

Overall Summary of Program Review:

The BME Graduate Program review of the 2016-2017 year exhibited strong growth in our Masters program with maintenance of quality, as exhibited by most of our students exceeding our SLOs. While our PhD program has stabilized in the number of matriculating students, the diversity of our matriculating students has continued to grow, with significant increases in the percentage of women and underrepresented minorities. Most of our PhD students exceeded our SLOs, demonstrating excellence in education and training.

Overall Summary of Changes:

The SACS graduate BME results were reviewed by the department's Graduate Program Committee (GPC). At the Master's degree level, students are achieving their outlined Student Learning Outcomes (SLOs); however, the strong growth of the program required modifications to both the Program Goals (PGs) and SLOs. The PGs were modified to transition our program's focus from growth to maintenance. SLOs were modified to include evaluation of all SLOs at the Master's Final Examination. At the Ph.D. degree level, we have modified our PG to focus on diversity and quality of our students, as opposed to growth. Further, our SLOs evaluation methods were expanded to include our Departmental Comprehensive Examination, as well as to focus on our students publishing in peer-reviewed journals and presenting at National and International conferences.

Biomedical Engineering (ME)

Responsible person: Associate Chair of Graduate Programs

PG 1: Recruit the best possible students (7/1/2016-6/30/2017)

Evaluation Method: Collect Masters admission data for the past 3 years (Fall admission only)

Goals: Maintain a matriculation rate of 60%

Results:

No students were enrolled in the ME degree in the 2016-2017 term. This is because we automatically enroll all of our Masters incoming students as MS. Once they have matriculated into the program, they have the choice to switch to the ME program (and provide the documents needed to validate ABET accreditation from their undergraduate program).

Year	# admitted	# matriculated	% mat rate	GRE verbal (of matriculated)	GRE quantitative (of matriculated)
2016	0	N/A	N/A	N/A	N/A
2015	0	N/A	N/A	N/A	N/A
2014	0	N/A	N/A	N/A	N/A
2013	2	2	100%	155	161
2012	1	1	100%	165	169

Use of Results:

This metric (matriculation) is not appropriate to track ME participation. As such, we will modify this to track overall enrollment.

Modifications

PG 1: Recruit highly qualified students.

Evaluation Method: Analyze ME admissions data with respect to admission and matriculation rates and GRE scores of admitted and matriculated students. Maintain average GRE Quantitative score >159 and GRE Verbal score >155.

PG 2: Grow the masters program 10% each year. (7/1/2016-6/30/2017)

Evaluation Method: Collect Masters admission data for the past 3 years (Fall admission only)

Goals: Increase the number of matriculants over previous years by 10%

Results:

Year	# admitted	# matriculated	% mat rate	GRE verbal (of matriculated)	GRE quantitative (of matriculated)
2016	0	N/A	N/A	N/A	N/A
2015	0	N/A	N/A	N/A	N/A
2014	0	N/A	N/A	N/A	N/A
2013	2	2	100%	155	161
2012	1	1	100%	165	169

Use of Results:

With the strong overall growth of our Masters program, we do not feel it is appropriate to seek additional growth; however, we will encourage our students to evaluate ME as an option, if they feel this is appropriate for their future goals. We have subsequently implemented additional meetings with our Masters students in the middle of their 1st term.

Modifications

PG 2: Encourage first year enrollment in ME program.

Evaluation Method: Analyze enrollment in ME program for each year. Maintain a 3-year average first year enrollment for all Masters students (MS and ME) at 35-50.

PG 3: Increase the number of domestic students by 20% annually. (7/1/2016-6/30/2017)

Evaluation Method: Collect Masters admission data for the past 3 years (Fall admission only)

Goals: Increase percent of domestic matriculants

Results: No students were enrolled in the ME degree in the 2016-2017 term.

Year	# admitted	# matriculated	# domestic matriculated	% domestic matriculated
2016	0	N/A	N/A	N/A
2015	0	N/A	N/A	N/A
2014	0	N/A	N/A	N/A
2013	2	2	2	100%
2012	1	1	1	100%

Use of Results:

With the strong overall growth of our Masters program, we do not feel it is appropriate to seek additional growth of domestic students. Thus, this PG was modified.

Modifications

PG 3: Achieve an average time to ME degree of less than 2 years.

