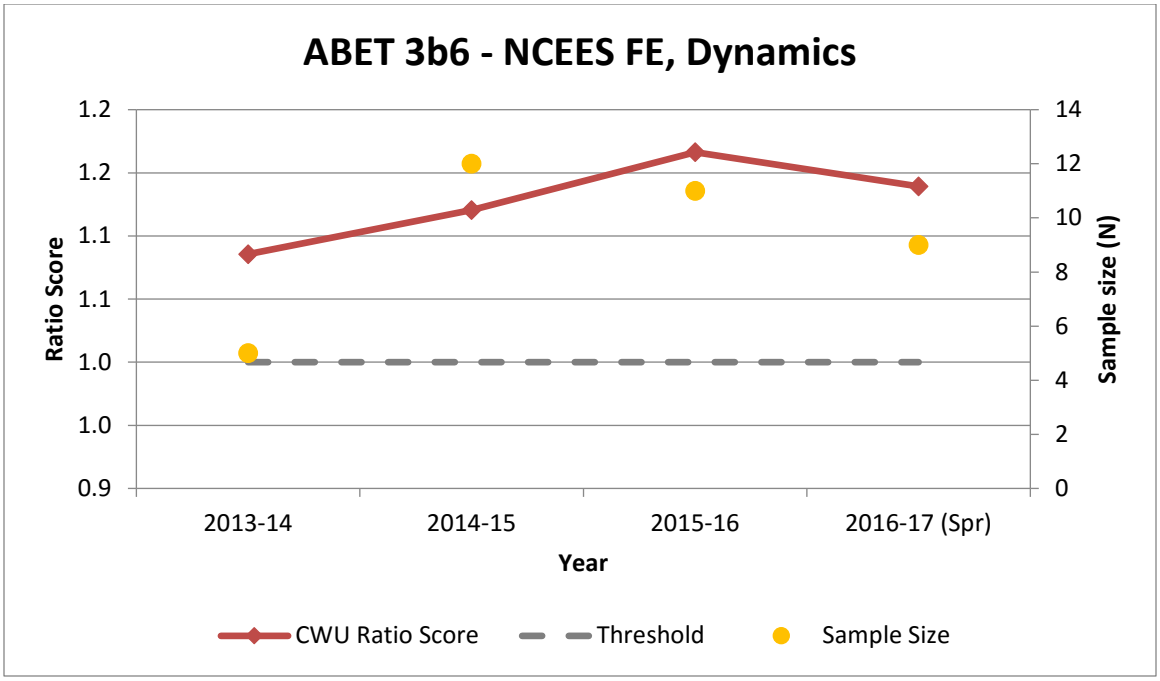

Figure 3b-06. CWU Ratio Score in Dynamics.

Figure 3b-06 is the bi-annual reports produced by the NCEES. The data come from the Static, Dynamics Kinematics and Vibrations, and Mechanics of Materials categories of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graphs shown in Figure 3b-05, Figure 3b-06, and Figure 3b-07. These graphs are produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the NCEES FE exam will be 0.70 or higher.

Figure 3b-06 shows the CWU ratio scores for Dynamics. Again, the CWU students are doing well. No action is necessary at this time; however, as noted for the Statics category, if CWU students continue to exceed the 0.70 threshold, it may need to be adjusted upward.

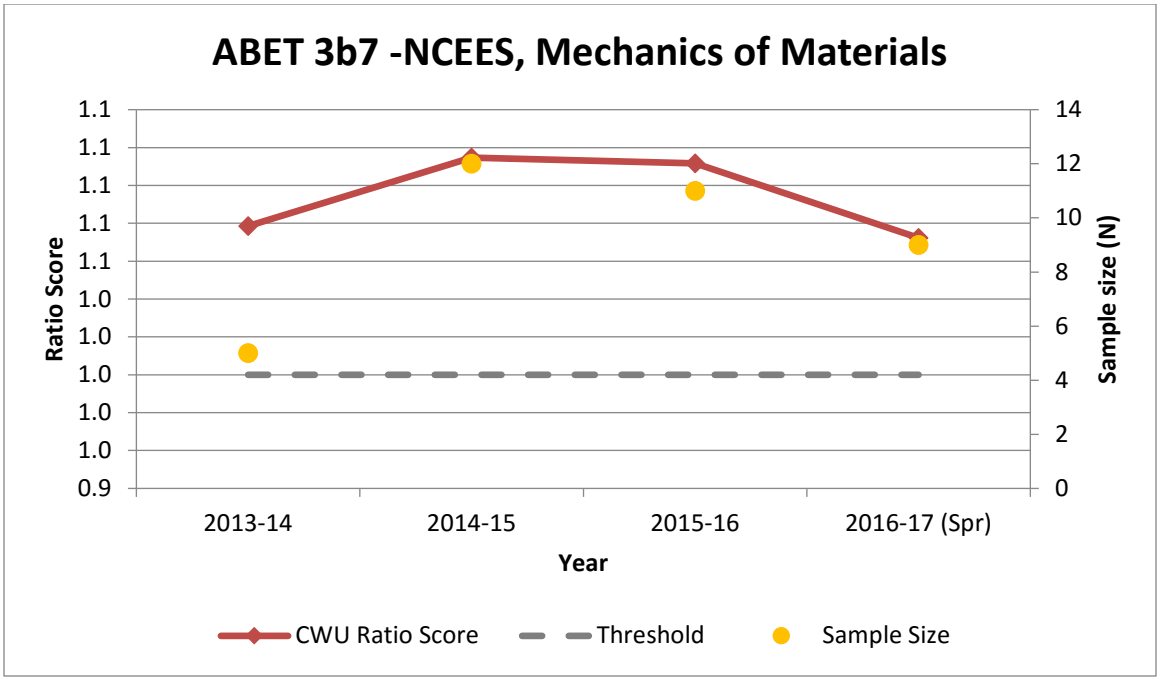

Figure 3b-07. CWU Ratio Score in Mechanics of Materials.

Figure 3b-07 is the bi-annual reports produced by the NCEES. The data come from the Static, Dynamics Kinematics and Vibrations, and Mechanics of Materials categories of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graphs shown in Figure 3b-05, Figure 3b-06, and Figure 3b-07. These graphs are produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the NCEES FE exam will be 0.70 or higher.

Figure 3b-07 shows the CWU ratio scores for Mechanics of Materials. The CWU students are slipping a little in this category; however, they are still exceeding the 0.70 threshold. While the decrease in performance is not significant enough at this time to warrant any action, it will be closely monitored, and corrective measures will be taken if needed.

20180105 Continuous Improvement:

Plan

MET 418 lever lab stress analysis data indicate that the students are not performing well. They are not meeting the threshold.
Practice FE Statics data meet or exceed the threshold with an upward trend.
Practice FE Dynamics data meet or exceed the threshold with an upward trend.
Practice FE Mechanics of Materials data are trending upward although below the threshold.
NCEES Statics data meet or exceed the threshold.
NCEES Dynamics data meet or exceed the threshold, but showing a downward trend.
NCEES Mechanics of Materials data meet or exceed the threshold, but showing a downward trend.

The direct measure of all the MET students shows poor performance in basic mechanics of engineering. The NCEES scores are all above the threshold, but these will tend to be the better students.

Do

The deficiencies in the MET 418 lever lab stress analysis and the Mechanics of Materials Practice FE scores need to be addressed. MET faculty are working with the faculty that teach Statics and Mechanics of Materials to institute changes. Beginning AY2017-18, there will be: 1) more free body diagram (FBD) quizzes in Statics; 2) at least one FBD quiz per week in Mechanics of Materials. There will also be a FBD and integration problem on the Statics and Mechanics of Materials final exams. These will be assessed using a rubric.

Check

The results of these efforts cannot be assessed until the end of fall quarter 2018. The MET faculty and the Industry Advisory Board will then review the results.

Act

A course of action will be determined (winter quarter 2019) after reviewing the results of the actions described above.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

Lower limits shown: NCEES National Performance

METRIC

MET 418 – Lever Lab Stress

MET 488 – MET Practice FE Statics, Dynamics, Mechanics of Materials

NCEES FE Data – NCEES Statics, Dynamics, Mechanics of Materials

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET418_1179_rosterTestScores.xlsx

MET488.xlsx

NCEES.xlsx

Appendix C. ABET Continuous Improvement, Student Outcome 3c.

Student Outcome: 3 B c. “an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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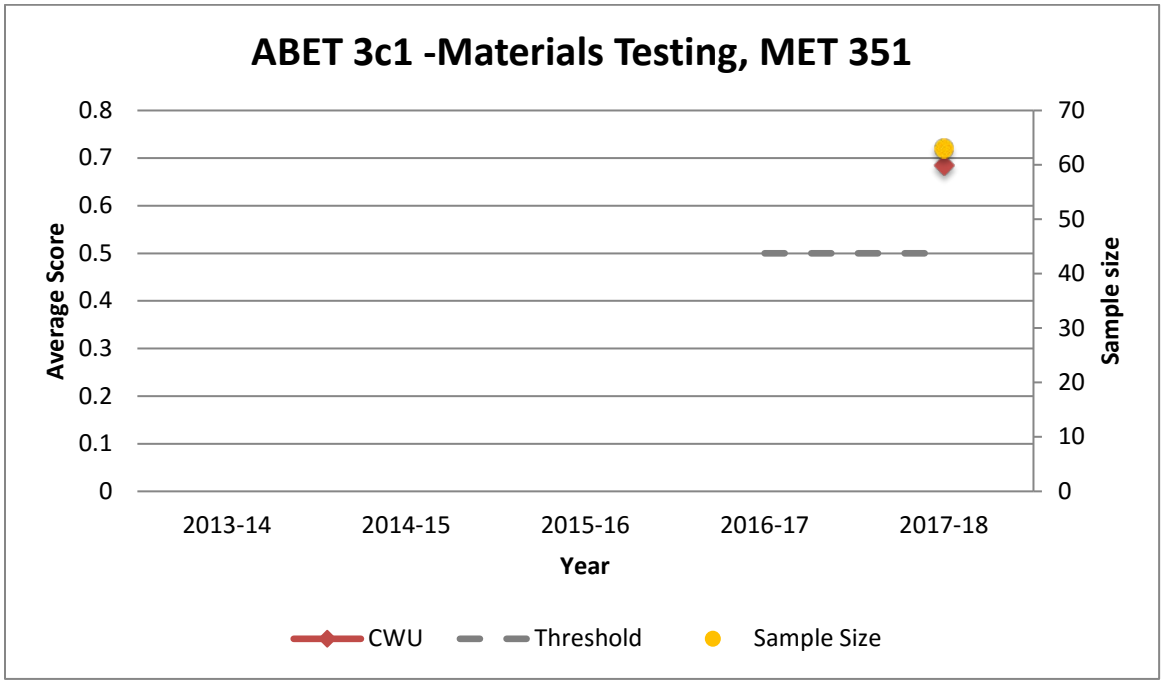

Figure 3c-01. Students' Material Testing in MET 351.

Figure 3c-01 comes from the Materials Testing completed in the fall quarter in the MET 351 Metallurgy/Materials and Processes course. The direct measure shows how well the students in MET 351 (typically taken fall of sophomore or junior year) are able to identify properties (i.e., UTS, E, Yield) and calculate some values. A rubric is used to score their ability. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3c-01.

This metric is examined annually.

The attainment threshold is that 50% of the students will receive a satisfactory or exemplary score. There are three questions testing students' understanding of this concept. Therefore, the threshold is set at 50% because a two out of three is still only a 67%. In the future, the MET faculty may choose to add more questions about this concept to enable the consistent use of the 70% threshold.

Figure 3c-01shows the SO 3c mechanical behavior level of attainment. This is the first time this metric is being used. The students have scored above the threshold. The next time this metric will be assessed will be spring 2019.

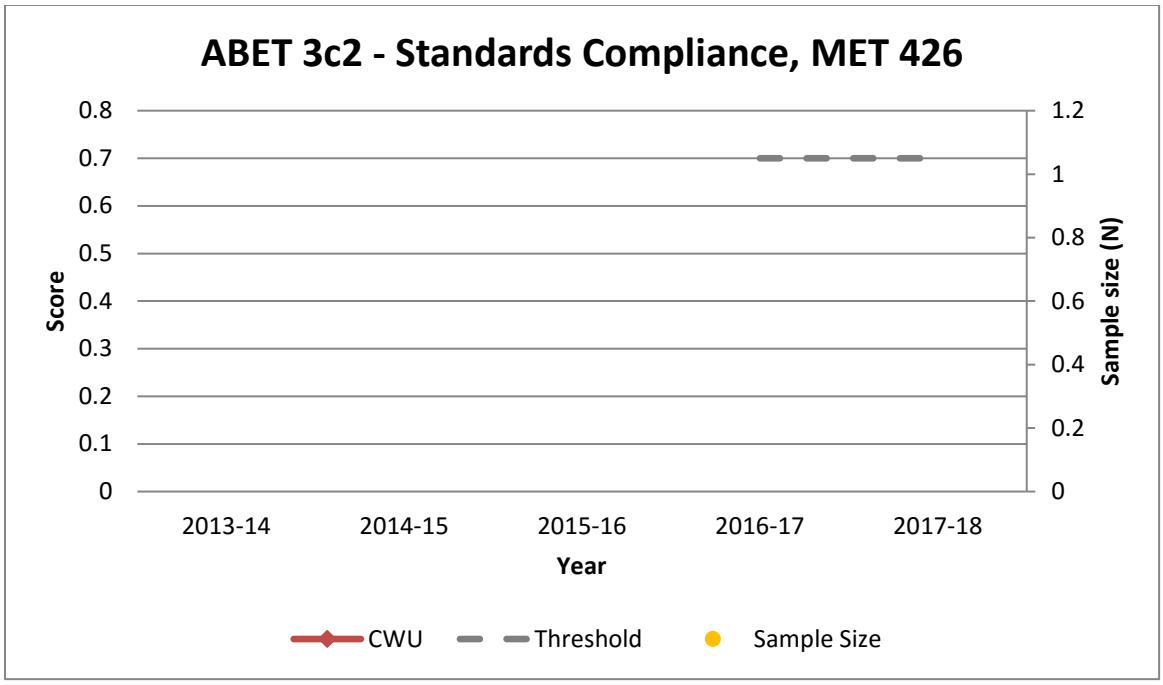

Figure 3c-02. ASTM Standards Compliance.

Figure 3c-02 Data will be collected and analyzed at the end of spring quarter 2018 (June).

Figure 3c-02 will come from the Standards Compliance assignments completed in the spring quarter in the MET 426 Applications in Strength of Materials course.

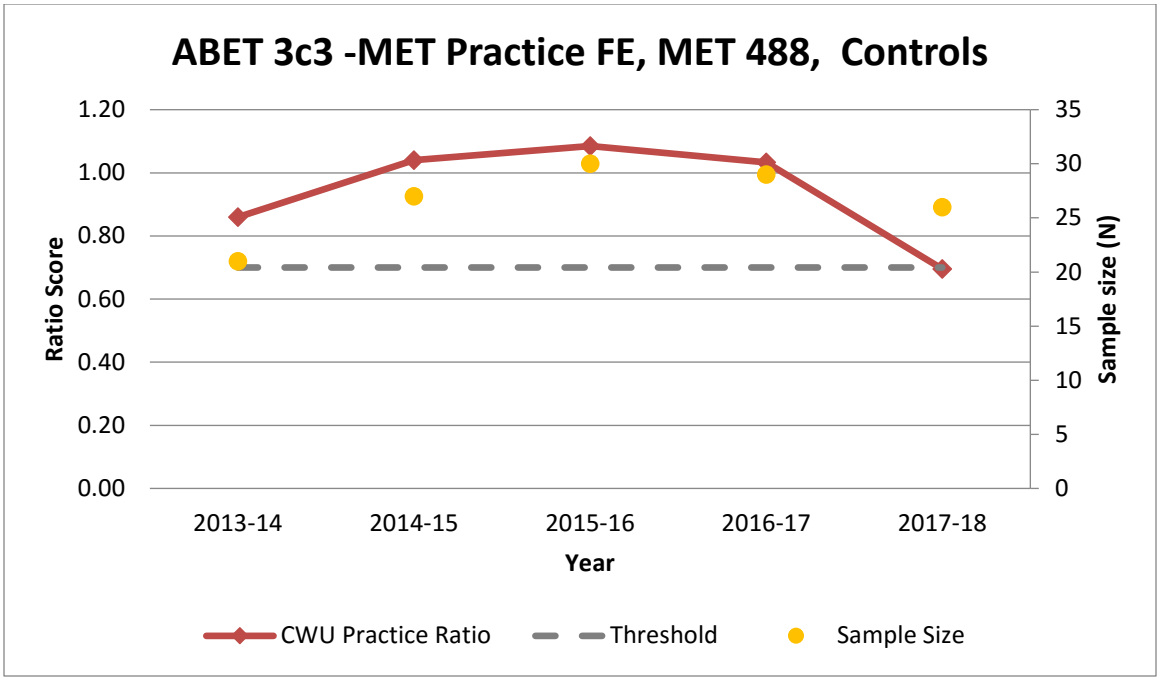

Figure 3c-03. Practice FE Ratio Score in Measurements Instrumentation and Controls.

Figure 3c-03 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Measurements Instrumentation and Controls category of the MET practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure 3c-03. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure 3c-03 shows CWU ratio scores for Measurements Instrumentation and Controls. All five student groups met or exceeded the threshold. Continued monitoring is necessary since the 2017-18 students are at the threshold.

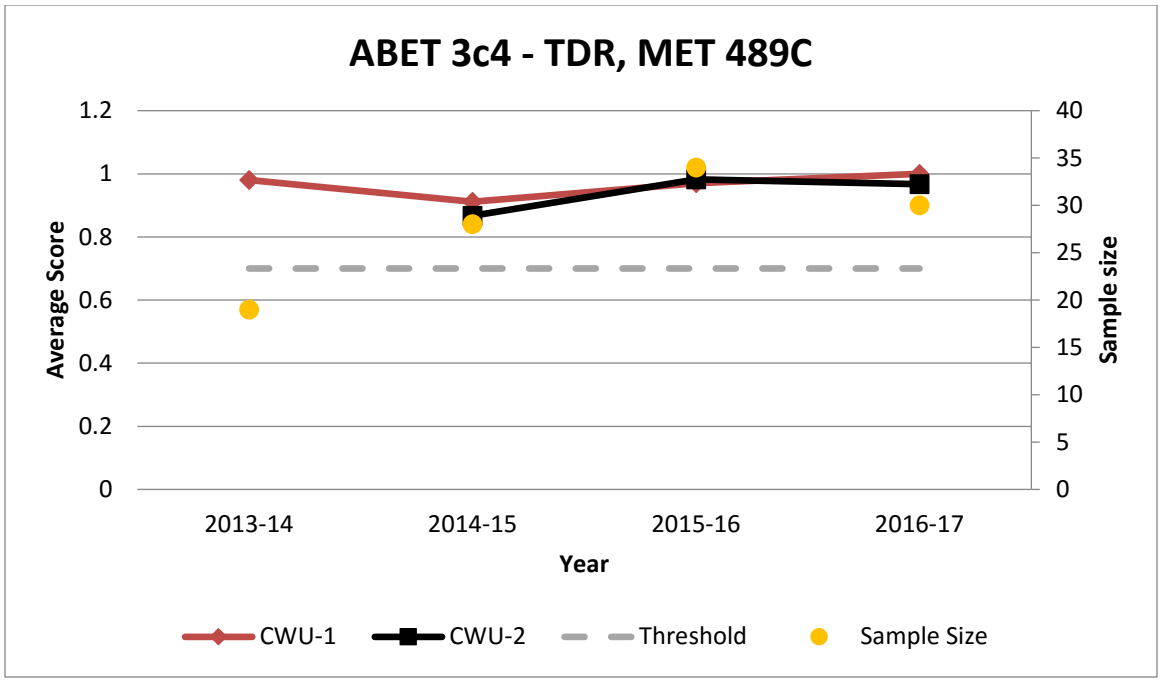

Figure 3c-04. Test Design Review Scores.

Figure 3c-04 comes from the Test Design Review (TDR) completed in the final (spring) quarter of the capstone experience (MET 489C). The direct measure is an assessment of the students' ability to analyze the test results on their senior project. Each student conducts a test review in front of their peers twice during the quarter. Each time they are assessed on their ability to verbalize their analysis of their test data. The TDR rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3c-04.

This metric is also examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3c-04 shows the SO 3c TDR level of attainment. For 2013-14, there was only a single assessment, and the students did well – exceeding the 70% threshold. In 2014-15, the MET faculty began conducting two assessments. For both the 2014-15 and 2016-17 student groups, the students performed better on the first assessment compared to the second. The students continued, however, to exceed the threshold.

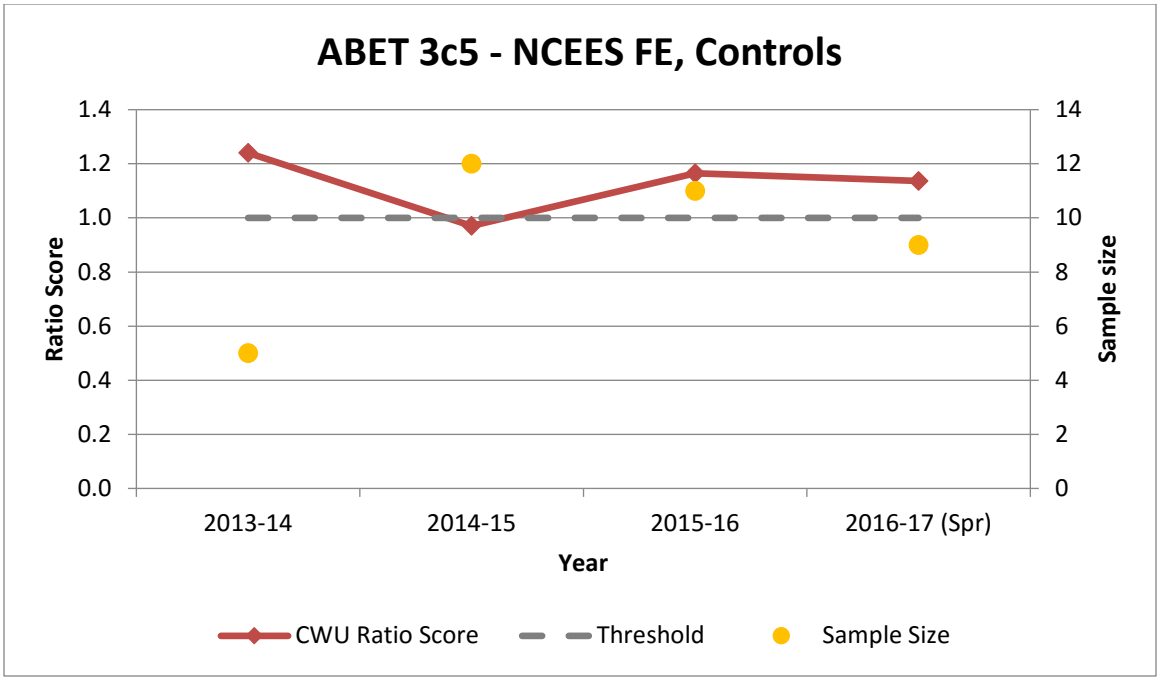

Figure 3c-05. CWU Ratio Score in Measurements Instrumentation and Controls.

Figure 3c-05 is assessed using the bi-annual reports produced by the NCEES. The data come from the Measurements Instrumentation and Controls category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure 3c-05. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure 3c-05 shows CWU ratio scores for Controls. All three student groups have exceeded the .70 threshold. No action is required at this time.

2019 Continuous Improvement:

20180105 Continuous Improvement:

Plan

MET 351 data is the initial data point and it is close to the threshold. The current threshold of 50% is an artifact of the assessment as explained above.
MET 426 data will be collected at the end of spring quarter 2018 (June).
MET 488 data have fallen to the threshold.
MET 489C data meet or exceed the threshold.
NCEES data meet or exceed the threshold.

Do

Add more questions to the MET 351 assessment to enable moving the threshold up to 70%.

Check

These results will be assessed in the fall of 2018.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

Lower limits shown: NCEES Nat'l Perf

METRIC

MET 351 – Mechanical Behavior

MET 426 –

MET 488 – MET Practice FE pass percentage

MET 489C – Testing Design Review

NCEES FE Data – NCEES passing percentage

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

17.10 351 all Grades.xlsx, MET351_3acef.xlsx

MET426.xlsx

MET488.xlsx

MET489C.xlsx

NCEES.xlsx

Appendix D. ABET Continuous Improvement, Student Outcome 3d.

Student Outcome: 3d. “an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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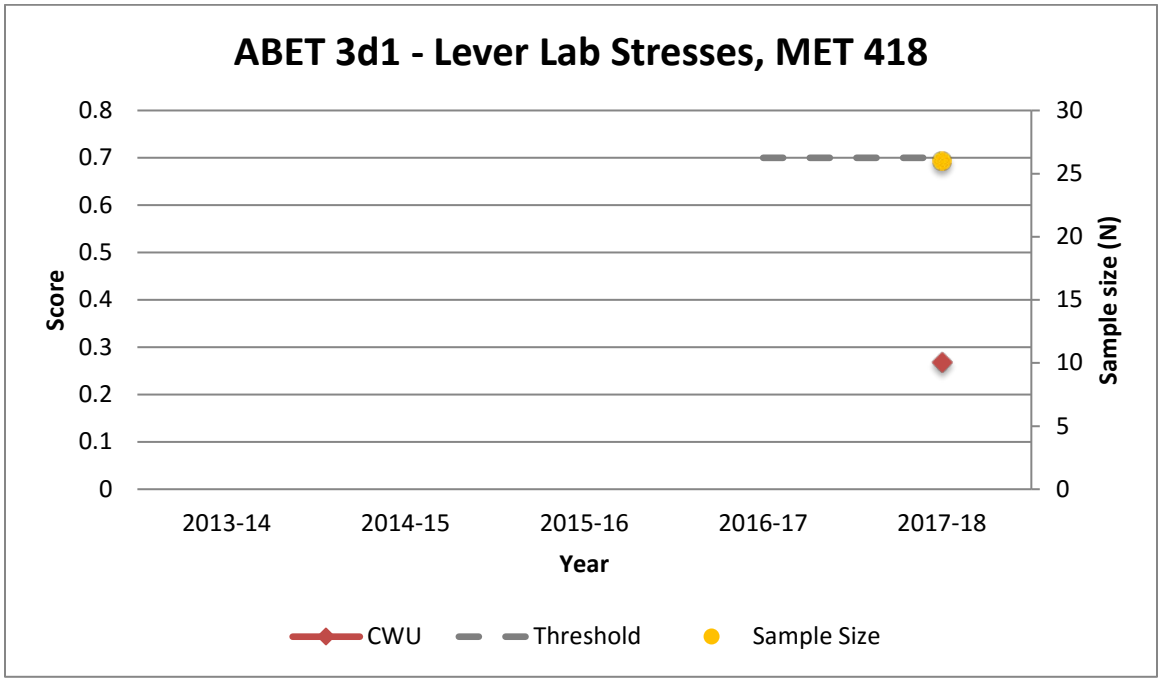

Figure 3d-01. Lever Lab Stresses from MET 418 Lab.

Figure 3d-01 comes from the Lever Lab completed in the fall quarter in the MET 418 Mechanical Design I course. The direct measure is an assessment of the students' ability to analyze and solve for the forces and stresses in a device. The students submit green sheets detailing their analysis. A rubric is used to score their ability to solve the problem. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3d-01.

This metric is examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3d-01 shows the SO 3d Lever Lab analysis level of attainment. This is the first time this metric is being used. The students have scored below the threshold. The next time this metric will be assessed will be fall 2018. The MET faculty discussed what might be changed (possible corrective action), but thought it prudent to wait and see what the next data point looks like.

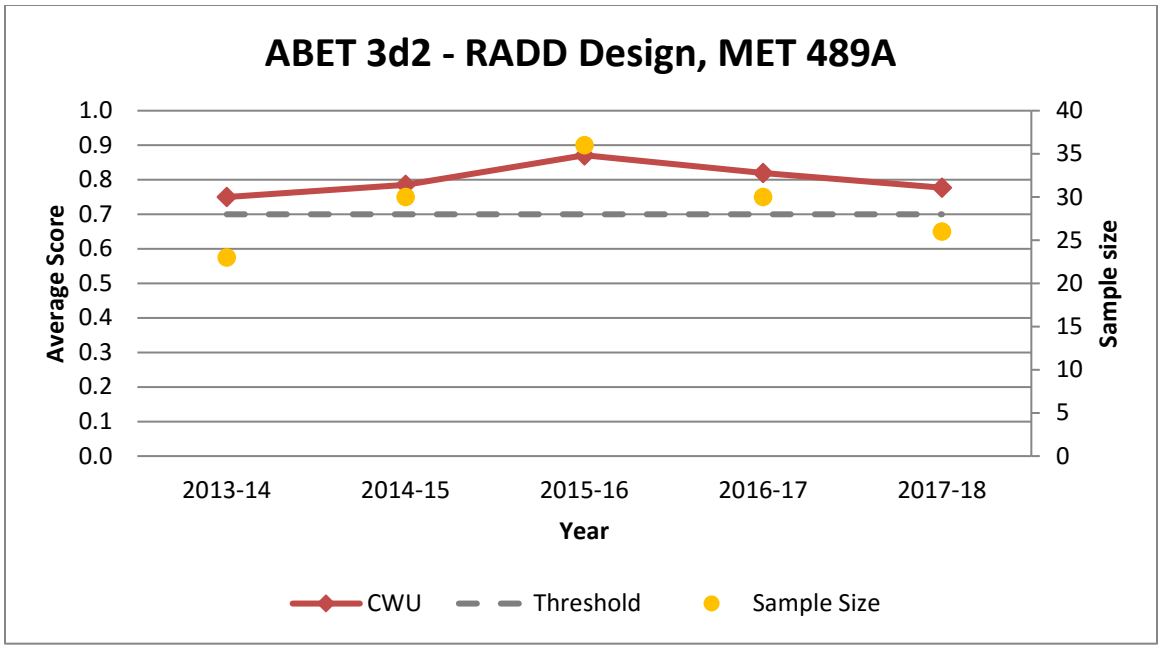

Figure 3d-02. Design scores for RADD in MET 489a.

