

University of Louisiana at Lafayette

Detailed Assessment Report 2015-2016 Mechanical Engineering BS

As of: 11/18/2016 10:15 AM CENTRAL

(Includes those Action Plans with Budget Amounts marked *One-Time, Recurring, No Request.*)

Mission / Purpose

Our mission is to provide quality education and meaningful career opportunities for mechanical engineering graduates of the University of Louisiana at Lafayette. We develop highly qualified graduates with potential to assume engineering positions of increasing responsibility in industry, or to pursue higher learning in the form of graduate studies;

We facilitate relevant research and development activities for faculty for economic and professional development, faculty proficiency, and feedback to the instructional program;

We provide services to the College of Engineering, the University, and the Community in which this University resides.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: A - Math Through Differential Equations

Graduates of the Mechanical Engineering program will demonstrate an ability to apply knowledge of mathematics, through multivariate calculus and differential equations.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching

expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be "S," Satisfactory or better, or, using the later scale, the average response will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Met

87.5% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 2: Senior Exit Interview

Each semester the Department Head conducts an exit interview with every graduating senior. The graduate's experience in the program is reviewed and suggestions are sought for improving the program. All graduating seniors complete a questionnaire prior to the interview, which serves as a guide for the discussion. Student identification on the questionnaire is optional, and the results are confidential. Information is obtained on what students think of the department's facilities, including laboratories and classrooms, of curricular content, faculty, the advisement process, recruiting, and the general operation of the department. Student opinions and suggestions are also gathered on other matters such as student services and other university-wide issues of interest to students. These issues, opinions and suggestions are presented at faculty meetings and retreats for faculty/staff discussion. When a desired course of action is determined, the department implements a change if such a change is within its purview, or proposes a solution to the administration. Because this is the last chance for a student to "make a difference" in the Mechanical Engineering program, the responses have been very candid and helpful.

Source of Evidence: Exit interviews with grads/program completers

Target:

The average score for all responses on the survey will be "S," Satisfactory or better.

Finding (2015-2016) - Target: Met

91.5% of all graduating seniors surveyed indicated a score of Satisfactory or better on the survey instrument. According to this instrument, the outcome is not met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |
Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Fundamentals of Engineering Exam

Mechanical Engineering students are encouraged to take the standardized national licensing exam, the Fundamentals of Engineering (FE) exam, sometime during their final year. The FE exam gives the percentage of correct answers for various subject areas. Results are summarized for individuals, the department, the college, and the nation.

If the percentage of correct answers is 15% above the national average, the outcome is scored as PS = Program Strength. The program is particularly strong with regard to this outcome. If the percentage of correct answers is within 5% of the national average, the outcome is scored as S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. If the percentage of correct answers is 10% below the national average, the outcome is scored as C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. If the percentage of correct answers is 20% below the national average, the outcome is scored as W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. If the percentage of correct answers is 30% below the national average, the outcome is scored as D=Deficiency. The data indicate this outcome is not satisfied.

Source of Evidence: Certification or licensure exam, national or state

Target:

The department score will be within 80% of the national score to be considered satisfactory.

Finding (2015-2016) - Target: Not Reported This Cycle

Not reported this cycle.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment

instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

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Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

92.8% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Changes to MCHE 301, 363, and 469

For A and K. More clear description of expectations in 363. Certain assignments will be made mandatory in 363. Add MCHE 301 as pre-req

for 469. Reduce work products that are assessed in 363. Sally. Dec 2015. More emphasis on differential equations in MCHE 301. More practice in solving mathematical problems in MCHE 469 in quizzes and tests.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** A
- Math Through Differential Equations
| K - Modern Engineering Tools

Implementation Description: 2016 - Prerequisites have been changed. Content added in 301, 363, and 469. Improvements have been noted. Assessment procedure review made part of another action plan. This action item is considered complete.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head and Instructors of each class.