Evaluation Method: Calculate the average time to the ME degree for all students who graduated in the previous academic year. For example, for the 2017-2018 report the average time to degree for the cohort of students who graduates during the 2016-2017 academic year will be reported.

Student Learning Outcome (SLO) Assessment Measures for ME Program:

		ME Thesis	ME Non-Thesis
SLO 1	Instruction	Core + Core Elective Courses ¹ BME 6971 ⁴	Core + Core Elective Courses ¹ BME 6905 ²
	Assessment	Thesis Defense	Final Project Report
SLO 2	Instruction	BME 6018 ³ BME 6971 ⁴	BME 6018 ³ BME 6905 ⁵
	Assessment	Thesis Defense	Final Project Report

SLO 3	Instruction	Core + Core Elective Courses ¹ BME 6971 ⁴	Core + Core Elective Courses ¹ BME 6905 ⁵
	Assessment	Thesis Defense	Final Project Report
SLO 4	Instruction	BME 6971 ⁴	BME 6905 ⁵
	Assessment	Thesis Defense	Final Project Report
SLO 5	Instruction	BME 6018 ³	BME 6018 ³
	Assessment	Report in BME 6018 ³	Report in BME 6018 ³
SLO 6	Instruction	BME 6018 ³ BME 6971 ⁴	BME 6018 ³ BME 6905 ⁵
	Assessment	Thesis Defense	Final Project Report

¹General BME materials is tested in these courses as a part of the curriculum

²BME 6905: BME MS Non-thesis Final Project: In this course, Masters non-thesis students must complete a Final Capstone project

³BME 6018: Clinical Correlations. In this course, students work in teams and with clinicians to identify clinical problems and generate engineering solutions. They also review ethical considerations and design criteria. HIPAA training is provided to all enrolled students

⁴MS Thesis Research course

SLO 1: (Knowledge) An ability to develop a broad-based knowledge of Biomedical Engineering problems. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes are taught and assessed according to the following matrix

Results:

No students were enrolled in the ME degree in the 2016-2017 term

Use of Results:

No change in SLO, but BME Graduate Program Committee (GPC) approved modifications in evaluation method.

Modifications

SLO 1: (Knowledge) An ability to develop a broad-based knowledge of Biomedical Engineering.

Evaluation Method: Satisfactory completion of graduate coursework requirements for the MS program with a cumulative GPA above 3.0. Additional assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 2: (Knowledge) An ability to critically read Biomedical Engineering literature. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes are taught and assessed according to the SLO matrix

Results:

No students were enrolled in the ME degree in the 2016-2017 term

Use of Results:

No change in SLO.

Modifications

None

SLO 3: (Skills) An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes are taught and assessed according to the SLO matrix

Results:

No students were enrolled in the ME degree in the 2016-2017 term

Use of Results:

No change in SLO, but BME Graduate Program Committee (GPC) approved modifications in evaluation method.

Modifications

Evaluation Method: Satisfactory completion of graduate coursework requirements for the MS program with GPA \geq 3.0. Assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 4: (Skills) An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes are taught and assessed according to the following matrix

Results:

No students were enrolled in the ME degree in the 2016-2017 term

Use of Results:

The BME Graduate Program Committee (GPC) approved modifications to the SLO to reflect the growth of the Masters program and the breath of experiences of our Masters students as it relates to their final examination.

Modifications

SLO 4: (Skills) An ability to design scientific/engineering experiments, and to analyze and interpret data.

Evaluation Method: Assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 5: (Professional Behavior) An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes are taught and assessed according to the following matrix

Results:

No students were enrolled in the ME degree in the 2016-2017 term

Use of Results:

No change in SLO, but BME Graduate Program Committee (GPC) approved modifications in evaluation method with the addition of this SLO to the MS final project rubric.

Modifications

Evaluation Method: Evaluation using a rubric based on student performance in report, or presentation in BME 6018 Clinical Correlations. Evaluated by the faculty teaching the course. Additional assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 6: (Professional Behavior) An ability to communicate effectively and work collaboratively. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes are taught and assessed according to the following matrix

Results:

No students were enrolled in the ME degree in the 2016-2017 term

Use of Results:

No change in SLO.

Modifications

None.

