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Applied Science Accreditation Commission
Computing Accreditation Commission
Engineering Accreditation Commission
Engineering Technology Accreditation Commission

August 20, 2014

Kazem Kazerounian
Dean, School of Engineering
University of Connecticut
261 Glenbrook Road, UBox 3237
Storrs, CT 06269-3237

Dear Dr. Kazerounian :

The Engineering Accreditation Commission (EAC) of ABET recently held its 2014 Summer Meeting to act on the program evaluations conducted during 2013-2014. 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 University of Connecticut 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 2013-2014 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).

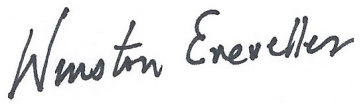
It is the obligation of the officer responsible for ABET accredited programs at your institution to notify ABET of any significant changes in program title, personnel, curriculum, or other factors which could affect the accreditation status of a program during the period of accreditation stated in Section II.H. of the 2013-2014 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 2013-2014 Accreditation Policy and Procedure Manual (available at www.abet.org).

Sincerely,



Winston F. Erevelles, Chair

Engineering Accreditation Commission

Enclosure: Summary of Accreditation Action
Final Statement

cc: Mun Y. Choi, Provost & Executive Vice President
Robert McCartney, Associate Professor
Daniel Burkey, Associate Dean Undergraduate Education and Diversity
Marty Wood, Assistant Dean
David Binning, Visit Team Chair

ABET

Engineering Accreditation Commission

Summary of Accreditation Actions
for the
2013-2014 Accreditation Cycle

University of Connecticut
Storrs, CT

Chemical Engineering (BSE)

Civil Engineering (BSE)

Computer Science and Engineering (BSE)

Environmental Engineering (BSE)

Material Science and Engineering (BSE)

Mechanical Engineering (BSE)

Accredit to September 30, 2020. A request to ABET by January 31, 2019 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, 2019. The reaccreditation evaluation will be a comprehensive general review.

Biomedical Engineering (BSE)

Computer Engineering (BSE)

Electrical Engineering (BSE)

Management and Engineering for Manufacturing (BS)

Accredit to September 30, 2016. A request to ABET by January 31, 2015 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, 2015. The reaccreditation evaluation will focus on these shortcomings. Please note that a visit is not required.

Engineering Accreditation Commission

Final Statement of Accreditation
to

University of Connecticut

Storrs, CT

2013-2014 Accreditation Cycle

Assuring Quality • Stimulating Innovation

ABET
ENGINEERING ACCREDITATION COMMISSION

UNIVERSITY OF CONNECTICUT
Storrs, CT

FINAL STATEMENT
Visit Dates: October 20-22, 2013
Accreditation Cycle Criteria: 2013-2014

Introduction & Discussion of Statement Construct

The Engineering Accreditation Commission (EAC) of ABET has evaluated the biomedical engineering, chemical engineering, civil engineering, computer engineering, computer science and engineering, electrical engineering, environmental engineering, management and engineering for manufacturing, material science and engineering, and mechanical engineering programs of the University of Connecticut.

This statement is the final summary of the EAC evaluation at the institutional and engineering-program levels. It includes information received during due process. The 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 degree of compliance or non-compliance with the criteria. This degree 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.

The University of Connecticut is the flagship public research university of the State of Connecticut. It enrolls approximately 30,250 students at six campuses and three professional schools, and is a land, sea and space grant university with a wide range of graduate and professional programs, as well as a comprehensive undergraduate program.

The School of Engineering is located on the Storrs campus. During the 2012-13 academic year, 2,109 undergraduate students and 729 graduate students were enrolled in engineering programs, and there were approximately 145 full-time, tenure-track faculty members. The school offers Bachelor of Science degrees in 12 programs, two of which are accredited by the Computing Accreditation Commission of ABET and ten of which are accredited by the Engineering Accreditation Commission. The School of Engineering is currently searching to fill 15 newly-created faculty positions in the areas of advanced manufacturing and materials genomics; genomics and biomedical sciences and engineering; and human sustainability, physical and cyber infrastructure resilience. In 2016, a new $62 million, 80,000 ft^2 engineering building will open to house research facilities, offices, and learning centers in systems engineering, advanced high performance computing, and communications technologies.

The following units were reviewed and found to adequately support the engineering programs: mathematics, chemistry, business school, physics, biology, career services, registrar, advising, assessment, facilities, and admissions.

