Mission / Purpose

Vision: The Department of Electrical and Computer Engineering will be a nationally recognized leader in student-centered education, research, and innovation. Mission: The mission of the Department of Electrical and Computer Engineering is to serve the state, nation, and global community by advancing the boundaries of knowledge through innovative research and education of the next generation of leaders.

Goals

G 1: Distinguished Graduates
We will provide high-quality experiences that educate distinguished bachelors, masters, and doctoral graduates.

G 2: Innovative Research
We will develop, conduct, and disseminate innovative research that engages students at all levels.

G 3: Faculty Dedication
We will foster faculty dedication to excellence in education, research, and service.

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

SLO 4: Graduates shall demonstrate and develop expert knowledge of advanced topics in electrical and computer engineering
(Discipline Knowledge) Graduates shall demonstrate and develop expert knowledge of advanced topics in their chosen major specialization area in electrical and computer engineering.

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electrical engineering PhD Curriculum Maps

Related Measures

M 7: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in devices and materials
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.
Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

M 8: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in embedded systems
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.
Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

M 9: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in electromechanical systems
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.
Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

M 10: Successful completion of department PhD qualifying exam as determined by a peer review of the graduate program committee
Successful completion of department PhD qualifying exam as determined by a peer review of the graduate program committee.
Source of Evidence: Academic direct measure of learning - other

Target:
100% of PhD students shall successfully complete the department PhD qualifying exam in no more than 2 attempts.

SLO 5: Graduates shall demonstrate expert skills and abilities in electrical and computer engineering
(Skills/Abilities) Graduates shall demonstrate expert skills and abilities in electrical and computer engineering including complex problem solving, analytical reasoning, advanced research and communication.

Connected Document
Related Measures

M 11: Direct, course embedded assessments with a focus on expert skills/abilities in devices and materials
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

M 12: Direct, course embedded assessments with a focus on expert skills/abilities in embedded systems
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

M 13: Direct, course embedded assessments with a focus on expert skills/abilities in electromechanical systems
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

M 14: Dissertation
Graduates will independently research a topic and produced a dissertation that is peer reviewed and accepted by a graduate advisory committee consisting of at least five graduate faculty members in the area of the research specialization.

Source of Evidence: Academic direct measure of learning - other

Target:
100% of graduates will have independently researched a topic and produced a dissertation that has been peer reviewed and accepted by a graduate advisory committee consisting of at least five graduate faculty members in the area of the research specialization.

Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

OthOttcm 1: The program will improve and sustain a high level of recognized quality
The program will improve and sustain a high level of recognized quality.

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electrical engineering PhD Curriculum Maps

Related Measures

M 1: Program Outcome 1: Measure 1.1
The department will offer at least one opportunity each year to advance capabilities of current faulty through training and instructional programs addressing advanced graduate teaching effectiveness. Accordingly, ECE faculty will average 4.0/5.0 on UA student opinion of instruction surveys.

Source of Evidence: Student course evaluations on learning gains made

Target:
The departmental target for SOI results for instructor rating by all graduate students is 4.00/5.00.

M 2: Program Outcome 1: Measure 1.2
By the year 2020, the department will have external contract and grant expenditures of over $3.5 million/year engaging PhD students in that research. The goal is a linear increase each year from the current expenditure level until the target is attained.

Source of Evidence: Academic direct measure of learning - other

Target:
To reach the departmental goal, considering new awards, by 2020, the new awards total increase each year must be $116,250. Thus, the target for 2012-2013 is $2.69M.

OthOttcm 2: The program will build and sustain an optimal level of annual program enrollments and degree completion
The program will build and sustain an optimal level of annual program enrollments and degree completion.

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Related Measures

M 3: Program Outcome 2: Measure 2.1
By the year 2020, the department will enroll 50 PhD students. Enrollment will be measured each fall using university census data. The goal is a linear increase each year from the current enrollment level until the target is attained.
Source of Evidence: Academic indirect indicator of learning - other

**Target:**
To reach the goal of 50 PhD students enrolled by 2020, based on the number enrolled during 2011, each year will require an increase of 1.5 students. Thus, for 2012-2013, the target is 40.