Biomedical Engineering (MS)

Responsible person: Associate Chair of Graduate Programs

PG 1: Recruit the best possible students. (7/1/2016-6/30/2017)

Evaluation Method:

Collect Masters admission data for the past 3 years (Fall admission only)

Goals: Maintain a matriculation rate of 60%

Results:

Fall Admissions Statistics for MS Program

Year	# admitted	# matriculated	% mat rate	GRE verbal (of matriculated)	GRE quantitative (of matriculated)
2016	159	40	25%	152	160
2015	170	45	26%	152	160
2014	85	29	34%	152	157
2013	46	22	47%	151	158

The information in the table above reflects statistics for admissions in the Fall term for each academic year only. While additional students are admitted at other points during the year, the majority of students are admitted in the Fall term and tracking statistics for this term facilitates monitoring trends in the program. Test scores reflect averages over the three academic terms (fall/spring/summer respectfully). All values are rounded down to the nearest whole number.

Use of Results:

As we have been significantly increasing the number of MS student admitted to the program (approximately a 1.5-fold increase in the last 3 years), this results in a significant decline in the matriculation rate, as we need to admit more students to ensure steady growth of the program. Of note, this increased admission number has not resulted in declines in the quality of the students, as the GRE attest to consistent maintenance of MS quality, per this metric. National trends indicate growth of BME MS programs, which lead to elevated competition. Thus, we believe we are still recruiting the best possible students, as evaluated by GRE and GPA scores.

Due to our increased numbers and elevated competition with other schools, we will modify our program goals to focus on student quality via admission metrics, as opposed to matriculation rates. ***Thus, changes PG1 goals and evaluation criteria were made.***

Modifications

PG 1: Recruit highly qualified students.

Evaluation Method: Analyze MS admissions data with respect to admission and matriculation rates and GRE scores of admitted and matriculated students. Maintain average GRE Quantitative score >156 and GRE Verbal score >148.

PG 2: Grow the masters program 10% each year. (7/1/2016-6/30/2017)

Evaluation Method: Collect Masters admission data for the past 3 years (Fall admission only)

Goals: Increase the number of matriculants over previous years by 10%

Results:

Fall Admissions Statistics for MS Program

Year	# admitted	# matriculated	% mat rate	GRE verbal (of matriculated)	GRE quantitative (of matriculated)
2016	159	40	25%	152	160
2015	170	45	26%	152	160
2014	85	29	34%	152	157
2013	46	22	47%	151	158

The information in the table above reflects statistics for admissions in the Fall term for each academic year only. While additional students are admitted at other points during the year, the majority of students are admitted in the Fall term and tracking statistics for this term facilitates monitoring trends in the program. Test scores reflect averages over the three academic terms (fall/spring/summer respectfully). All values are rounded down to the nearest whole number.

Use of Results:

We have observed a steady and consistent increase in the graduate program since 2013, with over a 1.5-fold increase from 2013 to 2016. This strong increase exceeds our program goals.

Now that we have achieved this level of MS students, we seek to transition to a maintenance mode, whereby the focus will be to ensure a steady population of high quality MS matriculated students between 35-50. ***Thus, new PG2 goals and evaluation criteria were made.***

Modifications

PG 2: Maintain first year enrollment in MS program.

Evaluation Method: Analyze first year enrollment in MS program. Maintain a 3-year average first year enrollment at 35-50 MS/ME students.

PG 3: Increase the number of domestic students by 20% annually. (7/1/2016-6/30/2017)

Evaluation Method: Collect Masters admission data for the past 3 years (Fall admission only)

Goals Increase percent of domestic matriculants

Results:

Fall Admissions Statistics for MS Program

Year	# admitted	# matriculated	# domestic matriculated	% domestic matriculated
2016	159	40	25	62%
2015	170	45	19	42%
2014	85	29	23	79%

The information in the table above reflects statistics for admissions in the Fall term for each academic year only. While additional students are admitted at other points during the year, the majority of students are admitted in the Fall term and tracking statistics for this term facilitates monitoring trends in the program. Test scores reflect averages over the three academic terms (fall/spring/summer respectfully). All values are rounded down to the nearest whole number.

Use of Results:

Our department has achieved a percentage of domestic matriculation students that averages at 61% with a deviation of 18%. The variability in domestic matriculation is dependent on a number of factors, from the political climate, visa availability, and completion among MS BME graduate programs in the US. At this stage, we consistently have achieved a matriculation rate above the 40% *Thus, new PG3 goals and evaluation criteria were made.*

Modifications

PG 3: Maintain proportion of domestic students in MS program.