Institutional Strengths

1. Investment in a new engineering building, facility revitalization, and faculty expansion manifested by the $1.9-billion "21st Century Connecticut" is noteworthy. This investment of

state and university resources enhances what is already excellent support for student achievement.

2. Numerous, varied opportunities for student tutoring by peers, graduate assistants, and faculty were found in virtually every program throughout the School of Engineering. These well-planned and structured opportunities provide students an avenue for direct help and support at an intensity not frequently seen at the undergraduate level, and greatly enhance student retention in the programs.

Institutional Observations

1. The university catalog provides conflicting information regarding the general education requirements. In one location, the catalog clearly cites six-credit hour requirements in each of four content areas for a total of a minimum of 24 credit hours. Elsewhere, the catalog states that students must pass at least seven content area courses of at least three credits each, amounting to a total of at least 21 credits. During the examination of engineering student transcripts, it was observed that some students followed the latter guidance, while others followed the former. Although all students, including those that completed the 21 credit requirement, received a general education that complemented the technical content of their curriculum, catalog ambiguity has resulted in inconsistent student advising as to the number of courses required to satisfy the general education requirements.

2. The engineering faculty is reported to be 80 percent male and 98 percent white or of Asian descent. The demographic composition of the faculty of the engineering school substantially differs from the state demographic and therefore does not meet the stated policy of the University "to reduce actual and perceived underrepresentation of minorities and women in the workforce."

Biomedical Engineering
Program

Program Criteria for Bioengineering, Biomedical, and Similarly Named Engineering Programs

Introduction

The biomedical engineering program was established in 2001 with the first bachelor degrees awarded in 2003. In 2012, the Department of Biomedical Engineering was established to further support the needs of the students. The program currently has 376 students, and has three full-time and 22 jointly-appointed tenure-track faculty members, four non-tenure-track faculty members, and 31 affiliate faculty members who support the program. The program conferred 69 baccalaureate degrees during the 2012-13 academic year.

Program Strengths

1. Students have a high level of satisfaction with the program and comment specifically on the ease of getting involved in research laboratories and the benefit of team-based projects offered in most biomedical courses.

2. Industrial members of the advisory board are strongly involved with the program through advisory roles as design sponsors and as part of a new Engineers in Residence initiative that brings industry representatives on campus to interact one-on-one with students to foster internships and full-time positions.

Program Weaknesses

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising

policies, strength of compliance with this aspect of the criterion is lacking. Additionally, the program does not have prerequisite courses or senior standing listed as a qualification for enrolling in the senior design course. Without published and enforced prerequisite requirements for courses covering topics integral to the design project, students can register in the senior design course without having adequate preparation and may not receive the full value of the culminating design experience. Future compliance with this aspect of the criterion is therefore jeopardized.

- Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

  The EAC also acknowledges documentation demonstrating that required prerequisites courses for BME-4900 Biomedical Engineering Design I, the first of two senior design courses, have been approved by the faculty and the required changes to the course description have been approved by the School of Engineering for inclusion in the 2014-2015 catalog. However, the catalog reflecting these course requirement changes has not yet been published.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented. The EAC also acknowledges supplemental information that required pre-requisites courses for BME-4900 Biomedical Engineering Design I have been incorporated into the 2014-2015 catalog.

- The weakness is resolved.

2. Criterion 4. Continuous Improvement This criterion requires that the program use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The program is using a documented process that relies on rubrics for assessment of each student outcome; however, the process relies on measures that do not clearly address the extent to which the student outcomes are attained. Rather, in many cases, the measures merely indicate that an outcome is being addressed in the curriculum and do not document attainment of the student outcomes. Strength of compliance with this criterion is therefore lacking.

   - Due-process response: The EAC acknowledges documentation of revisions to the assessment rubrics to better address attainment of student outcomes and the establishment of a cycle to regularly assess student outcome attainment using these rubrics. Assessing and documenting student attainment of outcomes, however, has not yet been undertaken.

   - The weakness remains and will be a focus of the next review. In preparation for this review, the EAC anticipates evidence that the revised rubrics and assessment procedures have been fully implemented, and documentation of the extent to which student outcomes are attained.

Chemical Engineering
Program

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

Introduction

The chemical engineering program currently has 18 faculty members and 242 students, with 37 graduates in the most recent graduating class.