**M 4: Program Outcome 2: Measure 2.2**
By the year 2020, the department will produce 18 PhD degrees each calendar year. The goal is a linear increase each year from the current graduation level until the target is attained.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
To reach the goal of 18 PhD graduates by 2020, based on degrees conferred in 2011-2012, an annual increase of 1.75 degrees is required. Thus, the target for the 2012-2013 academic year is 5 PhD graduates.

**OthOtm 3: The program will be highly valued by its program graduates and other key constituencies it serves**
The program will be highly valued by its program graduates and other key constituencies it serves.

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electrical engineering PhD Curriculum Maps

**Related Measures**

**M 5: Program Outcome 3: Measure 3.1**
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to multiple program quality parameters on an ECE department PhD graduate exit survey.

Source of Evidence: Exit interviews with grads/program completers

**Target:**
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to multiple program quality parameters on an ECE department PhD graduate exit survey.

**M 6: Program Outcome 3: Measure 3.2**
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to post graduation plans and how the PhD program quality impacted those plans on an ECE department PhD graduate exit survey.

Source of Evidence: Exit interviews with grads/program completers

**Target:**
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to post graduation plans and how the PhD program quality impacted those plans on an ECE department PhD graduate exit survey.
Mission / Purpose

Vision: The Department of Electrical and Computer Engineering will be a nationally recognized leader in student-centered education, research, and innovation. Mission: The mission of the Department of Electrical and Computer Engineering is to serve the state, nation, and global community by advancing the boundaries of knowledge through innovative research and education of the next generation of leaders.

Goals

G 1: Distinguished Graduates
We will provide high-quality experiences that educate distinguished bachelors, masters, and doctoral graduates.

G 2: Innovative Research
We will develop, conduct, and disseminate innovative research that engages students at all levels.

G 3: Faculty Dedication
We will foster faculty dedication to excellence in education, research, and service.

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

SLO 4: Graduates shall demonstrate and develop expert knowledge of advanced topics in electrical and computer engineering
( Discipline Knowledge) Graduates shall demonstrate and develop expert knowledge of advanced topics in their chosen major specialization area in electrical and computer engineering.

Connected Document
electrical engineering PhD Curriculum Maps

Related Measures

M 7: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in devices and materials
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

Finding (2012-2013) - Target: Met
This outcome is directly assessed through student performance in ECE 530. Course embedded assessments for 2012-2013 show that student performance for this outcome was 3.80/4.00, thus meeting the target.

M 8: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in embedded systems
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

Finding (2012-2013) - Target: Met
This outcome is directly assessed through student performance in ECE 580. Course embedded assessments for 2012-2013 show that student performance for this outcome was 4.00/4.00, thus meeting the target.

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

For full information, see the Details of Action Plans section of this report.

Improvements for instruction in expert knowledge in the embedded systems focus area
Established in Cycle: 2011-2012
Additional lecture time and assignments will focus on students’ ability to develop expert knowledge in the embedded systems focus area.

M 9: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in electromechanical systems
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.
Finding (2012-2013) - Target: Met
This outcome is directly assessed through student performance in ECE 551. Course embedded assessments for 2012-2013 show that student performance for this outcome was 4.00/4.00, thus meeting the target.

M 10: Successful completion of department PhD qualifying exam as determined by a peer review of the graduate program committee
Successful completion of department PhD qualifying exam as determined by a peer review of the graduate program committee.

Source of Evidence: Academic direct measure of learning - other

Target:
100% of PhD students shall successfully complete the department PhD qualifying exam in no more than 2 attempts.

Finding (2012-2013) - Target: Met
All PhD students taking the PhD qualifying exam during the 2012-2013 academic year successfully completed all parts of the exam.

SLO 5: Graduates shall demonstrate expert skills and abilities in electrical and computer engineering (Skills/Abilities) Graduates shall demonstrate expert skills and abilities in electrical and computer engineering including complex problem solving, analytical reasoning, advanced research and communication.

Connected Document
electrical engineering PhD Curriculum Maps

Related Measures

M 11: Direct, course embedded assessments with a focus on expert skills/abilities in devices and materials
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

Finding (2012-2013) - Target: Met
This outcome is directly assessed through student performance in ECE 539. Course embedded assessments for 2012-2013 show that student performance for this outcome was 3.40/4.00, thus meeting the target.

