8-16-2016

2016 Commission Letter and Final Statement of Accreditation

ABET-EAC

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August 16, 2016

Robert McMahan
President
Kettering University
1700 University Ave
Flint, MI 48504

Dear Dr. McMahan:

I am pleased to transmit to you the findings of the Engineering Accreditation Commission (EAC) of ABET with respect to the evaluation conducted for Kettering University during 2015-2016. Each of ABET’s Commissions is fully authorized to take the actions described in the accompanying letter under the policies of the ABET Board of Directors.

We are pleased that your institution has elected to participate in this accreditation process. This process, which is conducted by approximately 2,000 ABET volunteers from the professional community, is designed to advance and assure the quality of professional education. We look forward to our continuing shared efforts toward this common goal.

Sincerely,

[Signature]

Lawrence Jones
President

Enclosure: Commission letter and attachments
August 16, 2016

James Z. Zhang
Senior Vice President for Academic Affairs and Provost
Kettering University
Academic Affairs
1700 University Avenue
Flint, MI 48504

Dear Dr. Zhang:

The Engineering Accreditation Commission (EAC) of ABET recently held its 2016 Summer Meeting to act on the program evaluations conducted during 2015-2016. Each evaluation was summarized in a report to the Commission and was considered by the full Commission before a vote was taken on the accreditation action. The results of the evaluation for Kettering University are included in the enclosed Summary of Accreditation Actions. The Final Statement to your institution that discusses the findings on which each action was based is also enclosed.

The policy of ABET is to grant accreditation for a limited number of years, not to exceed six, in all cases. The period of accreditation is not an indication of program quality. Any restriction of the period of accreditation is based upon conditions indicating that compliance with the applicable accreditation criteria must be strengthened. Continuation of accreditation beyond the time specified requires a reevaluation of the program at the request of the institution as noted in the accreditation action. ABET policy prohibits public disclosure of the period for which a program is accredited. For further guidance concerning the public release of accreditation information, please refer to Section II.A. of the 2015-2016 Accreditation Policy and Procedure Manual (available at www.abet.org).

A list of accredited programs is published annually by ABET. Information about ABET accredited programs at your institution will be listed in the forthcoming ABET Accreditation Yearbook and on the ABET web site (www.abet.org).

It is the obligation of the officer responsible for ABET accredited programs at your institution to notify ABET of any significant changes in program title, personnel, curriculum, or other factors which could affect the accreditation status of a program during the period of accreditation stated in Section II.H. of the 2015-2016 Accreditation Policy and Procedure Manual (available at www.abet.org).
ABET requires that each accredited program publicly state the program’s educational objectives and student outcomes as well as publicly post annual student enrollment and graduation data as stated in Section II.A.6. of the Accreditation Policy and Procedure Manual (available at www.abet.org).

ABET will examine all newly accredited programs’ websites within the next two weeks to ensure compliance.

Please note that appeals are allowed only in the case of Not to Accredit actions. Also, such appeals may be based only on the conditions stated in Section II.L. of the 2015-2016 Accreditation Policy and Procedure Manual (available at www.abet.org).

Sincerely,

[Signature]

Sarah A. Rajala, Chair
Engineering Accreditation Commission

Enclosure: Summary of Accreditation Action
Final Statement

cc: Robert McMahan, President
    Edwin Imasuen, Director, Office of Institutional Effectiveness
    Lawrence M. Butkus, Visit Team Chair
Chemical Engineering (B.S.)
Electrical Engineering (BSEE)
Engineering Physics (B.S.)
Industrial Engineering (BSIE)
Mechanical Engineering (BSME)

Accredit to September 30, 2022. A request to ABET by January 31, 2021 will be required to initiate a reaccreditation evaluation visit. In preparation for the visit, a Self-Study Report must be submitted to ABET by July 01, 2021. The reaccreditation evaluation will be a comprehensive general review.

