

# Community College *of* Philadelphia

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## STUDENT OUTCOMES COMMITTEE OF THE BOARD OF TRUSTEES

Thursday, May 5, 2016  
1:30 p.m.  
Conference Room M2-34

### **AGENDA**

- (1) 1:30 p.m. Executive Session
  
- (2) Public Session
  - (a) Approval of the Minutes of April 7, 2016 (A)
  
  - (b) Academic Program Audit: Applied Science and Engineering Technology A.A.S. (A)
  
  - (c) Academic Program Audit: Technical Studies A.A.S. (A)
  
  - (d) Strategic Plan Development (I)
    - Discussion Questions:
      - What are the strategies?
      - How are stakeholders being engaged?
  
  - (e) Pathways Project Second Institute Report (I)
    - Discussion Questions:
      - What were the outcomes?
      - What assistance can the Board provide?

#### **Attachments:**

Minutes of April 7, 2016

Academic Program Audit: Technical Studies A.A.S

Academic Program Audit: Applied Science and Engineering Technology A.A.S.

**STUDENT OUTCOMES COMMITTEE OF THE  
BOARD OF TRUSTEES**

**MINUTES**

**Thursday, April 7, 2016  
1:30 p.m.  
West Regional Center, Room 136**

**Presiding:** Dr. Rényi

**Present:** Ms. de Fries, Dr. Gay, Dr. Generals, Ms. Hernández Vélez, Dr. Hirsch, Ms. Horstmann (by phone)

**Guests:** Dr. Celenza, Ms. Dunston, Mr. Geissinger, Ms. Harter, Ms. McDonnell, Ms. Rossi, Ms. Sweet

**(1) Executive Session**

The committee discussed faculty candidates for promotion.

**(2) Public Session**

**(a) Approval of the Minutes of March 3, 2016**

The minutes were accepted unanimously.

**(b) Program Audit Follow-Up Report - Music Performance, Sound Recording and Music Technology & Music Non-Performance**

Mr. Geissinger, new Department Head of Music and Ms. Sweet, new Dean of Liberal Studies were introduced. Dr. Rényi explained that the report is a brief interim follow up as requested by the Committee at the September 3, 2015 committee meeting. Mr. Geissinger reviewed the Program Audit Follow-Up Report for the Music Performance, Sound Recording and Music Technology & Music Non-Performance Programs. He highlighted the progress made to date on the audit recommendations including: closing of the Music Non-Performance Program; increased outreach efforts to high schools; revision of program entrance requirements; program assessment efforts including progress being made on course revisions; and meeting enrollment targets. Dr. Rényi was complimentary of the progress made on the recommendations and expressed appreciation for the work that is taking place in the Music Department.

Dr. Rényi reminded Mr. Geissinger and Ms. Sweet that a full progress report is expected by September 2016 at which time a decision will be made regarding recertifying the programs.

**(c) Academic Program Audit Respiratory Care Technology A.A.S**

Dr. Rényi stated that while the audit process is being modified the Committee would be reviewing the academic audits in the existing format.

Ms. Dunston, Director of Academic Assessment and Evaluation, provided an overview of the recommendations associated with Respiratory Care Audit. The recommendations focus on: assessment, reviewing the guidelines of the Advisory Committee, encouraging students to sit for the RRT exam, and completing the course revisions that are in progress.

Ms. Hernández Vélez asked if students in the program are already working in the field. Ms. Rossi, Department Head for Allied Health, responded that students in the program are not working in the respiratory field and that some are change-of-career students. Dr. Rényi inquired on the status of the course revisions. Ms. Rossi responded that the program revision is complete, ten new program learning outcomes have been approved, and three courses have been revised with the remaining course revisions to be completed within the year.

**Action: The Student Outcomes Committee recommends that the Board of Trustees accept the Respiratory Care Program Audit with approval for five years. In addition, the Committee requires a follow-up report by December 2016 on the status of the course revisions.**

**(d) Academic Program Audit Health Services Management A.A.**

Ms. Dunston reviewed the findings and recommendations in the audit. The recommendations include: focus on improving transfer opportunities, recruitment, retention, assessment, and completing the program revision. She highlighted that since the audit was completed the program revision has taken place and has gone through the College's approval process. Ms. Rossi noted that the program learning outcomes in the audit document are not correct. Since the program revision has been approved and will be implemented in Fall 2016, the new assessment plan for the program learning outcomes is being implemented. Focus is taking place on how the program learning outcomes integrate with the student learning outcomes at the course level. The Committee discussed the need for alignment with program measurable objectives.

