

Graduate Assessment Plan

for

M.S. in Bioengineering

Department of Bioengineering
School of Engineering and Computer Science
College of Arts and Sciences
Oakland University

As this is the first graduate program proposed in the Department of Bioengineering, assessment procedures will follow those of MS programs established in SECS and CAS.

The assessment plan for the new courses in the MS in Bioengineering degree (including core courses) will be coordinated by the BE department and will use both direct and indirect assessment to evaluate how well students are achieving the core outcomes of each individual course.

Direct assessments will include an anonymized assessment of student coursework to be sampled at random from the core courses. Selected student work will be cumulative and synthetic to each course, such as final projects, and BE program faculty will develop quality rubrics to assess the outcomes of each course and the level of achievement by current students. Direct assessments will occur annually.

Indirect assessments of the program and new core courses will include standard institutional metrics, including (but not limited to) enrollment data, completion and persistence rates, and student surveys (current students and alumni). The program will also conduct student interviews (group and individual) to understand student perceptions of program and course operation. Annual assessments of the program will be conducted for the first four years to continually improve the admissions rubric and to identify curricular gaps and employment trends, as well as program strengths and weaknesses. **Table 2** shows a provisional timeline for program assessment. A comprehensive program review will be conducted at the close of the program’s fifth year.

Table 2: A provisional timeline for program assessment

Assessment Plan	Timeline	AY 25/26			AY 26/27			AY 27/28			AY 28/29			AY 29/30		
		F	W	Su	F	W	Su	F	W	Su	F	W	Su	F	W	Su
Current Student Survey	Annual			x			x			x			x			x
Alumni Surveys	Annual after 1st cohort graduates								x			x			x	
Program Data	Annual			x			x			x			x			x
Student Coursework	Annual			x			x			x			x			x

Graduate students who complete this MS degree will be able to:

- Goal 1: Explain and evaluate key and emerging technologies in bioengineering
- Goal 2: Apply principles of bioengineering to real-world problems
- Goal 3: Analyze the unique ethical and societal implications of biotechnology
- Goal 4: Investigate current state-of-the-art biotechnology and identify new ways to tackle the growing bioengineering needs of society

Program assessment will be coordinated by BE. Two of the program goals above will be chosen to assess two required courses (core and depth area) for two consecutive years. Assessment plans for succeeding years will be developed during the second year of the program and we will follow the university's program assessment and review procedure.

Overview of the BE Dept. Assessment Process.

The Assessment process used in the BE Department has been developed over the years in conjunction with other departments from the School of Engineering and Computer Science and College of Arts and Sciences and refined to satisfy the relevant accreditation bodies. The assessment plan is driven by the goals and mission of the department which are in line with the goals and missions of Oakland University and those of the SECS and CAS.

Goals and Objectives of the M.S. Programs.

1. Oakland University's Goals (from Mission Statement)

Programs and activities within the Bioengineering (BE) department are in line with the following goals of the Oakland University extracted from the University mission:

- *It offers instructional programs of high quality that lead to degrees at the baccalaureate, master's and doctoral levels as well as programs in continuing education;*
- *It advances knowledge and promotes the arts through research, scholarship, and creative activity; and*
- *It renders significant public service.*

2. School of Engineering and Computer Science's Goals (from mission statement)

The School of Engineering and Computer Science mission, found in the school website at <http://www.oakland.edu/secs/>, states that the overall mission of the School of Engineering and Computer Science is threefold:

- *To provide high-quality undergraduate and graduate programs of instruction in engineering and computer science to prepare graduates for careers in the coming decades,*
- *To advance knowledge through basic and applied research in relevant branches of engineering and computer science, and*
- *To provide service to both the engineering profession and public of the State of Michigan.*

3. Learning Outcomes of the Master programs offered by the BE Department

The MS in Bioengineering program is developed to serve the mission of the department and meet the needs of its main constituents. A set of learning outcomes were identified for the BE master program.

Program Learning outcomes:

The graduates of the M.S. in Bioengineering will:

- Explain and evaluate key and emerging technologies in bioengineering
- Apply principles of bioengineering to real-world problems
- Analyze the unique ethical and societal implications of biotechnology
- Investigate current state-of-the-art biotechnology and identify new ways to tackle the growing bioengineering needs of society

4. How the Learning Outcomes are met

Faculty in the Dept. of Bioengineering have chosen an embedded approach to program assessment. Key courses have been identified for the MS in Bioengineering program where students will have the opportunity to demonstrate the achievement of the program outcomes; the sets of key courses have been chosen to ensure that all of the program outcomes are demonstrated. Student materials will be collected from the key courses that provide evidence that the outcomes have been achieved. External evaluators, including faculty not directly involved with the course and departmental advisory board members, will review these materials to establish whether the students in that class have achieved some or all of the program outcomes. Every semester, BE faculty reviews the results of these external evaluations and generates appropriate plans to improve the achievement of the program outcomes.

Each BE course has a set of course outcomes, developed by the instructing faculty and the BE Graduate Committee, which ensures the logical sequence of topics necessary to the eventual achievement of the program outcomes. At the end of each semester, the students and faculty in each course rate how well that particular course section achieved its objectives. The faculty identifies the specific program outcome(s) achieved in the course and provide evidence in support of their contention. In addition, students and faculty are encouraged to comment on how well the course fits into the overall scheme of the program and to suggest improvements to the course, the course outcomes and the overall program of study. The BE Dept. holds a faculty meeting at the beginning of each semester to review all external evaluations and end-of-course evaluations from the prior semester and develop any needed plan for improvement.

Measures.

The overall success of the MS in Bioengineering is measured by whether the students can demonstrate achievement of all learning outcomes as they graduate. In order to assess the students' achievement, the BE Dept. faculty have selected one direct measure and one indirect measure.

Direct Measure. Key courses are identified in each of the M.S. programs where students have the opportunity to demonstrate the achievement of the program learning outcomes. These courses are chosen to ensure that all of the learning outcomes are demonstrated. When a key course is under review, student materials are collected that provide evidence that the outcomes have been achieved, such as homework assignments, laboratory assignments, project assignment and exams. External evaluators (faculty not directly involved with the course, engineers from industry and BE Dept. Advisory Board members) review these materials to establish whether the students in that class have achieved some or all of the program outcomes.

The rubric used by the external evaluators is presented in the following. Note that every assignment is not expected to demonstrated competency in all learning outcomes. Hence, a customized rubric containing only the appropriate learning outcomes is generated for each assignment. The rubrics are generated by any BE Dept. faculty member from the SECS assessment website. The BE Dept. faculty meet to review the results of these external evaluations and generate appropriate plans to improve the achievement of the program outcomes.

Indirect Measure. Each BE M.S. course has a set of course outcomes, developed by the instructing faculty and the BE Dept. Graduate Committee, which ensures the logical

sequence of topics necessary to the eventual achievement of the program outcomes. At the end of each semester, the students in each course rate how well that particular course section achieved its outcomes. The BE faculty review all of these course evaluations each semester at a department faculty meeting and generate appropriate plans to improve the achievement of the program outcomes.

Documentation of Assessment Process.

All actions taken at each step of the assessment process are documented properly. This record is used by the BE faculty to evaluate and improve the assessment process.

BE Dept. Faculty Involved in the Assessment Process.

All BE Dept. faculty members are involved in the assessment process.