Review and Revise Assessment Procedures

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Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations
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Measure: Student Advisory Committee Evaluation |
Outcome/Objective: A - Math Through Differential Equations
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Global and Societal Context | I - Life-Long Learning | J -
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Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A
- Math Through Differential Equations
| B - Design and Conduct Experiments | C - Design a System,
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Identify and Solve Engineering Problems | F - Professional and
Ethical Responsibility | G - Communicate Effectively | H -
Global and Societal Context | I - Life-Long Learning | J -

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 2: B - Design and Conduct Experiments

Graduates of the Mechanical Engineering program will demonstrate an ability to design and conduct experiments, as well as to analyze and interpret data.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

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Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be "S," Satisfactory or better, or, using the later scale, the average response will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

75% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is not met, but we believe this indicates a problem with the instrument rather than student performance. An action plan has been established to review and revise the instrument as necessary.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the

direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 2: Senior Exit Interview

Each semester the Department Head conducts an exit interview with every graduating senior. The graduate's experience in the program is reviewed and suggestions are sought for improving the program. All graduating seniors complete a questionnaire prior to the interview, which serves as a guide for the discussion. Student identification on the questionnaire is optional, and the results are confidential. Information is obtained on what students think of the department's facilities, including laboratories and classrooms, of curricular content, faculty, the advisement process, recruiting, and the general operation of the department. Student opinions and suggestions are also gathered on other matters such as student services and other university-wide issues of interest to students. These issues, opinions and suggestions are presented at faculty meetings and retreats for faculty/staff discussion. When a desired course of action is determined, the department implements a change if such a change is within its purview, or proposes a solution to the administration. Because

this is the last chance for a student to “make a difference” in the Mechanical Engineering program, the responses have been very candid and helpful.

Source of Evidence: Exit interviews with grads/program completers

Target:

The average score for all responses on the survey will be "S," Satisfactory or better.

Finding (2015-2016) - Target: Not Met

70.6% of all graduating seniors surveyed indicated a score of Satisfactory or better on the survey instrument. According to this instrument, the outcome is not met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations

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Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

84.4% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Communication and Data Analysis

Cross-curriculum effort for B and G. Data analysis. Additional coverage of significant figures and graphing in MCHE 101, 201, 220, 357, 358. Technical writing. Sally, Josh, John, and Carla. AY 15-16.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** B
- Design and Conduct Experiments
| G - Communicate Effectively

Implementation Description: The changes described have been implemented and improvements noted. This action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head and Instructors of each class.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations
| E - Identify and Solve Engineering Problems | F -
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Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H -

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Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 3: C - Design a System, Component, or Process

Graduates of the Mechanical Engineering program will demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

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expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be "S," Satisfactory or better, or, using the later scale, the average response will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Met

87.5% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

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Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

95% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Curriculum Change

Outcomes C and D and E. Old 363 is being phased out. Changed curriculum to move design content from 363 to MCHE 201.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** C
- Design a System, Component, or Process
| D - Multidisciplinary Teams | E - Identify and Solve
Engineering Problems

Implementation Description: The curriculum changes have been accomplished. A new assessment procedure is being developed as part of another action plan. This action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations
| E - Identify and Solve Engineering Problems | F -
Professional and Ethical Responsibility | K - Modern
Engineering Tools | L - Thermal Systems Area
Measure: Senior Exit Interview | **Outcome/Objective:** A -
Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area
Measure: Student Advisory Committee Evaluation |
Outcome/Objective: A - Math Through Differential Equations
| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations
| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 4: D - Multidisciplinary Teams

Graduates of the Mechanical Engineering program will demonstrate an ability to function on multidisciplinary teams.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

62.5% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is not met. However, all other instruments indicate that this outcome is met, indicating that this instrument is not properly measuring the outcome. An action plan is being established to revise the assessment procedure.

Related Action Plans (by Established cycle, then alpha):

Change Administration of Senior Exit Surveys

Low participation in senior exit interviews. Senior exit interviews will be done during class time of 484.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: D - Multidisciplinary Teams

Implementation Description: This action item is being included in a new action plan established in 2016 to review and revise all instruments, targets, and assessment procedures.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head and Instructor of MCH 484.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

92.4% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Curriculum Change

Outcomes C and D and E. Old 363 is being phased out. Changed curriculum to move design content from 363 to MCHE 201.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems

Implementation Description: The curriculum change have been accomplished. A new assessment procedure is being developed as part of another action plan. This action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment

instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 5: E - Identify and Solve Engineering Problems

Graduates of the Mechanical Engineering program will demonstrate an ability to identify, formulate, and solve engineering problems.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this

outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be "S," Satisfactory or better, or, using the later scale, the average response will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Met

100% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 2: Senior Exit Interview