Evaluation Method: Analyze first year enrollment in MS program. Maintain 3-year average first year enrollment of domestic students in the program at >45%.

Additional Program Goal for MS Program

PG 4: Achieve an average time to MS degree of less than 2 years.

Evaluation Method: Calculate the average time to the MS degree for all students who graduated in the previous academic year. For example, for the 2017-2018 report the average time to degree for the cohort of students who graduates during the 2016-2017 academic year will be reported.

Student Learning Outcome (SLO) Assessment Measures for MS Program:

		MS Thesis	MS Non-Thesis
SLO 1	Instruction	Core + Core Elective Courses ¹ BME 6971 ⁴	Core + Core Elective Courses ¹ BME 6905 ²
	Assessment	Thesis Defense	Final Project Report
SLO 2	Instruction	BME 6018 ³ BME 6971 ⁴	BME 6018 ³ BME 6905 ⁵

	Assessment	Thesis Defense	Final Project Report
SLO 3	Instruction	Core + Core Elective Courses ¹ BME 6971 ⁴	Core + Core Elective Courses ¹ BME 6905 ⁵
	Assessment	Thesis Defense	Final Project Report
SLO 4	Instruction	BME 6971 ⁴	BME 6905 ⁵
	Assessment	Thesis Defense	Final Project Report
SLO 5	Instruction	BME 6018 ³	BME 6018 ³
	Assessment	Report in BME 6018 ³	Report in BME 6018 ³
SLO 6	Instruction	BME 6018 ³ BME 6971 ⁴	BME 6018 ³ BME 6905 ⁵
	Assessment	Thesis Defense	Final Project Report

¹General BME materials is tested in these courses as a part of the curriculum

²BME 6905: BME MS Non-thesis Final Project: In this course, Masters non-thesis students must complete a Final Capstone project

³BME 6018: Clinical Correlations. In this course, students work in teams and with clinicians to identify clinical problems and generate engineering solutions. They also review ethical considerations and design criteria. HIPAA training is provided to all enrolled students

⁴MS Thesis Research course

SLO 1: (Knowledge) An ability to develop a broad-based knowledge of Biomedical Engineering problems. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes were assessed using an assessment matrix completed by the Supervisory Chair upon completion of the MS thesis or non-thesis project.

Results:

For this SLO, 51 out of a total of 53 students received scores of average or above, for a percentage of 96%. The average was 4.2 (+/- 0. 0.8) on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory. Note that assessments were not collected on 4 students.

Use of Results:

Based on the assessment metric results collected during the MS student's final examination by their Supervisory Chair, a strong majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. Coupling this assessment with the requirement for a minimum 3.0 cumulative GPA to graduate from the program, this assessment indicates that most students are graduating with a strong broad-based knowledge of BME problems. No change in SLO, but BME Graduate Program Committee (GPC) approved modifications in evaluation method.

Modifications

Evaluation Method: Satisfactory completion of graduate coursework requirements for the MS program with a cumulative GPA above 3.0. Additional assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 2: (Knowledge) An ability to critically read Biomedical Engineering literature. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes were assessed using an assessment matrix completed by the Supervisory Chair upon completion of the MS thesis or non-thesis project.

Results:

For this SLO, 50 out of a total of 53 students received scores of average or above, for a percentage of 94%. The average was 4.1 (+/- 0. 0.9) on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory. Note that assessments were not collected on 4 students.

Use of Results:

Based on the assessment metric results collected during the MS student's final examination by their Supervisory Chair, a strong majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. As the Final Exam or Project for the MS thesis or non-thesis includes substantial review of BME literature, our students are well trained for this learning outcome. No change in SLO.

Modifications

None.

SLO 3: (Skills) An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes were assessed using an assessment matrix completed by the Supervisory Chair upon completion of the MS thesis or non-thesis project.

Results:

For this SLO, 51 out of a total of 53 students received scores of average or above, for a percentage of 96%. The average was 4.1(+/- 0. 0.9) on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory. Note that assessments were not collected on 4 students.

Use of Results:

Based on the assessment metric results collected during the MS student's final examination by their Supervisory Chair, a strong majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. As the Final Exam or Project for the MS thesis or non-thesis requires the application of BME principles to solve problems, our students are well trained for this learning outcome.