Figure 3d-02 comes from the Requirements, Analysis, Design, and Drawing (RADD) completed in the first quarter of the capstone experience (MET 489A). This quarter is about students' initial design. The direct measure is an assessment of the students' ability to design their senior project. Each student presents a brief review of a requirement, the analysis for that requirement, the design that resulted from that analysis, and finally the drawing of their design. The RADD rubric data is dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3d-02.

The metric is also examined annually.

The attainment threshold is the student average rubric score will be a 70% or higher.

Figure 3d-02 shows the level of attainment for design. All the student groups performed well – exceeding the 70% threshold. However, there is now a downward trend to this performance indicator. This will need to be monitored and some corrective action may be in order.

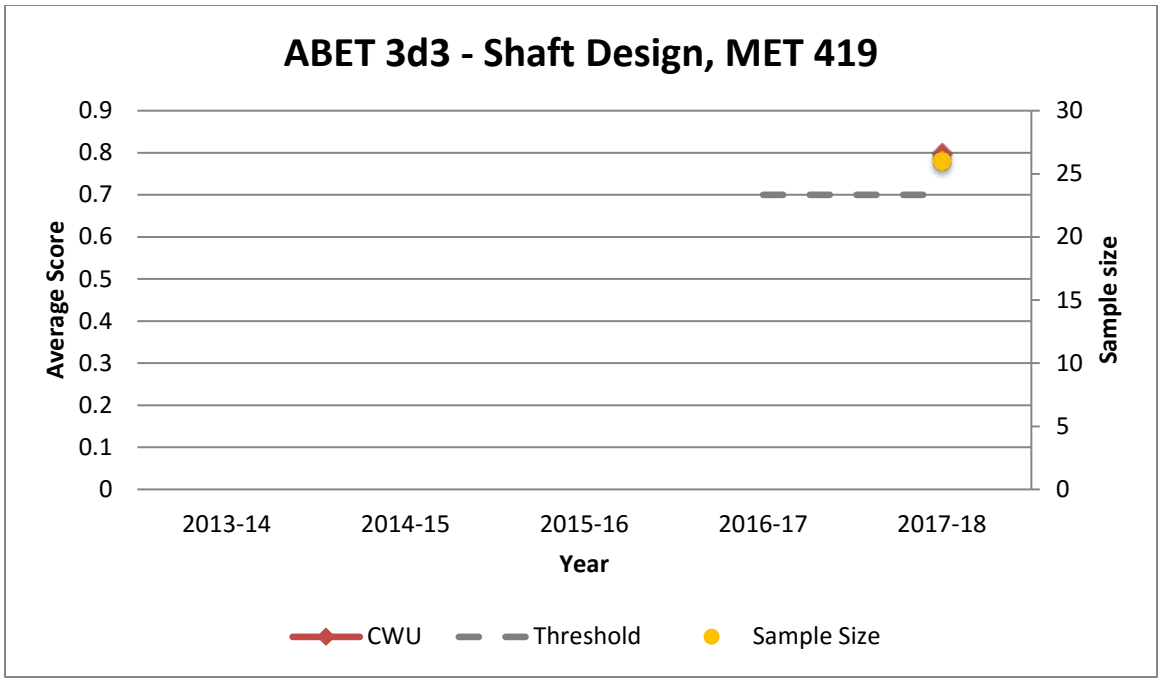

Figure 3d-03. Design scores for Shaft in MET 419.

Figure 3d-03 comes from the Shaft Design Lab completed in the winter quarter in the MET 419 Mechanical Design II course. The direct measure is an assessment of the students' ability to analyze and solve for the forces and stresses in a shaft. The students submit green sheets detailing their analysis. A rubric is used to score their ability to solve the problem. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3d-03.

This metric is also examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3d-03 shows the SO 3d Shaft Design Lab analysis level of attainment. This is the first time this metric is being used. The students have scored above the threshold. The next time this metric will be assessed will be winter 2019. A determination concerning the data will be made when this is reviewed in the spring of 2019.

2017-18 Continuous Improvement:

Plan

MET 418 Lever Lab data are below the threshold. It is also the initial data point.
MET 489A RADD data meet or exceed the threshold – although showing a downward trend.
MET 419 Shaft Design meet or exceed the threshold. This is the initial data point.

Do

No corrective action pending more data.

Check

There are no results of any previous action items to review.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

Lower limits shown: NCEES Nat'l Perf

METRIC

MET 418 – Lever Lab

MET 489A – RADD

MET 489B – Shaft Design

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET418_1179_rosterTestScores.xlsx

MET489A.xlsx

MET418_1181_rosterTestScores.xlsx

Appendix E. ABET Continuous Improvement, Student Outcome 3e.

Student Outcome: 3e. “an ability to function effectively as a member or leader on a technical team”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

This document is organized in the following manner:

1. Presentation of assessment data and description of metric.
2. Plan: Comments on assessment data and identification of problem(s).
3. Do: Development of action items to address comments or correct problem(s).
4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

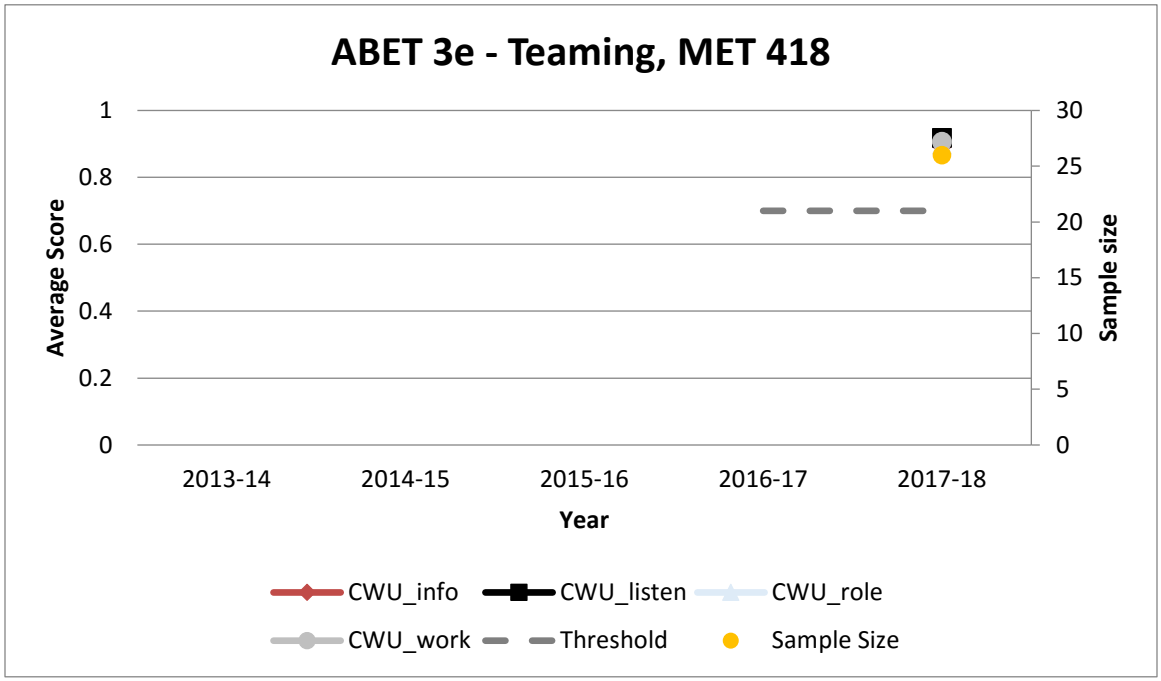

Figure 3e-01. Teaming scores for MET 418.

Figure 3e-01 3e comes from the teaming scores in the Mechanical Design I (MET 418) Labs. The direct measure is an assessment of the students' ability to function in and as a team member. Each week the students are randomly placed in teams of three. They are given a design problem and a week to provide a solution. At the end of the week the students assess their fellow team members via a provided rubric. The scores provided by the students are entered into an Excel workbook. The student scores are multiplied by a weighting factor and then summed for a teaming score for the week. The teaming data is dropped into another Excel workbook that aggregates the data to produce the graph shown in Figure 3e-01.

This metric is examined annually.

The attainment threshold is the average student rubric score is a 70% or higher.

Figure 3e-01 shows the scores for teaming. All five student groups exceeded the threshold. There will be a rubric change for this SO beginning in fall of 2018; the scoring will likely become more demanding. If students continue to exceed the threshold even when the more rigorous rubric is used, the MET faculty and IAB may need to consider increasing the threshold score.

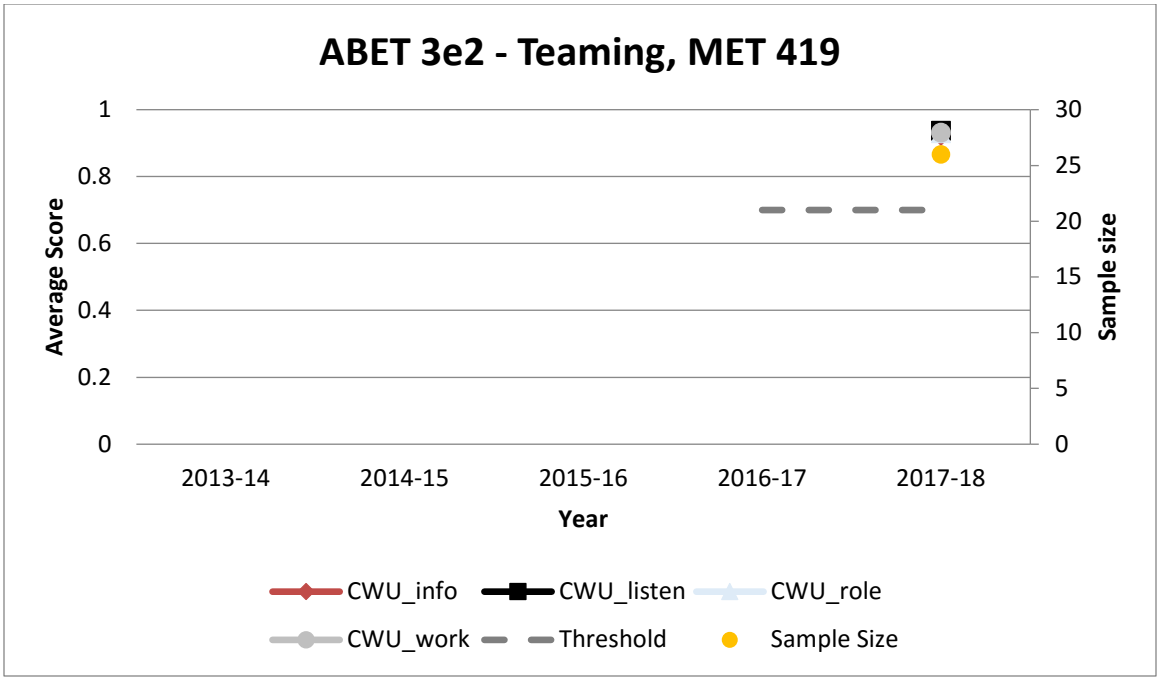

Figure 3e-02. Teaming Scores from MET 419.

Figure 3e-02 comes from the teaming scores in the Mechanical Design II (MET 419) Labs. The direct measure is an assessment of the students' ability to function in and as a team member. Each week the students are randomly placed in teams of three. They are given a design problem and a week to provide a solution. At the end of the week the students assess their fellow team members via a provided rubric. The scores provided by the students are entered into an Excel workbook. The student scores are multiplied by a weighting factor and then summed for a teaming score for the week. The teaming data is dropped into another Excel workbook that aggregates the data to produce the graph shown in Figure 3e-02.

This metric is also examined annually.

The attainment threshold is the average student rubric score is a 70% or higher.

Figure 3e-02 shows the scores for teaming. All three student groups exceeded the threshold. There will be a rubric change for this SO beginning in fall of 2017; the scoring will likely become more demanding. If students continue to exceed the threshold even when the more rigorous rubric is used, the MET faculty and IAB may need to consider increasing the threshold score.

20180105 Continuous Improvement:

Plan

MET 418 Teaming is above the threshold. This is the initial data point.
MET 419 Teaming is above the threshold. It is also the initial data point.

Do

No corrective action pending more data.

Check

No corrective action pending more data. These data will be reviewed in the spring of 2019.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 418 – Teaming

MET 419 – Teaming

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18 and S:\IET\15. MET - Program Information\CourseOutcomeData

MET418_3abdeMh.xlsx

MET419_3ade.xlsx

Appendix F. ABET Continuous Improvement, Student Outcome 3f.

Student Outcome: 3f. “an ability to identify, analyze, and solve broadly-defined engineering technology problems.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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3. Do: Development of action items to address comments or correct problem(s).
4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

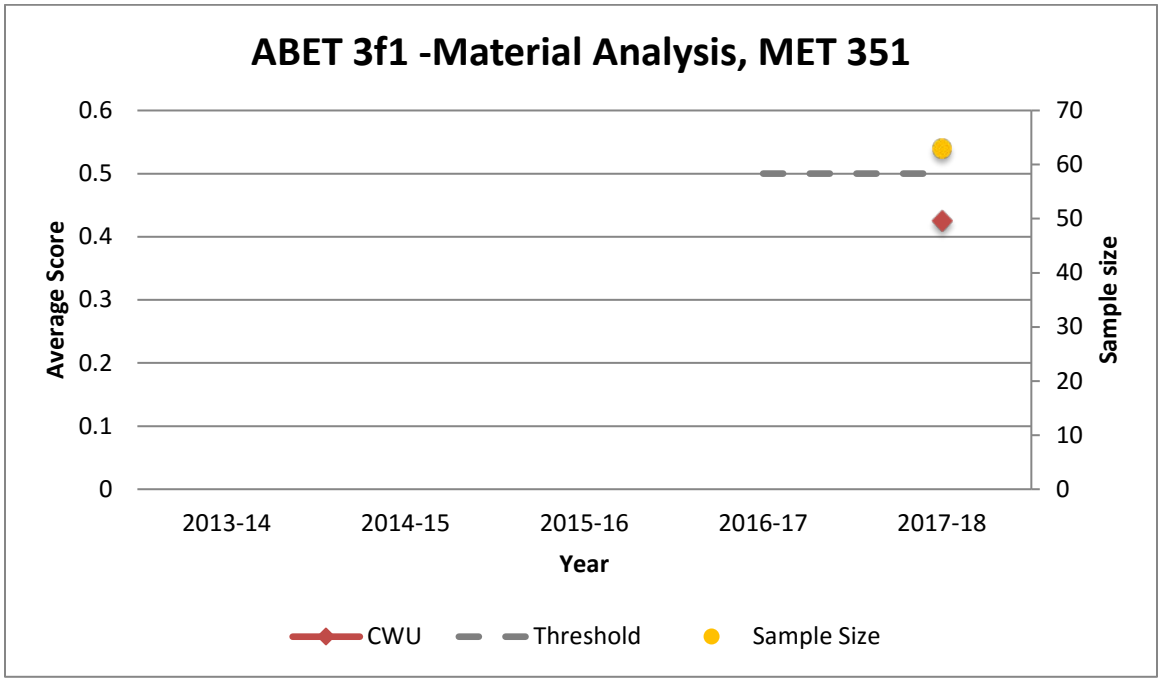

Figure 3f-01. Students' Material Analysis in MET 351.

Figure 3f-01 comes from the Material Analysis completed in the fall quarter in MET 351 Metallurgy/Materials and Processes course. The direct measure shows how well the students in MET 351 (typically taken fall of sophomore or junior year) are able to identify properties (i.e., UTS, E, Yield) and calculate some values. A rubric is used to score their ability. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3c-01.

This metric is examined annually.

The attainment threshold is that 50% of the students will receive a satisfactory or exemplary score. There are three questions testing students' understanding of this concept. Therefore, the threshold is set at 50% because a two out of three is still only a 67%. In the future, the MET faculty may choose to add more questions about this concept to enable the consistent use of the 70% threshold.

Figure 3f-01shows the SO 3f mechanical behavior level of attainment. This is the first time this metric is being used. The students have scored above the threshold. The next time this metric will be assessed will be spring 2019.

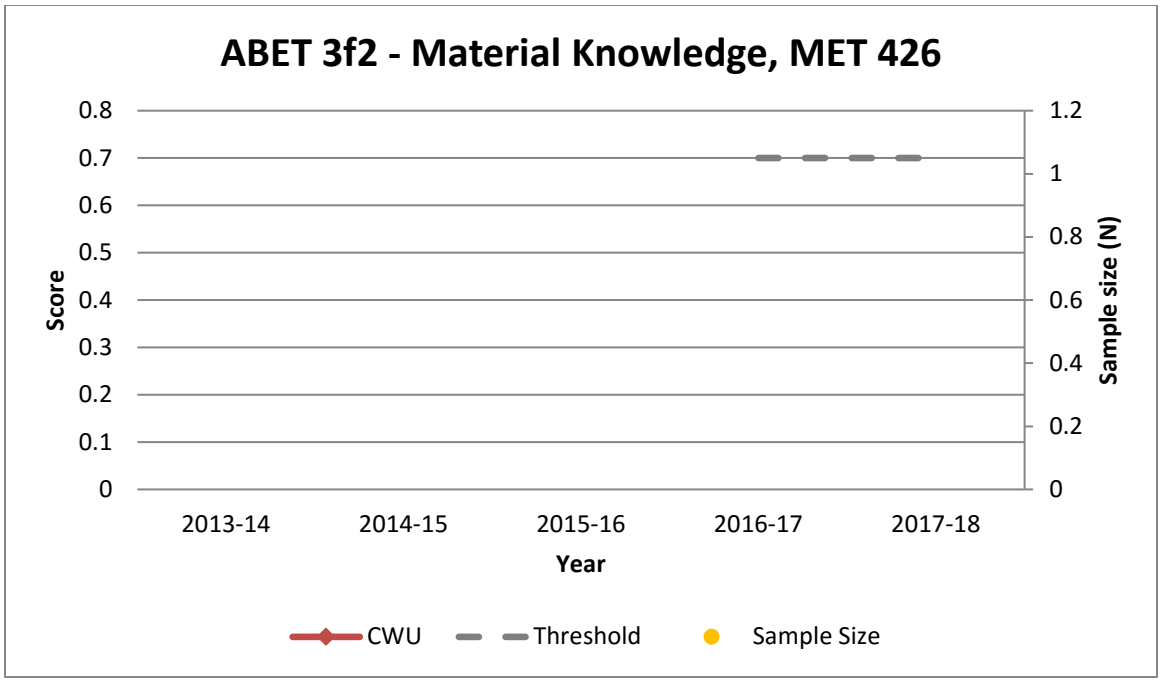

Figure 3f-02. Students' Material Knowledge in MET 426.

Figure 3f-02 Data will be collected at the end of spring quarter 2018 (June).

Figure 3f-02 will come from the Materials Knowledge assignments completed in the spring quarter in the MET 426 Applications in Strength of Materials course

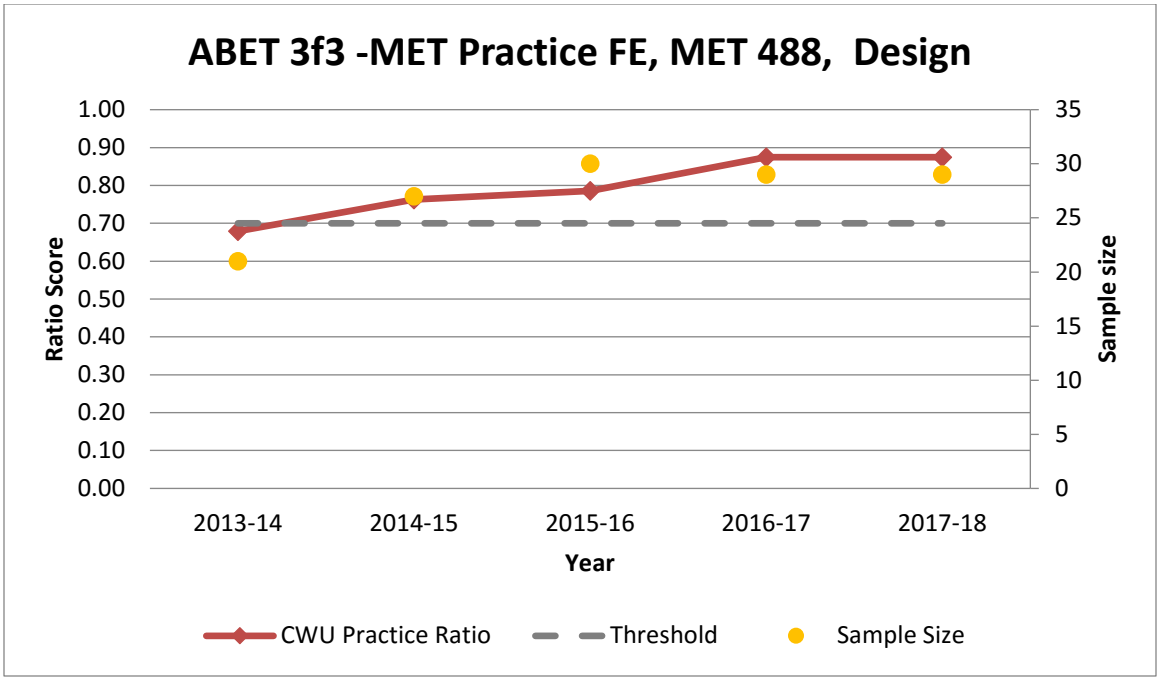

Figure 3f-03. Practice FE Ratio Score in Mechanical Design and Analysis.

Figure 3f-03 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Mechanical Design and Analysis category of the MET practice FE exam. The practice FE exam data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3f-03. The graph is produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure 3f-03 shows CWU ratio scores for Mechanical Design and Analysis. The students have continually improved with four of the five student groups exceeding the threshold. The MET faculty and IAB will consider increasing the threshold score higher – toward 1.0.

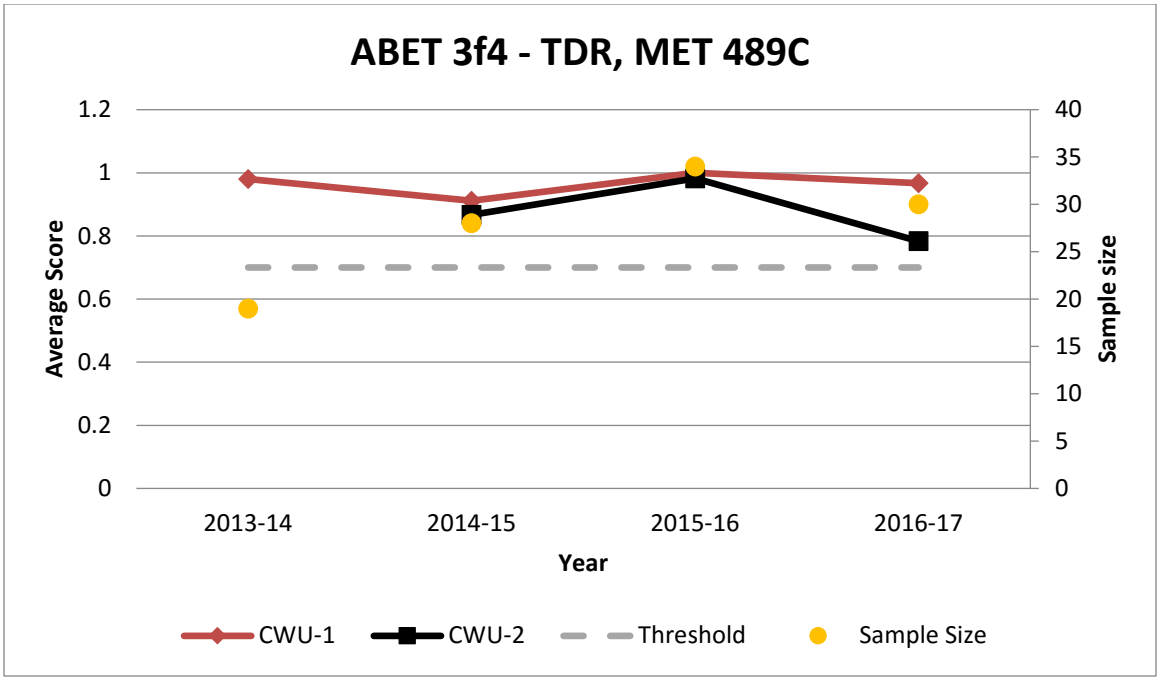

Figure 3f-04. CWU ABET 3f Test Design Review Scores.

Figure 3f-04 comes from the Test Design Review (TDR) completed in the final quarter of the capstone experience (MET 489C). The direct measure is an assessment of the students' ability to state their predicted test result value on their senior project. Each student conducts a test review in front of their peers twice during the quarter. Each time they are assessed on their ability to state their predicted value for the test result. The TDR rubric data is dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure 3f-04.

This metric is also examined annually.

The attainment threshold is the 70% of the students will receive a satisfactory or exemplary rubric score.

Figure 3f-04 shows the ABET 3f TDR level of attainment. For 2013-14, there was only a single assessment, and the students did well – exceeding the threshold. In 2014-15, the MET faculty began conducting two assessments. Consistently the students performed better on the first assessment than the second. This may require an adjustment of the instructions conveyed to the students prior to the second assessment as they appear to not be taking it as seriously as the first. Although the students consistently exceeded the threshold on both assessments, we want them to take both assessments equally seriously. The MET faculty have also doubled the points for the second assessment to encourage students to take it seriously.

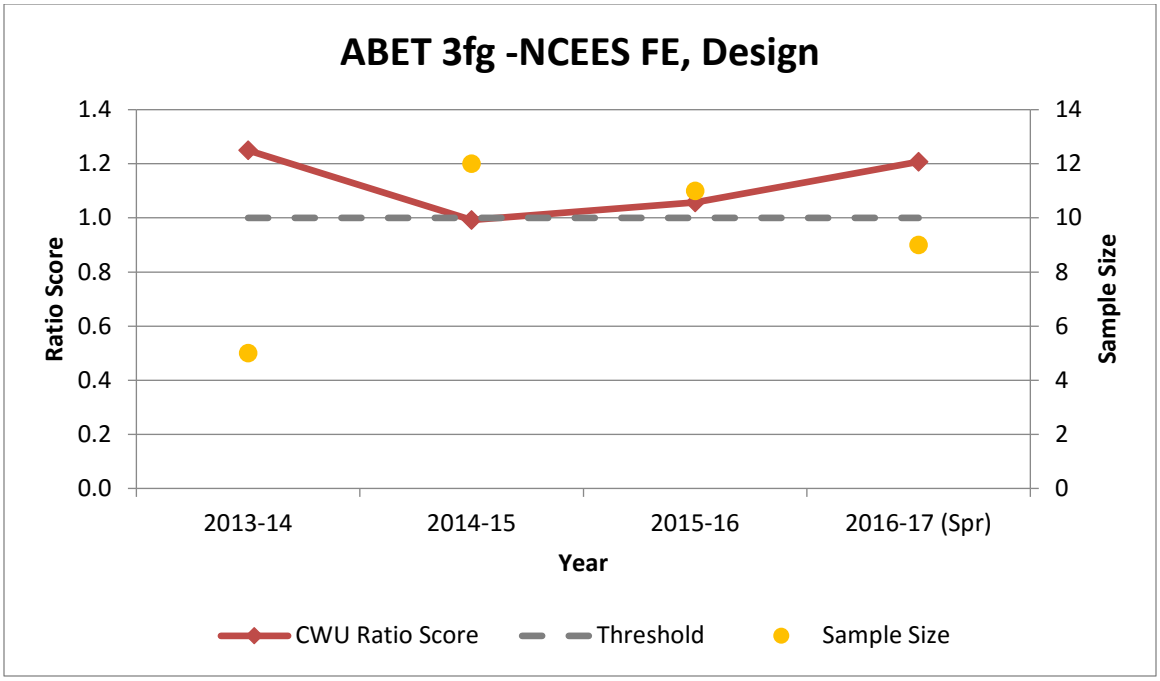

Figure 3f-05. CWU Ratio Scores in Mechanical Design and Analysis.

Figure 3f-05 is assessed using the bi-annual reports produced by the NCEES. The data comes from the Mechanical Design and Analysis category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3f-05. The graph is produced using the NCEES Ratio Score – the ratio of the performance of CWU students to the NCEES comparator performance in each category. These are average scores.

This metric is also completed annually.

The attainment threshold is the ratio score for the CWU students that take the FE exam will be .70 or higher.

Figure 3f-05 shows CWU ratio scores for Design. All four student groups met or exceeded the threshold. If these performance levels continue, the MET faculty and IAB may need to consider raising the threshold score.

2019 Continuous Improvement:

20180105 Continuous Improvement:

Plan

MET 351 data are the initial data point and are close to the threshold.
MET 426 data will be collected at the end of spring quarter 2018 (June).
MET 488 data are trending upward.
MET 489C data meet or exceed the threshold.
NCEES data meet or exceed the threshold and are trending upward.

Do

Add more questions to the MET 351 assessment to enable moving the threshold up to 70%. For MET 489C, improve instructions prior to second assessment and continue to double the points for the second assessment.

Check

There are no results of any previous action items to review. These data will be reviewed in the fall of 2019.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

Lower limits shown: NCEES Nat'l Perf

METRIC

MET 351 – Mechanical Behavior

MET 426 –

MET 488 – Design

MET 489C – Testing Design Review

NCEES - Design

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET351_3acef.xlsx

MET426.xlsx

MET488.xlsx

MET489C_3cfgkMb.xlsx

NCEES.xlsx

Appendix G. ABET Continuous Improvement, Student Outcome 3g.