Each semester the Department Head conducts an exit interview with every graduating senior. The graduate's experience in the program is reviewed and suggestions are sought for improving the program. All graduating seniors complete a questionnaire prior to the interview, which serves as a guide for the discussion. Student identification on the questionnaire is optional, and the results are confidential. Information is obtained on what students think of the department's facilities, including laboratories and classrooms, of curricular content, faculty, the advisement process, recruiting, and the general operation of the department. Student opinions and suggestions are also gathered on other matters such as student services and other university-wide issues of interest to students. These issues, opinions and suggestions are presented at faculty meetings and retreats for faculty/staff discussion. When a desired course of action is determined, the department implements a change if such a change is within its purview, or proposes a solution to the administration. Because this is the last chance for a student to "make a difference" in the Mechanical Engineering program, the responses have been very candid and helpful.

Source of Evidence: Exit interviews with grads/program completers

Target:

The average score for all responses on the survey will be "S," Satisfactory or better.

Finding (2015-2016) - Target: Met

91.2% of all graduating seniors surveyed indicated a score of Satisfactory or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):**Measure:** Fundamentals of Engineering Exam |**Outcome/Objective:** A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |**Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A

- Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017**Responsible Person/Group:** Chambers**M 3: Fundamentals of Engineering Exam**

Mechanical Engineering students are encouraged to take the standardized national licensing exam, the Fundamentals of Engineering (FE) exam, sometime during their final year. The FE exam gives the percentage of correct answers for various subject areas. Results are summarized for individuals, the department, the college, and the nation.

If the percentage of correct answers is 15% above the national average, the outcome is scored as PS = Program Strength. The program is particularly strong with regard to this outcome. If the percentage of correct answers is within 5% of the national average, the outcome is scored as S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. If the percentage of correct answers is 10% below the national average, the outcome is scored as C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. If the percentage of correct answers is 20% below the national average, the outcome is scored as W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. If the percentage of correct answers is 30% below the national average, the outcome is scored as D=Deficiency. The data indicate this outcome is not satisfied.

Source of Evidence: Certification or licensure exam, national or state

Target:

The average department score in the subcategories of Electricity and Magnetism, Statics, Dynamics Kinematics and Vibrations, Mechanics of Materials, Material

Properties, Fluid Mechanics, Thermodynamics, Heat Transfer, Measurements, and Mechanical Design will be within 80% of the national average.

Finding (2015-2016) - Target: Not Reported This Cycle

Not reported this cycle.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and

4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Not Met

70.8% of the student work products assessed met or exceeded expectations, which is below the target. However, the average score was brought down dramatically by the assessment in one particular class, and the results run counter to the results from other instruments. Therefore we believe this is an indication that we need to review the assessment procedure. An action plan has been established for this purpose.

Related Action Plans (by Established cycle, then alpha):

Curriculum Change

Outcomes C and D and E. Old 363 is being phased out. Changed curriculum to move design content from 363 to MCHE 201.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** C
- Design a System, Component, or Process
| D - Multidisciplinary Teams | E - Identify and Solve
Engineering Problems

Implementation Description: The curriculum changes have been accomplished. A new assessment procedure is being developed as part of another action plan. This action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations
| E - Identify and Solve Engineering Problems | F -
Professional and Ethical Responsibility | K - Modern
Engineering Tools | L - Thermal Systems Area
Measure: Senior Exit Interview | **Outcome/Objective:** A -
Math Through Differential Equations
| B - Design and Conduct Experiments | E - Identify and Solve
Engineering Problems | L - Thermal Systems Area
Measure: Student Advisory Committee Evaluation |
Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 6: F - Professional and Ethical Responsibility

Graduates of the Mechanical Engineering program will demonstrate an understanding of professional and ethical responsibility.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

75% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is not met, but we believe this indicates a problem with the instrument rather than student performance. An action plan has been established to review and revise the instrument as necessary.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Fundamentals of Engineering Exam

Mechanical Engineering students are encouraged to take the standardized national licensing exam, the Fundamentals of Engineering (FE) exam, sometime during their final year. The FE exam gives the percentage of correct answers for various subject areas. Results are summarized for individuals, the department, the college, and the nation.

If the percentage of correct answers is 15% above the national average, the outcome is scored as PS = Program Strength. The program is particularly strong with regard to this outcome. If the percentage of correct answers is within 5% of the national average, the outcome is scored as S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. If the percentage of correct answers is 10% below the national average, the outcome is scored as C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. If the percentage of correct answers is 20% below the national average, the outcome is scored as W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. If the percentage of correct answers is 30% below the national average, the outcome is scored as D=Deficiency. The data indicate this outcome is not satisfied.