M 12: Direct, course embedded assessments with a focus on expert skills/abilities in embedded systems
Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

Finding (2012-2013) - Target: Met
This outcome is directly assessed through student performance in ECE 586. Course embedded assessments for 2012-2013 show that student performance for this outcome was 3.00/4.00, thus meeting the target.

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

Improvements for instruction in expert skills/abilities in the embedded systems focus area
Established in Cycle: 2011-2012
Additional lecture time and assignments will focus on students' ability to develop expert skills/abilities in the embedded syste...
**SLO 6: An Improvement Outcome Derived from the 2010-11 Assessment Findings**
(An Improvement Outcome Derived from the 2010-11 Assessment Findings)
Implementation of direct, course embedded assessments.

**Related Measures**

**M 15: Implementation of direct, course embedded assessments**
Direct course embedded assessments will be performed in 2 classes for each departmental focus area.

Source of Evidence: Performance (recital, exhibit, science project)

**Target:**
The target is to identify courses in which to assess student performance and actually employ this assessment for the 2012-2013 academic year.

**Finding (2012-2013) - Target: Met**
The courses were identified by focus area as: embedded systems (ECE 580, 586), devices and materials (ECE 530, 539), and electromechanical systems (ECE 551, 579). Student performance in these classes was used used for other relevant measures.

**Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans**

**OthOtcm 1: The program will improve and sustain a high level of recognized quality**
The program will improve and sustain a high level of recognized quality.

**Related Measures**

**M 1: Program Outcome 1: Measure 1.1**
The department will offer at least one opportunity each year to advance capabilities of current faculty through training and instructional programs addressing advanced graduate teaching effectiveness. Accordingly, ECE faculty will average 4.0/5.0 on UA student opinion of instruction surveys.

Source of Evidence: Student course evaluations on learning gains made

**Target:**
The departmental target for SOI results for instructor rating by all graduate students is 4.00/5.00.

**Finding (2012-2013) - Target: Met**
The 2012-2013 SOI results for the instructor grade SOI question were weighted by number of graduate student respondents in both academic year semesters. The result was 4.44/5.00, which meets the target for this measure.

**M 2: Program Outcome 1: Measure 1.2**
By the year 2020, the department will have external contract and grant expenditures of over $3.5 million/year engaging PhD students in that research. The goal is a linear increase each year from the current expenditure level until the target is attained.

Source of Evidence: Academic direct measure of learning - other

**Target:**
To reach the departmental goal, considering new awards, by 2020, the new awards total increase each year must be $116,250. Thus, the target for 2012-2013 is $2.69M.

**Finding (2012-2013) - Target: Partially Met**
New awards in ECE for 2012-2013 totaled $1.03M, which falls significantly short of the target value of $2.69M.

**OthOtcm 2: The program will build and sustain an optimal level of annual program enrollments and degree completion**
The program will build and sustain an optimal level of annual program enrollments and degree completion.

**Related Measures**

**M 3: Program Outcome 2: Measure 2.1**
By the year 2020, the department will enroll 50 PhD students. Enrollment will be measured each fall using university census data. The goal is a linear increase each year from the current enrollment level until the target is attained.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
To reach the goal of 50 PhD students enrolled by 2020, based on the number enrolled during 2011, each year will require an increase of 1.5 students. Thus, for 2012-2013, the target is 40.

**Finding (2012-2013) - Target: Partially Met**
Actual Fall 2012 PhD enrollment was 37, which falls just short of the target.

**M 4: Program Outcome 2: Measure 2.2**
By the year 2020, the department will produce 18 PhD degrees each calendar year. The goal is a linear increase each year from the current graduation level until the target is attained.

Source of Evidence: Academic indirect indicator of learning - other

**Target:**
To reach the goal of 18 PhD graduates by 2020, based on degrees conferred in 2011-2012, an annual increase of 1.75 degrees is required. Thus, the target for the 2012-2013 academic year is 5 PhD graduates.

Finding (2012-2013) - Target: Partially Met
For the 2012-2013 academic year, the ECE department produced 3 PhD degrees, which falls short of the target.