Program Strength

1. Students in the program display a high level of energy and passion about the chemical engineering profession. The level of involvement with the student affiliate of the American Institute of Chemical Engineering is outstanding. The students in the program have volunteered to host the 2014 Northeast Student Regional Conference, which involves planning technical programs and social events for over 200 students from 19 regional universities, as well as numerous faculty mentors and industrial attendees. The students must also obtain over $30,000 in contributions from industrial sponsors to offset the costs of the conference. This activity provides an important venue for professional development for a significant number of students from around the region, and is an important service to the profession.

Program Weakness

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

- Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

Civil Engineering
Program

Program Criteria for Civil and Similarly Named Engineering Programs

Introduction

The undergraduate civil engineering program is administered by the Department of Civil and Environmental Engineering. The program currently has an enrollment of 237 undergraduates. It conferred 69 Bachelor of Science degrees in the 2011-12 academic year. The department has 24 full-time faculty members. It also has two full-time assistant research professors, ten part-time adjunct faculty members, and a laboratory technician who occasionally teaches some of the laboratory courses.

Program Weakness

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

    - Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising

including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

Computer Engineering
Program

Program Criteria for Electrical, Computer, and Similarly Named Engineering Programs

Introduction

The computer engineering program is jointly administered by the Department of Computer Science and Engineering and the Department of Electrical and Computer Engineering. The Computer Science and Engineering Department had 24 faculty in the fall of 2012 and 27 faculty in the fall of 2013. The Electrical and Computer Engineering department had 25 faculty as of fall of 2012. Total enrollment in computer engineering was 41 with four bachelor's degrees conferred in the 2011-12 academic year.

Program Strengths

1. The program attracts excellent undergraduate students, and several faculty members observed that student quality had improved over the past few years. The students interviewed reported that they are very satisfied with their undergraduate education and think highly of their program.

2. The program has cultivated multiple industry affiliations yielding a significant portion of industry-sponsored or -directed senior design projects, which enhance the students' senior design experience.

Program Weaknesses

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because

advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

- Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

2. Criterion 4. Continuous Improvement Criterion 4 requires that the program regularly use appropriate, documented processes for assessing and evaluating the extent to which student outcomes are attained, and that the results of these evaluations be systematically utilized as input for the continuous improvement of the program. In the past six years only three program-identified improvements were implemented, all identified from the senior exit survey. While

the program did employ additional assessment methods beyond student self-assessment, there is limited documentation that data from these instruments were used as input for program improvement. The program self-study stated that the assessment and continuous improvement process included review by the ABET Committee, the CSE/ECE Heads, and program constituencies. However, there were no artifacts documenting these reviews or the review process (e.g., assessment reports, minutes of assessment evaluation meetings, documentation of assessment instrument effectiveness, contemplated program improvement). The reliance on a single, self-reported instrument as the only basis for the programmatic improvement can yield misleading assessment data and missed opportunity for meaningful program improvement. Further, the lack of systematic documentation of the assessment practice may result in incomplete or inconsistent application of the program's own processes and cause the program to miss significant improvement opportunities. The program lacks the strength of compliance with this criterion.

- Due-process response: The EAC acknowledges documentation describing establishment of a system of direct and indirect measures for measuring the extent to which student outcomes are attained. Further, the program has developed a procedure for analyzing the assessment data, documenting the results, and discussing these results with program constituents. The program has not yet demonstrated full implementation these new processes nor documented continuous improvement that was informed by its evaluation of the assessment data.

- The weakness remains unresolved and will be a focus of the next review. In preparation for this review, the EAC anticipates documentation that the program regularly uses appropriate, documented processes for assessing and evaluating the extent to which student outcomes are attained, and that the results of these evaluations are systematically utilized as input for the continuous improvement of the program.

Computer Science and Engineering
Program

Program Criteria for Electrical, Computer, and Similarly Named Engineering Programs

Introduction

The computer science and engineering program is administered by the Department of Computer Science and Engineering. The department had 24 faculty members in the fall of 2012 and 27 faculty in the fall of 2013. As of fall of 2012, total undergraduate enrollment was 192 with 23 bachelor's degrees conferred in the 2011-12 academic year.

Program Strengths

1. The program attracts excellent undergraduate students, and several faculty members observed that student quality had improved over the past few years. The students interviewed reported that they are very satisfied with their undergraduate education and think highly of their program.
2. The program has cultivated multiple industry affiliations yielding a significant portion of industry-sponsored or -directed senior design projects, which enhance the students' senior design experience.