Student Outcome: 3g. “an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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6. Meta data

Data/Description:

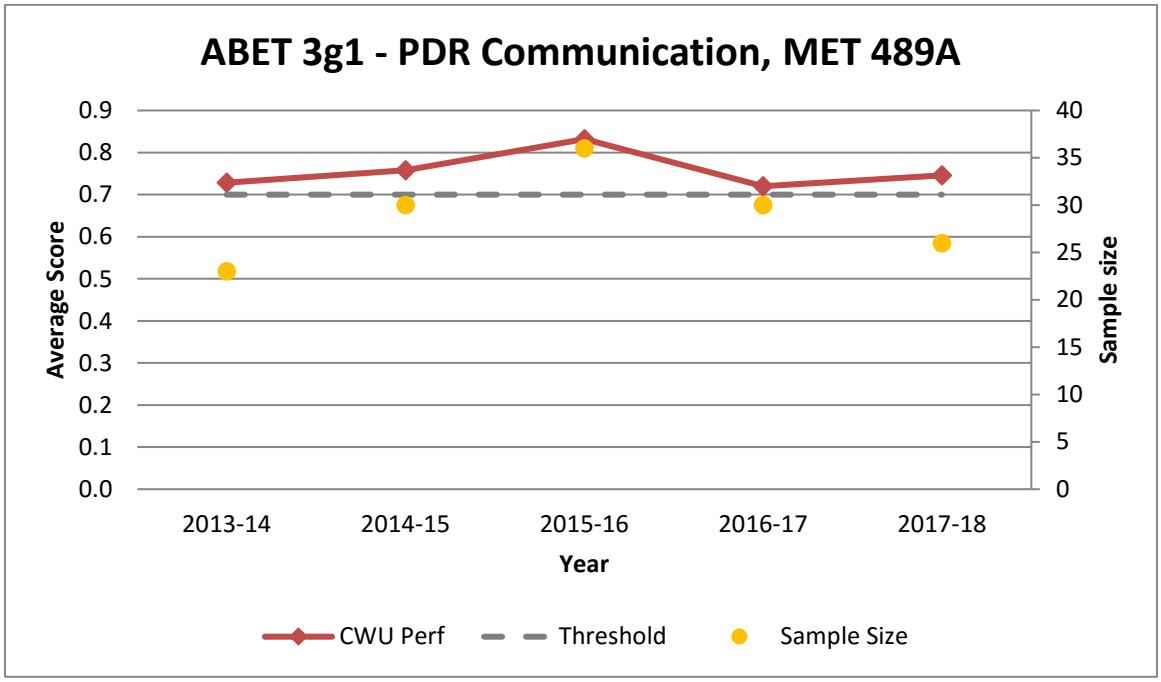

Figure 3g-01. ABET 3g Proposal Design Review Scores.

Figure 3g-01 comes from the Proposal Design Review (PDR) completed in the first quarter of the capstone experience (MET 489A). The direct measure is an assessment of the students' ability to communicate their proposed senior project to an audience. Each student presents a short review in front of their peers during the quarter. They are assessed on their ability to apply written, oral, and graphical communication in their proposal. The PDR rubric data is dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure 3g-01.

This metric is examined annually.

The attainment threshold is the student average rubric score will be a 70% or higher.

Figure 3g-01 shows the ABET 3g PDR level of attainment. All student groups exceeded the threshold. If students' performance continues to trend in a positive direction, the MET faculty and IAB will consider increasing the threshold score.

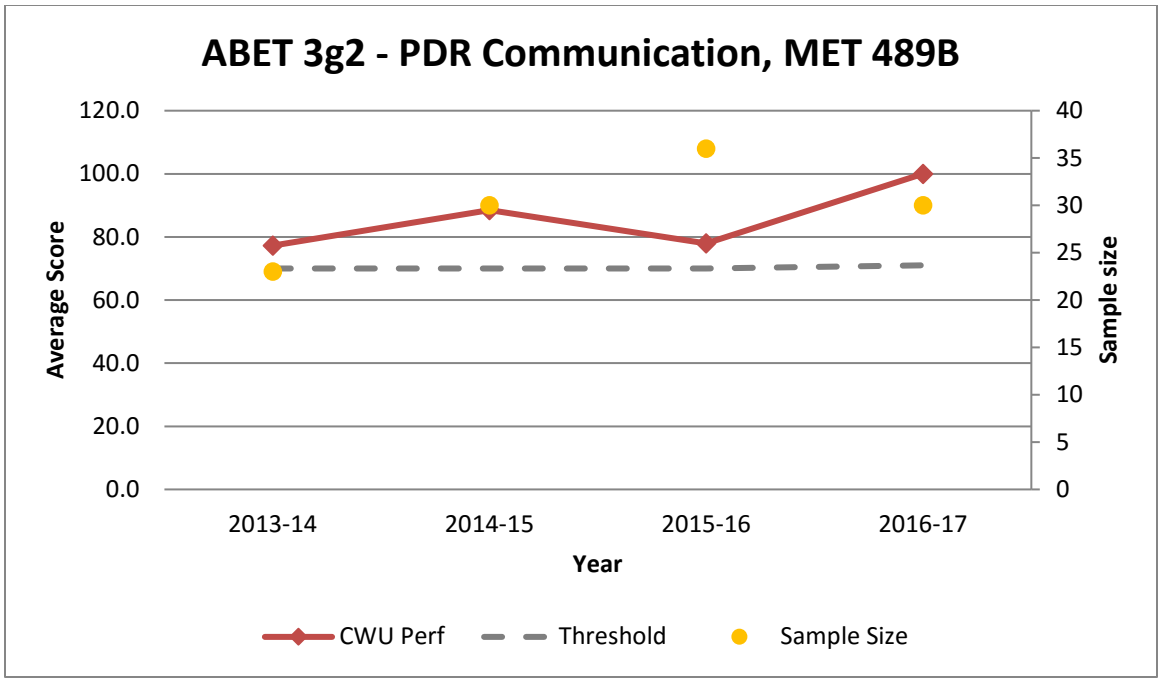

Figure 3g-02. ABET 3g Project Design Review Scores.

Figure 3g-02 comes from the Proposal Design Review (PDR) completed in the second quarter of the capstone experience (MET 489B). The direct measure is an assessment of the students' ability to design their senior project. Each student presents a brief review of a requirement, the analysis for that requirement, the design that resulted from that analysis, and finally the drawing of their design. The PDR rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3g-02.

The metric is also examined annually.

The attainment threshold is the student average rubric score will be a 70% or higher.

Figure 3g-02 shows the level of attainment for design. The students are exceeding the threshold. The students are showing a slight improvement over the preceding quarter (when they took the fall quarter MET 489A course), as they should.

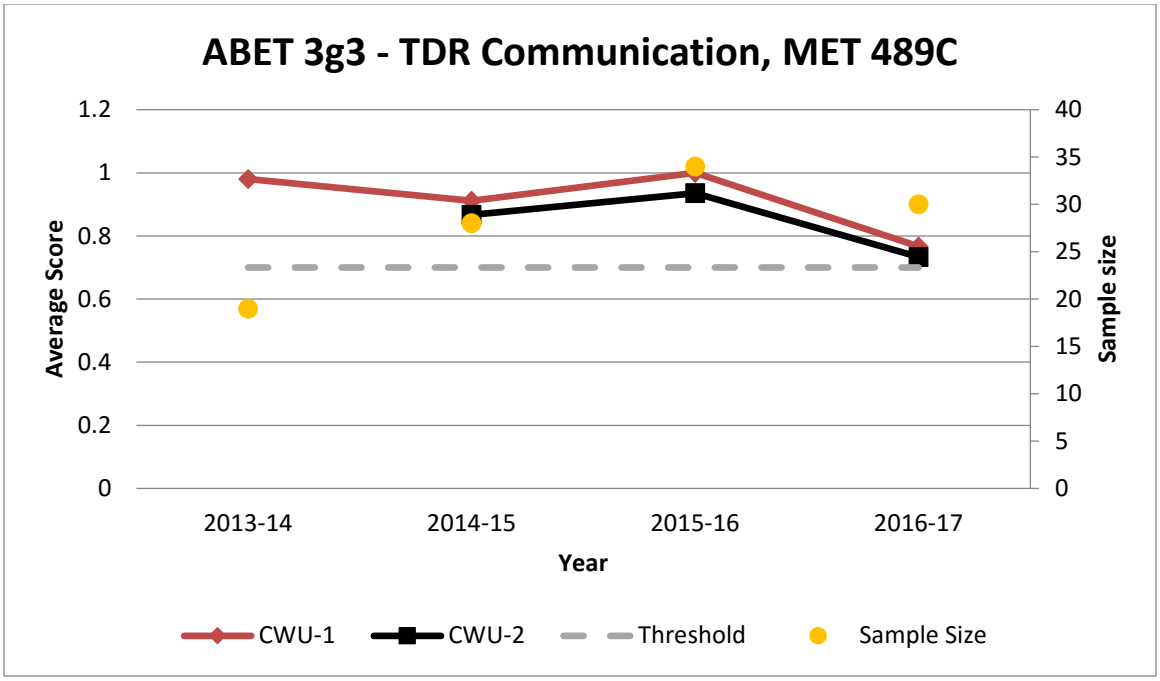

Figure 3g-03. Design scores for TDR in MET 489C.

Figure 3g-03 comes from the Test Design Review (TDR) completed in the final quarter of the capstone experience (MET 489C). The direct measure is an assessment of the students' ability to introduce the test they conducted on their senior project. Each student conducts a test review in front of their peers twice during the quarter. Each time they are assessed on their ability to verbalize what test they conducted on their senior project. The TDR rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3g-03.

This metric is also examined annually,

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary rubric score.

Figure 3g-03 shows the ABET 3f TDR level of attainment. For 2013-14, there was only a single assessment, and the students did well – exceeding the threshold. In 2014-15, the MET faculty began conducting two assessments. Consistently the students performed better on the first assessment than the second. This may require an adjustment of the instructions conveyed to the students prior to the second assessment as they appear to not be taking it as seriously as the first. Although the students consistently exceeded the threshold on both assessments, we want them to take both assessments equally seriously. The MET faculty have also doubled the points for the second assessment to encourage students to take it seriously.

2017-18 Continuous Improvement:

Plan

MET 489A – data meet or exceed the threshold.
MET 489B – data meet or exceed the threshold.
MET 489C – data meet or exceed the threshold.

Do

For MET 489C, improve instructions prior to second assessment and continue to double the points for the second assessment.

Check

There are no results of any previous action items to review. These data will be reviewed in the fall of 2019.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 418 – PDR

MET 489A – PDR

MET 489B – TDR

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18
and S:\IET\15. MET - Program Information\CourseOutcomeData

MET489A_3g.xlsx

MET489B_3g.xlsx

MET489C_3cfgkMb.xlsx

Appendix H. ABET Continuous Improvement, Student Outcome 3h.

Student Outcome: 3h. “an understanding of the need for and an ability to engage in self-directed continuing professional development.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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6. Meta data

Data/Description:

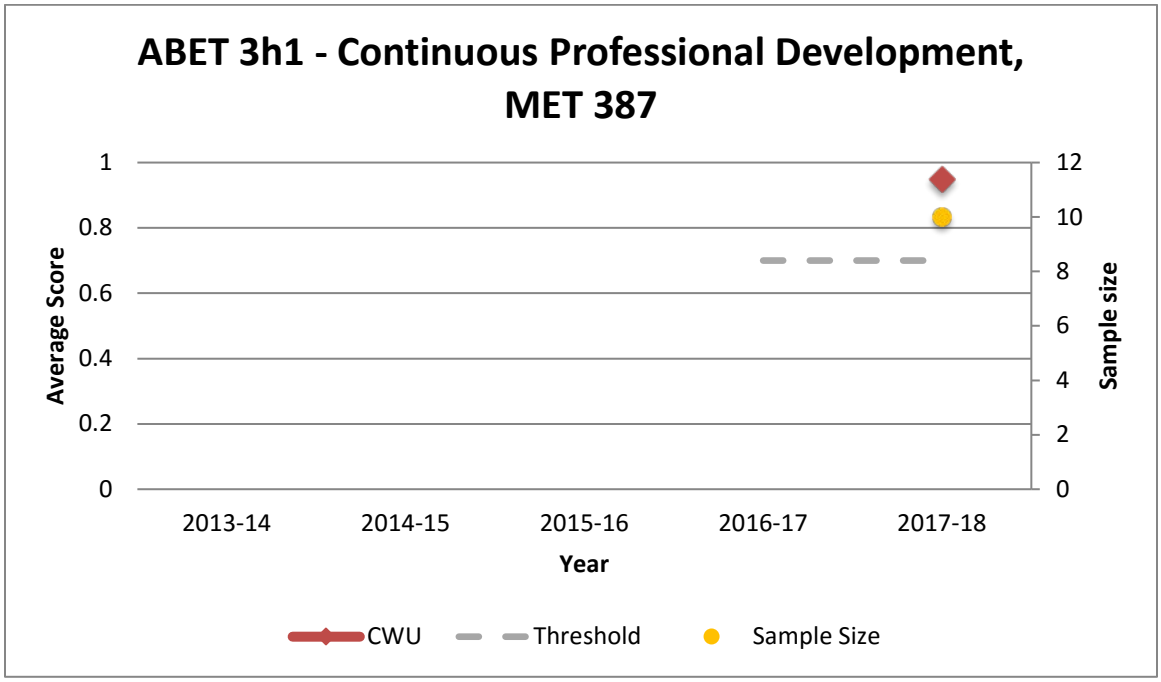

Figure 3h-01. MET 387 Continuous Professional Development Score.

Figure 3h-01 comes from the MET 387 Engineering Ethics course completed in the winter quarter. The direct measure is an assessment of the students' ability to recognize the need for continued professional development. The students are scored on a variety of exam questions that relate to professional development. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3h-01. These are average scores.

This metric is examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3h-01 shows the students understand the need for continuous professional development in the discipline of engineering ethics. The next time this metric will be assessed will be winter of 2019. A determination concerning the data will be made when this is reviewed in the spring of 2019.

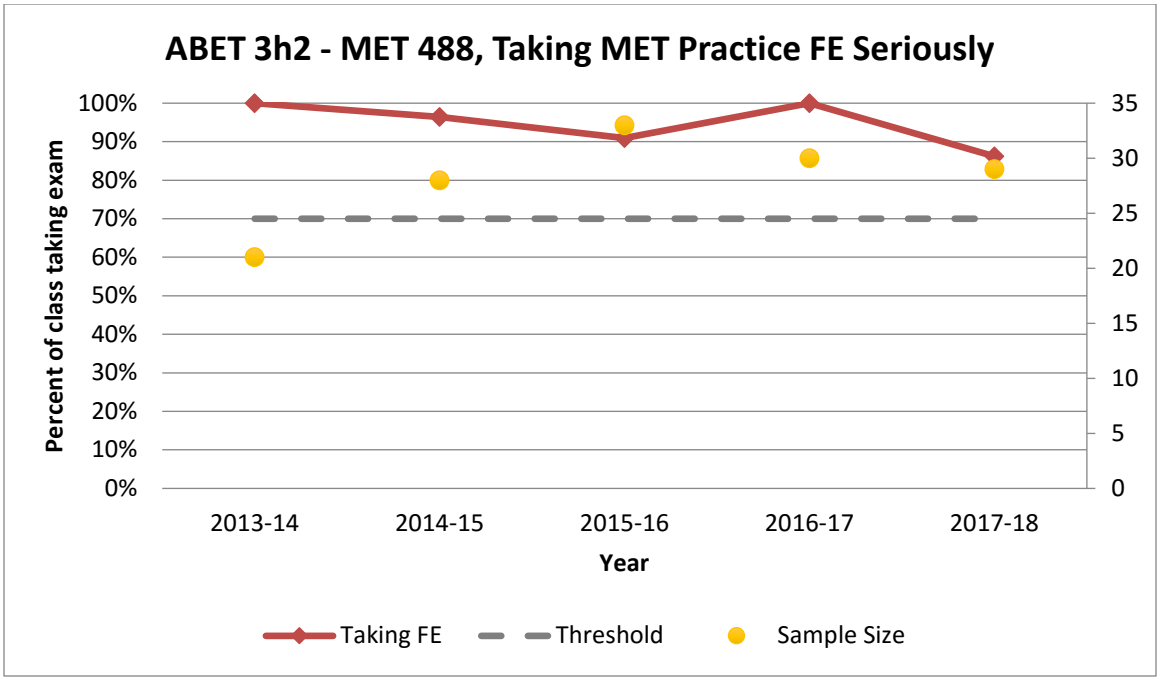

Figure 3h-02. MET Practice FE Examinees.

Figure 3h-02 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the number of students who take the test that are not flagged as "random guessers" but rather take the test seriously. The practice FE exam data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3h-02. The graph is produced using the number of CWU students who take the practice FE exam. (All students in the class.) The score is the percentage of students who took the practice test seriously and were not flagged as "random guessers."

This metric is also examined annually.

The attainment threshold is 70%, or higher, of the students will take the MET practice FE seriously.

Figure 3h-02 shows MET practice FE examinees who took the test seriously. Individual students are flagged as "random guessers" if they exhibit two of the following three attributes: 1) Self-reported little or no outside study (last question on the exam), 2) scratch paper notes were one page or less, and 3) student 'completed' the six-hour test in 2 hours or less. The scores generated by the "random guessers" are not removed from the data set, they are simply counted as not taking the exam seriously for this particular outcome.

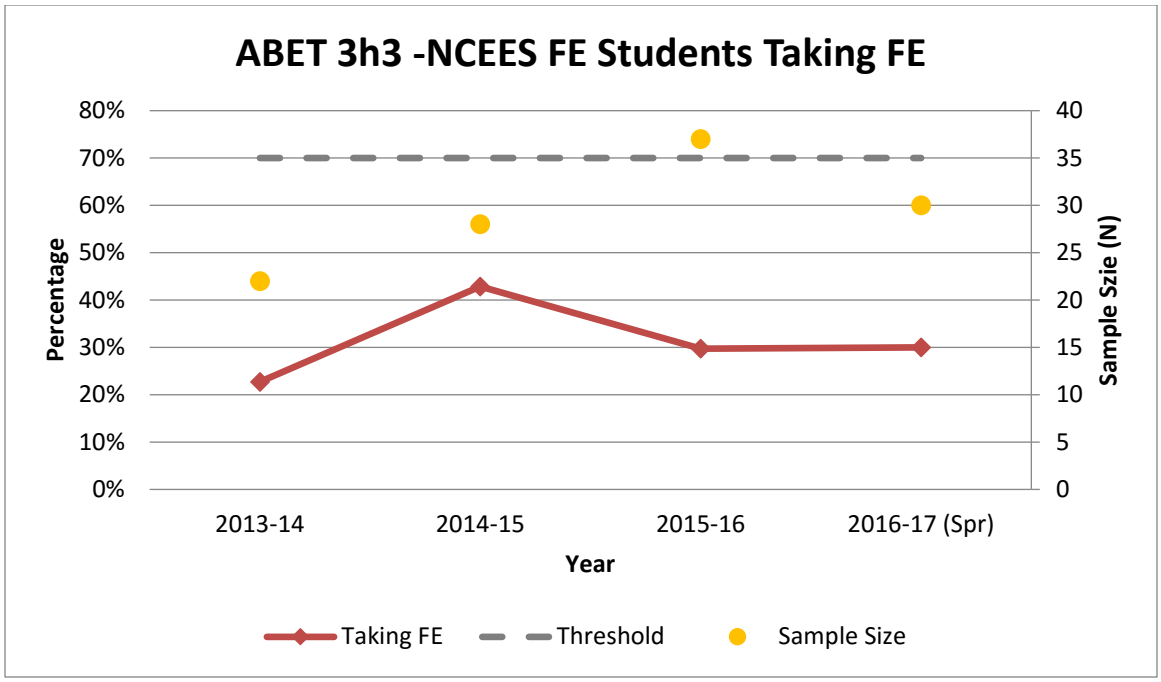

Figure 3h-03. MET Students who have taken the NCEES FE exam.

Figure 3h-03 is assessed using the bi-annual reports produced by the NCEES. The data come from the header information of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3h-03. The graph is produced using the NCEES Number of Examinees Taking the FE exam from CWU.

This metric is also examined annually.

The attainment threshold is 70% of the CWU graduating class, each year, will take the FE exam.

Figure 3h-03 shows the percentage of the graduating class willing to pursue the NCEES FE exam. Clearly, this is deficient, and the students do not understand the need for continuous professional development in terms of taking the NCEES FE exam. This requires a change in the message the students are receiving about the importance and value of professional development and of obtaining the FE credential. Corrective action will be taken.

2017-18 Continuous Improvement:

Plan

MET 387 the students scored well. This is the first data point.
MET 488 data meet or exceed the threshold.
NCEES data is fairly consistent, but well below the threshold.

MET 387 seems to indicate the students realize the need for continuous professional development. (These are students in their junior year). MET 488 has taken another downward turn and hopefully this trend will not continue. (These are seniors graduating in June). The data from the students taking the NCEES FE exam are well below the threshold of 70%. The reality may be that the threshold should be moved.

Do

Discuss with the faculty and IAB whether the threshold for MET 488 should be made higher. (It is the goal of the program that all students take the practice FE seriously).
Discuss with the faculty and IAB whether the threshold for the percentage of students taking the NCEES FE exam should be lowered. Also, discuss ways to improve the number of students taking the NCEES FE exam. After the discussion, the tasks outlined by the faculty and IAB will be documented.

Check

The results of these efforts cannot be assessed until the end of spring quarter 2019. The MET faculty and the Industry Advisory Board will review the results.

Act

A course of action will be determined (fall quarter 2019) after reviewing the results of the actions described above.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 387 – Exam question, test 1 and test 2

MET 488 – Number of students taking the exam

NCEES – Number of students taking the FE exam

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET387_1181_grades.xlsx and MET387_3hij.xlsx

MET_FE_PracticeScores2018RevApr30.xlsx and MET488.xlsx

NCEES.xlsx

Appendix I. ABET Continuous Improvement, Student Outcome 3i.

Student Outcome: 3 B i. “an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

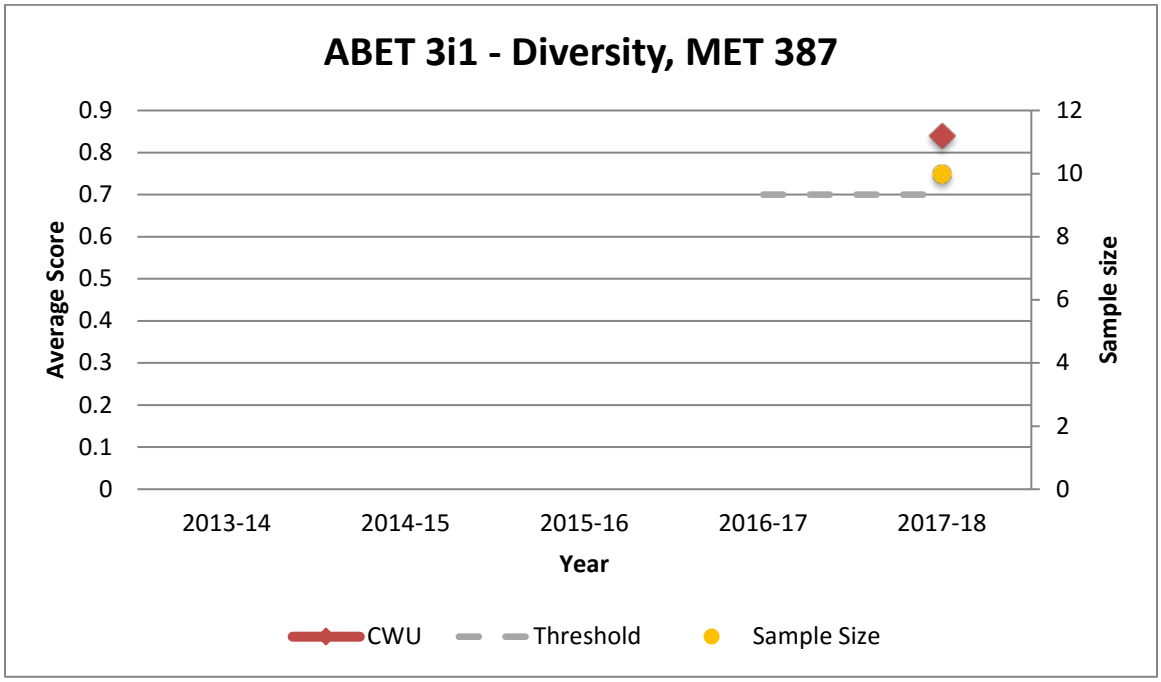

Figure 3i-01. MET 387 Respect for Diversity Score.

Figure 3i-01 shows data from exam questions specifically addressing application of respect for diversity.

Figure 3i-01 comes from the MET 387 Engineering Ethics course completed in the winter quarter. The direct measure is an assessment of the students' respect for diversity. The students are scored on a variety of exam questions that relate to diversity. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3i-01. These are average scores.

This metric is examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3i-01 shows the students understand the application of respect for diversity in the discipline of engineering ethics. The next time this metric will be assessed will be winter of 2019. A determination concerning the data will be made when this is reviewed in the spring of 2019.

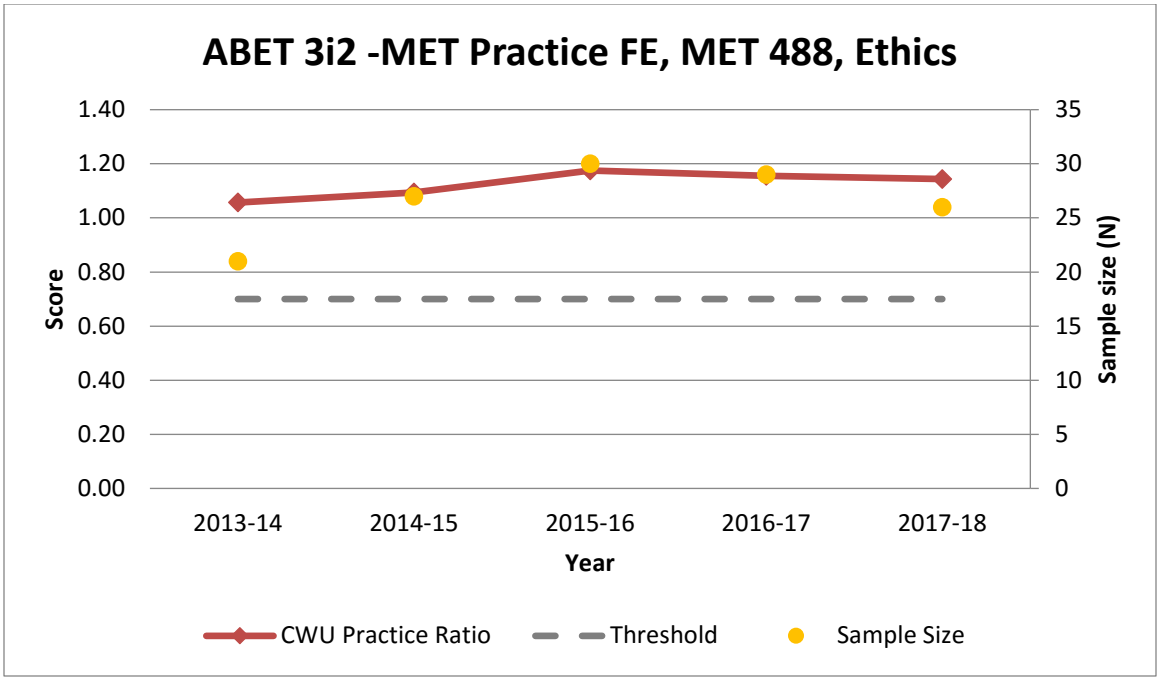

Figure 3i-02. MET Practice FE Examinees (Percentage of class size).

Figure 3i-02 comes from the practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Ethics category of the MET practice FE exam. The practice FE exam data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3i-02. The graph is produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is a ratio score of 0.70, or higher, for the CWU students taking the MET practice FE exam.

Figure 3i-02 shows CWU students' ratio scores for Ethics. The scores indicate the students are performing well. If this continues, the MET faculty and IAB may consider increasing the threshold score.

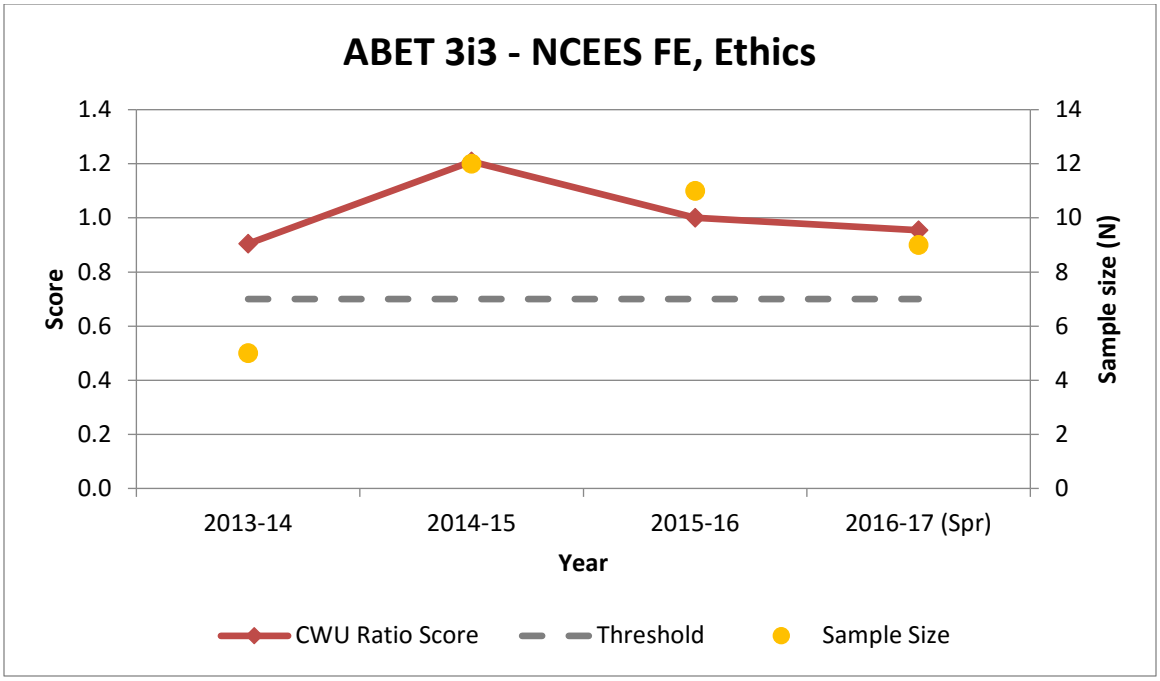

Figure 3i-03. MET Students that have taken the NCEES FE exam.