Computer Engineering (BSCE)

Accredit to September 30, 2018. A request to ABET by January 31, 2017 will be required to initiate a reaccreditation report evaluation. A report describing the actions taken to correct shortcomings identified in the attached final statement must be submitted to ABET by July 01, 2017. The reaccreditation evaluation will focus on these shortcomings. Please note that a visit is not required.
Final Statement of Accreditation
to

Kettering University
Flint, MI

2015-2016 Accreditation Cycle
Introduction & Discussion of Statement Construct

The Engineering Accreditation Commission (EAC) of ABET has evaluated the chemical engineering, computer engineering, electrical engineering, industrial engineering, engineering physics, and mechanical engineering programs of Kettering University.

This statement is the final summary of the EAC evaluation, at the institutional and engineering-program levels. It includes information received during due process, along with information submitted with the seven-day response. This statement consists of two parts: the first addresses the institution and its overall engineering educational unit, and the second addresses the individual engineering programs. It is constructed in a format that allows the reader to discern both the original visit findings and subsequent progress made during due process.

A program’s accreditation action is based upon the findings summarized in this statement. Actions depend on the program’s range of compliance or non-compliance with the criteria. This range can be construed from the following terminology:

- **Deficiency:** A deficiency indicates that a criterion, policy, or procedure is not satisfied. Therefore, the program is not in compliance with the criterion, policy, or procedure.

- **Weakness:** A weakness indicates that a program lacks the strength of compliance with a criterion, policy, or procedure to ensure that the quality of the program will not be compromised. Therefore, remedial action is required to strengthen compliance with the criterion, policy, or procedure prior to the next review.
Concern: A concern indicates that a program currently satisfies a criterion, policy, or procedure; however, the potential exists for the situation to change such that the criterion, policy, or procedure may not be satisfied.

Observation: An observation is a comment or suggestion that does not relate directly to the current accreditation action but is offered to assist the institution in its continuing efforts to improve its programs.

Kettering University is a private university offering bachelors and masters degrees, primarily in engineering and the applied sciences. The school was founded in 1919, became known as the General Motors Institute in 1926, became a degree-granting college in 1945, and changed its name to Kettering University in 1998. The university currently enrolls 1,741 undergraduate students supported by 119 full-time and 15 adjunct faculty members. The undergraduates alternate on-campus academic terms with co-op work terms and are largely in-state students, with approximately 20 percent enrolled from out-of-state (but within the United States) and another 10 percent from other countries. 1,436 undergraduates are majoring in engineering, and 236 graduated with undergraduate engineering degrees in the 2014-15 academic year.

The following units were reviewed and found to adequately support the engineering programs: the Center for Excellence in Teaching and Learning, chemistry, cooperative education, first-year education, information technology, institutional effectiveness, liberal studies, library services, mathematics, physics, the registrar, and student affairs.

Institutional Strengths

1. The Cooperative Education (co-op) Program is unique and exceptional. Intimately integrated into the institution’s academic schedule and approach to engineering education and supported by an experienced and passionate leader and staff, the co-op program serves as the defining characteristic of Kettering’s entire undergraduate program. The program benefits the institution by fostering strong connections with industrial constituents; the programs by serving as a source for real-world experiences that are introduced into the classroom; and the undergraduates by providing professional work experiences, culminating in a thesis, as well as substantial income.
2. The university has demonstrated an uncommonly strong commitment to service and has undertaken deliberate efforts to support the local community. The extent of its actions, including the construction of a first-of-its-kind FIRST lab and workshop, the purchase and renovation of Flint’s historic Atwood Stadium, and “Service Saturday” events attended by the majority of students, are remarkable and link valuable lessons of societal improvement with the academic engineering curricula.

3. The Center for Excellence in Teaching and Learning (CETL) provides a uniquely comprehensive set of programs that improves instruction and, therefore, directly benefits the students. The enthusiasm displayed by the center’s leadership is mirrored by the high participation rates of Kettering’s faculty in center activities which are not often seen at other institutions.