Source of Evidence: Certification or licensure exam, national or state

Target:

The departmental average of the section on Ethics and Professional Responsibility must be within 80% of the national average to be considered satisfactory.

Finding (2015-2016) - Target: Not Reported This Cycle

Not reported this cycle.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A

- Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. The target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

91% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

New Work Product

A new work product will be designed to measure Outcome F - an understanding of professional and ethical responsibility, to replace the one previously used in MCHE 484.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** F - Professional and Ethical Responsibility

Implementation Description: This action item is being rolled into another action plan to review and revise all assessment procedures. Therefore, this action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Chambers

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):**Measure:** Fundamentals of Engineering Exam |**Outcome/Objective:** A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |**Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017**Responsible Person/Group:** Chambers**SLO 7: G - Communicate Effectively**

Graduates of the Mechanical Engineering program will demonstrate an ability to communicate effectively.

Related Measures**M 1: Student Advisory Committee Evaluation**

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Met

87.5% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

83.5% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Communication and Data Analysis

Cross-curriculum effort for B and G. Data analysis. Additional coverage of significant figures and graphing in MCHE 101, 201, 220, 357, 358. Technical writing. Sally, Josh, John, and Carla. AY 15-16.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** B
- Design and Conduct Experiments
| G - Communicate Effectively

Implementation Description: The changes described have been implemented and improvements noted. This action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head and Instructors of each class.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area
Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations
| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area
Measure: Student Advisory Committee Evaluation |
Outcome/Objective: A - Math Through Differential Equations
| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations
| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 8: H - Global and Societal Context

Graduates of the Mechanical Engineering program will have the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching

expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

75% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is not met, but we believe this indicates a problem with the instrument rather than student performance. An action plan has been established to review and revise the instrument as necessary.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

91.5% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

New Work Product Assessments in MCHE 490

New student work product assessments will be added to MCHE 490 to assess student achievement for Outcomes H and I.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** H
- Global and Societal Context
| I - Life-Long Learning

Implementation Description: MCHE 490 was eliminated in the last curriculum change. This action item is being consolidated with another action item to review and revise all assessment procedures in 2016 - 2017. Therefore, this action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Chambers, Simon

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations
| E - Identify and Solve Engineering Problems | F -
Professional and Ethical Responsibility | K - Modern
Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area
Measure: Student Advisory Committee Evaluation | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 9: I - Life-Long Learning

Graduates of the Mechanical Engineering program will demonstrate a recognition of the need for, and an ability to engage in life-long learning.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

50% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is not met. However, all other instruments indicate that this outcome is met, indicating that this instrument is not properly measuring the outcome. An action plan is being established to revise the assessment procedure.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

90.7% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

New Work Product Assessments in MCHE 490

New student work product assessments will be added to MCHE 490 to assess student achievement for Outcomes H and I.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** H
- Global and Societal Context
| I - Life-Long Learning

Implementation Description: MCHE 490 was eliminated in the last curriculum change. This action item is being consolidated with another action item to review and revise all assessment procedures in 2016 - 2017. Therefore, this action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Chambers, Simon

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations
| E - Identify and Solve Engineering Problems | F -
Professional and Ethical Responsibility | K - Modern
Engineering Tools | L - Thermal Systems Area
Measure: Senior Exit Interview | **Outcome/Objective:** A -
Math Through Differential Equations
| B - Design and Conduct Experiments | E - Identify and Solve
Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |
Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 10: J - Contemporary Issues

Graduates of the Mechanical Engineering program will demonstrate a knowledge of contemporary issues.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

50% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is not met. However, all other instruments indicate that this outcome is met, indicating that this instrument is not properly measuring the outcome. An action plan is being established to revise the assessment procedure.

Related Action Plans (by Established cycle, then alpha):

New Work Product and Additional Coverage

New work product in 490. Additional coverage in 482 and 484.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: J - Contemporary Issues

Measure: Work Product Assessment | **Outcome/Objective:** J - Contemporary Issues

Implementation Description: MCHE 490 was eliminated in the last curriculum change. The assessment for outcome J that was previously performed in MCHE 490 was moved to MCHE 482. Additional coverage of contemporary issues has been added to MCHE 482 and 484. Improvements have been noted. This action item is considered complete.