Figure 3i-03 is assessed using the bi-annual reports produced by the NCEES. The data comes from the Ethics and Professional Practice category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3i-03. The graph is produced using the NCEES ratio score – the performance of CWU students to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is a ratio score of 0.70, or higher, for the CWU students who take the FE.

Figure 3i-03 shows the CWU students' ratio scores for Ethics. The students are performing well and exceeding the threshold. If this continues, the MET faculty and IAB may consider increasing the threshold score.

2017-18 Continuous Improvement:

Plan

MET 387 the students scored well. This is the first data point.
MET 488 data meet or exceed the threshold. The trend is stable.
NCEES Ethics data meet or exceed the threshold. There is a slight downward trend.

The students appear to realize the need for diversity. All indicators are above the threshold, although the NCEES data bear watching.

Do

No corrective action items are necessary at this time; however, the MET faculty and IAB will discuss the possibility of increasing these thresholds.

Check

These indicators will be assessed again at the end of spring quarter 2019. The MET faculty and the Industry Advisory Board will review the results.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 387 – Exam question, test 1 and test 2

MET 488 – Ethics section

NCEES – Ethics section

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET387_1181_grades.xlsx and MET387_3hij.xlsx

MET_FE_PracticeScores2018RevApr30.xlsx and MET488.xlsx

NCEES.xlsx

Appendix J. ABET Continuous Improvement, Student Outcome 3j.

Student Outcome: 3j. “knowledge of the impact of engineering technology solutions in a societal and global context.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

This document is organized in the following manner:

1. Presentation of assessment data and description of metric.
2. Plan: Comments on assessment data and identification of problem(s).
3. Do: Development of action items to address comments or correct problem(s).
4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

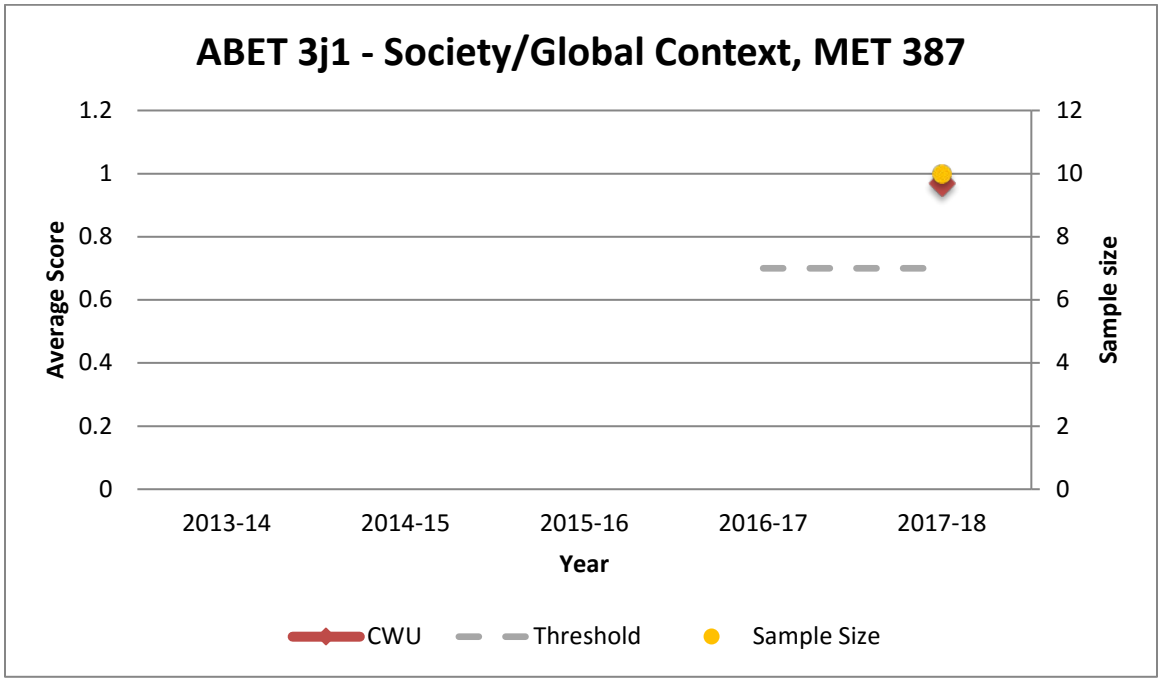

Figure 3j-01. MET 387 Continuous Professional Development Score.

Figure 3j-01 comes from the MET 387 Engineering Ethics course completed in the winter quarter. The direct measure is an assessment of the students' ability to recognize the impact of engineering technology solutions in a societal and global context. The students are scored on a variety of exam questions that relate to impact of engineering technology solutions in a societal and global context. The scores are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3j-01. These are average scores.

This metric is examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary score.

Figure 3j-01 shows the students understand the impact of engineering technology solutions in a societal and global context. The next time this metric will be assessed will be winter of 2019. A determination concerning the data will be made in when this is reviewed in the spring of 2019.

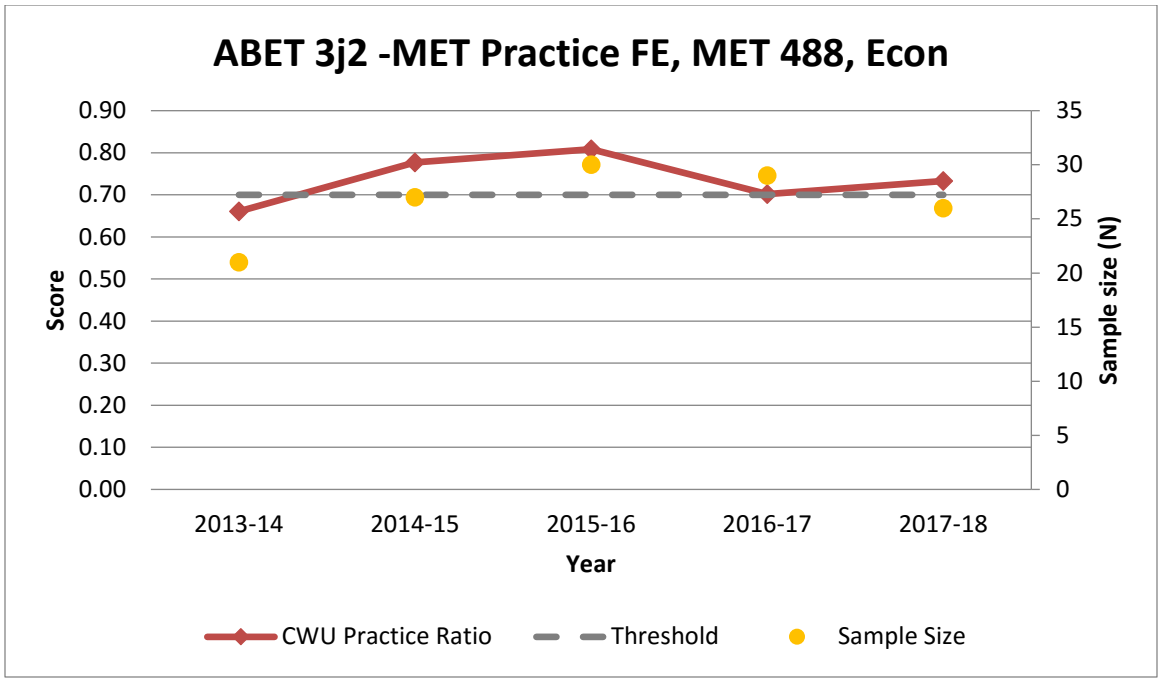

Figure 3j-02. MET Practice FE Exam Ratio Score in Economics.

Figure 3j-02 comes from the practice FE exam that every MET student takes as the final exam, for MET 488 (Professional Certification Exam Preparation course). The data come from the Ethics and Professional Practice category of the MET practice FE exam. The practice FE exam data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3j-02. The graph is produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is a ratio score of 0.70, or higher, for the CWU students who take the MET practice FE exam.

Figure 3j-02 shows CWU students' ratio scores for Engineering Economics. The score made a small recovery in 2017-18 after dropping to just at the threshold in 2016-17. This outcome will require continued monitoring.

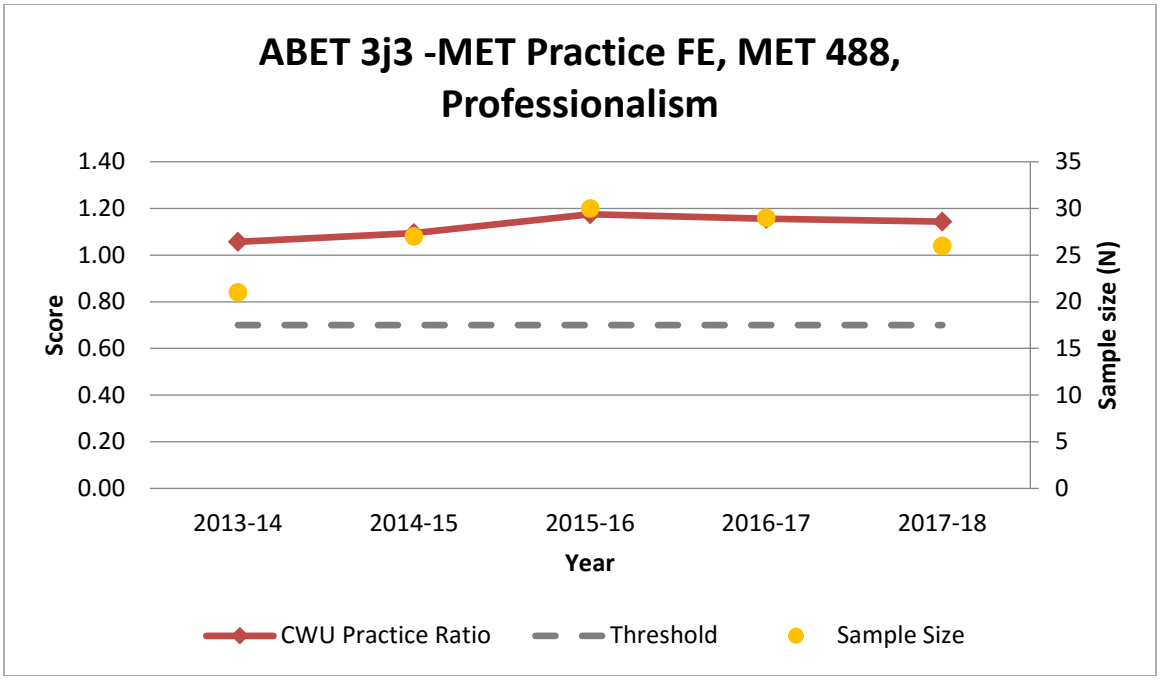

Figure 3j-03. MET Practice FE Exam Ratio Score in Professionalism.

Figure 3j-03 comes from the practice FE exam that every MET student takes as the final exam, for MET 488 (Professional Certification Exam Preparation course). The data come from the Ethics and Professional Practice category of the MET practice FE exam. The practice FE exam data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3j-03. The graph is produced using the CWU practice FE exam ratio score – the ratio of the performance of CWU students on the practice FE exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is a ratio score of 0.70, or higher, for the CWU students who take the MET practice FE exam.

Figure 3j-03 shows CWU students' ratio scores for Professionalism. The students are maintaining performance above the threshold. No action is required at this time.

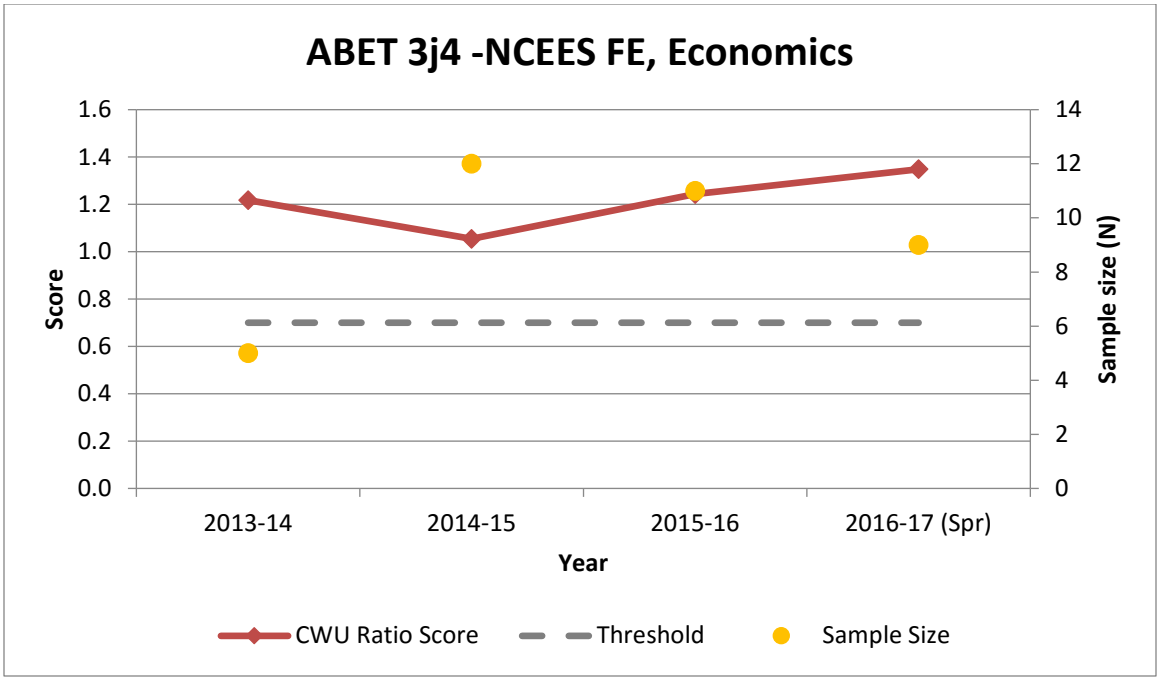

Figure 3j-04. CWU Ratio Scores in Engineering Economics.

Figure 3j-04 assessed using the bi-annual reports produced by the NCEES. The data come from the Engineering Economics category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3j-04. The graph is produced using the NCEES ratio score – the ratio of the performance of CWU students to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is a ratio score of 0.70, or higher, for the CWU students who take the FE exam.

Figure 3j-04 shows that CWU students' ratio scores for Economics. The students are maintaining performance above the threshold. No action is required at this time.

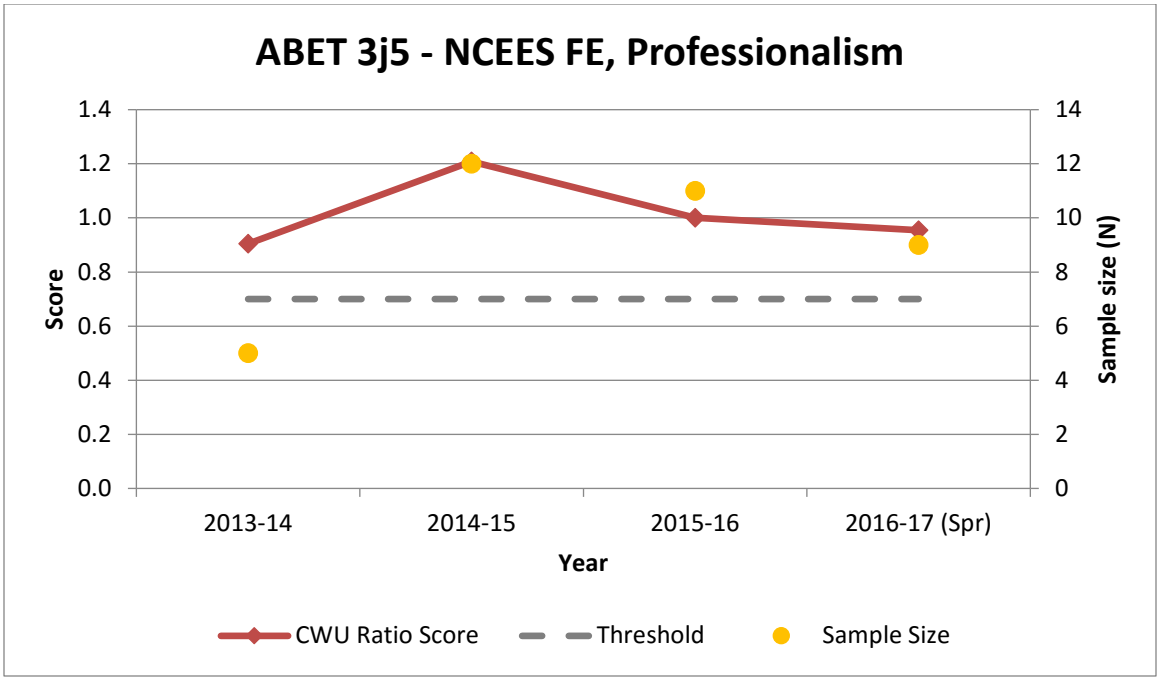

Figure 3j-05. CWU Ratio Scores in Ethics and Professional Practice.

Figure 3j-05 assessed using the bi-annual reports produced by the NCEES. The data come from the Ethics and Professional Practice category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3j-05. The graph is produced using the NCEES ratio score – the ratio of the performance of CWU students to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is a ratio score of 0.70, or higher, for the CWU students who take the FE exam.

Figure 3j-05 shows that CWU students' ratio scores for Ethics and Professional Practice. The students are maintaining performance above the threshold. Although the data have been trending downward, no action is required at this time.

2017-18 Continuous Improvement:

Plan

MET 387 the students scored well. This is the first data point.
MET 488 data meet or exceed the threshold and are stable.
NCEES data are going in opposite directions. Economics is going up and Professionalism is on a downward trend, but both continue to exceed the threshold.

Do

No corrective action items are necessary.

Check

These indicators will be assessed again at the end of spring quarter 2019. The MET faculty and the Industry Advisory Board will review the results.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 387 – Exam question, test 1 and test 2

MET 488 – Ethics and Economics

NCEES – Ethics and Economics

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET387_1181_grades.xlsx and MET387_3hij.xlsx

MET_FE_PracticeScores2018RevApr30.xlsx and MET488.xlsx

NCEES.xlsx

Appendix K. ABET Continuous Improvement, Student Outcome 3k.

Student Outcome: 3k: “a commitment to quality, timeliness, and continuous improvement”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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6. Meta data

Data/Description:

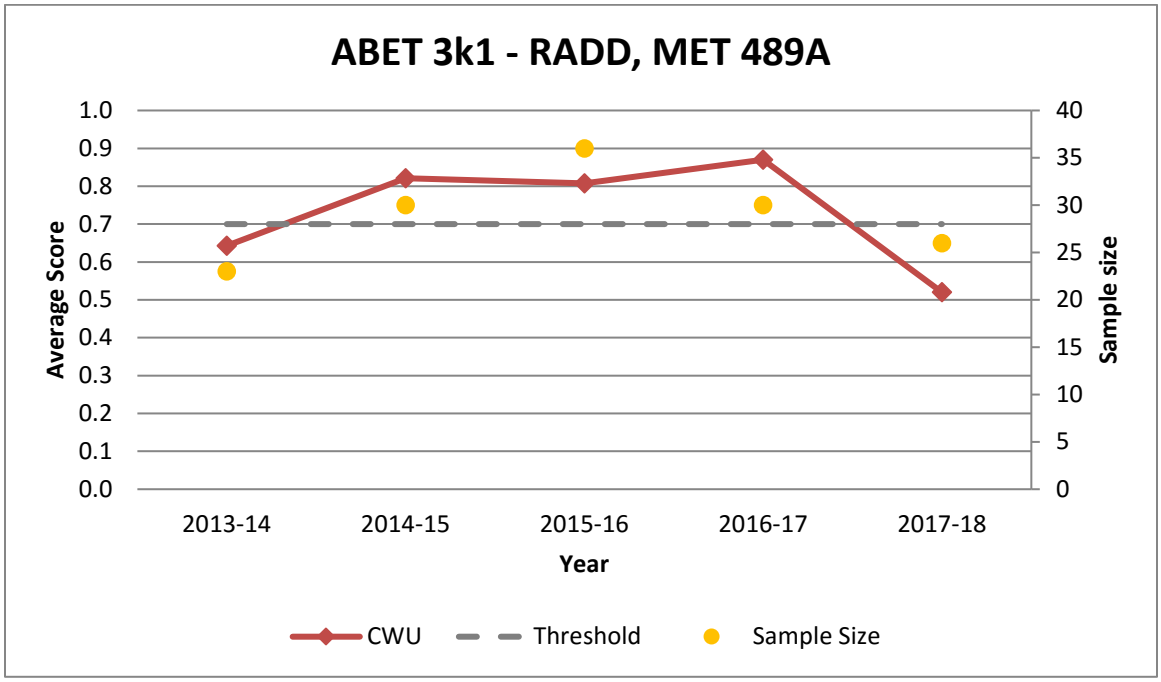

Figure 3k-01. RADD for MET 489A.

Figure 3k-01 comes from the Requirement, Analysis, Design, and Drawing (RADD) completed in the first quarter of the capstone experience (MET 489A). The direct measure is an assessment of the students' ability to produce an ANSI Y14.5 drawing for their senior project. Each student conducts a review in front of their peers. They are assessed on their ability to produce an ANSI y14.5 drawing for their senior project. The RADD rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3k-01.

This metric is examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary rubric score.

The attainment threshold is the students' average will be 70%, or higher.

Figure 3k-01 shows the SO 3k RADD level of attainment. The students' performance has taken a severe drop below the threshold. Immediate action is required.

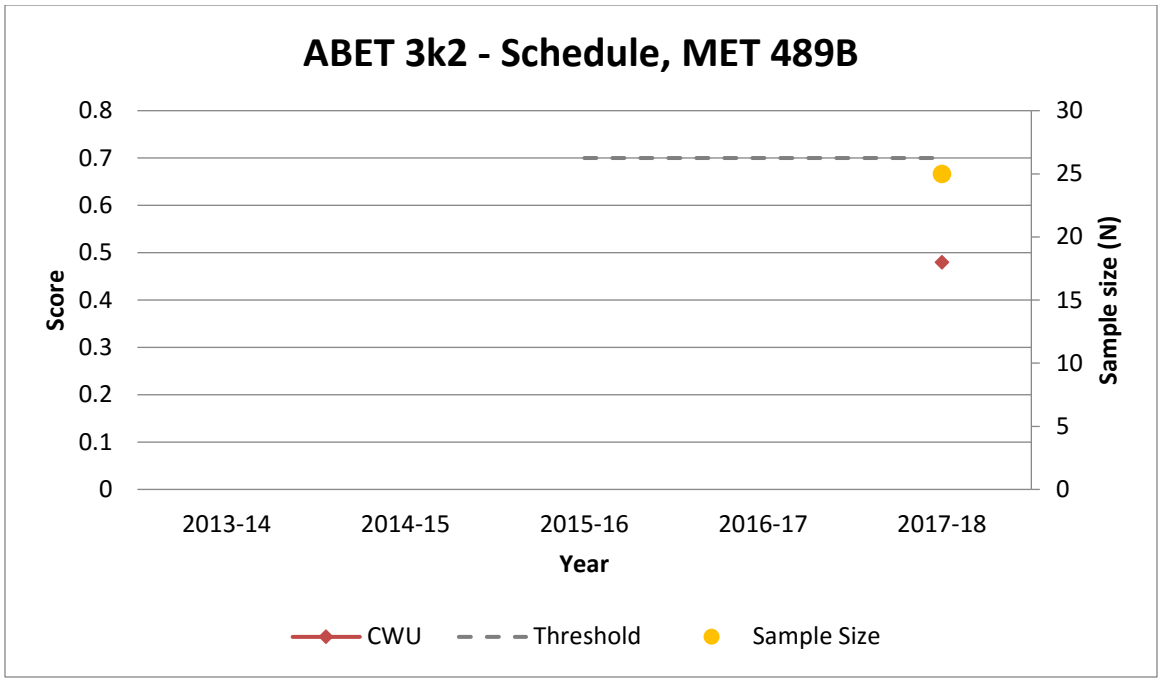

Figure 3k-02. ABET 3k Project on Schedule in MET 489B.

Figure 3k-02 comes from the Manufacturing Design Review (MDR) completed in the second quarter of the capstone experience (MET 489B). The direct measure is an assessment of the students' ability to show timeliness of manufacturing. Each student demonstrates the completion of their device's components in front of their peers. They are assessed on their ability to complete component manufacturing and keeping their project on schedule for an on-time completion at the end of the quarter. The MDR rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3k-02.

This metric is also examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary rubric score.

The attainment threshold is the students' average will be 70%, or higher.

Figure 3k-02 shows the SO 3k MDR level of attainment. This initial data point shows the students well below the threshold. Immediate action is required.

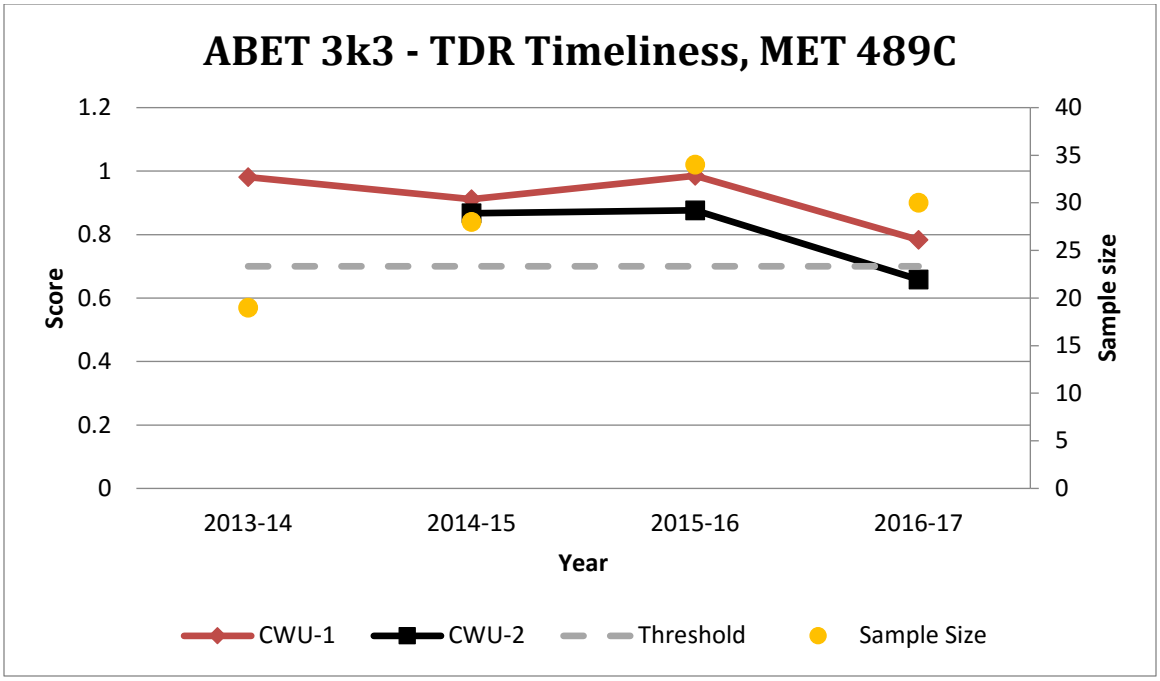

Figure 3k-03. TDR scores for timeliness in MET 489C.

Figure 3k-03 comes from the Test Design Review (TDR) completed in the final quarter of the capstone experience (MET 489C). The direct measure is an assessment of the students' ability to have their testing demonstration prepared and ready at the time of presenting on their senior project. Each student conducts a test review in front of their peers twice during the quarter. Each time they are assessed on their ability to be prepared and ready to go. The TDR rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure 3k-03.

This metric is also examined annually.

The attainment threshold is that 70% of the students will receive a satisfactory or exemplary rubric score.

Figure 3k-03 shows the ABET 3k TDR level of attainment. For 2013-14, there was only a single assessment, and the students did will – exceeding the threshold. In 2014-15, the MET faculty began conducting two assessments. Similar to findings discussed above for other SOs, the students continued to perform better on the first assessment than the second. This requires corrective action.

2017-18 Continuous Improvement:

Plan

MET 489A the students have dipped below the threshold.
MET 489B the students are well below the threshold but this is only the first data point.
MET 489C data are trending downward and below the threshold for the second review.

Do

MET 489A: The MET faculty are working with the instructors of ETSC 160 (2-D drawing) and ETSC 265 (3-D drawing) to include more ANSI Y14.5. Other course work in the MET program is requiring ANSI Y14.5 when submitting homework that includes a drawing.
MET 489B: The MET faculty discussed what might be changed (possible corrective action), but thought it prudent to wait and see what the next data point looks like.
MET 489C: The second TDR score was changed to be double the points of the first TDR score.

