2018-2019 Annual Report on the Implementation of the Academic Quality Assessment and Development
October 4, 2019

College of Arts and Sciences
AQAD Reviews

During Academic Year 2018-2019, the College of Arts and Sciences (CAS) undertook one AQAD review in the Department of Chemistry and Biochemistry. The Department offers a BS in Chemistry/Biochemistry, an MS in Chemistry/Biochemistry and a PhD in Chemistry/Biochemistry.

The Department of Chemistry and Biochemistry, like all College of Arts and Sciences' departments, has learning outcomes, curriculum maps, and established assessment plans. The assessment processes in CAS are designed to allow flexibility for each program to identify, develop, and assess learning within the major, while also providing guidance, parameters, and timelines aimed toward appropriate curriculum assessment and revision. During AY 2018-2019, Associate Dean Robert Jones coordinated assessment in the college. He worked with a designated faculty coordinator in each department to develop its assessment plan using a "best practices" approach.

Each department submits to the Dean's Office an annual assessment report that aligns with NECHE and the University of Massachusetts' Academic Quality Assessment and Development (AQAD) assessment criteria, to help departments continue to make progress and collect significant data for efficient and effective review. What follows is a summary of each review.

Department of Chemistry and Biochemistry

The Department of Chemistry and Biochemistry completed the final draft of its self-study in September of 2018. External reviewers, Drs. David Ryan (University of Massachusetts Lowell) and Glen Miller (University of New Hampshire), visited the University of Massachusetts Dartmouth campus on Thursday, November 29, 2018. They submitted a review subsequent to their site visit.

The Department has clearly articulated learning outcomes and approaches assessment in a comprehensive way. The Department continues to develop new assessment instruments that will best gather the needed information to move the program forward.

Dean Pauline Entin shared the reviewers' concerns and concurred with some of their recommendations. The Dean also felt the Department should address additional concerns not highlighted by the external reviewers. The areas to address were grouped into six categories:

1. **Facilities.** The reviewers cited a need for facilities improvement. While this need cannot be addressed at the Departmental level, the Department develop priorities to guide investments that may become available.
2. **Equipment.** The reviewers stated that "Synthetic laboratories appear to be poorly equipped. Major state-of-the-art instrumentation such as high field NMR spectrometers, modern mass spectrometers, polymer characterization equipment, etc., is either limited or non-existent." The Department will prioritize equipment needs for institutional investment, and seek for grant opportunities.
3. **Graduate student recruitment.** The reviewers indicated that an informative and easily navigated website is critical to successful recruitment of graduate students, particularly international students. The Department will address this issue with appropriate campus partners (e.g., Marketing). The reviewers and Department also cited low graduate student financial support as a barrier to student recruitment.
4. **Curriculum.** The reviewers suggested incorporating topics such as green chemistry and nanoscience. The Department indicated both approaches were viable. The reviewers indicated that two to three introductory chemistry pathways are typical. UMassD has four. Streamlining the number of introductory chemistry pathways from four to three will be considered.
5. **Teaching loads and research time**. The reviewers stated that the teaching loads for pre-tenure and research active faculty are high. The Department will develop a workload plan, but also felt a hiring plan was necessary to address this point.
6. **CHM 151 and 152 success rate**. The Chemistry Department was charged with increasing the percentage of students who successfully complete CHM 151 and 152.

During May of 2019, the Department of Chemistry and Biochemistry submitted a final action plan that addresses Dean Entin's concerns. The plan details the program's actions for each academic year through AY 2023-2024.

Retention and Graduation Rates

The tables below present the first-year retention rates and six-year graduation rates for the University, the College of Arts and Sciences, and each department that conducted an AQAD review during the 2018-2019 Academic Year.

University Total

First Year Retention Rate	
Fall 2017 Cohort	70.9%
Fall 2016 Cohort	74.2%
Fall 2015 Cohort	73.4%
Fall 2014 Cohort	75.0%
Fall 2013 Cohort	79.4%
Fall 2012 Cohort	76.1%

Six Year Graduation Rate	
Fall 2012 Cohort	56.3%
Fall 2011 Cohort	48.5%
Fall 2010 Cohort	48.8%
Fall 2009 Cohort	45.8%
Fall 2008 Cohort	47.5%
Fall 2007 Cohort	49.0%

College of Arts and Sciences

First Year Retention Rate	
Fall 2017 Cohort	69.6%
Fall 2016 Cohort	71.6%
Fall 2015 Cohort	72.6%
Fall 2014 Cohort	71.7%
Fall 2013 Cohort	75.3%
Fall 2012 Cohort	68.4%