Projected Completion Date: 09/2016

Responsible Person/Group: Chambers and instructor of affected classes.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

91.5% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

New Work Product and Additional Coverage

New work product in 490. Additional coverage in 482 and 484.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: J - Contemporary Issues

Measure: Work Product Assessment | **Outcome/Objective:** J - Contemporary Issues

Implementation Description: MCHE 490 was eliminated in the last curriculum change. The assessment for outcome J that was previously performed in MCHE 490 was moved to MCHE 482. Additional coverage of contemporary issues has been added to MCHE 482 and 484. Improvements have been noted. This action item is considered complete.

Projected Completion Date: 09/2016

Responsible Person/Group: Chambers and instructor of affected classes.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results

from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 11: K - Modern Engineering Tools

Graduates of the Mechanical Engineering program will demonstrate an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

62.5% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is not met. However, all other instruments indicate that this outcome is met, indicating that this instrument is not properly measuring the outcome. An action plan is being established to revise the assessment procedure.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Fundamentals of Engineering Exam

Mechanical Engineering students are encouraged to take the standardized national licensing exam, the Fundamentals of Engineering (FE) exam, sometime during their final year. The FE exam gives the percentage of correct answers for various subject areas. Results are summarized for individuals, the department, the college, and the nation.

If the percentage of correct answers is 15% above the national average, the outcome is scored as PS = Program Strength. The program is particularly strong with regard to this outcome. If the percentage of correct answers is within 5% of the national average, the outcome is scored as S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. If the percentage of correct answers is 10% below the national average, the outcome is scored as C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. If the percentage of correct answers is 20% below the national average, the outcome is scored as W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. If the percentage of correct answers is 30% below the national average, the outcome is scored as D=Deficiency. The data indicate this outcome is not satisfied.

Source of Evidence: Certification or licensure exam, national or state

Target:

The departmental average of the section on Computational tools must be within 80% of the national average to be considered satisfactory.

Finding (2015-2016) - Target: Not Reported This Cycle

Not reported this cycle.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area
Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area
Measure: Student Advisory Committee Evaluation |
Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. the target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

81.7% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Changes to MCHE 301, 363, and 469

For A and K. More clear description of expectations in 363. Certain assignments will be made mandatory in 363. Add MCHE 301 as pre-req for 469. Reduce work products that are assessed in 363. Sally. Dec 2015. More emphasis on differential equations in MCHE 301. More practice in solving mathematical problems in MCHE 469 in quizzes and tests.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** A
- Math Through Differential Equations
| K - Modern Engineering Tools

Implementation Description: 2016 - Prerequisites have been changed. Content added in 301, 363, and 469. Improvements have been noted. Assessment procedure review made part of another action plan. This action item is considered complete.

Projected Completion Date: 09/2016

Responsible Person/Group: Department Head and Instructors of each class.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |
Outcome/Objective: A - Math Through Differential Equations
| E - Identify and Solve Engineering Problems | F -
Professional and Ethical Responsibility | K - Modern
Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -
Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve
Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,
Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A
- Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,
Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 12: L - Thermal Systems Area

Graduates of the Mechanical Engineering program will demonstrate an ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations); to model, analyze, design, and realize physical systems, components or processes; and to work professionally in the thermal systems area.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be "S," Satisfactory or better, or, using the later scale, the average response will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Not Met

75% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Changes in Thermodynamics, Heat Transfer, and Fluids Courses

The performance of our students on the heat transfer portion of the FE exam, and on the work product assessments continues to be a concern. A previous action plan called for a look at the content of the FE exam questions in these topical areas, but that action was never completed. The faculty revisited this in our recent assessment retreat and action will be taken this fall. Instructor changes are likely for spring 2015.

Established in Cycle: 2013-2014

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: L - Thermal Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** L - Thermal Systems Area

Implementation Description: 2015 - Instructor changes were implemented. Improvement was noted. There is not sufficient improvement, however, and so this action plan will be continued, with the goal of providing additional coverage in the thermal science courses in the curriculum, particularly MCHE 469. 2016 - The exam format was changed and additional content was added to MCHE 469. Improvements noted, but we will continue to monitor this issue. The action item will be continued.