Program Weakness

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

- Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

Electrical Engineering
Program

Program Criteria for Electrical, Computer, and Similarly Named Engineering Programs

Introduction

The electrical engineering program is located in the Department of Electrical Engineering. The program has 178 undergraduate students, 25 faculty members, a technician, and two administrative staff members. The program had 27 graduates during the previous academic year.

Program Strengths

1. The program enjoys strong support from industrial partners. Many senior design projects are conducted in collaboration with regional industry.

2. Students are highly motivated and value their educational program experience. There is strong interaction between program faculty and students.

Program Weaknesses

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

    - Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow

appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

2. Criterion 4. Continuous Improvement This criterion requires that the program regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The criterion further requires that the results of these evaluations be systematically utilized as input for continuous improvement of the program. The program implemented curricular changes that were prompted by a variety of assessment inputs. However, the program's documentation of systematic review and utilization of the input from assessment instruments was limited and it was not apparent that the program had artifacts such as assessment reports, minutes of assessment evaluation meeting, documentation of the evaluation of assessment instrument effectiveness, of the evaluation of contemplated program improvement, or of assessment reviews by self-study identified groups. Without systematic documentation of assessment processes the program lacks the strength of compliance with the criterion.

- Due-process response: The EAC acknowledges documentation describing the establishment of a system of direct and indirect measures for measuring the extent to which student outcomes are attained. Further, the program has developed a procedure for analyzing the assessment data, documenting the results, and discussing these results with program constituents. The program has not yet demonstrated full implementation these new processes nor documented continuous improvement that was informed by its evaluation of the assessment data.

- The weakness remains unresolved and will be a focus of the next review. In preparation for this review, the EAC anticipates documentation that the program regularly uses appropriate, documented processes for assessing and evaluating the extent to which student outcomes are attained, and that the results of these evaluations are systematically utilized as input for the continuous improvement of the program.

Environmental Engineering
Program

Program Criteria for Environmental and Similarly Named Engineering Programs

Introduction

The environmental engineering program is administered by the Department of Civil and Environmental Engineering. The program currently has an enrollment of 98 students. It conferred 14 Bachelor of Science degrees in the 2011-12 academic year. The environmental engineering program has 13 full-time faculty members. The department has 24 full-time faculty members. It also has two full-time assistant research professors, ten part-time adjunct faculty members, and a laboratory technician who occasionally teaches or assists in some of the laboratory courses.

Program Weakness

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

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- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

Management and Engineering for Manufacturing
Program

Program Criteria for Engineering Management and Similarly Named Engineering Programs
Program Criteria for Manufacturing Engineering and Similarly Named Engineering Programs

Introduction

The management and engineering for manufacturing program has 62 students currently enrolled with 11 graduates in 2013 and approximately 10.5 graduates per year on average for the previous five years. The program has eight total faculty members (3.5 FTE) of whom six are tenured and two are in-residence; six have engineering doctorates, and none are licensed professional engineers. The program is supported by 1.5 office staff. Technical staff and three laboratories that are used in teaching the undergraduate curriculum are shared with other programs.

Program Strength

1. The working relationship between engineering and business faculty is highly collaborative and has resulted in a program that produces graduates with a unique set of capabilities that are highly desirable for employers. The program has new administration bringing a fresh new vision and plans for improving curriculum, laboratories, and industrial interaction.

Program Weaknesses

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

- Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

2. Criterion 5. Curriculum This criterion requires that students be prepared for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints. Review of project documentation indicated that, while projects marginally met the expectations for a culminating design experience, the majority of senior design projects did not provide significant breadth of design practice. Many projects included a focus on analytical investigations or compilations of experimental results, or were of such simplicity that they did not rise to the level expected of

a major design experience. As a result, students may not be fully prepared to recognize or practice effective design in their engineering careers. The program therefore lacks strength of compliance with this criterion.

- Due-process response: The EAC acknowledges documentation demonstrating that, in collaboration with the industrial advisory council, the program has established an instructor-led vetting process to ensure that senior design projects have appropriate design content. Further the program described revisions to the design report format and the course syllabus to more fully clarify design course expectations. However, neither notes from the final vetting process nor the revised syllabus was provided with the due-process documentation. In addition, no design project reports were provided evidencing compliance with this criterion.