OthOtcm 3: The program will be highly valued by its program graduates and other key constituencies it serves
The program will be highly valued by its program graduates and other key constituencies it serves.

Connected Document
electrical engineering PhD Curriculum Maps

Related Measures

M 5: Program Outcome 3: Measure 3.1
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to multiple program quality parameters on an ECE department PhD graduate exit survey.
Source of Evidence: Exit interviews with grads/program completers

Target:
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to multiple program quality parameters on an ECE department PhD graduate exit survey.

Finding (2012-2013) - Target: Not Reported This Cycle
The ECE department PhD graduate exit survey has not been implemented. Thus, this measure could not be assessed.

M 6: Program Outcome 3: Measure 3.2
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to post graduation plans and how the PhD program quality impacted those plans on an ECE department PhD graduate exit survey.
Source of Evidence: Exit interviews with grads/program completers

Target:
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to post graduation plans and how the PhD program quality impacted those plans on an ECE department PhD graduate exit survey.

Finding (2012-2013) - Target: Not Reported This Cycle
The ECE department PhD graduate exit survey has not been implemented. Thus, this measure could not be assessed.

Details of Action Plans for This Cycle (by Established cycle, then alpha)

Improvments for instruction in expert knowledge in the embedded systems focus area
Additional lecture time and assignments will focus on students' ability to develop expert knowledge in the embedded systems focus area.

Established in Cycle: 2011-2012
Implementation Status: Finished
Priority: Medium

Relationships (Measure | Outcome/Objective):
Measure: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in embedded systems | Outcome/Objective: Graduates shall demonstrate and develop expert knowledge of advanced topics in electrical and computer engineering

Responsible Person/Group: Embedded systems faculty.

Improvements for instruction in expert skills/abilities in the embedded systems focus area
Additional lecture time and assignments will focus on students' ability to develop expert skills/abilities in the embedded systems focus area.

Established in Cycle: 2011-2012
Implementation Status: Finished
Priority: Medium

Relationships (Measure | Outcome/Objective):
Measure: Direct, course embedded assessments with a focus on expert skills/abilities in embedded systems | Outcome/Objective: Graduates shall demonstrate expert skills and abilities in electrical and computer engineering

Responsible Person/Group: Embedded systems faculty.
Mission / Purpose

Vision: The Department of Electrical and Computer Engineering will be a nationally recognized leader in student-centered education, research, and innovation. Mission: The mission of the Department of Electrical and Computer Engineering is to serve the state, nation, and global community by advancing the boundaries of knowledge through innovative research and education of the next generation of leaders.

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

SLO 4: Graduates shall demonstrate and develop expert knowledge of advanced topics in electrical and computer engineering

(Discipline Knowledge) Graduates shall demonstrate and develop expert knowledge of advanced topics in their chosen major specialization area in electrical and computer engineering.

Connected Document electrical engineering PhD Curriculum Maps

Related Measures

M 7: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in devices and materials

Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

Finding (2011-2012) - Target: Met
Assessments of this outcome include 2 unique assessments across 2 course offerings including courses as shown in the attached course embedded assessment curriculum maps. Course embedded assessments for 2011-2012 show that student performance for this outcome was 3.55/4.00 in ECE539 and 3.42/4.00 in ECE566. The target for this assessment was met. No substantial changes in course instruction or assessment are anticipated for the upcoming reporting cycle.

M 8: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in embedded systems

Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

Finding (2011-2012) - Target: Partially Met
Assessments of this outcome include 2 unique assessments across 2 course offerings including courses as shown in the attached course embedded assessment curriculum maps. Course embedded assessments for 2011-2012 show that student performance for this outcome was 2.75/4.00 in ECE586. No PhD students were enrolled in ECE580 so no data could be reported. The target for this assessment was not met in ECE586, however the assessment represents data from a very small number of students (2).

Related Action Plans (by Established cycle, then alpha):
For full information, see the Details of Action Plans section of this report.

Improvements for instruction in expert knowledge in the embedded systems focus area

Established in Cycle: 2011-2012
Additional lecture time and assignments will focus on students' ability to develop expert knowledge in the embedded systems focu...