Projected Completion Date: 05/2017

Responsible Person/Group: Department Head.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A

- Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 2: Senior Exit Interview

Each semester the Department Head conducts an exit interview with every graduating senior. The graduate's experience in the program is reviewed and suggestions are sought for improving the program. All graduating seniors complete a questionnaire prior to the interview, which serves as a guide for the discussion. Student identification on the questionnaire is optional, and the results are confidential. Information is obtained on what students think of the department's facilities, including laboratories and classrooms, of curricular content, faculty, the advisement process, recruiting, and the general operation of the department. Student opinions and suggestions are also gathered on other matters such as student services and other university-wide issues of interest to students. These issues, opinions and suggestions are presented at faculty meetings and retreats for faculty/staff discussion. When a desired course of action is determined, the department implements a change if such a change is within its purview, or proposes a solution to the administration. Because this is the last chance for a student to "make a difference" in the Mechanical Engineering program, the responses have been very candid and helpful.

Source of Evidence: Exit interviews with grads/program completers

Target:

The average score for all responses on the survey will be "S," Satisfactory or better.

Finding (2015-2016) - Target: Met

82.4% of all graduating seniors surveyed indicated a score of Satisfactory or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Evaluate Thermodynamics and Heat Transfer Courses

The content of the MCHE thermodynamics, heat transfer, and thermal fluids courses will be examined relative to the expectations of the FE exam. Although some changes may be made sooner, we expect to fully address the findings of this examination in the formulation of the revised MCHE curriculum which will be put in place in the Fall of 2013 (to coincide with the two new required university wide freshman courses).

Established in Cycle: 2010-2011

Implementation Status: Finished

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Senior Exit Interview | **Outcome/Objective:** L -
Thermal Systems Area

Projected Completion Date: 05/2013

Responsible Person/Group: William Simon, John Guillory, Chris Dalton,
Sally Anne McInerney

Changes in Thermodynamics, Heat Transfer, and Fluids Courses

The performance of our students on the heat transfer portion of the FE exam, and on the work product assessments continues to be a concern. A previous action plan called for a look at the content of the FE exam questions in these topical areas, but that action was never completed. The faculty revisited this in our recent assessment retreat and action will be taken this fall. Instructor changes are likely for spring 2015.

Established in Cycle: 2013-2014

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: L - Thermal Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** L - Thermal Systems Area

Implementation Description: 2015 - Instructor changes were implemented. Improvement was noted. There is not sufficient improvement, however, and so this action plan will be continued, with the goal of providing additional coverage in the thermal science courses in the curriculum, particularly MCHE 469. 2016 - The exam format was changed and additional content was added to MCHE 469. Improvements noted, but we will continue to monitor this issue. The action item will be continued.

Projected Completion Date: 05/2017

Responsible Person/Group: Department Head.

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area
Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Fundamentals of Engineering Exam

Mechanical Engineering students are encouraged to take the standardized national licensing exam, the Fundamentals of Engineering (FE) exam, sometime during their final year. The FE exam gives the percentage of correct answers for various subject areas. Results are summarized for individuals, the department, the college, and the nation.

If the percentage of correct answers is 15% above the national average, the outcome is scored as PS = Program Strength. The program is particularly strong with regard to this outcome. If the percentage of correct answers is within 5% of the national average, the outcome is scored as S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. If the percentage of correct answers is 10% below the national average, the outcome is scored as C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. If the percentage of correct answers is 20% below the national average, the outcome is scored as W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. If the percentage of correct answers is 30% below the national average, the outcome is scored as D=Deficiency. The data indicate this outcome is not satisfied.

Source of Evidence: Certification or licensure exam, national or state

Target:

The average department score for the subsections on Fluids, Thermodynamics, and Heat Transfer will be within 80% of the national average to be considered satisfactory.

Finding (2015-2016) - Target: Not Reported This Cycle

Not reported this cycle.

Related Action Plans (by Established cycle, then alpha):

Changes in Thermodynamics, Heat Transfer, and Fluids Courses

The performance of our students on the heat transfer portion of the FE exam, and on the work product assessments continues to be a concern. A previous action plan called for a look at the content of the FE exam questions in these topical areas, but that action was never completed. The faculty revisited this in our recent assessment retreat and action will be taken this fall. Instructor changes are likely for spring 2015.