Institutional Observation

1. As the university continues to stress the importance of and encourage faculty to perform research, it may wish to consider the use of a differentiated workload paradigm for tenure track positions as well as using separate positions for clinical faculty or professors of the practice. It may find such an approach as being simultaneously commensurate with its current emphasis on research and with its traditional focus on undergraduate education.
Chemical Engineering  
B.S. Program

Program Criteria for Chemical, Biochemical, Biomolecular, and Similarly Named Engineering Programs

Introduction

The chemical engineering B.S. program is administered by the Department of Chemistry and Biochemistry. The program currently enrolls 116 undergraduate students supported by five faculty members. The program produced 13 graduates during the 2014-15 academic year. The program was first offered in 2008 and underwent a major revision in 2012.

Program Strength

1. The program provides its students an undergraduate research experience that enables them to better understand various aspects of the chemical engineering field and to be exposed to open-ended problems. This experience is uncommonly strong and greatly benefits the students by augmenting skills that they gain during their co-op assignments.

Program Weakness

1. Criterion 2. Program Educational Objectives. This criterion requires that the program have published program educational objectives that are consistent with the mission of the institution, the needs of the program’s various constituencies, and the EAC criteria. Program educational objectives are defined as broad statements that describe what graduates are expected to attain within a few years of graduation. The program’s educational objectives are phrased as student outcomes and do not describe the future attainments of the program’s graduates. Thus the program lacks strength of compliance with this criterion.

• 30-day due-process response: The EAC acknowledges receipt of documentation demonstrating that the program has rephrased its PEOs such that they now describe what graduates are expected to attain within a few years of graduation. Furthermore, these changes were presented to and accepted by the program’s constituencies, published on the university website, and will be incorporated into the university’s 2016-17 academic catalog.
• The weakness is resolved.
Computer Engineering
BSCE Program

Program Criteria for Electrical, Computer, Communications, and Telecommunication(s), and Similarly Named Engineering Programs

Introduction

The computer engineering BSCE program is administered by the Department of Electrical and Computer Engineering. The program currently enrolls 93 undergraduate students supported by five computer engineering faculty members and one lecturer with significant assistance from the electrical engineering faculty. The program produced 13 graduates during the 2014-15 academic year.

Program Weaknesses

1. **Criterion 2. Program Educational Objectives**  This criterion requires that the program have published program educational objectives that are consistent with the mission of the institution, the needs of the program’s various constituencies, and the EAC criteria. There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program’s constituents’ needs, and these criteria.

Program educational objectives are defined as broad statements that describe what graduates are expected to attain within a few years of graduation. The program’s educational objectives are phrased as student outcomes and do not describe the future attainments of the program’s graduates. Furthermore, while the program’s self-study describes a process for reviewing the program educational objectives and identifies the program’s constituents as its students, potential employers, and industry partners, and states that all of the program’s constituents initially approved the current program educational objectives, there is no evidence that these constituents, other than the students, have participated in a periodic review of the program educational objectives since the program was last reviewed. Without periodic participation of all constituents in a review of program educational objectives, the program cannot ensure that its program educational objectives are consistent with the needs of its constituencies. For the reasons stated above, the program lacks strength of compliance with this criterion.
• **30-day due-process response:** The EAC acknowledges receipt of documentation stating that the program has rewritten its PEOs and that they will be reviewed by the program’s constituencies in May 2016.

• The weakness remains unresolved.

• **Post 30-day due-process information:** The EAC acknowledges receipt of documentation that confirms that the program’s new PEOs are broad statements that describe what graduates are expected to attain within a few years of graduation. The PEOs have been reviewed and accepted by the program’s constituencies and are published on the program’s website and in the university catalog. The program also provided a schedule by which the PEOs will be periodically reviewed by the program’s constituencies.

• The weakness is resolved.

2. **Criterion 4. Continuous Improvement** This criterion requires that the program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. It was observed that assessments for the following student outcomes rely solely on subjective employer and student surveys that have limited reliability: outcome (d), redefined by the program as SO5, an ability to function on multidisciplinary teams; outcome (f), also identified by the program as SO6, an understanding of professional and ethical responsibility; outcome (g), redefined by the program as SO7, an ability to communicate effectively; outcome (h), redefined by the program as SO8, the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context; outcome (i), redefined by the program as SO9, a recognition of the need for and an ability to engage in life-long learning; and outcome (j), redefined by the program as SO10, a knowledge of contemporary issues. Without an appropriate and systematic assessment process the program will be unable to determine the extent to which student outcomes are obtained with confidence.