Check

The results of these efforts cannot be assessed until fall quarter 2018. The MET faculty and the Industry Advisory Board will review the results.

Act

A course of action will be determined (winter quarter 2019) after reviewing the results of the actions described above.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 489A – RADD

MET 489B – MDR

MET 489C – TDR

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18
and S:\IET\15. MET - Program Information\CourseOutcomeData

MET489A_3dkMa.xlsx

MET489B_3dkMa.xlsx

MET489C_3cfgkMb.xlsx

Appendix MA. ABET Continuous Improvement, Program Criterion Outcome Ma.

MET Program Criteria Outcome Ma. “geometric dimensioning and tolerancing; computer aided drafting and design; and a basic knowledge and familiarity with industry codes, specifications, and standards;”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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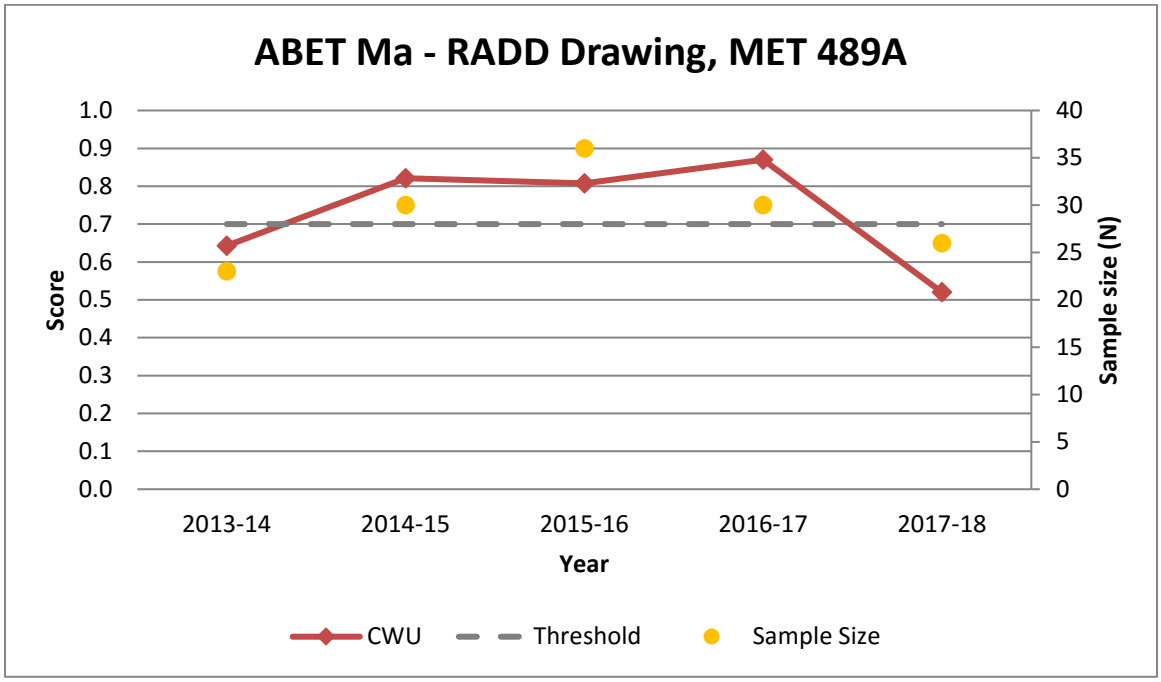

Figure Ma-01. Requirement, Analysis, Design, and Drawing (RADD) in MET 489A

Figure Ma-01 comes from the Requirement, Analysis, Design, and Drawing (RADD) completed in the first quarter of the capstone experience (MET 489A). The direct measure is an assessment of the students' ability to produce an ANSI Y14.5 drawing for their senior project. Each student conducts a review in front of their peers. They are assessed on their ability to produce an ANSI Y14.5 drawing for their senior project. The RADD rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Ma-01.

This metric is examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Ma-01 shows the SO Ma RADD level of attainment. The students have taken a severe drop below the threshold. Immediate action is required.

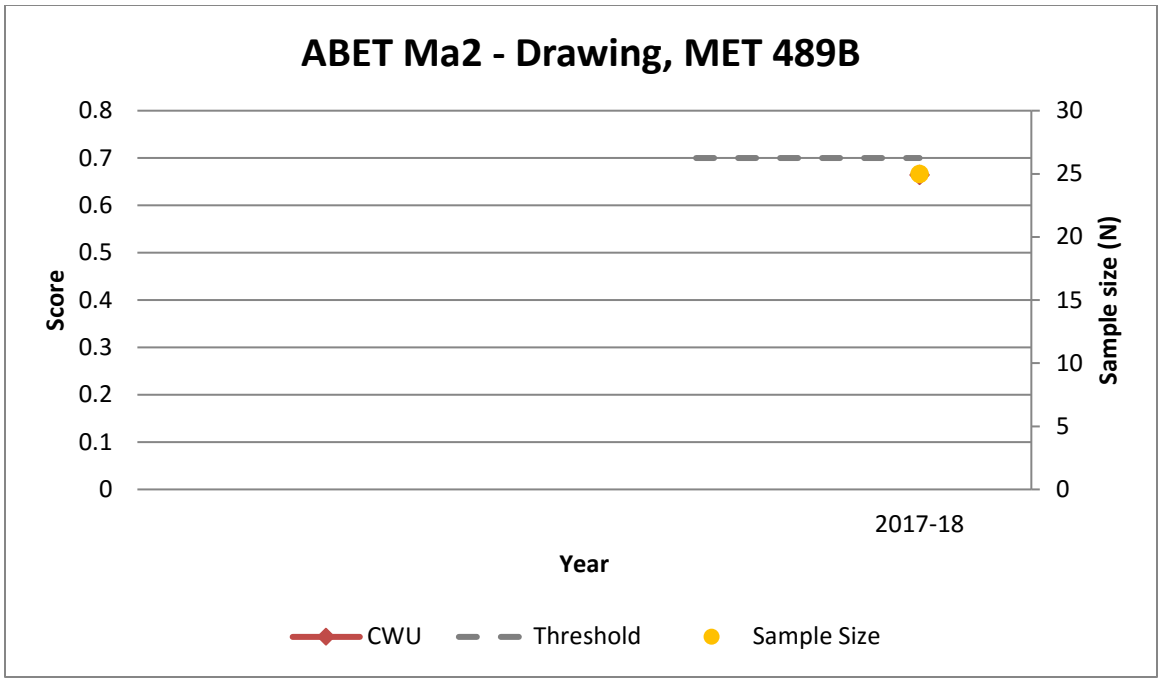

Figure Ma-02. Drawing in MET 489B.

Figure Ma-02 comes from the drawings completed for the student's senior project device in winter quarter of the capstone experience (MET 489B). The direct measure is an assessment of the students' ability to produce an ANSI Y14.5 drawing for their senior project. They are assessed on their ability to produce an ANSI Y14.5 drawing for their senior project. The rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Ma-02.

This metric is also examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Ma-02 shows the SO Ma drawing level of attainment. The students have not quite met the threshold.

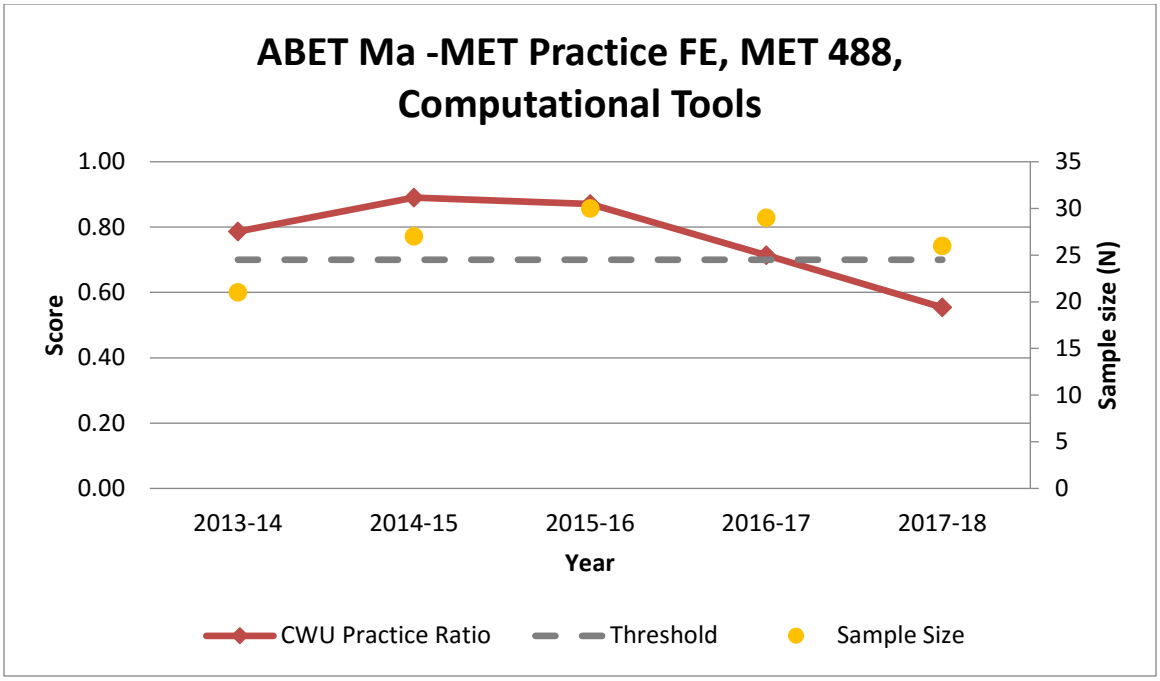

Figure Ma-03. MET Practice FE Exam Ratio Score in Computational Tools.

Figure Ma-03 comes from the practice FE exam that every MET student takes as the final for MET 488 (Professional Certification Exam Preparation course). The data come from the Computational Tools category of the MET Practice FE Exam. The Practice FE Exam data is dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Ma-03. The graph is produced using the CWU Practice Ratio Score. The CWU Practice Ratio Score is the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be 0.70 or higher.

Figure Ma-03 shows CWU ratio scores for Computational Tools. These data are on a definite downward trend and have dropped below the threshold. Corrective action is required.

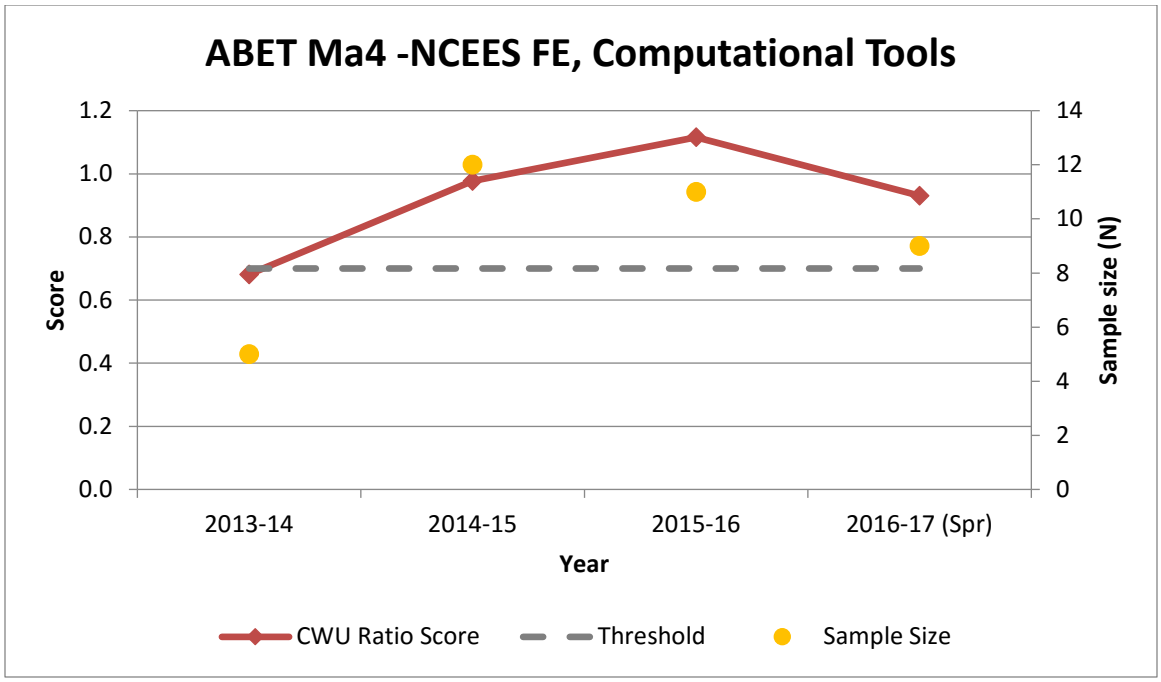

Figure Ma-04. CWU Ratio Scores in Computational Tools.

Figure Ma-04 is assessed using the bi-annual reports produced by the NCCES. The data comes from the Computational Tools category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Ma-04. The graph is produced using the NCEES Ratio Score. The NCEES Ratio Score is the ratio of the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is compiled annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Ma-04 shows CWU ratio scores for Computational Tools. These scores are demonstrating a change in direction. It would seem action is required, but the computational tools score is still above the threshold.

2017-18 Continuous Improvement:

Plan

MET 489A data have taken a severe plunge below the threshold.
MET 489B data are just below the threshold.
MET 488 data have dropped below the threshold.
NCEES data meet or exceed the threshold.

Do

MET 489A: The MET faculty are working with the instructors of ETSC 160 (2-D drawing) and ETSC 265 (3-D drawing) to include more ANSI Y14.5. Other course work in the MET program is requiring ANSI Y14.5 when submitting homework that includes a drawing.
MET 489B: The MET faculty discussed what might be changed (possible corrective action), but thought it prudent to wait and see what the next data point looks like.
With both scores going down for the practice FE and the NCEES data, the MET faculty will be looking for ways to improve the scores in this category.
MET 488: The MET faculty and IAB will discuss these results at out next meeting (May 30th, 2018).

Check

These data will be reviewed in the spring of 2018.

Act

Action will be determined at May 30th, 2018 meeting.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 489A – RADD

MET 489B – Drawing

MET 488 – Computational Tools

NCEES – Computational Tools

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

201701_MET488.xlsx

201709_MET489A_3dMa.xlsx

201701_MET489B_3dMa.xlsx

Appendix MB. ABET Continuous Improvement, Program Criterion Outcome Mb.

MET Program Criteria Outcome Mb. “selection, set-up, and calibration of instrumentation and the preparation of laboratory reports and systems documentation associated with the development, installation, or maintenance of mechanical components and systems.”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

This document is organized in the following manner:

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5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

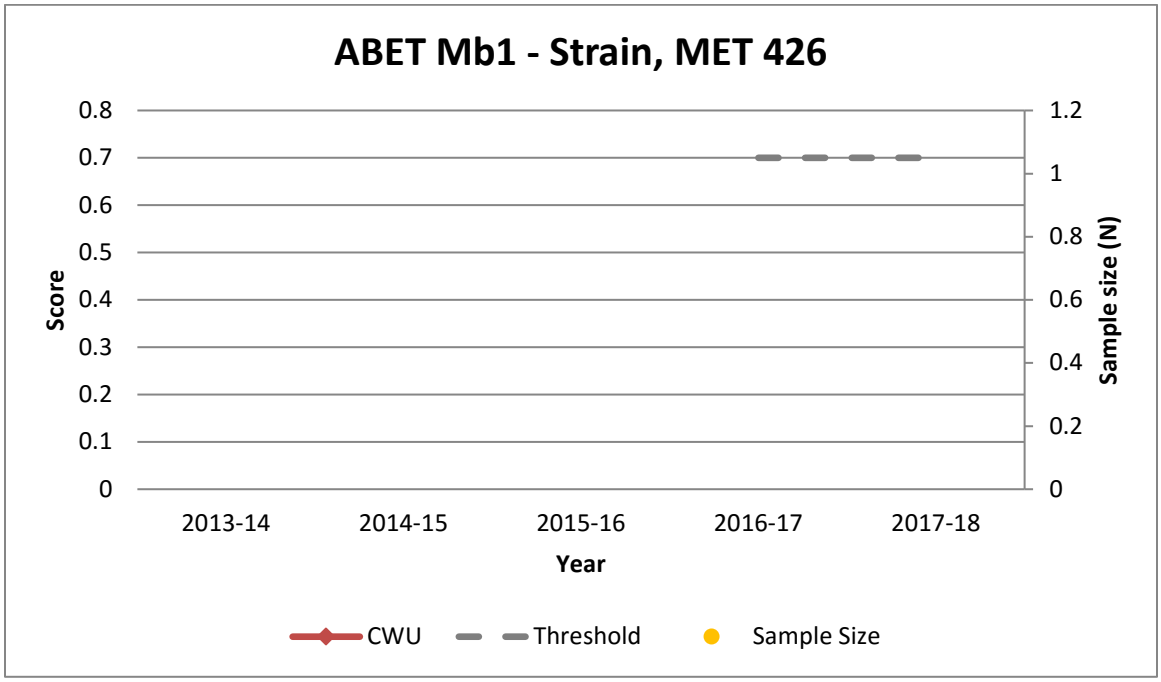

Figure Mb-01. Strain Lab in MET 426.

Figure Mb-01 Data will be collected at the end of spring quarter 2018 (June).

Figure Mb-01 will come from the Strain Lab assignments completed in the spring quarter in the MET 426 Applications in Strength of Materials course

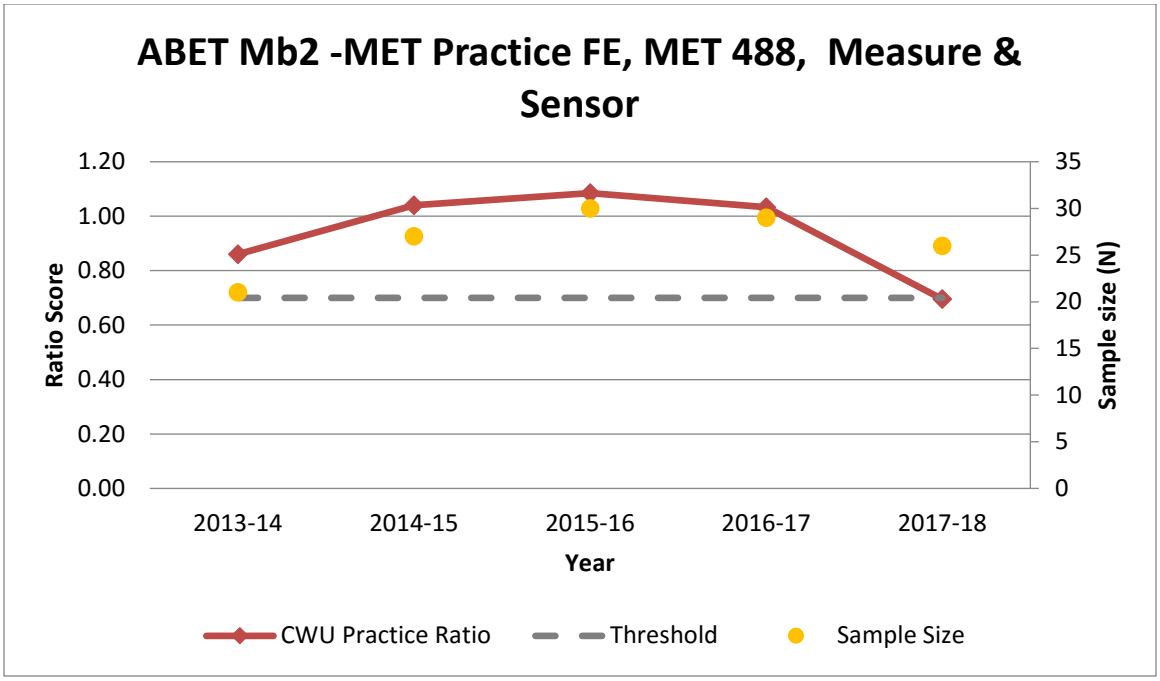

Figure Mb-02. MET Practice FE Exam Ratio Score in Measurements Instrumentation and Controls.

Figure Mb-02 data come from the Measurements Instrumentation and Controls category of the MET practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mb-02. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be 70% or higher.

Figure Mb-02 shows CWU ratio scores for Measurements Instrumentation and Controls. All five student groups meet or exceed the threshold; however, there has been a recent downward trend that should be monitored.

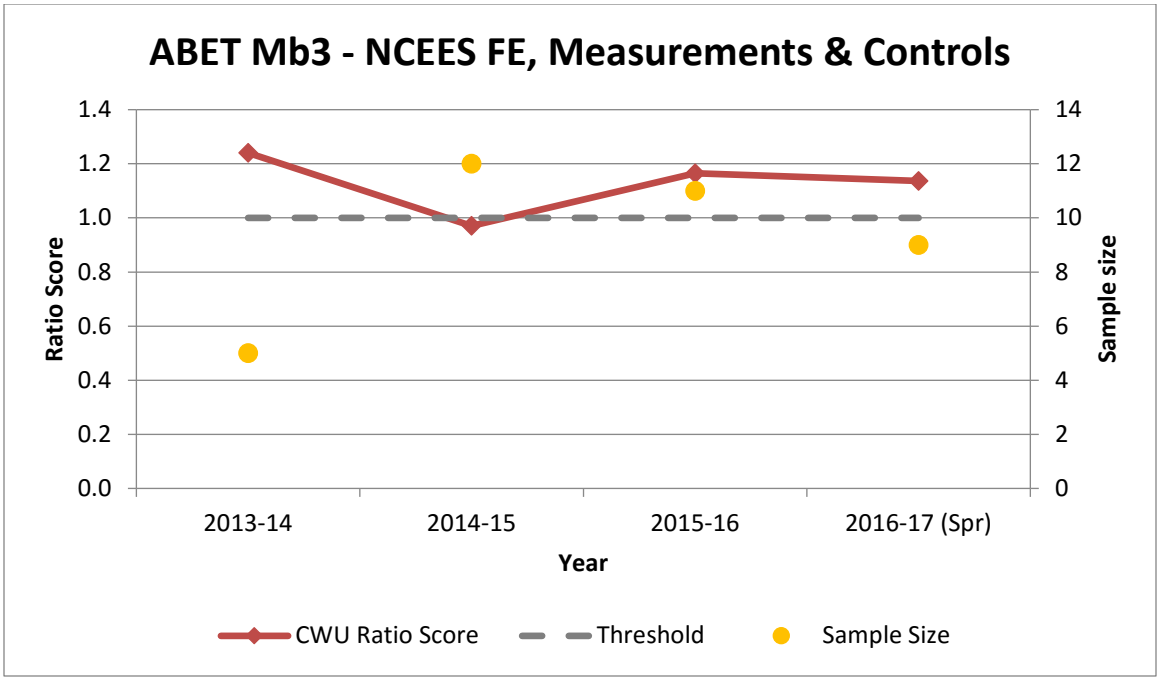

Figure Mb-03. CWU Ratio Scores in Measurements Instrumentation and Controls.

Figure Mb-03 is assessed using the bi-annual reports produced by the NCEES. The data come from the Measurements Instrumentation and Controls category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mb-03. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Mb-03 shows CWU ratio scores for Measurements Instrumentation and Controls. The students are see-sawing, but staying above the threshold. No action is required at this time.

2017-18 Continuous Improvement:

Plan

MET 426 data will be collected at the end of spring quarter 2018 (June).
MET 488 current data point is just at the threshold and require monitoring.
NCEES data meet or exceed the threshold.

Do

MET 488: The MET faculty and IAB will discuss these results at out next meeting (May 30th, 2018).

Check

These data will be reviewed in the spring of 2018.

Act

MET 488: Action will be determined at May 30th, 2018 meeting.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 426 – Strain gage lab

MET 488 – Measurements and Controls

NCEES – Measurements and Controls

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET426.xlsx

MET_FE_PracticeScores2018RevApr30.xlsx, MET488.xlsx

NCEES.xlsx

Appendix MC. ABET Continuous Improvement, Program Criterion Outcome Mc.

MET Program Criteria Outcome M c. “basic engineering mechanics”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

This document is organized in the following manner:

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2. Plan: Comments on assessment data and identification of problem(s).
3. Do: Development of action items to address comments or correct problem(s).
4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

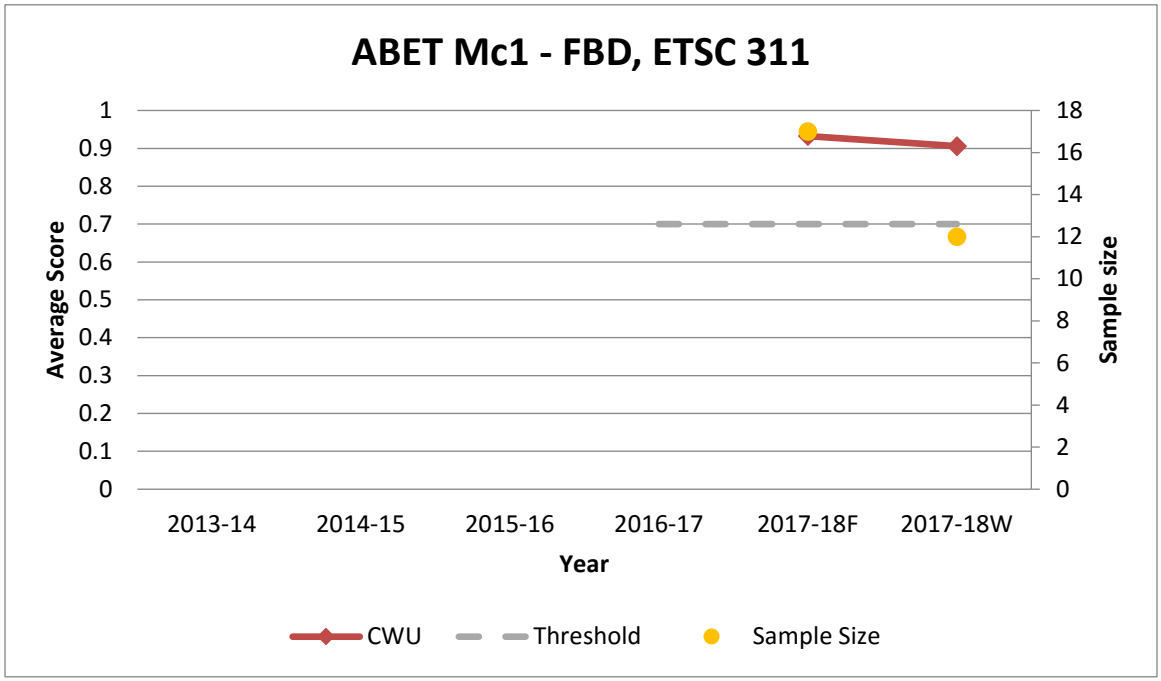

Figure Mc-01. Free Body Diagram scores in Statics.

Figure Mc-01 comes from a Free Body Diagram (FBD) question on the final for ETSC 311 (Statics). This course is conducted in the fall and winter quarter of each academic year. The direct measure is an assessment of the students' ability to complete a correct FBD. Each student is assessed on their ability to produce a correct FBD. The FBD rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Mc-01.

This metric is examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Mc-01 shows the SO Mc FBD level of attainment. The students are doing well in this first year of assessment and are above the threshold.

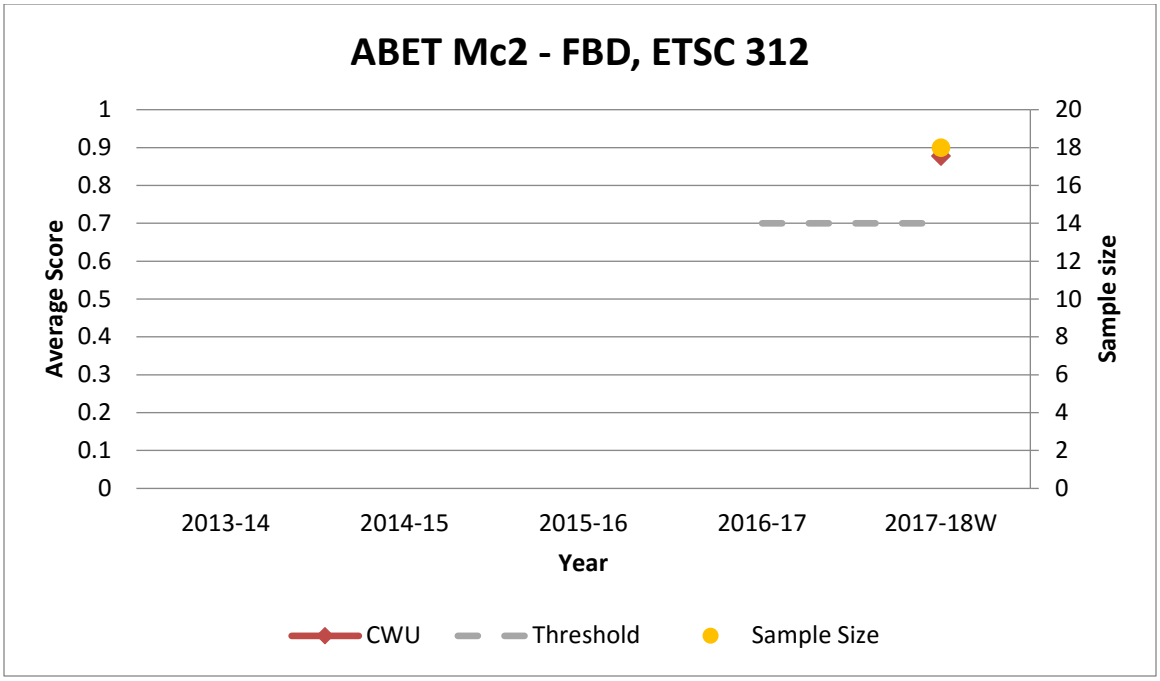

Figure Mc-02. Free Body Diagram scores in Mechanics of Materials.