Established in Cycle: 2013-2014

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):**Measure:** Fundamentals of Engineering Exam |**Outcome/Objective:** L - Thermal Systems Area**Measure:** Senior Exit Interview | **Outcome/Objective:** L - Thermal Systems Area**Measure:** Student Advisory Committee Evaluation |**Outcome/Objective:** L - Thermal Systems Area**Measure:** Work Product Assessment | **Outcome/Objective:** L - Thermal Systems Area

Implementation Description: 2015 - Instructor changes were implemented. Improvement was noted. There is not sufficient improvement, however, and so this action plan will be continued, with the goal of providing additional coverage in the thermal science courses in the curriculum, particularly MCHE 469. 2016 - The exam format was changed and additional content was added to MCHE 469. Improvements noted, but we will continue to monitor this issue. The action item will be continued.

Projected Completion Date: 05/2017**Responsible Person/Group:** Department Head.**Review and Revise Assessment Procedures**

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016**Implementation Status:** In-Progress**Priority:** High**Relationships (Measure | Outcome/Objective):****Measure:** Fundamentals of Engineering Exam |**Outcome/Objective:** A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |**Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

Work products are assessed once a year for all students in six carefully-selected courses in the junior and senior years. The courses were selected to provide direct assessment of student achievement related to all outcomes. The courses in which assessment takes place are: MCHE 357, MCHE 358, MCHE 363, MCHE 469, MCHE 484, and MCHE 490. Rubrics have been created for assessing each work product using a common unit of measure. The student work is evaluated and assigned a score of 1 - 4, with 1 meaning that the student work is below expectations, 2 means that the work is approaching expectations, 3 means that the work is meeting expectations, and 4 means that the work is exceeding expectations. The target is that 80% of the students will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

91.1% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Changes in Thermodynamics, Heat Transfer, and Fluids Courses

The performance of our students on the heat transfer portion of the FE exam, and on the work product assessments continues to be a concern. A previous action plan called for a look at the content of the FE exam questions in these topical areas, but that action was never completed. The faculty revisited this in our recent assessment retreat and action will be taken this fall. Instructor changes are likely for spring 2015.

Established in Cycle: 2013-2014

Implementation Status: In-Progress

Priority: Medium

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: L - Thermal Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** L - Thermal Systems Area

Implementation Description: 2015 - Instructor changes were implemented. Improvement was noted. There is not sufficient improvement, however, and so this action plan will be continued, with the goal of providing additional coverage in the thermal science courses in the curriculum, particularly MCHE 469. 2016 - The exam format was changed and additional content was added to MCHE 469. Improvements noted, but we will continue to monitor this issue. The action item will be continued.

Projected Completion Date: 05/2017

Responsible Person/Group: Department Head.

New Work Product Assessment

This will not be assessed in 363 anymore. New assessment method will be devised. Fall 2015. Terry.

Established in Cycle: 2014-2015

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Work Product Assessment | **Outcome/Objective:** L - Thermal Systems Area

Implementation Description: This action item is being consolidated with another action item to review and revise all assessment procedures in 2016 - 2017. Therefore, this action item will be closed.

Projected Completion Date: 09/2016

Responsible Person/Group: Chambers

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

| E - Identify and Solve Engineering Problems | F -

Professional and Ethical Responsibility | K - Modern

Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

SLO 13: M - Mechanical Systems Area

Graduates of the Mechanical Engineering program will demonstrate an ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations); to model, analyze, design, and realize physical systems, components or processes; and to work professionally in the mechanical systems area.

Related Measures

M 1: Student Advisory Committee Evaluation

The Mechanical Engineering Student Advisory Committee (SAC) was formed to obtain student ideas and suggestions for continuous improvement in the program and the departmental operation of the undergraduate program. The SAC consists of representatives from each class (freshman, sophomore, junior, senior, as well as representatives from each of the students organizations, such as the American Society for Mechanical Engineers (ASME). In addition to taking a survey directly related to the desired program outcomes, the students are also encouraged to provide other suggestions for program improvement. Many helpful suggestions for program improvement have been obtained through this means, including suggestions for improving the co-op program, inviting more industry speakers into the classroom, and ideas for upgrading and expanding the computer capabilities and software used in the computer laboratories.

On the survey, scores are given based on the following scale: PS = Program Strength. The program is particularly strong with regard to this outcome. S = Satisfactory. The data seem to indicate that this outcome is being achieved in a satisfactory manner. C=Concern. The outcome is currently satisfied, but potential exists for non-satisfaction in the near future. W=Weakness. The data indicate that this outcome is in danger of not being satisfied unless corrective action is taken soon. D=Deficiency. The data indicate this outcome is not satisfied.