In addition, the program redefines ABET required student outcomes (a) through (k) with its own program-defined outcomes SO1 through SO10. Although a mapping between the ABET-required and program-defined outcomes is provided, the complexity of the mapping makes it
difficult to ascertain that all ABET student outcomes are assessed at an appropriate level. While it appears that all ABET outcomes are currently assessed in some manner, there is a potential that even small changes in the assessment process may result in some ABET-required outcomes going unassessed in the future. This criterion also requires that results of evaluations are systematically utilized as input for the continuous improvement of the program. Evidence exists that the results of the evaluations that have been conducted have been utilized in the past as input to the continuous improvement process; however, this usage has been sporadic rather than systematic. An inability to systematically use the results of evaluations threatens the effectiveness of the continuous improvement process. The program lacks strength of compliance with this criterion.

- **30-day due-process response:** The EAC acknowledges receipt of documentation stating that the program: 1) has adopted the ABET (a) through (k) student outcomes to replace its previous SO 1-10 outcomes, 2) has undertaken a new mapping of individual courses to the new student outcomes, 3) is developing a strategy to use direct and indirect measures to assess the attainment of student outcomes, and 4) is engaged in formalizing its process to evaluate the assessments of the attainment of student outcomes. However, most of these activities have not yet been completed.

- The weakness remains unresolved and will be a focus of the next review. In preparation for the next review, the EAC anticipates receiving evidence that the program regularly uses appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained.
Introduction

The electrical engineering BSEE program is administered by the Department of Electrical and Computer Engineering. The program currently enrolls 177 undergraduate students supported by eight faculty members, two lecturers, and two and a half administrative and technical staff. The program produced 32 graduates during the 2014-15 academic year.

Program Strength

1. The program participates in a vibrant, well organized, and institutionalized study abroad program that is primarily based in Germany and which augment’s the institution’s overall co-op program. The study abroad program offers not only the opportunity to take courses abroad, but also the ability to have a co-op experience with an international company. The approximately 20 percent of the program’s students who participate in the program develop an appreciation for the intricacies of engineering in a global context and value the diversity of different cultures. This is an outstanding program with an enviable participation rate.

Program Weakness

1. Criterion 2. Program Educational Objectives. This criterion requires that the program have published program educational objectives that are consistent with the mission of the institution, the needs of the program’s various constituencies, and the EAC criteria. There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program’s constituents’ needs, and these criteria. Program educational objectives are defined as broad statements that describe what graduates are expected to attain within a few years of graduation. The program’s educational objectives are phrased as student outcomes and do not describe the future attainments of the program’s graduates. Furthermore, while the program’s self-study describes a process for reviewing the program educational objectives and identifies the program’s constituents as its students,
potential employers, and industry partners, and states that all of the program’s constituents initially approved the current program educational objectives, there is no evidence that these constituents, other than the students, have participated in a periodic review of the program educational objectives since the program was last reviewed. Without periodic participation of all constituents in a review of program educational objectives, the program cannot ensure that its program educational objectives are consistent with the needs of its constituencies. For the reasons stated above, the program lacks strength of compliance with this criterion.

- **30-day due-process response:** The EAC acknowledges receipt of documentation stating that the program has rewritten its Program Educational Objectives (PEOs) and that they will be reviewed by the program’s constituencies in May 2016.

- The weakness remains unresolved.

- **Post 30-day due-process information:** The EAC acknowledges receipt of documentation that confirms that the program’s new PEOs are broad statements that describe what graduates are expected to attain within a few years of graduation. The PEOs have been reviewed and accepted by the program’s constituencies and are published on the program’s website and in the university catalog. The program also provided a schedule by which the PEOs will be periodically reviewed by the program’s constituencies.

- The weakness is resolved.