Figure Mc-02 comes from a Free Body Diagram (FBD) question on the final for ETSC 312 (Mechanics of Materials). This course is conducted in the winter and spring quarter of each academic year. The direct measure is an assessment of the students' ability to complete a correct FBD. Each student is assessed on their ability to produce a correct FBD. The FBD rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Mc-02.

This metric is also examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Mc-02 shows the SO Mc FBD level of attainment. The students are doing well in this first year of assessment and are above the threshold.

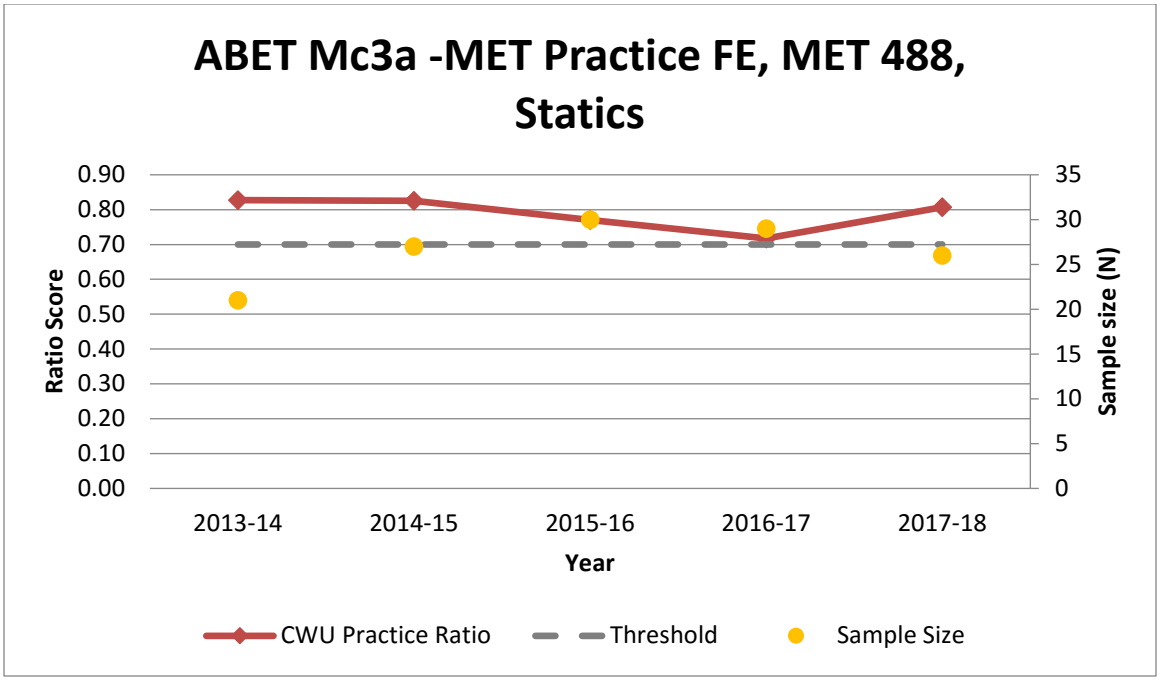

Figure Mc-03a. MET Practice FE Exam Ratio Score in Statics.

Figure Mc-03a comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Statics category of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mc-03a. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Mc-03a shows CWU ratio scores for Statics. Students are exceeding the threshold; no action is required.

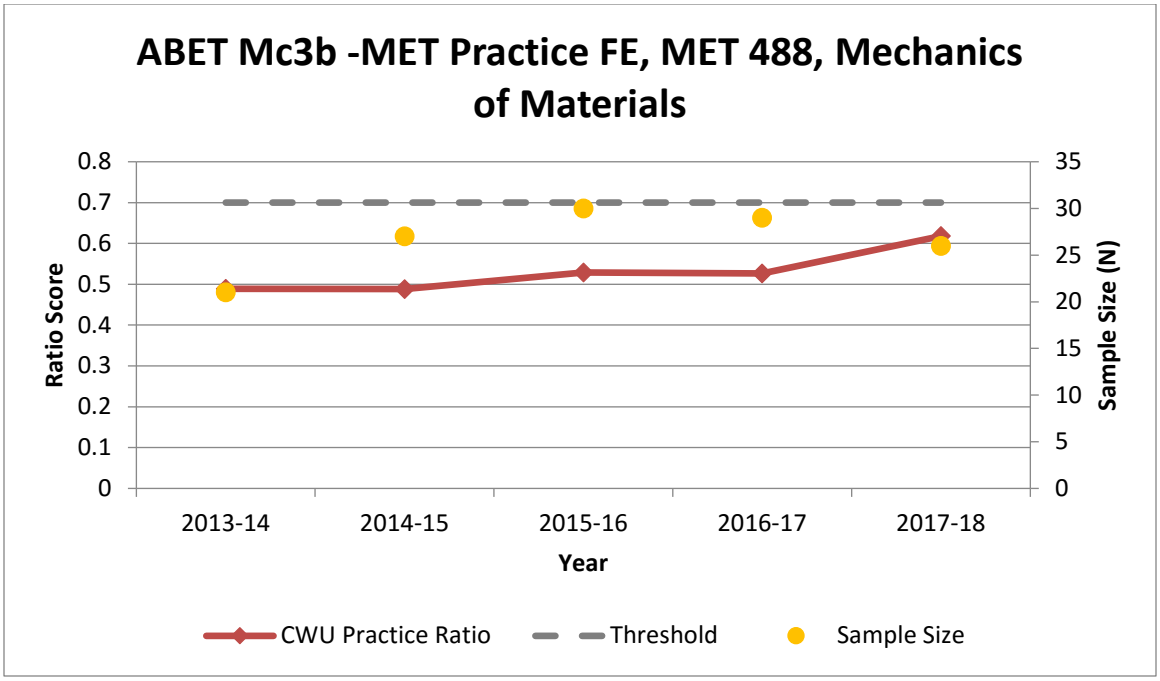

Figure Mc-03b. MET Practice FE Exam Ratio Score in Mechanics of Materials.

Figure Mc-03b comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Mechanics of Materials category of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mc-03b. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Mc-03b shows CWU ratio scores for Mechanics of Materials. Some action is required. While the trend is upward, the students are still below the threshold. Corrective action is required.

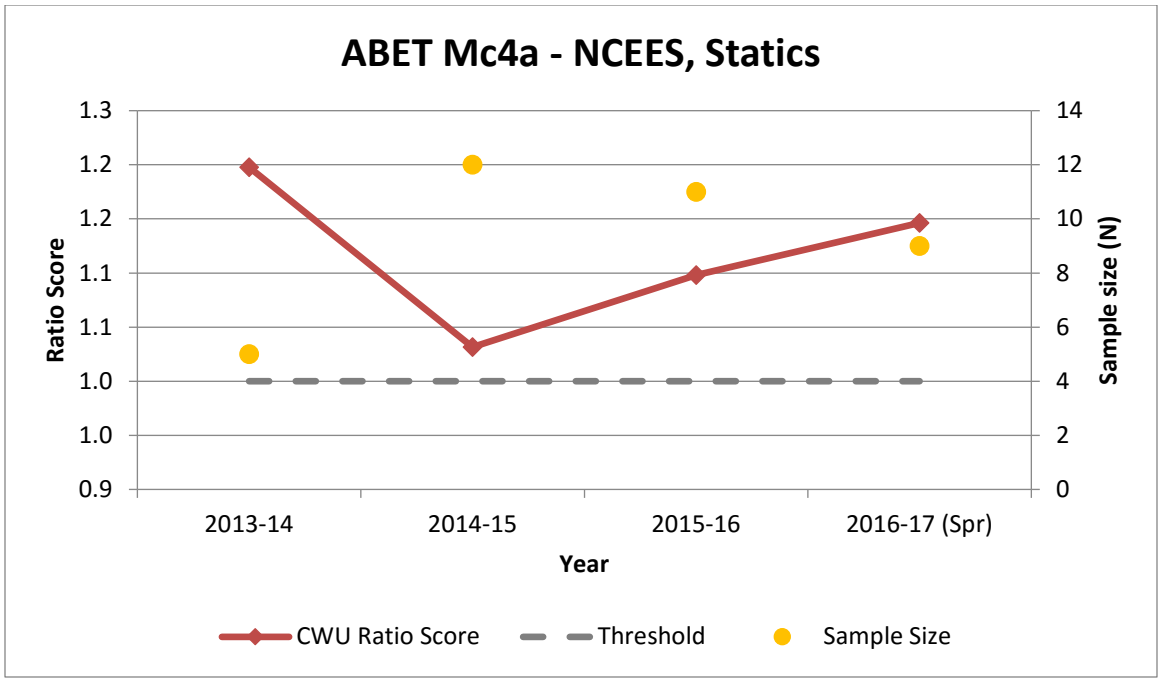

Figure Mc-04a. CWU Ratio Scores in Statics.

Figure Mc-04a is assessed using the bi-annual reports produced by the NCEES. The data come from the Statics category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mc-04a. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Mc-04a shows CWU ratio scores for Statics. All classes have exceeded the .70 threshold. No action is required at this time.

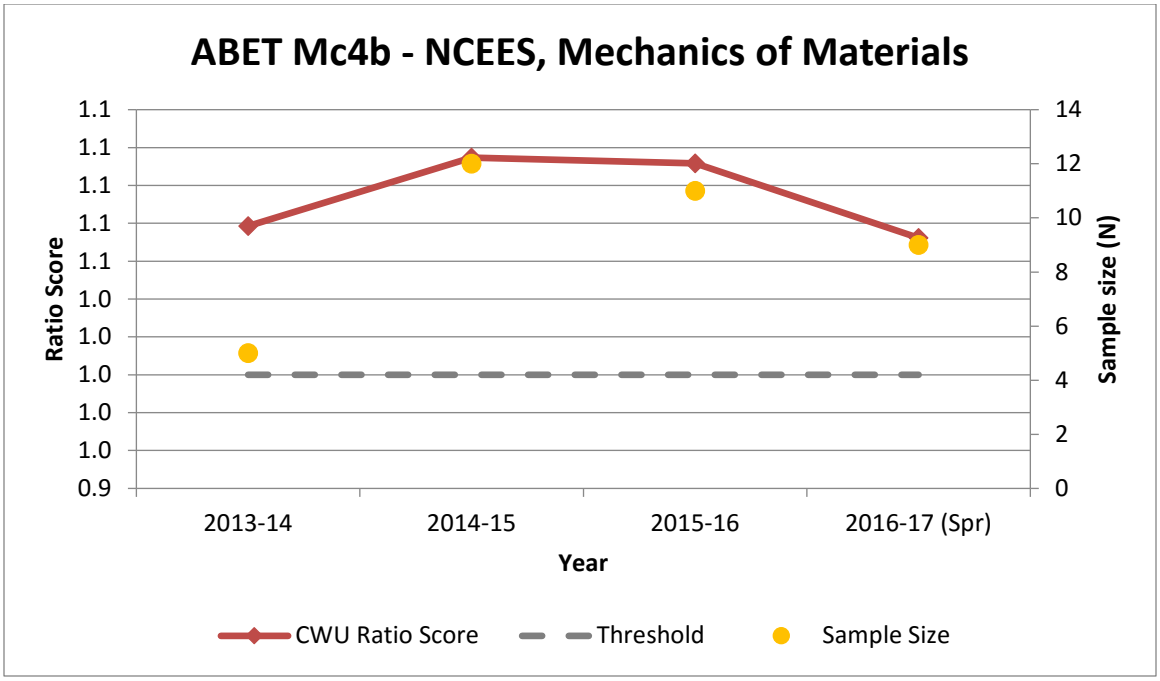

Figure Mc-04b. CWU Ratio Scores in Mechanics of Materials.

Figure 6 is assessed using the bi-annual reports produced by the NCEES. The data come from the Mechanics of Materials category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mc-04b. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Mc-04b shows CWU ratio scores for Mechanics of Materials. All classes have exceeded the .70 threshold. Although a downward trend is noted, no action is required at this time.

2019

20180105 Continuous Improvement:

Plan

ETSC 311 FBD data meet or exceed the threshold.
ETSC 312 FBD data meet or exceed the threshold.
MET 488 Statics data meet or exceed the threshold. The data also show an upward trend.
MET 488 Mechanics of Materials data are still below the threshold, but are showing an upward trend.
NCEES Statics data meet or exceed the threshold. These data are also on an upward trend.
NCESS Mechanics of Materials data meet or exceed the threshold.

Do

Mechanics of Materials results will be discussed among the MET faculty and IAB at the May 30th, 2018 meeting. Corrective action will be determined.

Check

These results of the corrective action for Mechanics of Materials will be examined after the MET 488 course in winter quarter 2019 is completed.

Act

Action will be determined at the May 30th, 2018 meeting.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

ETSC 311 – FBD

ETSC 312 – FBD

MET 488 – Statics & Mechanics of Materials

NCEES – Statics & Mechanics of Materials

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

ETSC311_1179_Capovia_FBD Assess Rubric.xlsx,
ETSC311_1179_Olson_fbdAssessRubric.xlsx, and ETSC311Mcd.xlsx

ETSC312_1181_Capovilla_FBD_AssessRubric.xlsx, and ETSC312Mcd.xlsx

MET488.xlsx

NCEES.xlsx

Appendix MD. ABET Continuous Improvement, Program Criterion Outcome Md.

MET Program Criteria Outcome M d. “differential and integral calculus”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

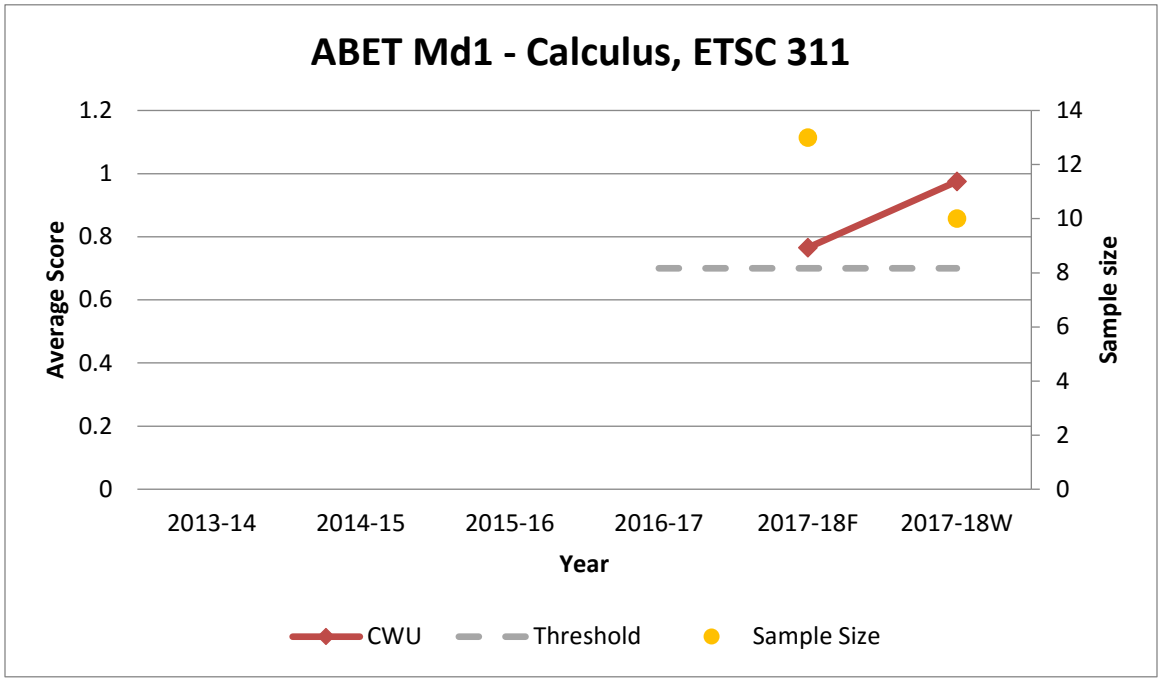

Figure Md-01. Calculus scores in Statics.

Figure Md-01 comes from a calculus question on the final for ETSC 311 (Statics). This course is conducted in the fall and winter quarter of each academic year. The direct measure is an assessment of the students' ability to complete a simple integration. Each student is assessed on their ability to integrate correctly. The calculus rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Md-01.

This metric is examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Md-01 shows the SO Md calculus level of attainment. The students are doing well in this first year of assessment and are above the threshold.

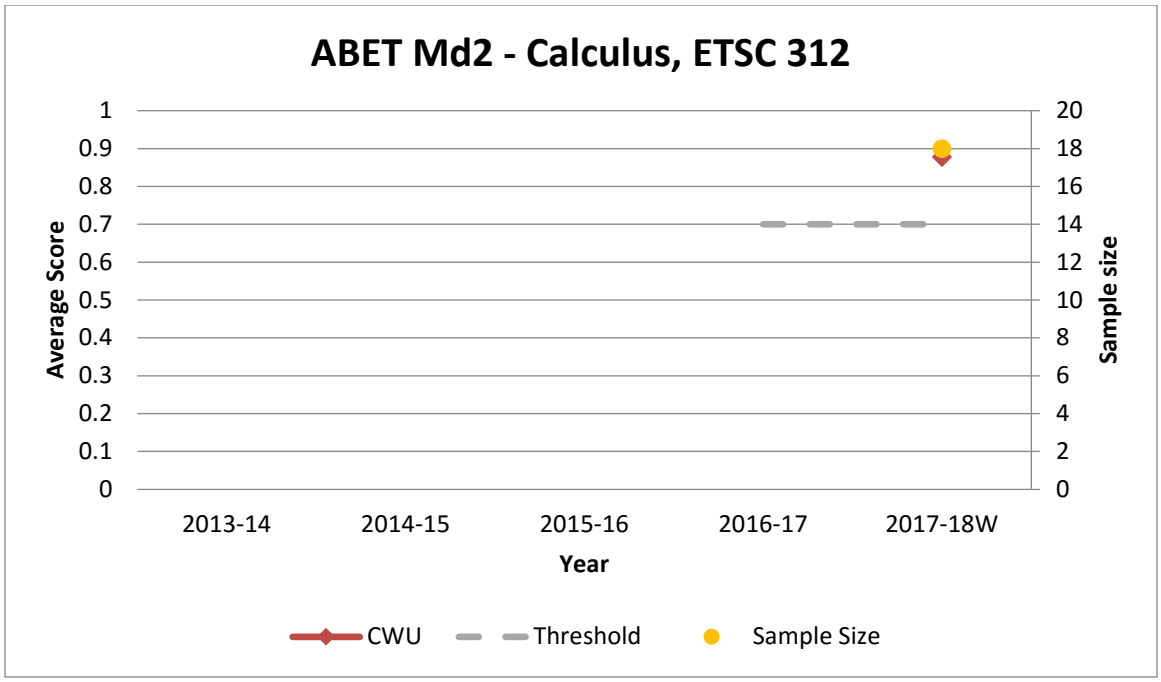

Figure Md-02. Calculus scores in Mechanics of Materials.

Figure Md-02 comes from a calculus question on the final for ETSC 312 (Statics). This course is conducted in the winter and spring quarter of each academic year. The direct measure is an assessment of the students' ability to complete a simple integration. Each student is assessed on their ability to integrate correctly. The calculus rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Md-02.

This metric is also examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Md-02 shows the SO Md calculus level of attainment. The students are doing well in this first year of assessment and are above the threshold.

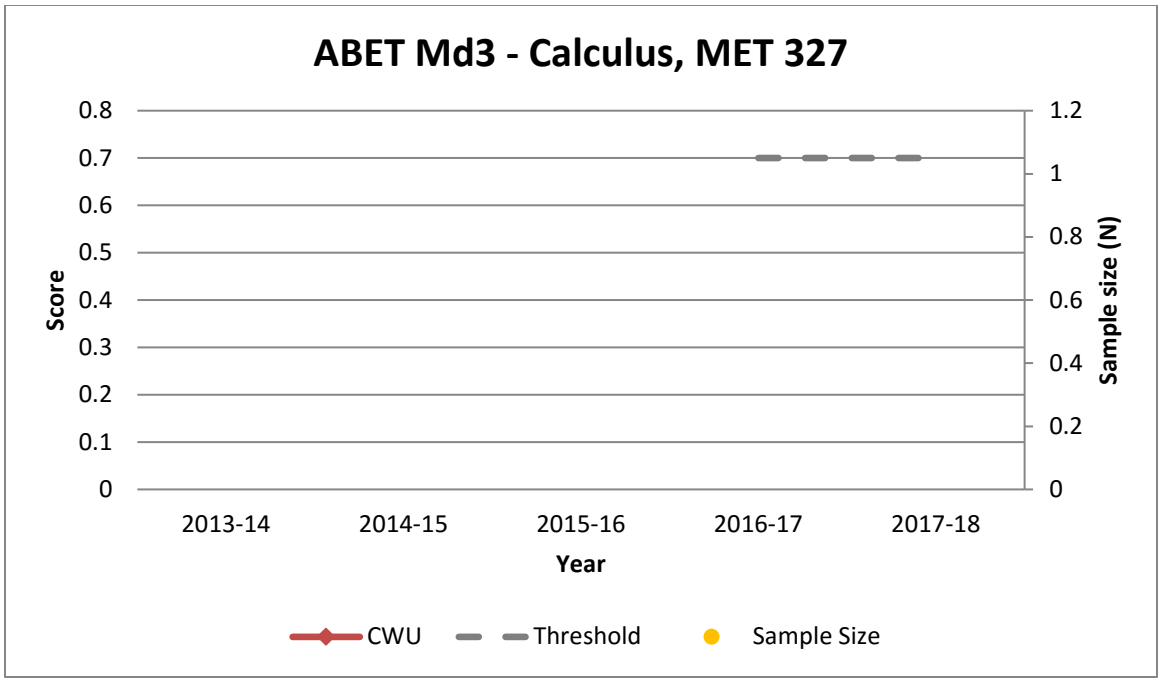

Figure Md-03. Calculus scores in Technical Dynamics.

Figure Md-03 comes from a calculus question on an exam in MET 327 (Technical Dynamics). This course is conducted in the spring quarter of each academic year. The direct measure is an assessment of the students' ability to complete a simple integration. Each student is assessed on their ability to integrate correctly. The calculus rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Md-03.

This metric is also examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Md-03 will show the SO Md calculus once the data have been collected (June 2018).

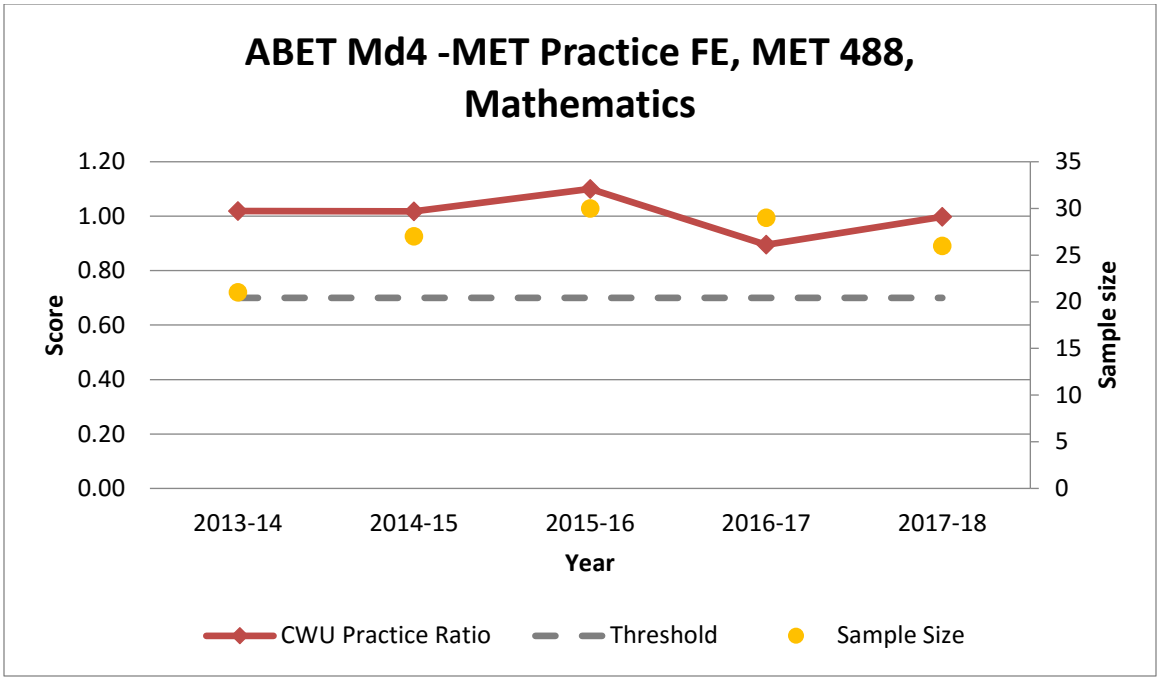

Figure Md-04. MET Practice FE Exam Ratio Score in Mathematics.

Figure Md-04 comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Mathematics category of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Md-04. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Md-04 shows CWU ratio scores for Mathematics. The students are doing well. No action is required.

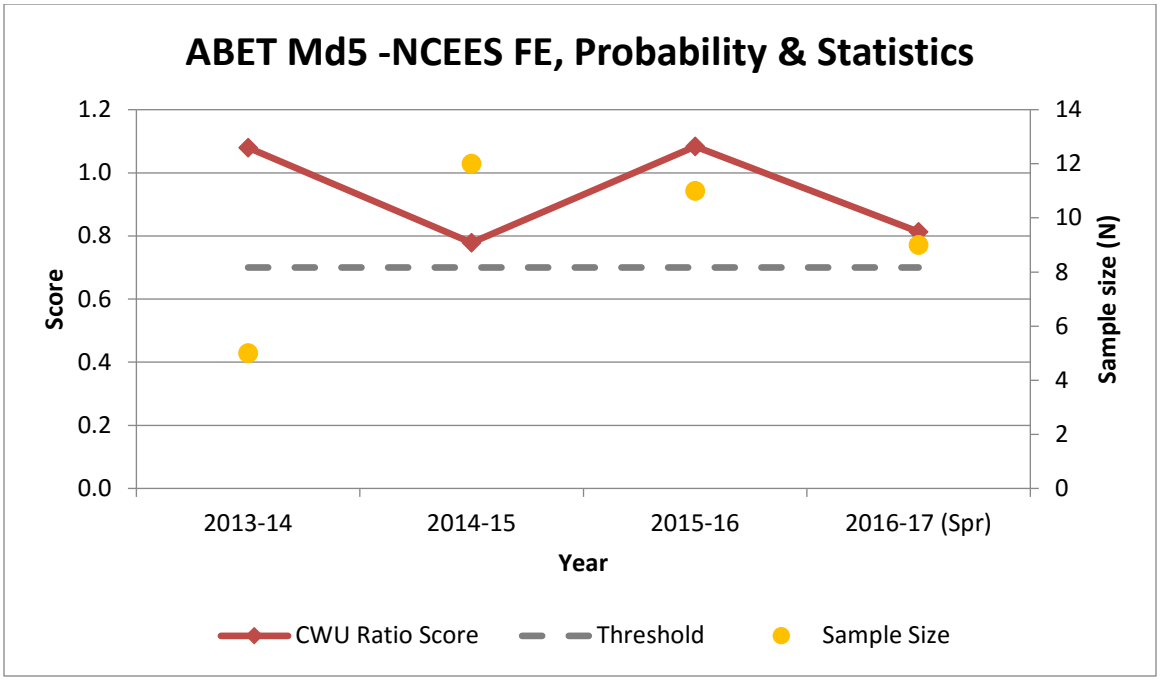

Figure Md-05. CWU Ratio Scores in Probability and Statistics.

Figure Md-05 is assessed using the bi-annual reports produced by the NCEES. The data come from the Probability and Statistics category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Md-05. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Md-05 shows CWU ratio scores for Probability and Statistics. All three classes have exceeded the .70 threshold, but action may be required depending on the 2016-17 scores.

2019

20180105 Continuous Improvement:

Plan

ETSC 311 data meet or exceed the threshold with an upward trend.
ETSC 312 data meet or exceed the threshold.
MET 327 data will be examined at the end of spring quarter 2018 (June).
MET 488 data meet or exceed the threshold with an upward trend.
NCEES data meet or exceed the threshold with a downward trend.

Do

No corrective action items are necessary.

Check

These results will be reviewed in fall of 2018.

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

ETSC 311 – Calculus

ETSC 312 – Calculus

MET 327 – Calculus

MET 488 – Mathematics

NCEES – Probability and Statistics

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18 and S:\IET\15. MET - Program Information\CourseOutcomeData

ETSC311Mcd.xlsx

ETSC312Mcd.xlsx

MET327

MET488.xlsx

NCEES.xlsx

Appendix ME. ABET Continuous Improvement, Program Criterion Outcome Me.