**Action: The Student Outcomes Committee recommends that the Board of Trustees accept the Health Services Management Program Audit with approval for five years. In addition, the Committee requires a follow-up report by December 2016 on the status of the assessment of the program learning outcomes.**

**(e) Recommendation to Close the A.A.S. Degree in Chemical Technology**

Ms. Harter, Associate Professor in the Chemistry Department, provided an overview of the rationale for recommending the closure of the A.A.S. degree in Chemical

Technology. The reasons include: the creation of the A.S. degree in Chemistry (effective Fall 2016) creating an overlap in the core course requirements for both the Chemistry Degree and the Chemical Technology Degree; employment opportunities for graduates with an Associate in Applied Science degree within the chemical industry are extremely limited; and technicians are not on the 2015 High-Priority Occupations List for the Philadelphia County Workforce Investment Area.

**Action: The Student Outcomes Committee recommends that the Board of Trustees accept the recommendation to close the A.A.S. degree in Chemical Technology effective fall 2016.**

**(f) Workforce Development Report**

*Discussion Questions:*

- How can we make the College top of mind with employers, the City, and other civic entities when discussing training needs?
- Are there additional partners we should be including?
- How can the Board serve as city-wide ambassadors to identify key business and industry contacts?

Dr. Rényi stated that she would like for the Committee to have a more in-depth discussion of the workforce agenda when additional Board members can participate. She would like to focus on the question of how Board members can be engaged to participate in assisting the College with forming relationships with additional strategic business partners. She asked that a list be created of individuals or categories of businesses that the College wishes to engage in a partnership. Dr. Rényi will then follow up with Board members.

**(3) Next Meeting**

The next meeting of the Student Outcomes Committee of the Board is scheduled for May 5, 2016 at 1:30 p.m. in Conference Room M2-34.

**Attachments:**

Minutes of March 3, 2016

Program Audit Follow-Up Report Music Performance, Sound Recording and Music Technology & Music Non-Performance

Academic Program Audit Respiratory Care Technology A.A.S.

Academic Program Audit Health Services Management A.A.

Recommendation to Close the A.A.S. Degree in Chemical Technology

Workforce Development Report

**Community College of Philadelphia**

**Academic Program Audit**

**Applied Science and Engineering Technology A.A.S.**

Author: Christine  
McDonnell Krishna  
Dunston

Contributor:  
Randy Libros

Date: November, 2015

## I. **Executive Summary**

The Applied Science and Engineering Technology program prepares students for employment in various areas of scientific technology occupations (according to the course catalog). Currently, the program focuses specifically on Biomedical Equipment and Process Technology. The most recent program revision took place in 2014 and took effect in the fall of 2015.\*<sup>1</sup>

The Program enrolls students with similar demographics as the Division and the College in terms of age and level of college readiness. Differences exist in terms of the high proportion of males, high proportion of African American students (lower proportion of Caucasian and Latino/a), and higher proportion of full-time students.

The Program retains 64.4% of students from fall to spring, and 26.2% from one fall to the next. Between fall and spring 11.7% of students return to the College but change programs, and from one fall to the next 14.1% of student change programs. Of the students that depart the program, 2.2% leave with a degree and 42% leave with a GPA below 2.0 or having never completed a college level course. Looking at the courses in the Program, the course completion rate is 85%.

Four degrees were awarded between 2010 and 2014. Between 2009 and 2013, 56 students left the program. Forty-three of these students left with 12 credits or less.

ASET courses have run at 69% of capacity in the fall and 66% in the spring.

Assessment of the first PLO is complete and assessment of the remaining four PLOs will be completed in the spring of 2016. In response to assessment, the Program has evaluated benchmarks, utilized industry training videos, introduced clearer directions with a clearer structure defined, incorporated modeling of different aspects of the final project into the class, and clarified expectations of students regarding the final project. As part of the College's developing assessment plan, faculty should edit the current program curricular map to indicate where outcomes are being introduced, reinforced, mastered or assessed. This will clarify where assessment is supposed to occur. A focused evaluation of the program map revealed that students may be able to select a path through the curriculum in which they may not be asked to demonstrate proficiency in all program outcomes.

The ASET Program prepares graduates to enter the fields of Industrial Engineering Technology and Medical Equipment Repair. Locally, regionally, and nationally, careers in these areas are projected to grow over the next ten years. In Philadelphia, jobs in industrial engineering technology and medical equipment repair are projected to grow at approximately twice the rate of jobs nationwide. The majority of industrial engineering technician and medical equipment repair jobs are filled by people with some college or an associate's degree. The growth and the level of education both speak to the importance of offering these programs at the associate's level.

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<sup>1</sup> The primary investigation and evaluation period for this audit is Spring 2015. The audit does reference some program changes or projects on-going in Fall 2015, but the bulk of the report, including environmental scan demographic data and analysis of assessment reporting was conducted last academic year.

Locally, colleges offer programs in Engineering Technology, Process Technology, and Biomedical Equipment Repair. However, unlike the ASET Program, other institutions surveyed frequently differentiate between engineering technology programs and career programs and do not combine them into one degree option. "Engineering Technology," does encompass a broad discipline. Given that, it is problematic to align the ASET curriculum with engineering technology curricula offered at other institutions. Frequently, engineering technology programs have a broader curriculum that requires students to take a variety of courses in engineering, physics, and math. The program believes these distinctions are clarified for CCP students as part of the advising process.