**Program Concern**

1. **Criterion 4. Continuous Improvement** This criterion requires the regular use of appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained and that the results of these evaluations be systematically utilized as input for the continuous improvement of the program. The program’s student outcomes (d) an ability to function on interdisciplinary teams, (f) an understanding of professional and ethical responsibility, (g) an ability to communicate effectively, (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context, (i) a recognition of the need for and an ability to engage in life-long learning, and (j) a knowledge of contemporary issues are assessed using a mix of direct and indirect
measures, some of which have not been used regularly. If the direct measures, in particular, are not used regularly, then these outcomes may not be appropriately or fully assessed in the future. In addition, although evidence exists that the results of the evaluations have been utilized in the past as input to the continuous improvement process, this usage has been sporadic rather than systematic. An inability to systematically use the results of evaluations threatens the effectiveness of the continuous improvement process. For these reasons, there is a potential that this criterion may not be satisfied in the future.

- **30-day due-process response:** The EAC acknowledges receipt of documentation stating that the program is actively engaged in developing appropriate methods that will be used to systematically assess the attainment of outcomes (d) and (f) through (j). However, these methods will not be piloted until the summer 2016 term.

- The concern remains unresolved.
Engineering Physics
B.S. Program

Program Criteria for Engineering, General Engineering, Engineering Physics, Engineering Science, and Similarly Named Engineering Programs

Introduction
The engineering physics B.S. program is administered by the Department of Physics. The program currently enrolls 27 undergraduate students supported by nine full-time and two part-time faculty members, two full-time technical support staff, and a half-time administrative assistant. The program produced five graduates during the 2014-15 academic year. The program allows students to specialize in one of nine different course sequences and in one of four concentrations including mechanical, industrial, electrical, and computer engineering.

Program Weakness

1. **Criterion 4. Continuous Improvement** This criterion requires that a program must regularly use appropriate, documented process for assessing and evaluating the extent to which the student outcomes are being attained. A substantial fraction of the course-based assessment data used by the program includes data from students majoring in engineering physics combined with data from students majoring in a variety of other engineering and non-engineering disciplines. Without separating the data obtained from its students’ from that collected from other students, the program receives an incomplete and inconsistent assessment of the attainment of engineering physics student outcomes. Furthermore, four of the eleven student outcomes (namely outcomes (c), (d), (f), and (h)) are assessed using only student, thesis advisor, and co-op employer surveys. Although the program uses more comprehensive sets of tools to assess other outcomes and has shown evidence that it has developed more appropriate tools in June 2015, these measurement methods have not been fully implemented for the aforementioned outcomes. Thus, for the reasons mentioned above, strength of compliance with this criterion is lacking.

   - **30-day due-process response:** The EAC acknowledges receipt of documentation stating that the program plans to use coursework (in addition to surveys) to assess the attainment of student outcomes (c), (d), (f), and (h) but that it believes it will be difficult to separate assessment data for engineering physics majors from that of physics majors. The program
provided evidence in the form of faculty meeting minutes that document that it will use performance indicators from mid- and upper-level courses as sources for assessment data for the attainment of all outcomes, including (c), (d), (f), and (h). However, no assessment results for outcomes (c), (d), (f), and (h) were provided nor were separate assessment data for engineering physics majors identified.

- The weakness remains unresolved.

- Post 30-day due-process information: The EAC acknowledges receipt of documentation that shows that the program is now using methods in addition to surveys to assess the degree of attainment of outcomes (c), (d), (f), and (h) for engineering physics majors. In addition, the program also provided evidence that it has begun to collect separate assessment data for engineering physics majors in a comprehensive manner from multiple courses.

- The weakness is resolved.
Introduction

The industrial engineering BSIE program is administered by the Department of Industrial and Manufacturing Engineering. The program currently enrolls 112 undergraduate students supported by seven and a half full-time faculty members, one full-time lecturer, and two technicians. The program produced 26 graduates during the 2014-15 academic year.