M 9: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in electromechanical systems

Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

Target:
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

Finding (2011-2012) - Target: Met
Assessments of this outcome include 2 unique assessments across 2 course offerings including courses as shown in the attached course embedded assessment curriculum maps. Course embedded assessments for 2011-2012 show that student performance for this outcome was 4.00/4.00 in ECE551 and 3.20/4.00 in ECE579. The target for this assessment was met. No substantial changes in course instruction or assessment...
are anticipated for the upcoming reporting cycle.

**M 10:** Successful completion of department PhD qualifying exam as determined by a peer review of the graduate program committee

Successful completion of department PhD qualifying exam as determined by a peer review of the graduate program committee.

Source of Evidence: Academic direct measure of learning - other

**Target:**
100% of PhD students shall successfully complete the department PhD qualifying exam in no more than 2 attempts.

**Finding (2011-2012) - Target: Met**
All PhD students taking the PhD qualifying exam during the 2011-2012 academic year successfully completed all parts of the exam.

**SLO 5:** Graduates shall demonstrate expert skills and abilities in electrical and computer engineering

(Skills/Abilities) Graduates shall demonstrate expert skills and abilities in electrical and computer engineering including complex problem solving, analytical reasoning, advanced research and communication.

*Connected Document* [electrical engineering PhD Curriculum Maps](#)

**Related Measures**

**M 11:** Direct, course embedded assessments with a focus on expert skills/abilities in devices and materials

Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

**Target:**
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

**Finding (2011-2012) - Target: Met**
Assessments of this outcome include 2 unique assessments across 2 course offerings including courses as shown in the attached course embedded assessment curriculum maps. Course embedded assessments for 2011-2012 show that student performance for this outcome was 3.53/4.00 in ECE539 and 3.61/4.00 in ECE566. The target for this assessment was met. No substantial changes in course instruction or assessment are anticipated for the upcoming reporting cycle.

**M 12:** Direct, course embedded assessments with a focus on expert skills/abilities in embedded systems

Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

**Target:**
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

**Finding (2011-2012) - Target: Partially Met**
Assessments of this outcome include 2 unique assessments across 2 course offerings including courses as shown in the attached course embedded assessment curriculum maps. Course embedded assessments for 2011-2012 show that student performance for this outcome was 2.50/4.00 in ECE586. No PhD students were enrolled in ECE580 so no data could be reported. The target for this assessment was not met in ECE586, however the assessment represents data from a very small number of students (2)

**Related Action Plans (by Established cycle, then alpha):**
For full information, see the Details of Action Plans section of this report.

**Improvements for instruction in expert skills/abilities in the embedded systems focus area**

*Established in Cycle:* 2011-2012

Additional lecture time and assignments will focus on students' ability to develop expert skills/abilities in the embedded systems...

**M 13:** Direct, course embedded assessments with a focus on expert skills/abilities in electromechanical systems

Direct assessment of this student learning outcome will be made through multiple course embedded assessments as indicated on the ECE graduate curriculum map.

Source of Evidence: Academic direct measure of learning - other

**Target:**
For students passing the courses with embedded assessments for this outcome, the department average for these assessments will be 3.0/4.0 or above using a department standard assessment rubric.

**Finding (2011-2012) - Target: Met**
Assessments of this outcome include 2 unique assessments across 2 course offerings including courses as shown in the attached course embedded assessment curriculum maps. Course embedded assessments for 2011-2012 show that student performance for this outcome was 3.80/4.00 in ECE551 and 3.40/4.00 in ECE579. The target for this assessment was met. No substantial changes in course instruction or assessment are anticipated for the upcoming reporting cycle.

**M 14:** Dissertation

Graduates will independently research a topic and produced a dissertation that is peer reviewed and accepted by a graduate advisory committee consisting of at least five graduate faculty members in the area of the research specialization.

Source of Evidence: Academic direct measure of learning - other
Target:
100% of graduates will have independently researched a topic and produced a dissertation that has been peer reviewed and accepted by a graduate advisory committee consisting of at least five graduate faculty members in the area of the research specialization.

Finding (2011-2012) - Target: Met
All PhD candidates that successfully completed all PhD degree requirements and received the PhD degree completed the necessary dissertation requirements.