Six Year Graduation Rate	
Fall 2012 Cohort	51.3%
Fall 2011 Cohort	42.6%
Fall 2010 Cohort	45.3%
Fall 2009 Cohort	42.2%
Fall 2008 Cohort	42.4%
Fall 2007 Cohort	40.8%

Department of Chemistry and Biochemistry

First Year Retention Rate	
Fall 2017 Cohort	77.8%
Fall 2016 Cohort	93.3%
Fall 2015 Cohort	76.5%
Fall 2014 Cohort	80.0%
Fall 2013 Cohort	75.0%
Fall 2012 Cohort	77.3%

Six Year Graduation Rate	
Fall 2012 Cohort	54.5%
Fall 2011 Cohort	40.0%
Fall 2010 Cohort	51.9%
Fall 2009 Cohort	50.0%
Fall 2008 Cohort	42.1%
Fall 2007 Cohort	68.4%

College of Engineering
AQAD Reviews

During Academic Year 2018-2019, the College of Engineering (CoE) at UMass Dartmouth underwent six Academic Quality Assessment and Development (AQAD) reviews: five reviews of graduate programs and one undergraduate program.

The AQAD graduate reviews covered the following degree programs:

- MS in Civil and Environmental Engineering offered through the Department of Civil & Environmental Engineering;
- MS in Computer Science offered through the Department of Computer and Information Science;
- MS in Computer Engineering, MS in Electrical Engineering, and PhD in Electrical Engineering, all offered through the Department of Electrical & Computer Engineering;
- MS in Mechanical Engineering with Option in Industrial & Systems Engineering offered through the Department of Mechanical Engineering; and
- MS in Physics offered through the Department of Physics.

The AQAD undergraduate review covered the following degree program:

- BS in Physics offered through the Department of Physics.

It should be noted that during academic year 2016-2017, the undergraduate programs in Bioengineering, Civil Engineering, Computer Engineering, Electrical Engineering, and Mechanical Engineering underwent reaccreditation review by the Engineering Accreditation

Commission of ABET, and the undergraduate program in Computer Science underwent reaccreditation review by the Computing Accreditation Commission of ABET. Each undergraduate program has articulated and documented learning outcomes that prepare students to attain the program educational objectives. The assessment tools considered for the attainment of learning outcomes include exams, individual and team projects, and other direct measures. The evaluation results of student attainment of the learning outcomes are used systematically as input for the continuous improvement of each program. For all the foregoing programs, the findings of ABET were as follows: Accredited to September 30, 2023 (Appendix A).

Department of Civil & Environmental Engineering

The Department of Civil & Environmental Engineering (CEN) completed the self-study for its graduate program in March 2019. The external reviewers' site visit was conducted on April 22, 2019, by Dr. Dana N. Humphrey, Dean of College of Engineering and Distinguished Maine Professor of Civil and Environmental Engineering at the University of Maine, and Dr. Sanjay Raja Arwade, Professor of Civil and Environmental Engineering at UMass Amherst. In preparation for the site visit, Drs. Humphrey and Arwade reviewed the self-study provided by CEN department chair, Dr. Daniel MacDonald.

In their report, Drs. Humphrey and Sanjay noted that aspects of the five goals of the UMass Dartmouth strategic plan are contained within the Department Mission Statement. They also noted several significant strengths including the high-quality professional preparation of the faculty, the faculty's scholarly activities and their commitment to student success. The reviewers commended the faculty and overall curriculum, but also pointed out several challenges, such as not having all the faculty located in a single location and inadequate space for graduate students.

The review committee recommended that department consider addressing the following –
- Develop a mission statement and goals that are specific to the MS program
- Offer more and dedicated graduate level courses (and not dual-listed)
- Consolidate the space locations of faculty and identify graduate student spaces
- Increase efforts made to promote and support a Civil Engineering graduate student organizations

Action Plan

In response to these recommendations, Dean VanderGheynst directed the chairperson to work with the appropriate committees to develop a plan to address these recommendations. At the start of the 2019-20 academic year, the Civil and Environmental Engineering Department submitted a plan to have the graduate curriculum committee develop a mission statement and goals as well as a schedule of graduate-only courses. Similarly, the departmental space committee will study the current space allocations to identify suitable spaces for graduate students and faculty.