- The weakness remains unresolved and will be a focus of the next review. In preparation for this review, the EAC anticipates documentation including course materials and completed design reports demonstrating that the curriculum culminates in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.

3. Criterion 6. Faculty This criterion requires that the faculty be of sufficient number and must have the competencies to cover all of the curricular areas of the program. The criterion further requires that there be sufficient faculty to accommodate adequate levels of student-faculty interaction, student advising and counseling, university service activities, professional development, and interactions with industrial and professional practitioners, as well as employers of students. While there is evidence that the overall number of faculty is sufficient (eight faculty members representing 3.8 FTE) for the number of students in the program, the full scope of manufacturing engineering curricular areas are inadequately covered by these faculty members. A majority of the program's faculty members have expertise in narrow subsets of skills and are thus not fully qualified to effectively deliver the full breadth of a manufacturing engineering program. The program therefore lacks strength of compliance with this criterion.

- Due-process response: The EAC acknowledges documentation that a number of faculty members have been hired during the past year, but there was no documentation demonstrating clear lines of responsibility or accountability to the management and engineering for manufacturing program. The due-process response indicated formal agreements were being negotiated but there was no indication that such agreements had been finalized. In addition, the documentation did not clearly demonstrate that the program faculty has sufficient expertise to cover all manufacturing curricular areas.

- The weakness remains unresolved and will be a focus of the next review. In preparation for this review, the EAC anticipates documented evidence that the faculty is of sufficient number and has the competencies to cover all of the curricular areas of the program.

4. Criterion 7. Facilities This criterion requires that classrooms, offices, laboratories, and associated equipment be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning. The criterion further requires that modern tools, equipment, computing resources, and laboratories appropriate to the program be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. The program relies on laboratory facilities that are shared with other curricular programs, and these shared facilities support many of the educational needs of the program. However, the program does not have access to facilities appropriate for some topics typically addressed in manufacturing engineering including polymer processing, materials joining, and material forming, even though these facilities are available at the institution. The facilities available to the program therefore do not fully support the curricular needs of the program and may cause students to be inadequately prepared for manufacturing engineering practice. The program therefore lacks strength of compliance with this criterion.

   - Due-process response: The EAC acknowledges receipt of documentation demonstrating expanded laboratories for the students in this program. The program has obtained space in two new laboratories to be used as part of the new MEM 2212 Manufacturing Laboratory course. The new facilities are expected to significantly expand opportunities for the students to design, fabricate, evaluate, and measure compliance with manufactured

systems. In addition, the documentation indicated that, the program now has access to a 3D printing tool for student use.

- The weakness is resolved.

5. Program Criteria The manufacturing engineering program criteria state that the program must prepare graduates to have proficiency in (a) materials and manufacturing processes: ability to design manufacturing processes that result in products that meet specific material and other requirements; (b) process, assembly and product engineering: ability to design products and the equipment, tooling, and environment necessary for their manufacture; (c) manufacturing competitiveness: ability to create competitive advantage through manufacturing planning, strategy, quality, and control; (d) manufacturing systems design: ability to analyze, synthesize, and control manufacturing operations using statistical methods; and (e) manufacturing laboratory or facility experience: ability to measure manufacturing process variables and develop technical inferences about the process. Program documentation indicates that, while process analysis, system analysis, and design topics are apparent in both the curriculum and student work, there is little evidence that process design is covered to a degree that students gain proficiency in this topic. The laboratory experiences do not provide enough variety or experience with manufacturing processes for the students to gain proficiency in the measurement of process variables or the ability to make technical inferences about these processes. Insufficient coverage of these technical areas may cause students to be inadequately prepared to work in these areas of manufacturing engineering. Thus, the program lacks strength of compliance with this criterion.

   - Due-process response: The EAC acknowledges receipt of documentation describing expanded laboratory facilities and equipment for the program. However there was no accompanying evidence of the inclusion of additional manufacturing processes to the MEM-3299 syllabus. It is acknowledged that access to new 3D printing equipment will afford students an opportunity to work with a process commonly used to produce prototype parts. However, no evidence was presented that students are receiving exposure to the broad variety of manufacturing processes, and to the area of process design.

- The weakness remains unresolved and will be a focus of the next review. In preparation for this review, the EAC anticipates documentation demonstrating that, in addition to student laboratory experience in the manufacture of parts, students are also receiving laboratory exposure and experience related to the design and operation of manufacturing processes.