No change in SLO, but BME Graduate Program Committee (GPC) approved modifications in evaluation method.

Modifications

Evaluation Method: Satisfactory completion of graduate coursework requirements for the MS program. Assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 4: (Skills) An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes were assessed using an assessment matrix completed by the Supervisory Chair upon completion of the MS thesis or non-thesis project.

Results:

For this SLO, 52 out of a total of 53 students received scores of average or above, for a percentage of 98%. The average was 4.1 (+/- 0. 0.8) on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory. Note that assessments were not collected on 4 students.

Use of Results:

Based on the assessment metric results collected during the MS student's final examination by their Supervisory Chair, a strong majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. While the MS thesis students conduct extensive experiments, not every MS non-thesis student will conduct experiments and may perform only an extensive literature review. Thus, **we have modified this SLO to reflect the diversity of experience for our MS students.**

Modifications

SLO 4: (Skills) An ability to design scientific/engineering experiments, and to analyze and interpret data.

Evaluation Method: Assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 5: (Professional Behavior) An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes were assessed using scores from a proposal submitted in BME 6018. For these proposals, the students had to include information on the professional and ethical impacts of their engineering proposal, as well as the regulatory strategy and cost of the design.

Results:

The range of scores on this proposal was 43-66 (out of 70 total points). The average score was 61/70. This results in an average score of 87.1% with a max and min of 61.4% and 94.3%, respectively.

Use of Results:

Based on the proposal scores collected in BME 6018 but the instructor, a strong majority of the students are performing well above average. Students are gaining an awareness of the unity professional and ethical responsibilities associated with their discipline via this course; however, to ensure high emphasis on this SLO, **we have modified this SLO to also include assessment in the Final Project.**

Modifications

Evaluation Method: Evaluation using a rubric based on student performance in report, or presentation in BME 6018 Clinical Correlations. Evaluated by the faculty teaching the course. Additional assessment performed by the student's Supervisory Committee upon completion of the student's thesis or capstone project.

SLO 6: (Professional Behavior) An ability to communicate effectively and work collaboratively. (7/1/2016-6/30/2017)

Evaluation Method: Student learning outcomes were assessed using an assessment matrix completed by the Supervisory Chair upon completion of the MS thesis or non-thesis project.

Results:

For this SLO, 48 out of a total of 53 students received scores of average or above, for a percentage of 90%. The average was 4.0 (+/- 0. 1.1) on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory. Note that assessments were not collected on 4 students.

Use of Results:

Based on the assessment metric results collected during the MS student's final examination by their Supervisory Chair, a strong majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. As the Final Exam or Project for the MS thesis or non-thesis has extensive assessment of effective communication, our students are well trained for this learning outcome. No changes in this SLO or in evaluation methods.

Modifications

None.

Biomedical Engineering (PhD)

Responsible person: Associate Chair of Graduate Programs and BME Graduate Program Committee

PG 1: Recruit the best possible students. (7/1/2016-6/30/2017)

Evaluation Method: Collect PhD admission data for the past 3 years (Fall admission only)

Goals:

Maintain a matriculation rate of 75%

Maintain GRE verbal > 153 , GRE quant > 159

Results:

Fall Admissions Statistics for PhD Program

Year	# admitted	# matriculated	% matric. rate	GRE verbal (of matriculated)	GRE quantitative (of matriculated)
2016	35	16	45%	154	159
2015	20	14	70%	156	160
2014	19	25	131%*	156	162
2013	12	13	108%*	155	158
2012	16	12	75%	149	161

*Matriculation rate can exceed 100% due to students who transfer into the program from MS or students transferring to UF from another institution (e.g., when their advisors are recruited to UF).

The information in the table above reflects statistics for admissions in the Fall term for each academic year only. While additional students are admitted at other points during the year, the majority of students are admitted in the Fall term and tracking statistics for this term facilitates monitoring trends in the program. Test scores reflect averages over the three academic terms (fall/spring/summer respectfully). All values are rounded down to the nearest whole number.

Use of Results:

As our program increases the quality and diversity of the students, our department has increased the number of students admitted to the program to compete with these highly competitive students. As the number of admitted students increase, a decline in the matriculation rate is expected. Of note, this increased admission number has not resulted in declines in the quality of the student. On the contrary, our GRE scores are increased, demonstrating an increase in the quality of our students over time. Thus, we believe we are still recruiting the best possible students, as evaluated by GRE and GPA scores.