Department of Computer and Information Science

The Department of Computer and Information Science (CIS) completed the self-study for its graduate program in March 2019. The external reviewers' site visit was conducted on April 19, 2019, by Dr. Wei Ding, Associate Professor of Computer Science at UMass Boston, and Dr. Yun

Raymond Fu, Professor of Electrical and Computer Engineering and the Khoury College of Computer Science at Northeastern University. In preparation for the site visit, Drs. Ding and Fu reviewed the self-study provided by CIS department chair, Dr. Haiping Xu.

During the visit, Drs. Ding and Fu met with CIS faculty, staff and students as well as the College of Engineering Dean and Provost.

In their report, Drs. Ding and Fu noted that the Program's mission is properly aligned with the campus mission and direction as a vibrant, public research university noting the curriculum design, enrollments, faculty teaching, research, professional, and creative activities, and outreach activities are all well thought-out to provide engaged learning and innovative research. They also noted that the program has strong connections with external research institutes and industrial partners. Both faculty and students have benefited greatly from these collaborations. The reviewers also commended the curriculum as relevant and up-to-date.

The review committee recommended that department consider addressing the following –

- The Department can consider providing more options of different topics and classes in different concentrations, and more career networking opportunities for job searching.
- Provide additional support for middle-career faculty for promotions and career development, especially in support of internal and external grant applications.
- Provide more research space to graduate students, which will help the program to better align with the campus mission and strategic priorities in research.

Action Plan

In response to these recommendations, Dean VanderGheynst directed the chairperson to work with the appropriate committees to develop a plan to address these recommendations. At the start of the 2019-20 academic year, the Computer and Information Science Department submitted a plan to have the graduate curriculum committee to develop a course offering plan to include diverse topics in different concentrations. The department is also developing a plan to increase the networking opportunities and career advising to graduate students. The department will also review faculty workload to ensure appropriate supports are available for mid-career faculty. Several graduate student spaces were renovated in late spring and early summer of 2019 and additional research-specific and general; graduate student spaces have been created

Department of Electrical and Computer Engineering

The Department of Electrical and Computer Engineering (ECE) completed the self-study for its graduate programs in March 2019. The external reviewers' site visit was conducted on April 18, 2019, by Dr. Hamid Nawab, Professor of Electrical and Computer Engineering and Biomedical Engineering at Boston University, and Dr. Richard Vaccaro, Professor of Electrical, Computer and Biomedical Engineering at the University of Rhode Island. In preparation for the site visit, Drs. Nawab and Vaccaro reviewed the self-study provided by ECE department chair, Dr. Antonio Costa.

During the visit, Drs. Nawab and Vaccaro met with ECE faculty, staff and students as well as the College of Engineering Dean and Provost.

In their report, Drs. Nawab and Vaccaro noted that based on the materials submitted and the on-site visit, that there is high certainty that each of the five core criteria are being met. The reviewers' comments were all positive, specifically noting that the accelerated B.S.-M.S. program is a particularly noteworthy development that is well structured and well run. It helps to provide skilled TAs to support the undergraduate programs and attracts students to the M.S. program that might otherwise go directly to industry. The best of these students may continue on to the doctoral program.

The review committee recommended that department consider addressing the following: -

- The department should consider increasing their collaboration with other departments in the College of Engineering, and more broadly, with those in the Applied Sciences. Interdisciplinary collaboration could benefit both teaching and research.
- Ensure appropriate faculty specializations are represented to support the doctoral program.

Action Plan

In response to these recommendations, Dean VanderGheynst directed the chairperson to work with the appropriate committees to develop a plan to address these recommendations. At the start of the 2019-20 academic year, the Electrical and Computer Engineering Department submitted a plan to have their faculty evaluation committee evaluate the current level of collaboration and identify opportunities for collaborations within the college as well as outside. The chairperson will work with the dean of the college to address the faculty specializations within the department to support their doctoral program.

Department of Mechanical Engineering

The Department of Mechanical Engineering (MNE) completed the self-study for its graduate program in March 2019. The external reviewers' site visit was conducted on April 19, 2019, by Dr. Christopher Niezrecki, Professor of Mechanical Engineering & Department Chair at UMass Lowell, and Dr. Paul R. Chiarot, Associate Professor of Mechanical Engineering at Binghamton University -- State University of New York. In preparation for the site visit, Drs. Niezrecki and Chiarot reviewed the self-study provided by MNE department chair, Dr. Sankha Bhowmick.

During the visit, Drs. Niezrecki and Chiarot met with MNE faculty, staff and students as well as the College of Engineering Dean and Provost.