MET Program Criteria Outcome Me. “manufacturing processes; material science and selection; solid mechanics (such as statics, dynamics, strength of materials, etc.) and mechanical system design”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

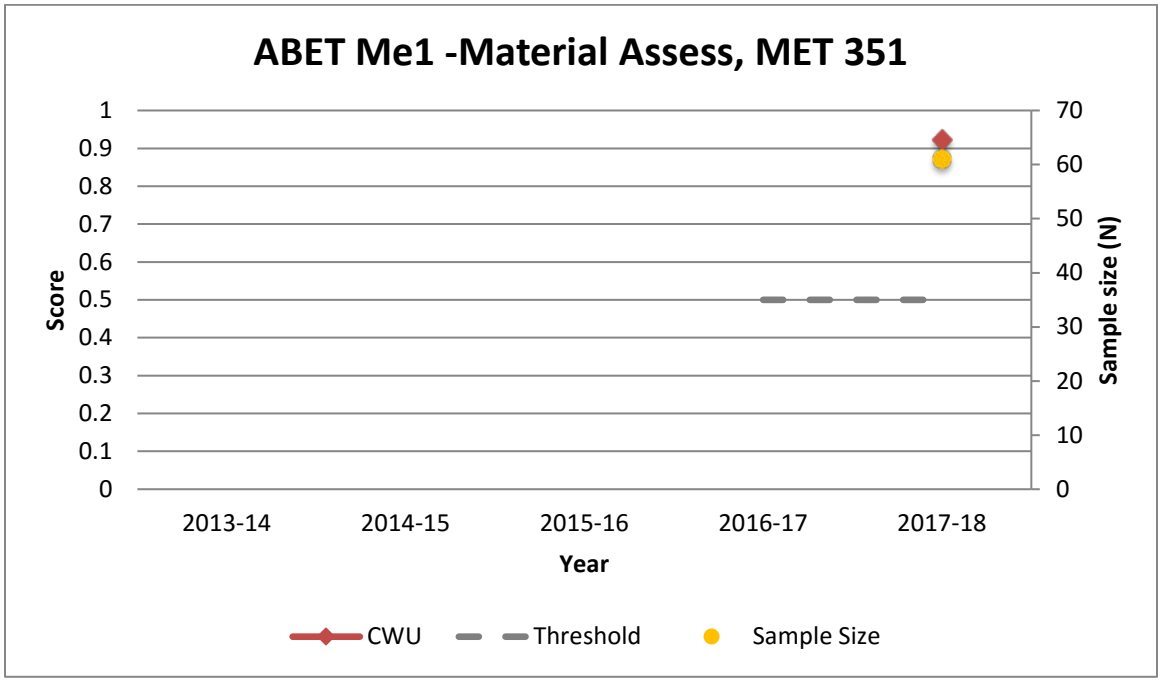

Figure Me-01. Assessment of Material Properties in MET 351.

Figure Me-01 comes from the materials diagnostic exam completed in MET 351 Metallurgy/Materials and Processes in the fall quarter. This direct measure covers four basic concepts in materials and strength of materials and assess students' knowledge of these concepts. Each student is assessed individually. The rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Me-01.

This metric is examined annually.

The attainment threshold is the students' average will be 50%, or higher. There are three questions testing students' understanding of this concept. Therefore, the threshold is set at 50% because a two out of three is still only a 67%. In the future, the MET faculty may choose to add more questions about this concept to enable the consistent use of the 70% threshold.

Figure Me-01 shows the SO Me level of attainment. The students are doing well in this first year of assessment and are above the threshold.

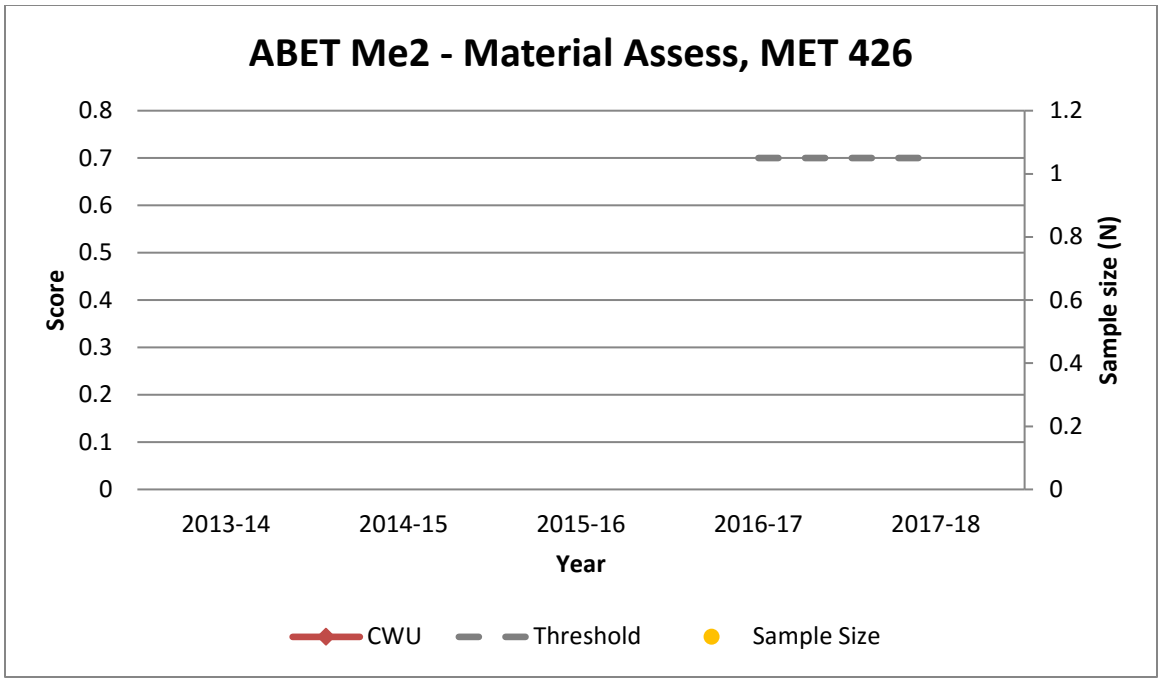

Figure Me-02. Assessment of Material Properties in MET 426.

Figure Me-02 will come from the materials diagnostic exam completed in MET 426 in spring quarter each year. This direct measure covers four basic concepts in materials and strength of materials and assesses students' knowledge of these concepts. Each student is assessed individually. The rubric data will be dropped into an Excel workbook that aggregates the data to produce the graph.

This metric will also be examined annually.

The attainment threshold is the students' average will be 70%, or higher.

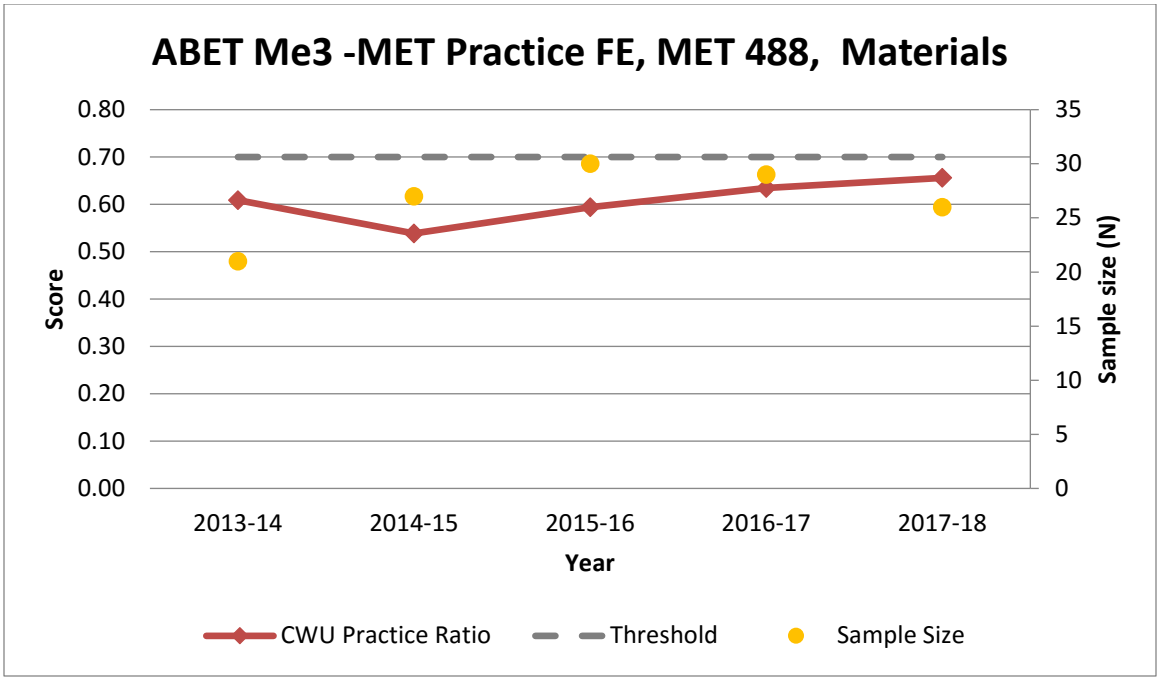

Figure Me-03. MET Practice FE Exam Ratio Score in Material Properties and Processing.

Figure Me-03 comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Material Properties and Processing category of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Me-03. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Me-03 shows CWU ratio scores for Material Properties and Processing. These scores are below the threshold and require corrective action.

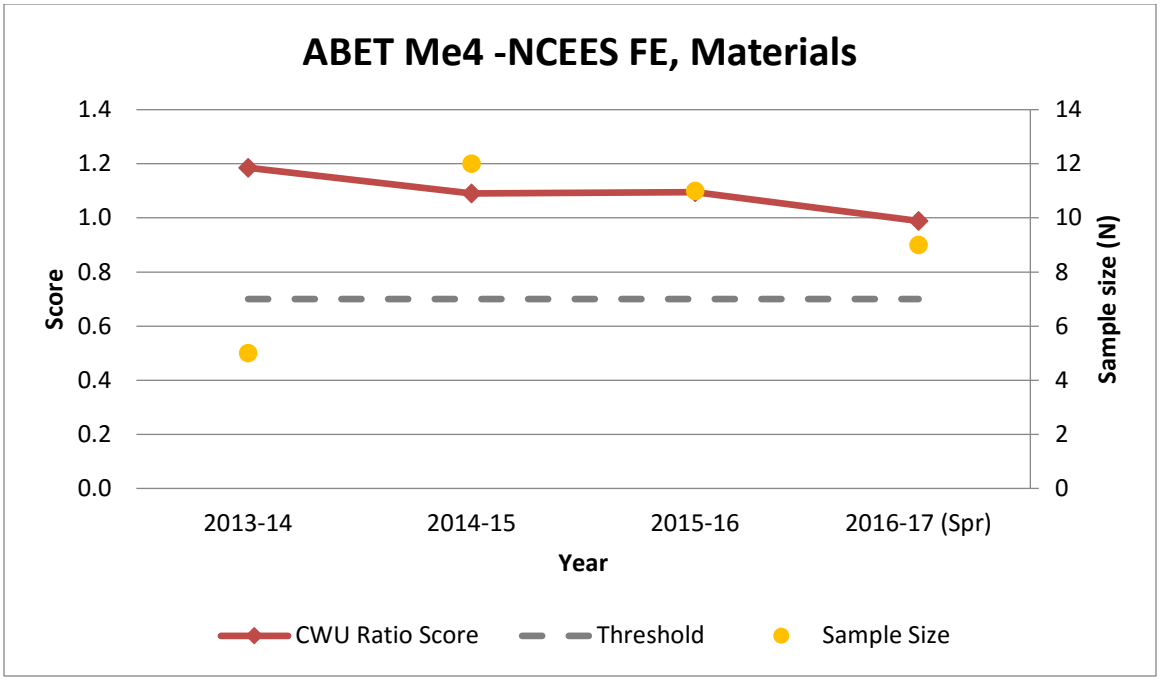

Figure Me-04. CWU Ratio Scores in Material Properties and Processing.

Figure Me-04 is assessed using the bi-annual reports produced by the NCEES. The data come from the Material Properties and Processing category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Me-04. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Me-04 shows CWU ratio scores for Material Properties and Processing. All three classes have exceeded the .70 threshold. No action is required at this time.

2019

20180105 Continuous Improvement:

Plan

MET 351 data meet or exceed the threshold with an upward trend.
MET 426 data will be collected at the end of spring quarter 2018 (June).
MET 488 data are below the threshold but continuing to trend upward.
NCESS data meet or exceed the threshold.

Do

MET 488: The MET faculty and IAB will discuss these results at out next meeting (May 30th, 2018).

Check

These data will be reviewed in the spring of 2018.

Act

Action will be determined at the May 30th, 2018 meeting.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 351 – Material Assess

MET 426 – Material Assess

MET 488 – Material Properties and Processing

NCEES – Material Properties and Processing

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

17.10 351 all Grades.xlsx, MET351_3acefMe.xlsx

MET426

MET488.xlsx

NCEES.xlsx

Appendix MF. ABET Continuous Improvement, Program Criterion Outcome Mf.

MET Program Criteria Outcome M f. “thermal sciences, such as thermodynamics, fluid mechanics, heat transfer, etc.;”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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5. Act: Determination if action items were effective or if further action is required.
6. Meta data

Data/Description:

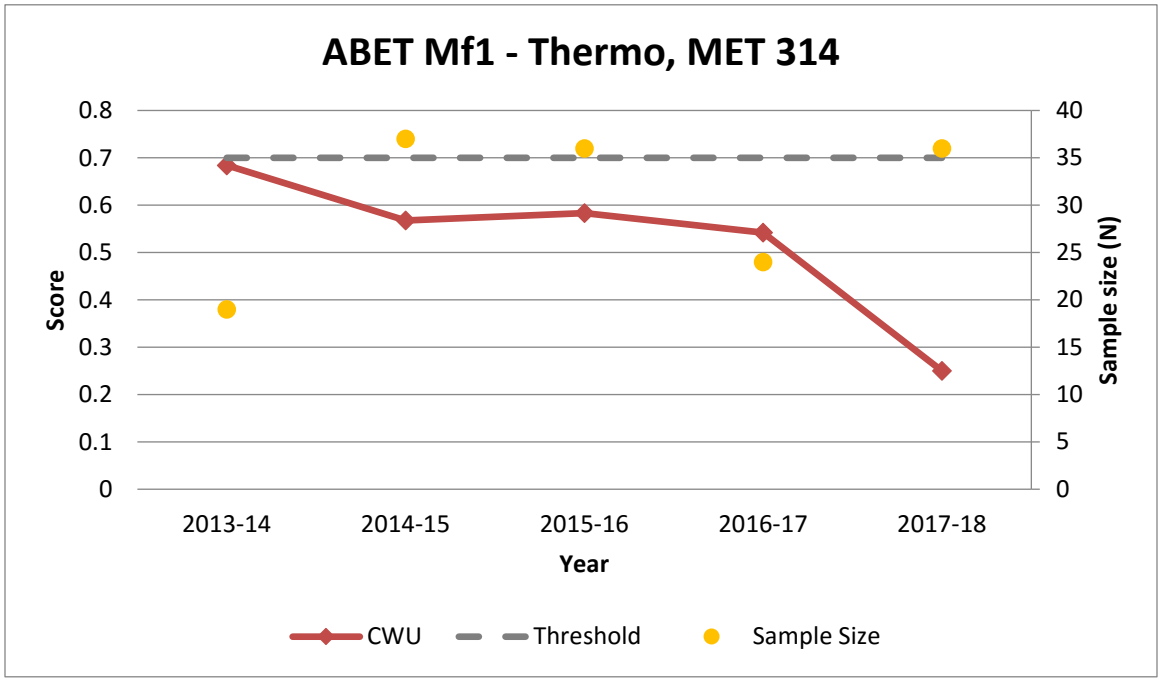

Figure Mf-01. Rankine Cycle Problem on Final.

Figure Mf-01 comes from a Rankine Cycle problem on the final for MET 314 completed in fall quarter each year. The direct measure is an assessment of the students' ability to complete a simple steam cycle analysis. They are assessed on their ability properly to complete the problem. The Rankine Cycle rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Mf-01.

This metric is examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Mf-01 shows the SO Ma Rankine Cycle level of attainment. The students have taken a severe drop below the threshold. Immediate action is required.

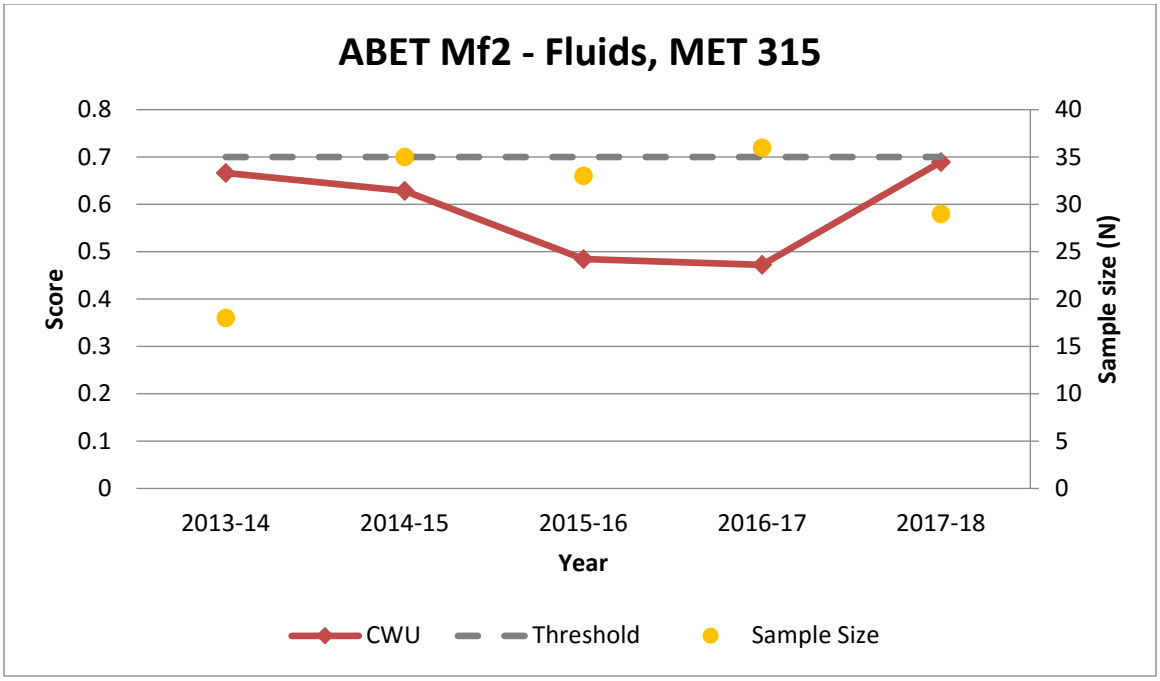

Figure Mf-02. Lift and Drag Problem on Final.

Figure Mf-02 comes from a lift and drag problem on the final for MET 315 completed in winter quarter each year. The direct measure is an assessment of the students' ability to complete a simple lift and drag problem. They are assessed on their ability properly to complete the problem. The lift and drag rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Mf-02.

This metric is also examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Mf-02 shows the SO Ma lift and drag problem level of attainment. The students have traditionally been below the threshold, but have taken a major step up to the threshold. Existing actions should be continued.

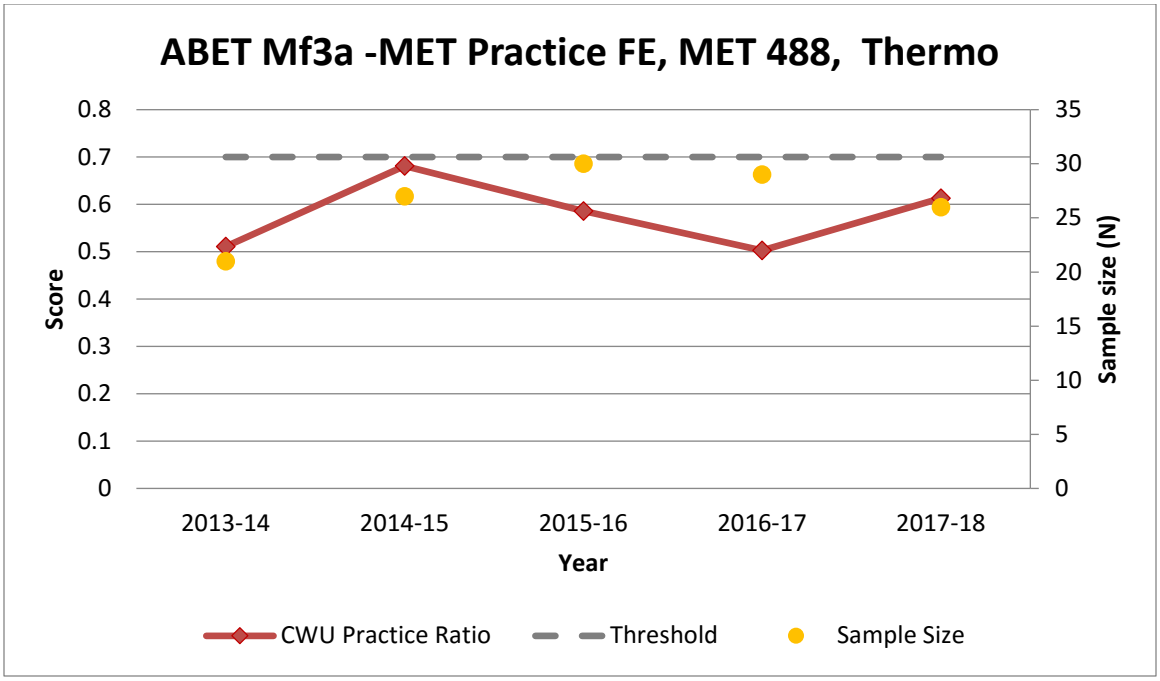

Figure Mf-03a. MET Practice FE Exam Ratio Score in Thermodynamics.

Figure Mf-03a comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Thermodynamics, Fluid Mechanics, and Heat Transfer categories of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mf-03a, Figure Mf-03b, and Figure Mf-03c. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Mf-03a shows CWU ratio scores for Thermodynamics. Students are consistently below the threshold. Corrective action is required.

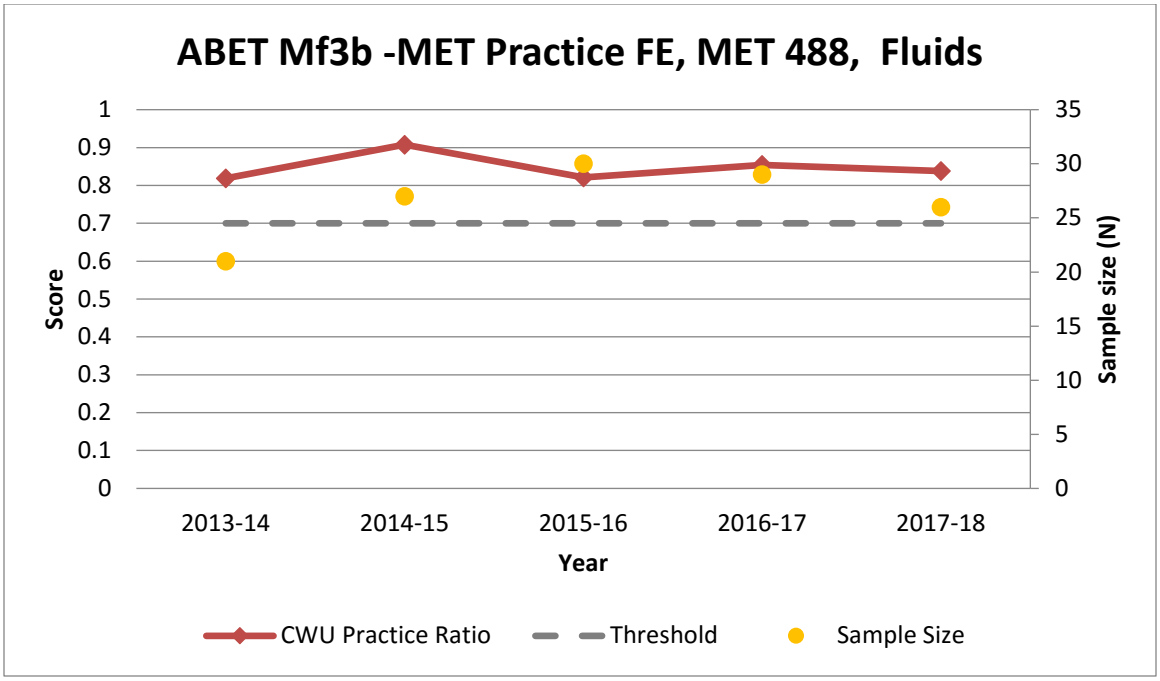

Figure Mf-03b. MET Practice FE Exam Ratio Score in Fluid Mechanics

Figure Mf-03b comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Thermodynamics, Fluid Mechanics, and Heat Transfer categories of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mf-03a, Figure Mf-03b, and Figure Mf-03c. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Mf-03b shows CWU ratio scores for Fluid Mechanics. The students are performing about the threshold. No action is required at this time.

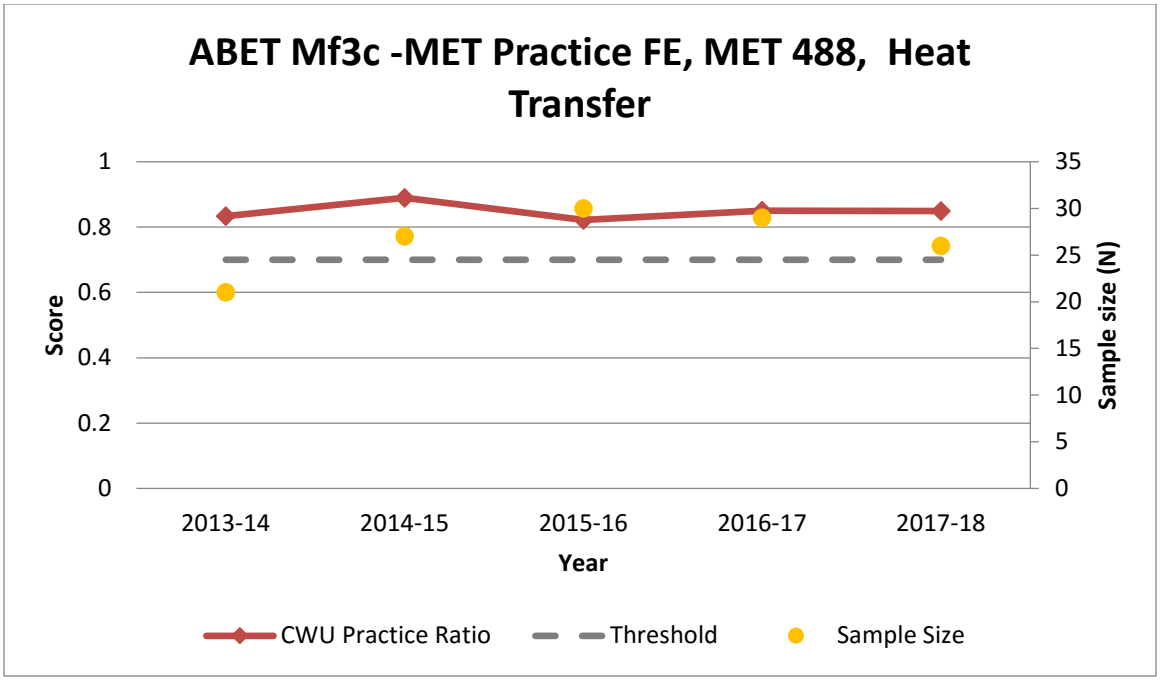

Figure Mf-03c. MET Practice FE Exam Ratio Score in Heat Transfer

Figure Mf-03c comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Thermodynamics, Fluid Mechanics, and Heat Transfer categories of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mf-03a, Figure Mf-03b, and Figure Mf-03c. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Mf-03c shows CWU ratio scores for Heat Transfer. These scores are excellent. No action is required.

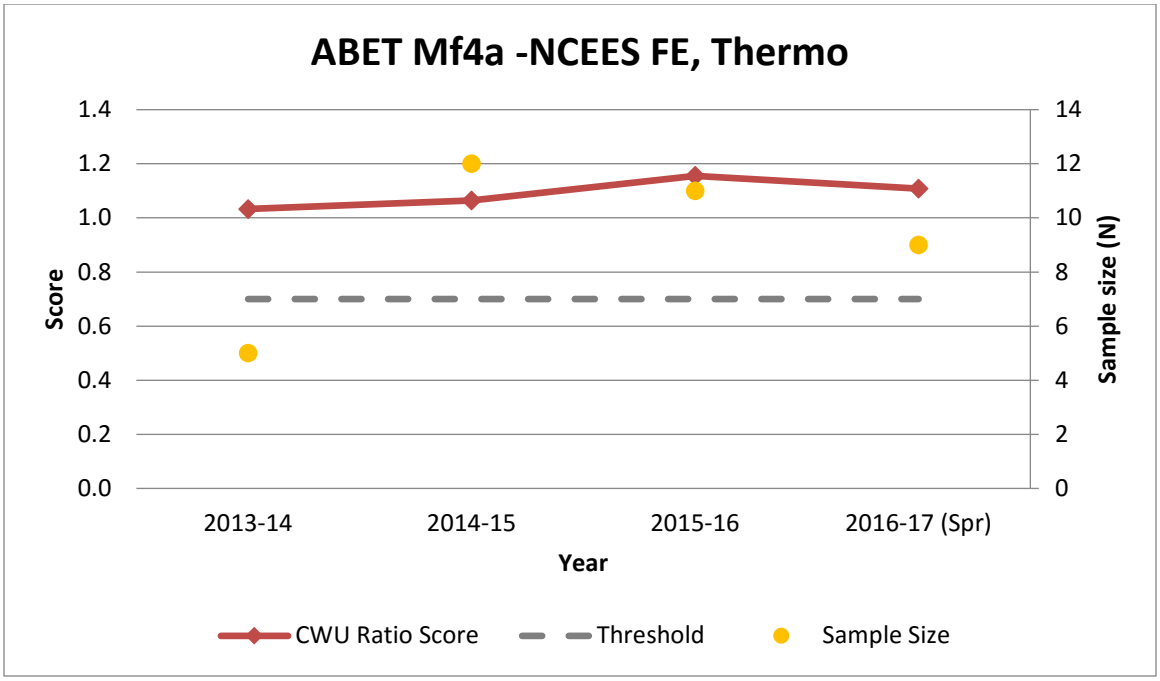

Figure Mf-04a. CWU/NCEES Ratio of average scores in Thermodynamics Topic.

Figure Mf-04a is assessed using the bi-annual reports produced by the NCEES. The data come from the Thermodynamics, Fluid Mechanics, and Heat Transfer categories of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mf-04a, Figure Mf-04b, and Figure Mf-04c. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Mf-04a shows CWU ratio scores for Thermodynamics. These scores are above the threshold, no action is required.