Due to elevated competition with other schools and the increase in the quality of students we are admitting to the program, we will modify our program goals to focus on student quality via

admission metrics, as opposed to matriculation rates. ***Thus, new PG1 goals and evaluation criteria were proposed and accepted by the BME GPC.***

Modification:

PG 1: Recruit highly qualified students.

Evaluation Method: Analyze PhD admissions data with respect to admission and matriculation rates and GRE scores of admitted and matriculated students. Maintain average GRE Quantitative score >158 and GRE Verbal score >152 (based on average across last 3 years). Track the number of students with competitive external fellowships in the program (e.g., NSF, Ford Foundation, etc.) with the goal of increasing this number over the years.

PG 2: Provide stipend and tuition to all PhD students. (7/1/2016-6/30/2017)

Evaluation Method: Annual review of PhD appointments.

Goals: 100 % of Ph.D. students on stipend and tuition funding

Results:

100% of full-time students admitted in Fall 2016 were provided a stipend and tuition funding.

Use of Results:

Over the past several years, we have focused on efforts on ensuring all students brought into the program receive a long-term funding commitment. This is important to ensure uniformity across the department in the support of students for their project. No changes in this PG.

Modifications

None

PG 3: Maintain a time to degree average of 5 years or less. (7/1/2016-6/30/2017)

Evaluation Method: Calculate the time to degree in years for PhD students graduated in the last 3 years

Goals: Maintain time to degree at 5 years or less

Results:

Year	Number of PhD Graduates	Average Years to Degree
2016	19	4.59
2015	17	5.00
2014	18	4.67

Based on the time provided in the table above, the 3 year average time to degree is 4.75 ± 0.22 years.

Use of Results:

The last 3 years of graduates meet the target of 5 years or less in their time to degree. This ensures that students are making efficient progress to completion of their requirements. We will continue to ensure timely completion via milestone management of the students as they progress through the program. No changes in this PG.

Modifications:

None

Additional Program Goals for PhD Program

To ensure quality and diversity of our students, the BME GPC has added two new program goals:

PG 4: Maintain proportion of domestic students in PhD program.

Evaluation Method: Analyze first year enrollment in PhD program. Maintain the percentage of first year domestic students enrolled in the program at >50%

PG 5: Maintain diversity of PhD student population.

Evaluation Method: Analyze demographics of PhD student population and compare it to diversity at the UF and the HWCOE.

Student Learning Outcome (SLO) Assessment Measures for MS Program:

Student Learning Outcome	Index	PhD Thesis
SLO 1	Instruction	Core + Core Elective Courses ¹ BME 7980 ³
	Assessment	Thesis Defense
SLO 2	Instruction	BME 6018 ² BME 7980 ³
	Assessment	Thesis Defense
SLO 3	Instruction	Core + Core Elective Courses ¹ BME 7980 ³
	Assessment	Thesis Defense
SLO 4	Instruction	BME 7980 ³
	Assessment	Thesis Defense
SLO 5	Instruction	BME 6018 ² BME 7980 ³
	Assessment	Report in BME 6018 ² Thesis Defense
SLO 6	Instruction	BME 6018 ² BME 7980 ³

	Assessment	Thesis Defense
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¹General BME materials is tested in these courses as a part of the curriculum

²BME 6018: Clinical Correlations. In this course, students work in teams and with clinicians to identify clinical problems and generate engineering solutions. They also review ethical considerations and design criteria. HIPAA training is provided to all enrolled students

³PhD Post-Candidacy Research course

SLO 1: (Knowledge) An ability to develop a broad-based knowledge of Biomedical Engineering problems. (7/1/2016-6/30/2017)

Evaluation Method:

Completion of PhD Curriculum with cumulative GPA at or above 3.0 – Administrative Check

Qualifying Examination – Assessment Matrix at time of examination

Dissertation Defense – Assessment Matrix at time of examination

Results:

Students were assessed via assessment matrix at 2 separate occasions: the Qualifying Examination (Assessment 1) and the Doctoral Dissertation Defense (Assessment 2). The assessment form was filled out by the Supervisory Chair with input from the entire Supervisory Committee. During the 2016-2017 year, 10 of the 11 students passed Assessment 1 (91%) and 16 of the 16 students passed Assessment 2 (100%). The average for each assessment (within one standard deviation) is illustrated, below where the scores are based on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory.