Program Concern

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 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 published program educational objectives include language typically associated with student outcomes. If the program educational objectives are not clearly aligned with professional expectations of graduates a few years after graduation, they may misrepresent the purpose of the program to present and potential constituents in the future. There is therefore a risk that compliance with this criterion may be jeopardized.

    - Due-process response: The EAC acknowledges documentation demonstrating that the program now has published program educational objectives that are consistent with the mission of the institution, the needs of the program's various constituencies, and the definition set forth in the Engineering Accreditation Criteria. The new program objectives have been reviewed by the program's industrial advisory board and approved by the full faculty.

    - The concern is resolved.

Materials Science and Engineering
Program

Program Criteria for Materials, Metallurgical, and Similarly Named Engineering Programs

Introduction

The materials science and engineering program is the only undergraduate materials engineering program at a public university in New England. The program was authorized in 1999 and has been growing. In July 2013, the administration of the program was moved to the new Department of Materials Science and Engineering. The program offers specialized concentrations in biomaterials, metallurgy, nanomaterials, energy materials, and electronic materials. The program had 116 students in Fall 2012, 16 full-time faculty members, one emeritus professor, and two adjunct faculty members. There is one laboratory manager.

Program Strength

1. The program has a strong relationship with local industry and an active, involved industrial advisory board. Industrial partners participate in numerous program activities and act as senior project mentors. This involvement has resulted in a strong culminating design experience and opportunities for internships.

Program Weakness

1. Criterion 1. Students This criterion requires that student progress be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. The program has well-documented policies that require a plan of study for all students and specific processes for approval of course waivers and substitutions. However, transcripts and related curricular forms accompanying the self-study showed numerous examples of course substitutions and waivers that did not follow the published policy such as waivers and substitutions processed during a student's last semester. Documentation of the rationale for the waivers and substitutions did not appear to be consistent. Because advising decisions are not consistently documented and do not follow published advising policies, strength of compliance with this criterion is lacking.

- Due-process response: The EAC acknowledges documentation of three actions initiated to improve advising. First, the program described a significantly revised and updated process that monitors student academic progress and records advising actions. This new process also identifies shortcomings in students' progress to degree sufficiently early to allow appropriate corrective actions in accordance with existing program policies. Second, the program described development and publication of new advising guides and ongoing implementation of two new student information systems that will allow students to develop detailed plans of study and facilitate centralized documentation of student advising including course substitutions and waivers. Third, the program described ongoing hiring of additional advising staff. While hiring new advising staff should help with monitoring of students, implementation of the new advising guidance and software systems is not complete. The new student information systems that support specific plans of study and centralized documentation of advising have yet to be fully implemented. In addition, the existence of software to track waivers and substitutions does not necessarily guarantee that these changes will be made in accordance with program policies.

- The weakness remains unresolved.

- Supplemental Information: The EAC acknowledges supplemental information documenting actions taken to improve and control student advising. The program has added additional staff and strengthened advising processes, thereby demonstrating that program advising policies are now met and properly documented.

- The weakness is resolved.

Program Observations

1. While the current assessment and analysis process used for continuous improvement is satisfactory and sustainable, there appear to be opportunities to simplify the process so it requires less energy and faculty time.

2. It was noted that a number of the culminating design experiences were completed by students working individually. Both the program and students could benefit if projects were conceived as team activities, giving students an additional opportunity for team experience.

Mechanical Engineering
Program

Program Criteria for Mechanical and Similarly Named Engineering Programs

Introduction

The mechanical engineering program emphasizes the traditional areas of mechanical systems and thermal systems. The program has consistently grown over the past several decades. At the time of the review, the program had 27 faculty members including 23 tenured/tenure-track faculty members and four full-time teaching faculty members. The program currently has 510 undergraduate students. During the 2012-13 academic year, 114 students graduated. The program has recently established several new areas of concentration in aerospace, dynamic systems and controls, energy and power, and design and manufacturing.

Program Strength

1. The two-semester senior design program integrates real-world design problems into the curriculum in a creative and highly effective manner. Almost all projects are industrially sponsored with practicing engineers serving as mentors along with individual faculty mentors. It was notable that alumni, advisory board members, students, and faculty (even those not teaching senior design) were uniformly enthusiastic about the quality and significance of the senior design program.

Program Weakness

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