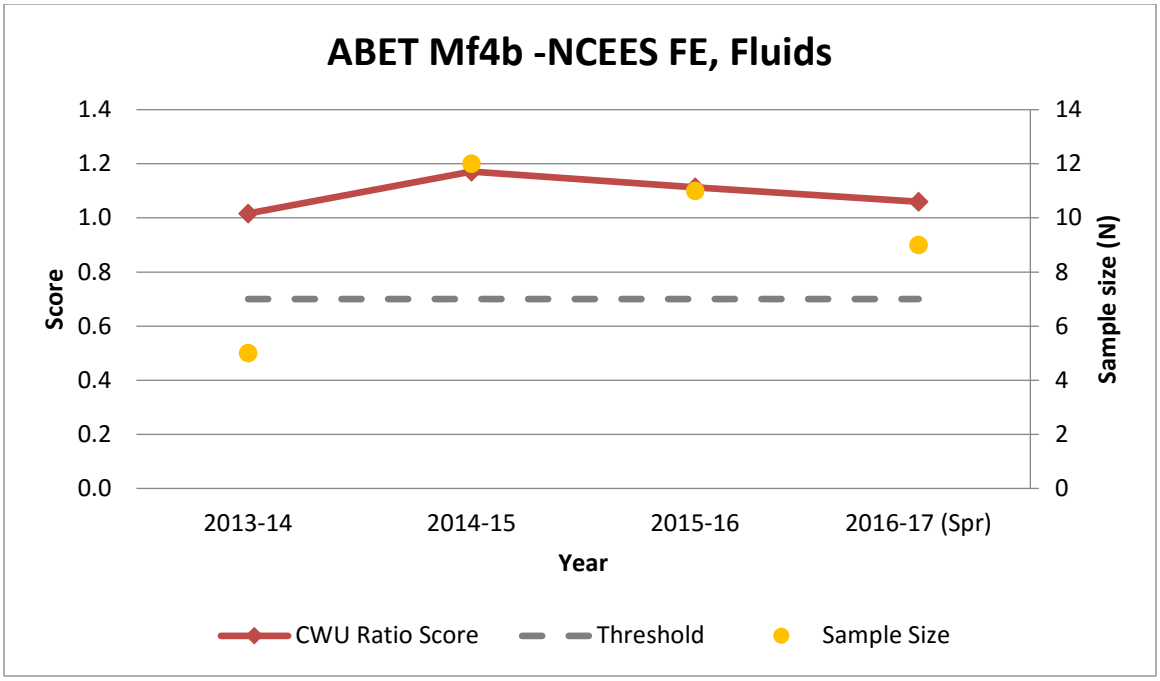

Figure Mf-04b. CWU/NCEES Ratio of average scores in Fluid Mechanics Topic

Figure Mf-04b is assessed using the bi-annual reports produced by the NCEES. The data come from the Thermodynamics, Fluid Mechanics, and Heat Transfer categories of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mf-04a, Figure Mf-04b, and Figure Mf-04c. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Mf-04b shows CWU ratio scores for Fluid Mechanics. These scores are above the threshold, no action is required.

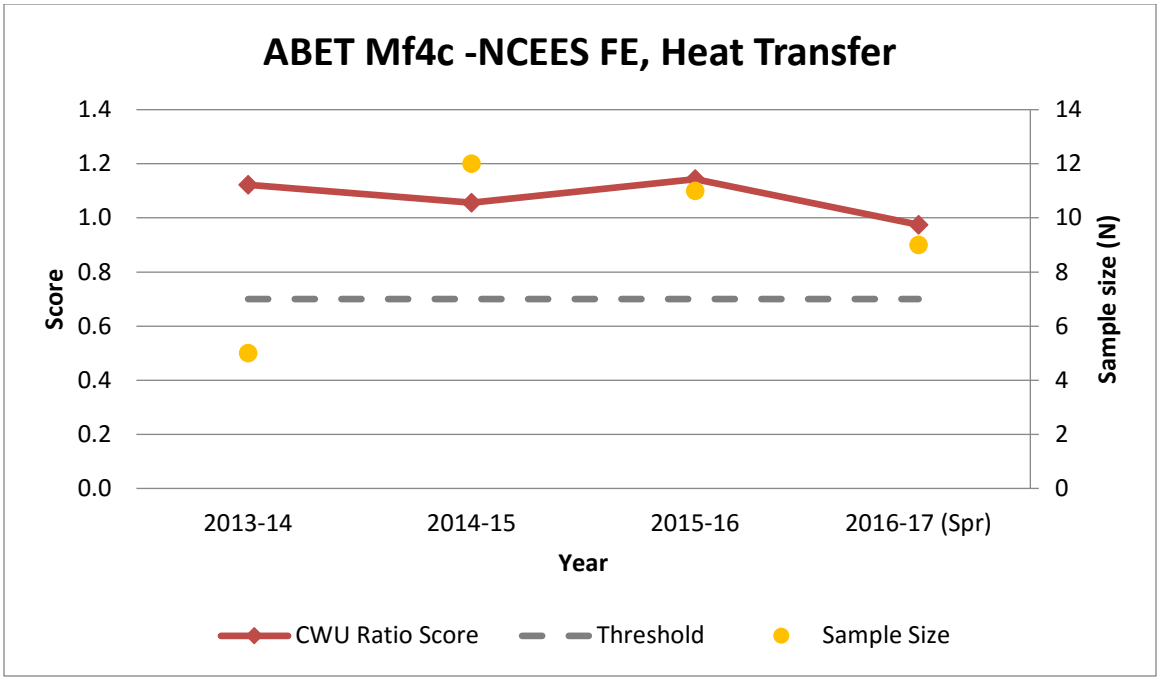

Figure Mf-04c. CWU/NCEES Ratio of average scores in Heat Transfer Topic

Figure Mf-04c is assessed using the bi-annual reports produced by the NCEES. The data come from the Thermodynamics, Fluid Mechanics, and Heat Transfer categories of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mf-04a, Figure Mf-04b, and Figure Mf-04c. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Mf-04c shows CWU ratio scores for Heat Transfer. These scores are above the threshold, no action is required.

20180105 Continuous Improvement:

Plan

MET 314: Student performance is dropping. Figure Mf-01 (Rankine Steam simple cycle, final exam) shows a strongly declining trend. Figure Mf-03a (Practice FE ratio score, all CWU MET students) shows downward trend and below standard. Figure Mf-04a (NCEES ratio score, CWU vs National average; for test takers only) values are stable and consistently above national average.

MET 315: Online homework problems and more time spent reviewing prior to the exam had a significant impact on the student scores. Figure Mf-03b (Practice FE ratio score, all CWU MET students) shows stable values with values above standard (all students). Figure Mf-04b (NCEES ratio score, CWU vs. national average; for test takers only) shows data stable and above standard.

MET 316: Figure Mf-03c (Practice FE ratio score, all CWU MET students) shows data are stable and above standard. Figure Mf-04c (NCEES ratio score, CWU vs. national average; for test takers only) shows data are stable and above standard.

MET 488 – Thermo data are below the threshold, but trending upward. All Fluids and Heat Transfer data meet or exceed the threshold.

NCEES – data meet or exceed the threshold.

Do

MET 314: Try incorporating online homework (McGraw Hill Connect) with immediate response and solutions. Students' weak point is usually integrating information into thermo cycles. This was implemented in 2016.
MET 315: No corrective actions considered necessary; continuing with normal continuous improvement efforts.
MET 316: No corrective actions considered necessary; continuing with normal continuous improvement efforts.
MET 488: The MET faculty and IAB will discuss these results at out next meeting (May 30th, 2018).

Check

MET 314: Online homework appeared to help some students; however, they also got used to the tables being presented to them in the homework problem and did not realize tables were in the text appendix. This adversely affected some test grades. The decrease in 2017 student performance (Figure 1) included the effect of class schedule changing so that thermo cycles were not introduced until almost Thanksgiving, with the related distractions and holiday schedule discontinuity.
MET 315: No corrective actions to review.
MET 316: No corrective actions to review.
MET 488: These data will be reviewed in the spring of 2018.

Act

MET 314: Spend less time on properties and processes to get another week or more of cycles into schedule. For Fall 2018 develop worksheets for Otto, Diesel, Rankine steam and R134a cycles, psychrometric chart processes. Replace Dual Cycle homework problem that was confusing to students.

MET 315: No corrective actions to review.

MET 316: No corrective actions to review.

MET 488: Action will be determined at May 30th, 2018 meeting.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET314_Mf.xlsx

MET315_Mf.xlsx

MET488.xlsx

NCEES.xlsx

Note: Heat Transfer is an elective course in the CWU MET program, and so data from the class do not reflect all students. It is a topic in the FE, so all students pick up information during the FE review, and all students in each graduation cohort are included in the Practice FE results.

Appendix MG. ABET Continuous Improvement, Program Criterion Outcome Mg.

MET Program Criteria Outcome Mg. “electrical circuits (ac and dc), and electronic controls;”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

This document is organized in the following manner:

1. Presentation of assessment data and description of metric.
2. Plan: Comments on assessment data and identification of problem(s).
3. Do: Development of action items to address comments or correct problem(s).
4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

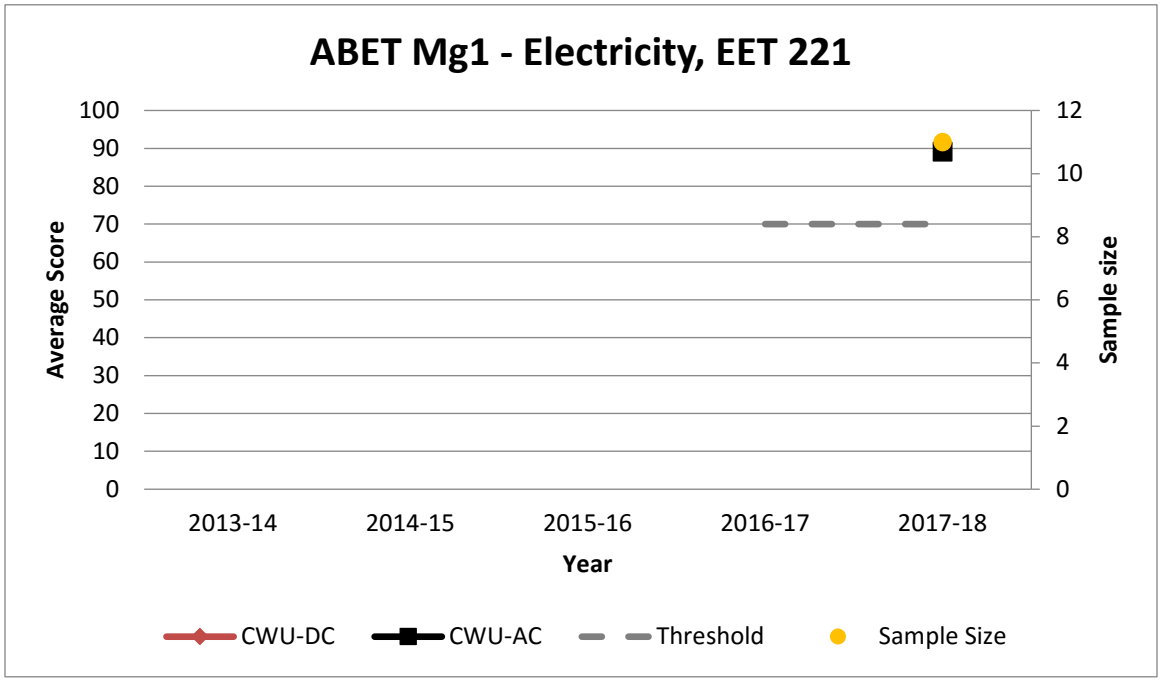

Figure Mg-01. Basic Electricity – DC and AC circuits.

Figure Mg-01 comes from questions on the EET 221 midterm that test students' ability to apply Ohms law, Kirchhoff's Voltage Law, Kirchhoff's Current Law, power equations, resistor color code, and series/parallel circuit analysis in Direct Current circuits. The final exam tests students' ability to apply circuit analysis techniques to Alternating Current circuits. Topics include frequency/period calculations, RMS power, transformers, inductors, capacitors, RL circuits, RC circuits, and RLC circuits in series and parallel combinations. The students are assessed on their ability properly to complete the problems. The AC and DC rubric data are dropped into an Excel workbook that aggregates the data to produce the graph shown in Figure Mg-01.

This metric is examined annually.

The attainment threshold is the students' average will be 70%, or higher.

Figure Mg-01 shows the SO Ma DC and AC circuit level of attainment. The students are above the threshold. No action is required.

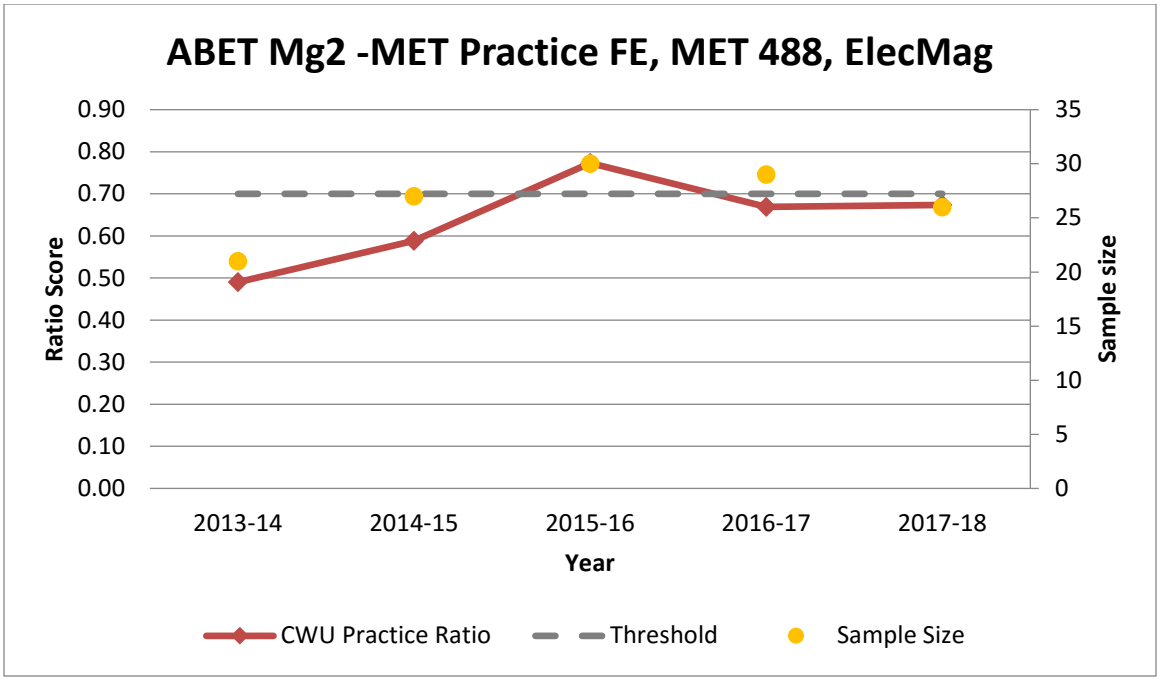

Figure Mg-02. MET Practice FE Exam Ratio Score in Electricity and Magnetism.

Figure Mg-02 comes from the MET Practice FE exam that every MET student takes as the final exam for MET 488 (Professional Certification Exam Preparation course). The data come from the Electricity and Magnetism category of the MET Practice FE exam. The practice exam data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mg-02. The graph is produced using the CWU Practice Ratio Score – the ratio of the performance of CWU students on the practice exam to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students taking the MET Practice FE will be .70 or higher.

Figure Mg-02 shows CWU ratio scores for Electricity and Magnetism. Student scores are below threshold, action is required.

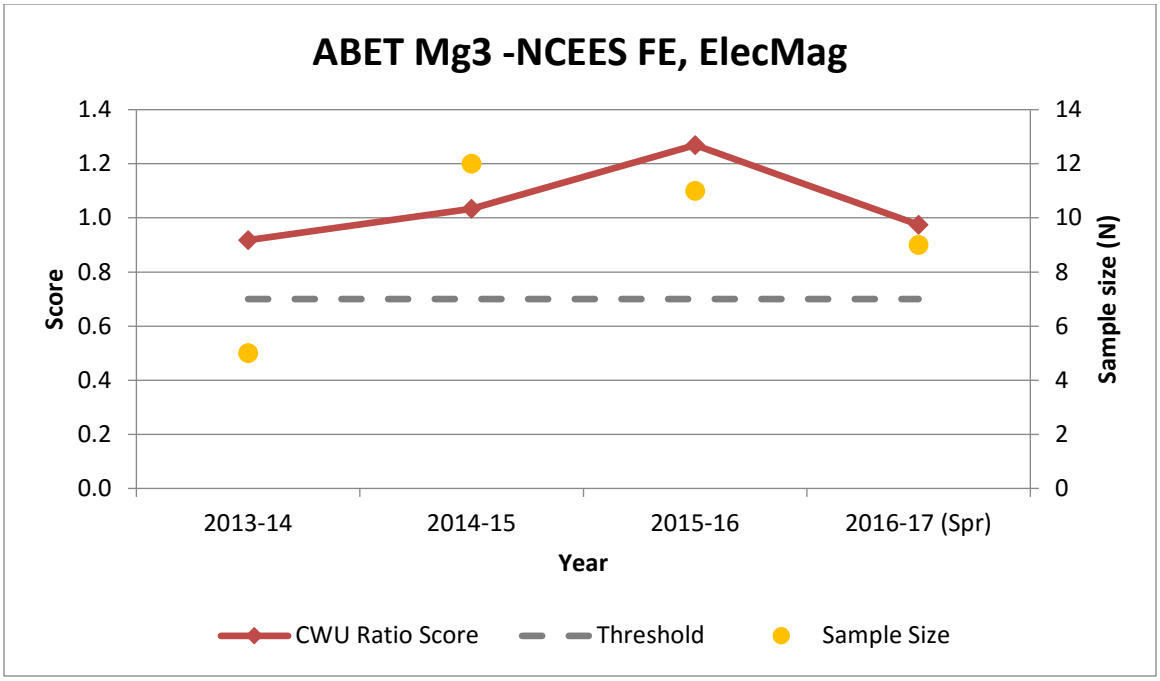

Figure Mg-03. CWU Ratio Scores in Electricity and Magnetism.

Figure Mg-03 is assessed using the bi-annual reports produced by the NCEES. The data come from the Electricity and Magnetism category of the NCEES report. The NCEES data are dropped into an Excel workbook that aggregates the data to produce the graph seen in Figure Mg-03. The graph is produced using the NCEES ratio score – the performance of CWU to the NCEES comparator performance in each category. These are average scores.

This metric is also examined annually.

The attainment threshold is the ratio score for the CWU students that take the FE will be 0.70 or higher.

Figure Mg-03 shows CWU ratio scores for Electricity and Magnetism. The students' performance is above the threshold, no action is required.

20180105 Continuous Improvement:

Plan

EET 221 data meet or exceed the threshold.
MET 488 appears to be oscillating around the threshold. Continue to watch.
NCEES data meet or exceed the threshold.

Do

MET 488: The MET faculty and IAB will discuss these results at out next meeting (May 30th, 2018).

Check

These data will be reviewed in the spring of 2018.
.

Act

Action will be determined at May 30th, 2018 meeting.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

EET 221 – DC and AC test questions

MET 488 – Electricity and Magnetism

NCEES – Electricity and Magnetism

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

EET221_Mg.xlsx

MET488.xlsx

NCEES.xlsx

Appendix MH. ABET Continuous Improvement, Program Criterion Outcome Mh.

MET Program Criteria Outcome M h. “application of industry codes, specifications, and standards; and using technical communications, oral and written, typical of those required to prepare and present proposals, reports, and specifications”

Source: http://www.abet.org/wp-content/uploads/2016/12/T001-17-18-ETAC-Criteria-10-29-16-1.pdf

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3. Do: Development of action items to address comments or correct problem(s).
4. Check: Review of results of action items.
5. Act: Determination if action items were effective or further action is required.
6. Meta data

Data/Description:

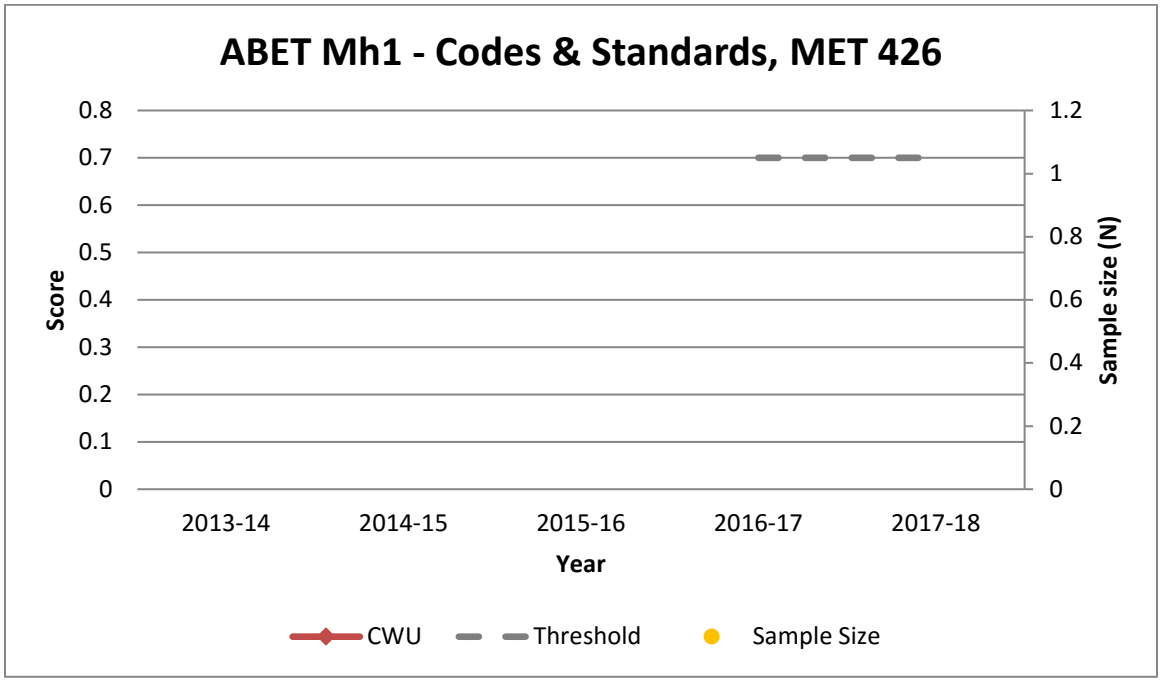

Figure Mh-01. Codes and Standards.

Figure Mh-01 Data will be collected at the end of spring quarter 2018 (June).

Figure Mh-01 will come from the Codes and Standards assignments completed in the spring quarter in the MET 426 Applications in Strength of Materials course.

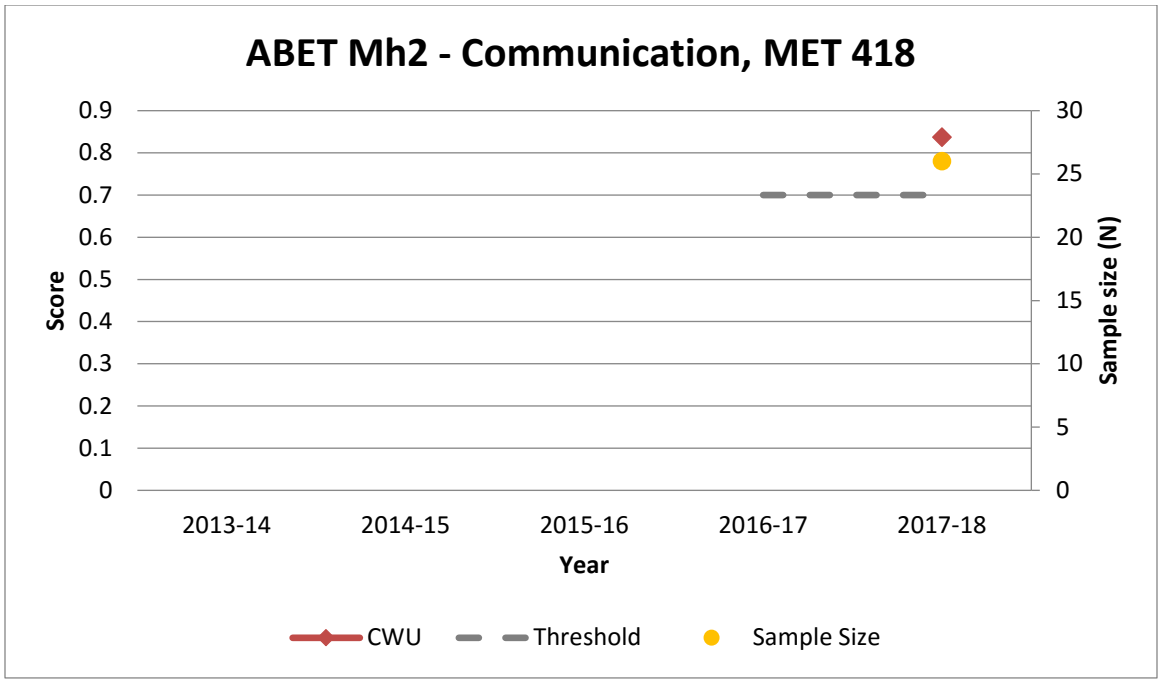

Figure Mh-02. Technical Communication.

Figure Mh-02 is assessed using the scores of the students presenting their design of a lever to be 3-D printed. The data come from the effectiveness portion of the rubric used to score their report. The effectiveness score data can be seen in Figure Mh-02. The graph is produced using the average effectiveness score for the course.

This metric is examined annually.

The attainment threshold is the students will receive a 70%, or higher, score.

Figure Mh-02 shows the effectiveness score. These scores indicate the students are doing well. No action is required.

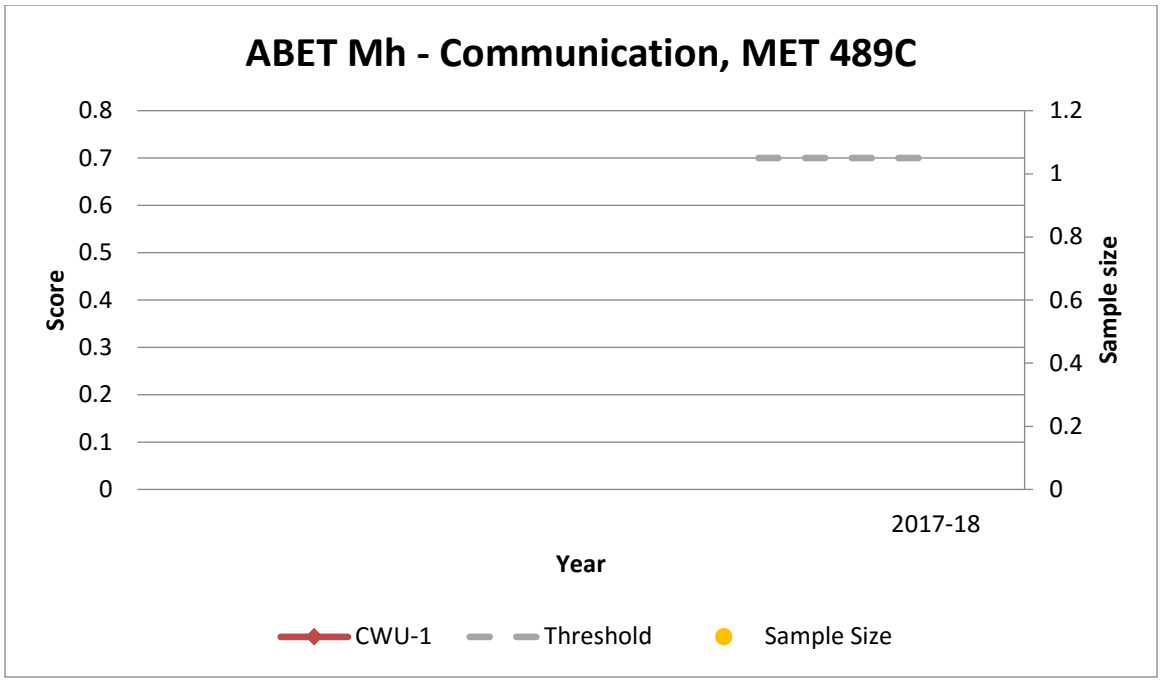

Figure Mh-03. Communication Effectiveness.

Figure Mh-03 will be assessed using the scores of the students presenting their final capstone report. The data will come from the rubric used to score the effectiveness of communicating the technical content in the presentation. The effectiveness score data will be seen in Figure Mh-03. The graph is produced using the average effectiveness score for the course.

This metric is also examined annually.

The attainment threshold is the students will receive a 70%, or higher, score.

Figure Mh-03 Data will be collected at the end of spring quarter 2018 (June).

Figure Mh-03 will come from students' final presentation completed in the spring quarter in the MET 489C Senior Project.

20180105 Continuous Improvement:

Plan

MET 426 data will be collected at the end of spring quarter 2018 (June).
MET 489A data meet or exceed the threshold.
MET 489C data will be collected at the end of spring quarter 2018 (June).

Do

No corrective action items are necessary.

Check

There are no results of any previous action items to review

Act

No action is required at this time.

METADATA and DATA LIMITS:

Years and sample sizes shown on graphs

METRIC

MET 426 – Codes & Standards

MET 418 – Presentation

MET 489C – Final Presentation

DATA CAPTURE AND GRAPH PRESENTATION:

Source: S:\IET\15. MET - Program Information\CourseOutcomeData\2017-18

and S:\IET\15. MET - Program Information\CourseOutcomeData

MET426.xlsx

MET418.xlsx

MET489C_3cfgkMbh.xlsx