Assessment 1	Assessment 2
4.43 ± 0.53	4.56 ± 0.73

Use of Results:

Based on the assessment metric results collected during the PhD student's Qualifying Examination and Doctoral Defense, the vast majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. Coupling this assessment with the requirement for a minimum 3.0 cumulative GPA to graduate from the program, this assessment indicates that most students are graduating with a strong broad-based knowledge of BME problems.

Modifications:

None

SLO 2: (Knowledge) An ability to critically read Biomedical Engineering literature. (7/1/2016-6/30/2017)

Evaluation Method:

Completion of PhD Curriculum with cumulative GPA at or above 3.0 – Administrative Check
 Qualifying Examination – Assessment Matrix at time of examination
 Dissertation Defense – Assessment Matrix at time of examination

Results:

Students were assessed via assessment matrix at 2 separate occasions: the Qualifying Examination (Assessment 1) and the Doctoral Dissertation Defense (Assessment 2). The assessment form was filled out by the Supervisory Chair with input from the entire Supervisory Committee. During the 2016-2017 year, 10 of the 11 students passed Assessment 1 (91%) and 16 of the 16 students passed Assessment 2 (100%). The average for each assessment (within one standard deviation) is illustrated, below where the scores are based on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory.

Assessment 1	Assessment 2
4.43 ± 0.53	4.4 ± 0.74

Use of Results:

Based on the assessment metric results collected during the PhD student's Qualifying Examination and Doctoral Defense, the vast majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. As both of these milestones include substantial reviews of BME literature, our students are well trained for this learning outcome. The BME GPC approved adding our new PhD examination as an additional assessment method for this outcome.

Modifications:

Evaluation Method: Assessment performed by the Departmental Comprehensive Examination (DCE) Committee upon completion of the student's DCE. Assessment performed by the student's Supervisory Committee upon completion of the student's Thesis Proposal and Dissertation. Assessment performed by the student's Supervisory Committee upon completion of both the student's Thesis Proposal and Dissertation Defense.

SLO 3: (Skills) An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems. (7/1/2016-6/30/2017)

Evaluation Method:

Completion of PhD Curriculum with cumulative GPA at or above 3.0 – Administrative Check
 Qualifying Examination – Assessment Matrix at time of examination
 Dissertation Defense – Assessment Matrix at time of examination

Results:

Students were assessed via assessment matrix at 2 separate occasions: the Qualifying Examination (Assessment 1) and the Doctoral Dissertation Defense (Assessment 2). The assessment form was filled out by the Supervisory Chair with input from the entire Supervisory Committee. During the 2016-2017 year, 10 of the 11 students passed Assessment 1 (91%) and 16 of the 16 students passed Assessment 2 (100%). The average for each assessment (within one standard deviation) is illustrated, below where the scores are based on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory.

Assessment 1	Assessment 2
4.57 ± 0.53	4.57 ± 0.73

Use of Results:

Based on the assessment metric results collected during the PhD student’s Qualifying Examination and Doctoral Defense, the vast majority of the students are performing in the “good” percentile, which is classified as 60-80 percent. As both of these milestones require the application of BME principles to solve problems, our students are well trained for this learning outcome.

Modifications:

None

SLO 4: (Skills) An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data. (7/1/2016-6/30/2017)

Evaluation Method:

Completion of PhD Curriculum with cumulative GPA at or above 3.0 – Administrative Check
 Qualifying Examination – Assessment Matrix at time of examination
 Dissertation Defense – Assessment Matrix at time of examination

Results:

Students were assessed via assessment matrix at 2 separate occasions: the Qualifying Examination (Assessment 1) and the Doctoral Dissertation Defense (Assessment 2). The assessment form was filled out by the Supervisory Chair with input from the entire Supervisory Committee. During the 2016-2017 year, 10 of the 11 students passed Assessment 1 (91%) and 16 of the 16 students passed Assessment 2 (100%). The average for each assessment (within one standard deviation) is illustrated, below where the scores are based on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory.

Assessment 1	Assessment 2
4.57 ± 0.53	4.4 ± 0.71

Use of Results:

Based on the assessment metric results collected during the PhD student's Qualifying Examination and Doctoral Defense, the vast majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. As both of these milestones require students to conduct extensive experiments, our students are well trained for this learning outcome. The BME GPC approved additional metrics for this outcome, to reflect growing rigor and accountability of our program.