Note that in the 2012 - 2013 reporting cycle, the score was changed to the scores of 1 - 4, with 1 not meeting expectations, 2 approaching expectations, 3 meeting expectations, and 4 exceeding expectations. There is a rough mapping between previous data reported using a different scale: PS = 4, S = 3, C = 2, W = 1.

Source of Evidence: Focus groups on teaching, learning, program value

Target:

The average score for all responses on the survey will be 3 (meets expectations) or better.

Finding (2015-2016) - Target: Met

87.5% of all students on the Student Advisory Committee responded with a 3 or better on the survey instrument. According to this instrument, the outcome is met.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | K - Modern Engineering Tools | L - Thermal Systems Area

Measure: Senior Exit Interview | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | E - Identify and Solve Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations | B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System, Component, or Process | D - Multidisciplinary Teams | E - Identify and Solve Engineering Problems | F - Professional and Ethical Responsibility | G - Communicate Effectively | H - Global and Societal Context | I - Life-Long Learning | J - Contemporary Issues | K - Modern Engineering Tools | L - Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

M 3: Work Product Assessment

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Source of Evidence: Academic direct measure of learning - other

Target:

The target is that 80% of the student work products assessed will meet or exceed expectations (i.e. achieve a score of 3 or higher).

Finding (2015-2016) - Target: Met

88.9% of the student work products assessed met or exceeded expectations.

Related Action Plans (by Established cycle, then alpha):

Review and Revise Assessment Procedures

Recent changes in the curriculum require a modification to the courses in which embedded assessment takes place. In addition, in some cases the direct measures of student achievement are yielding conflicting results from the indirect measures, indicating a need to review our assessment procedure. Other action items related to this issue will be consolidated into this one action plan, and a complete review of all assessment

instruments, targets, and data collection methods for all outcomes will be reviewed this year.

Established in Cycle: 2015-2016

Implementation Status: In-Progress

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Fundamentals of Engineering Exam |

Outcome/Objective: A - Math Through Differential Equations

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Measure: Senior Exit Interview | **Outcome/Objective:** A -

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| B - Design and Conduct Experiments | E - Identify and Solve

Engineering Problems | L - Thermal Systems Area

Measure: Student Advisory Committee Evaluation |

Outcome/Objective: A - Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

Global and Societal Context | I - Life-Long Learning | J -

Contemporary Issues | K - Modern Engineering Tools | L -

Thermal Systems Area | M - Mechanical Systems Area

Measure: Work Product Assessment | **Outcome/Objective:** A -

Math Through Differential Equations

| B - Design and Conduct Experiments | C - Design a System,

Component, or Process | D - Multidisciplinary Teams | E -

Identify and Solve Engineering Problems | F - Professional and

Ethical Responsibility | G - Communicate Effectively | H -

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Thermal Systems Area | M - Mechanical Systems Area

Projected Completion Date: 05/2017

Responsible Person/Group: Chambers

Analysis Questions and Analysis Answers

How were assessment results shared and evaluated within the unit?

Assessment results and action plan status were summarized and shared with the faculty via email. The results were discussed in a faculty meeting on 9/30/2016 and it was decided to close several action plans that were considered to be complete, and to open a new action item to review and revise as necessary all assessment procedures. This was prompted by the observation that in some cases the results from different instruments for the same outcome were giving significantly different results.

Identify which action plans [created in prior cycle(s)] were implemented in this current cycle. For each of these implemented plans, were there any measurable or perceivable effects? How, if at all, did the findings appear to be affected by the implemented action plan?

In this assessment cycle several action plans were completed, including changes to the curriculum, addition of content in targeted classes, changes in the instructor for certain courses, and changes in certain assessment procedures. As a result, improvements have been observed for several outcomes, including outcomes A, B, C, D, K, and L.

In this assessment cycle it was observed that in some cases the results from different instruments for the same outcome were giving significantly different results. It was felt that

all the recent changes in the curriculum and course content had made it necessary to review and revise as necessary all assessment procedures.

What has the unit learned from the current assessment cycle? What is working well, and what is working less well in achieving desired outcomes?

The main lessons learned were: 1) follow-through on action plans can result in improvements in the program, and 2) changes in the program necessitate changes to assessment procedures. For that reason, a complete review of all assessment procedures will be conducted in 2016 - 2017.