In their report, Drs. Niezrecki and Chiarot noted that the department is meeting their central goal of conducting innovative and high-quality scholarship noting that the faculty have been successful in obtaining major research grants, are publishing in high quality journals, and are engaged with local industry. They also noted that the students have a high opinion of their program. They note that they receive good support while attending the university and that they have the resources they need to pursue their studies.

The review committee recommended that department consider addressing the following: -

- Develop a strategic plan with a set of quantifiable goals and objectives as well as action items that need to be performed to help achieve the goals.

- Define the direct and indirect measures of self-evaluation in comparison to the level of assessment required for the undergraduate program.
- The department should explore approaches to growing the graduate enrollment.
- The Department and College to identify strategic clusters that are aligned with faculty strength and interest as well as the available opportunities and resources within the region.

Action Plan

In response to these recommendations, Dean VanderGheynst directed the chairperson to work with the appropriate committees to develop a plan to address these recommendations. At the start of the 2019-20 academic year, the Mechanical Engineering Department submitted a plan to have the graduate curriculum committee to explore several options to growing graduate enrollment, such as promoting the non-thesis option, reducing the number of credits required to 31 credits, creating new marketing materials, offering a ½ RA – ½ TA model to increase the number of students that are financially supported and a stand-alone PhD program. The Department and College will identify strategic clusters that are aligned with faculty strength and interest as well as the available opportunities and resources within the region. Three new faculty joined in fall 2019 in fluid mechanics and robotics strengthened existing research clusters in fluid mechanics with their expertise in experimental research, and will strengthen/open new horizon in robotics research, such as micro robot, sensors and MEMS in biomedical research.

Department of Physics

The Department of Physics (PHY) completed the self-study for its undergraduate and graduate programs in March 2019. The external reviewers' site visit was conducted on April 17, 2019, by Dr. Marc S. Seigar, Associate Dean, Swenson College of Science and Engineering at the University of Minnesota Duluth, and Dr. Bala Sundaram, Professor of Physics & Department Chair at UMass Boston. In preparation for the site visit, Drs. Seigar and Sundaram reviewed the self-study provided by PHY department chair, Dr. Jay Wang.

During the visit, Drs. Seigar and Sundaram met with PHY faculty, staff and students as well as the College of Engineering Dean and Provost.

In their report, Drs. Seigar and Sundaram noted that in terms of structure, student satisfaction, nucleating research activity and utilization of existing resources, the Department of Physics at the University of Massachusetts Dartmouth is doing a very good job noting that the atmosphere in the department is collegial and supportive, and their peers recognize the faculty research and graduate program quality. They further noted that faculty members in Physics are clearly leaders in their fields and they all have the appropriate credentials.

The review committee recommended that department consider addressing the following: -
- The department should consider increasing enrollment by expanding concentration areas, perhaps with a data science emphasis, is one such strategy while another may be to have a stand-alone Astronomy B.S. program.
- The department to consider a new BA program in physics.

Action Plan

In response to these recommendations, Dean VanderGheynst has directed the chairperson to work with the appropriate committees to develop a plan to address these recommendations. At the start of the 2019-20 academic year, the Physics Department submitted a plan to have their curriculum committees develop several concentrations including in computational physics and teacher preparation, as well as explore a stand-alone major in Astrophysics. The department will conduct some background research on demand for preparation in physics at the B.A. level and best practices at current institutions that offer a B.A. degree in physics that could be emulated in a new degree program. This research will inform the development of a BA proposal with several tracks to attract students in closely related disciplines such as pre-med, teaching, engineering, and finance and possibly law.

Retention and Graduation Rates

The tables below present the first-year retention rates and six-year graduation rates for the University, the College of Engineering, and each department that conducted an AQAD review during the 2018-2019 Academic Year.

University Total

First Year Retention Rate	
Fall 2017 Cohort	70.9%
Fall 2016 Cohort	74.2%
Fall 2015 Cohort	73.4%
Fall 2014 Cohort	75.0%
Fall 2013 Cohort	79.4%
Fall 2012 Cohort	76.1%

Six Year Graduation Rate	
Fall 2012 Cohort	56.3%
Fall 2011 Cohort	48.5%
Fall 2010 Cohort	48.8%
Fall 2009 Cohort	45.8%
Fall 2008 Cohort	47.5%
Fall 2007 Cohort	49.0%

College of Engineering

First Year Retention Rate	
Fall 2017 Cohort	78.7%
Fall 2016 Cohort	72.3%
Fall 2015 Cohort	72.1%
Fall 2014 Cohort	74.8%
Fall 2013 Cohort	81.0%
Fall 2012 Cohort	81.8%