SLO 6: An Improvement Outcome Derived from the 2010/11 Assessment Findings
(An Improvement Outcome Derived from the 2010/11 Assessment Findings) Implementation of direct, course embedded assessments.

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electrical engineering PhD Curriculum Maps

Related Measures

M 15: Implementation of direct, course embedded assessments
Direct course embedded assessments have been implemented in six graduate courses. Two graduate courses in three department focus areas including devices/materials, embedded systems, and electromechanical systems have these assessments now included.

Source of Evidence: Academic direct measure of learning - other

Target:
Six graduate courses will have direct embedded assessments included within the course.

Finding (2011-2012) - Target: Met
All noted courses had assessments developed and included as a part of the PhD student learning outcomes.

Other Outcomes, with Any Associations and Related Measures, Targets, Findings, and Action Plans

OthOtcm 1: The program will improve and sustain a high level of recognized quality
The program will improve and sustain a high level of recognized quality.

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Related Measures

M 1: Program Outcome 1: Measure 1.1
The department will offer at least one opportunity each year to advance capabilities of current faculty through training and instructional programs addressing advanced graduate teaching effectiveness. Accordingly, ECE faculty will average 4.0/5.0 on UA student opinion of instruction surveys.

Source of Evidence: Student course evaluations on learning gains made

M 2: Program Outcome 1: Measure 1.2
By the year 2020, the department will have external contract and grant expenditures of over $3.5 million/year engaging PhD students in that research. The goal is a linear increase each year from the current expenditure level until the target is attained.

Source of Evidence: Academic direct measure of learning - other

OthOtcm 2: The program will build and sustain an optimal level of annual program enrollments and degree completion
The program will build and sustain an optimal level of annual program enrollments and degree completion.

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Related Measures

M 3: Program Outcome 2: Measure 2.1
By the year 2020, the department will enroll 50 PhD students. Enrollment will be measured each fall using university census data. The goal is a linear increase each year from the current enrollment level until the target is attained.

Source of Evidence: Academic indirect indicator of learning - other

M 4: Program Outcome 2: Measure 2.2
By the year 2020, the department will produce 18 PhD degrees each calendar year. The goal is a linear increase each year from the current graduation level until the target is attained.

Source of Evidence: Academic indirect indicator of learning - other

OthOtcm 3: The program will be highly valued by its program graduates and other key constituencies it serves
The program will be highly valued by its program graduates and other key constituencies it serves.

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electrical engineering PhD Curriculum Maps

Related Measures

M 5: Program Outcome 3: Measure 3.1
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to multiple program quality parameters on an ECE department PhD graduate exit survey.

Source of Evidence: Exit interviews with grads/program completers
M 6: Program Outcome 3: Measure 3.2
80% of students will report an average of 3.0/4.0 or greater for relevant questions directly relating to post
graduation plans and how the PhD program quality impacted those plans on an ECE department PhD graduate
exit survey.

Source of Evidence: Exit interviews with grads/program completers

Details of Action Plans for This Cycle (by Established cycle, then alpha)

Improvements for instruction in expert knowledge in the embedded systems focus area
Additional lecture time and assignments will focus on students' ability to develop expert knowledge in the embedded
systems focus area.

Established in Cycle: 2011-2012
Implementation Status: Planned
Priority: Medium

Relationships (Measure | Outcome/Objective):
Measure: Direct, course embedded assessments with a focus on expert knowledge of advanced topics in
embedded systems | Outcome/Objective: Graduates shall demonstrate and develop expert knowledge of
advanced topics in electrical and computer engineering

Responsible Person/Group: Embedded systems faculty.

Improvements for instruction in expert skills/abilities in the embedded systems focus area
Additional lecture time and assignments will focus on students' ability to develop expert skills/abilities in the embedded
systems focus area.

Established in Cycle: 2011-2012
Implementation Status: Planned
Priority: Medium

Relationships (Measure | Outcome/Objective):
Measure: Direct, course embedded assessments with a focus on expert skills/abilities in embedded
systems | Outcome/Objective: Graduates shall demonstrate expert skills and abilities in electrical and
computer engineering

Responsible Person/Group: Embedded systems faculty.