Modifications:

Evaluation Method: Assessment performed by the student's Supervisory Committee upon completion of the student's Thesis Proposal and Dissertation. Publication of at least one scientific article describing original research in a peer reviewed journal with the student as the first contributing author. Publication data for graduating students will be collected during exit interviews. Goal is to have >80% of students meet this publication requirement at the time of graduation.

SLO 5: (Professional Behavior) An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions. (7/1/2016-6/30/2017)

Evaluation Method:

BME 6018 Course – Proposal grade
Completion of PhD Curriculum with cumulative GPA at or above 3.0 – Administrative Check
Qualifying Examination – Assessment Matrix at time of examination
Dissertation Defense – Assessment Matrix at time of examination

Results:

Students were assessed via assessment matrix at 3 separate occasions: a grade on a proposal given in BME 6018, the Qualifying Examination (Assessment 1) and the Doctoral Dissertation Defense (Assessment 2). For BME 6018, the range of scores on this proposal was 43-66 (out of 70 total points). The average score was 61/70. This results in an average score of 87.1% with a max and min of 61.4% and 94.3%, respectively. For the other 2 assessment, the assessment form was filled out by the Supervisory Chair with input from the entire Supervisory Committee. During the 2016-2017 year, 10 of the 11 students passed Assessment 1 (91%) and 16 of the 16 students passed Assessment 2 (100%). The average for each assessment (within one standard deviation) is illustrated, below where the scores are based on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory.

Assessment 1	Assessment 2
5 ± 0	4.77 ± 0.41

Use of Results:

Based on the proposal scores collected in BME 6018 but the instructor, a strong majority of the students are performing well above average. Based on the assessment metric results collected during the PhD student's Qualifying Examination and Doctoral Defense, the vast majority of the students are performing in the "excellent" percentile, which is classified as 80-100 percent. Students are gaining an awareness of the unity professional and ethical responsibilities associated with their discipline via this course. To further emphasize this critical SLO and its impact on teaching, we have now included completion of Supervised Teaching and FERPA training into this matric.

Modifications:

Evaluation Method: Evaluation using a rubric based on student performance in a homework assignment, exam or exam question, project, report, or presentation in BME 6018 Clinical Correlations. Evaluated by the faculty teaching the course. Additional assessment performed by the student's Supervisory Committee upon completion of the student's Thesis Proposal and Dissertation. Completion of Supervised Teaching assignment with FERPA training.

SLO 6: (Professional Behavior) An ability to communicate effectively and work collaboratively. (7/1/2016-6/30/2017)

Evaluation Method:

Completion of PhD Curriculum with cumulative GPA at or above 3.0 – Administrative Check
Qualifying Examination – Assessment Matrix at time of examination
Dissertation Defense – Assessment Matrix at time of examination

Results:

Students were assessed via assessment matrix at 2 separate occasions: the Qualifying Examination (Assessment 1) and the Doctoral Dissertation Defense (Assessment 2). The assessment form was filled out by the Supervisory Chair with input from the entire Supervisory Committee. During the 2016-2017 year, 10 of the 11 students passed Assessment 1 (91%) and 16 of the 16 students passed Assessment 2 (100%). The average for each assessment (within one standard deviation) is illustrated, below where the scores are based on a scale of 1-5 where 5 is the maximum and less than 2 is considered unsatisfactory.

Assessment 1	Assessment 2
4.43 ± 0.53	4.28 ± 0.89

Use of Results:

Based on the assessment metric results collected during the PhD student's Qualifying Examination and Doctoral Defense, the vast majority of the students are performing in the "good" percentile, which is classified as 60-80 percent. As both of these milestones has extensive assessment of effective communication, our students are well trained for this learning outcome. To reflect the growing rigor of our program, we have added an additional metric.

Modifications:

Evaluation Method: Assessment performed by the Departmental Comprehensive Examination (DCE) Committee upon completion of the student's DCE. Assessment performed by the student's Supervisory Committee upon completion of the student's Thesis Proposal and Dissertation. Presentation of the student's research in at least one national or international scientific or technical meeting related to biomedical engineering. An exit survey of graduating students will provide information about student presentations. Goal is to have >80% of students meet this presentation requirement at the time of graduation.