Six Year Graduation Rate	
Fall 2012 Cohort	59.6%
Fall 2011 Cohort	56.9%
Fall 2010 Cohort	50,6%
Fall 2009 Cohort	47.5%
Fall 2008 Cohort	44.0%
Fall 2007 Cohort	52.2%

Department of Physics

First Year Retention Rate	
Fall 2017 Cohort	77.8%
Fall 2016 Cohort	60.0% #
Fall 2015 Cohort	50.0% #
Fall 2014 Cohort	88.9% #
Fall 2013 Cohort	83.3% #
Fall 2012 Cohort	57.1% #

Six Year Graduation Rate	
Fall 2012 Cohort	57.1% #
Fall 2011 Cohort	64.3%
Fall 2010 Cohort	40.0% #
Fall 2009 Cohort	36.4%
Fall 2008 Cohort	33.3% #
Fall 2007 Cohort	70.0% #

 # Beginning cohort was less than 10 students.

Appendix A

During the Academic Year 2016-17, the College of Engineering underwent reaccreditation review of the following undergraduate programs – Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, and Mechanical Engineering. The undergraduate degree in Bioengineering underwent its initial accreditation review. The chair of the Engineering Accreditation Commission (EAC) Accrediting Team was Dr. Mark E. Law from the University of Florida. The chair of the Computing Accreditation Commission (CAC) Accrediting Team was Dr. Barbara Price from the Georgia Southern University.

Bioengineering – The Department of Bioengineering prepared its self-study report during academic year 2015-16, and submitted it for review by the EAC of the Accreditation Board for Engineering and Technologies (ABET). The site visit occurred between October 30, 2016 and November 1, 2016. The reviewer was Dr. Ruth Ochia from Temple University. The findings of ABET were as follows: This is a newly accredited program. This accreditation action extends retroactively from October 01, 2014. Accredited to September 30, 2023. A request to ABET by January 31, 2022 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, 2022. The reaccreditation evaluation will be a comprehensive general review.

Civil Engineering – The Department of Civil and Environmental Engineering prepared its self-study report during academic year 2015-16, and submitted it for review by the EAC of the Accreditation Board for Engineering and Technologies (ABET). The site visit occurred between October 30, 2016 and November 1, 2016. The reviewer was Dr. William Peter Schonberg from Missouri University of Science and Technology. The findings of ABET were as follows: Accredited to September 30, 2023. A request to ABET by January 31, 2022 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, 2022. The reaccreditation evaluation will be a comprehensive general review.

Computer Engineering – The Department of Electrical and Computer Engineering prepared its self-study report during academic year 2015-16, and submitted it for review by the EAC of the Accreditation Board for Engineering and Technologies (ABET). The site visit occurred between October 30, 2016 and November 1, 2016. The reviewer was Dr. J.W. Bruce from Mississippi State University. The findings of ABET were as follows: Accredited to September 30, 2023. A request to ABET by January 31, 2022 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, 2022. The reaccreditation evaluation will be a comprehensive general review.

Electrical Engineering – The Department of Electrical and Computer Engineering prepared its self-study report during academic year 2015-16, and submitted it for review by the EAC of the

Accreditation Board for Engineering and Technologies (ABET). The site visit occurred between October 30, 2016 and November 1, 2016. The reviewer was Dr. Ibrahim Mohamed Elamin from King Fahd University of Petroleum and Minerals. The findings of ABET were as follows: Accredited to September 30, 2023. A request to ABET by January 31, 2022 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, 2022. The reaccreditation evaluation will be a comprehensive general review.

Mechanical Engineering – The Department of Mechanical Engineering prepared its self-study report during academic year 2015-16, and submitted it for review by the EAC of the Accreditation Board for Engineering and Technologies (ABET). The site visit occurred between October 30, 2016 and November 1, 2016. The reviewer was Dr. John Hoke from US Air Force. The findings of ABET were as follows: Accredited to September 30, 2023. A request to ABET by January 31, 2022 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, 2022. The reaccreditation evaluation will be a comprehensive general review.

Computer Science – The Department of Computer and Information Science prepared its self-study report during academic year 2015-16, and submitted it for review by the CAC of the Accreditation Board for Engineering and Technologies (ABET). The site visit occurred between October 30, 2016 and November 1, 2016. The reviewer was Dr. Barbara Price from Georgia Southern University. The findings of ABET were as follows: Accredit to September 30, 2023. A request to ABET by January 31, 2022 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 1, 2022. The reaccreditation evaluation will be a comprehensive general review.