Program Strength

1. The program exhibits teaching and learning excellence in the area of laboratory-based education. In the Ergonomics Laboratory, realistic problems are solved in experimental settings utilizing a unique motion tracking and data capture system funded by the National Science Foundation. In the Lean Work Design (Lego) Laboratory, each student team executes a project according to a set of self-governing rules with minimal teaching staff intervention. These exceptional laboratory experiences expose students to professional perspectives that are essential to the success of real-world engineering projects.

Program Weakness

1. Accreditation Policy and Procedure Manual Subsection II.G.6.b.(1) requires an examination of facilities to assure that the instructional and learning environments are adequate and are safe for the intended purposes. The program’s Computer Integrated Manufacturing Laboratory lacks designated walkways between machines as well as appropriate safety signage on machines, to indicate an area under renovation, and to identify a large rectangular platform temporarily stored in the laboratory. This situation increases the safety risk for students and teaching staff. Hence, the program lacks strength of compliance with respect to this subsection of the Accreditation Policy and Procedure Manual.

- 30-day due-process response: The EAC acknowledges receipt of photographic documentation demonstrating that the program has marked designated walkways, installed appropriate safety signage on machines in the Computer Integrated Manufacturing
Laboratory, and moved excess items into designated and appropriately marked storage areas.

- The weakness is resolved.
Introduction

The mechanical engineering BSME program is administered by the Department of Mechanical Engineering. The program currently enrolls 1,024 undergraduate students supported by 34 full-time and one part-time adjunct faculty members, and six administrative and technical staff. The program produced 151 graduates during the 2014-15 academic year.

Program Strengths

1. The program has a long history of strong ties with alumni and local industry as evidenced by the level of support provided by the Industry Advisory Board, industry’s involvement in curriculum updates, and industry support of the program’s unique cooperative education model. These unusually exceptional close ties with industry have strengthened the program by providing up-to-date and relevant content for the curriculum.

2. The faculty and administration are strongly committed to the development of the program and the overall learning experience of its students. This is evident by the level of support provided to the cooperative education component of the curriculum, to student professional society activities, and to student national and international team competitions. The results of this commitment contribute substantially to the overall quality and effectiveness of the program.

Program Weakness

1. Criterion 2. Program Educational Objectives This criterion states that the program must have educational objectives that are consistent with the mission of the institution, the needs of the program’s various constituencies, and the EAC criteria. There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program’s constituents’ needs, and the EAC criteria. Program educational objectives are defined as broad statements that describe what graduates are expected to attain within a few years of graduation. The program’s educational objectives
mainly describe student capabilities and qualities at the time of graduation (outcomes) rather than what they are expected to attain a few years after graduation. In addition, the program’s self-study describes a method and frequency for gathering input from four of the five identified constituencies (faculty, alumni, co-op employers, and employers). However, input from students (the fifth constituency) is obtained primarily from informal and undocumented interactions with faculty. Without appropriately written objectives and a review process involving all constituencies, it is difficult to ensure that the program educational objectives are consistent with the needs of its constituents. Therefore, the program lacks strength of compliance with this criterion.

- **30-day due-process response:** The EAC acknowledges receipt of documentation demonstrating that the program has rephrased its Program Educational Objectives (PEOs) such that they now describe what graduates are expected to attain within a few years of graduation. Furthermore, these changes were reviewed and accepted by the program’s constituents, including students, subsequently adopted by the department and are published, on the program’s website and in the university catalog.

- The weakness is resolved.

Program Concern

1. **Criterion 4. Continuous Improvement** This criterion states that the program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The current process uses a combination of student grades, survey results and rubrics to assess and evaluate all outcomes. While this process provides meaningful information on the extent to which many of the outcomes are being attained, survey results for outcomes (h) and (j) are mixed and inconclusive. Without stronger or more effective measures for these two outcomes, there is the risk that the program may lack proper input from these outcomes for its continuous improvement process. Therefore, there is a potential that this criterion may not be satisfied in the future.

- **30-day due-process response:** The EAC acknowledges receipt of documentation indicating that the program plans to address this concern during the next calendar year.
• The concern remains unresolved.