The Program required significant startup resources for PTEC and BMET courses, which were funded by the College, the NSF, and Department of Labor grants. The Program has a flexible design in which certificates can be created in order to meet student and industry needs. Resources such as specialized equipment for proficiency certificate tracks have been funded through external grants; requiring faculty to balance a dual role in program and grant management. The current NSF grant includes funds for recruitment and student mentorship for the aligned Proficiency Certificate in Biomedical Equipment Technology. The current grant's sustainability plan calls for lab equipment to be maintained through continued donation, resource sharing with other CCP Allied Health programs, and capital budget request.

In 2014, both the ASET and Technical Studies programs underwent revisions which created overlap between the two programs. Both revisions include a block of credits that could be used for prior learning; ASET allows students to transfer up to 15 credits into this block, while Technical Studies allows students to transfer between 12 and 30 credits into this block. Technical Studies also added a 6-24 credit Personal Education Plan with a focus in either Technology or Business. The technology focus could incorporate classes from ASET. Additionally, some of the relationships forged with local unions or industry could be utilized by both programs.

## **II. Program Description**

### **A. Description from the College Catalog**

The Applied Science and Engineering Technology program prepares students for employment in a range of scientific technology occupations and also provides a foundation for transfer to four-year technology programs. The flexible design of the program allows students to choose from a range of scientific technology fields, including biomedical equipment technology, engineering technology and process technology, among others.

The program includes a set of courses required of all students and gives students the opportunity to select specialized courses in a particular field of interest, leading to a proficiency certificate in a specialized field. Some students may initially opt to finish a proficiency certificate without completing the degree in order to directly enter the workforce. Students who do so and who later decide to pursue the associate's degree will have a seamless transition to the degree program, since most credits earned through the proficiency certificate will also count toward the degree itself.

## **B. History and Revisions to the Curriculum**

The Program was revised in 2014 and the revision took effect in the fall of 2015. The revision consists of a series of changes to the existing program intended to provide students with a better pathway to employment and/or transfer. The changes include:

- Prior non-credit learning to be used to fulfill program requirements with a block of 15 credits incorporated to the Program that can be fulfilled by a combination of industry certifications, documented competencies, and /or directed electives.
- The creation of the Biomedical Equipment Technology (BMET) proficiency certificates.
- The Biology and English 117 course requirements were deleted.
- The Biotechnology PC and the Biomedical Technician Proficiency Certificates were moved into the Biology Degree and subsequently closed by the Biology Department.
- The list of directed electives has been modified and some courses that were directed electives have become program requirements; consequently, the list of directed electives has been modified.
- As a result of these changes there was a two-credit increase in the number of credits required for graduation
- The ASET program was originally housed in the Biology Department, but now the Program is located in the Physics Department.

A series of changes were made with the intention of providing students with a better pathway to employment and/ or transfer and to provide an opportunity for prior non-credit learning to be used to fulfill program requirements. The Program currently provides students with two pathways: Biomedical Engineering Technology or Process Technology. Two certificates are offered in each area: Biomedical Equipment Technician Proficiency Certificate I, Biomedical Equipment Technician Proficiency Certificate II, Process Technology I Proficiency Certificate, and Process Technology II Proficiency Certificate.



### C. Curriculum Sequence

| Course Number and Name   | Pre & Co-requisites   | Credits         | Gen Ed Req.        |
|--|---|-----------------|--------------------|
| <b>First Semester</b>  |   |                 |                    |
| FNMT 118 - Intermediate Algebra or higher*   |   | 3               | Mathematics        |
| ASET 101 - Science, Technology and Public Policy or BMET 101   | BMET: BIOL 108 pre or co requisite  | 3 or 4          | Science            |
| Directed Electives [Prior Learning Assessment may be applied]**  |   | 15              |                    |
| <b>Second Semester</b>   |   |                 |                    |
| ENGL 101 - English Composition I   |   | 3               | Composition        |
| CIS 103 - Applied Computer Technology  |   | 3               | Tech Comp          |
| ELEC 120 - DC and AC Circuits  | FNMT 118 or MATH 118 pre or co- requisite   | 4               |                    |
| PTEC 103 - Introduction to Process Technology and Plant Equipment<br>or BMET 102 - Introduction to Biomedical Equipment Repair Technology II | FNMT 118 or MATH 118 ready & CHEM 110 for PTEC 103<br><br>BMET 101 for BMET 102               | 4<br><br>4      |                    |
| <b>Third Semester</b>  |   |                 |                    |
| ENGL102 - The Research Paper   | ENGL 101 "C" or better  | 3               | ENGL 102, Info Lit |
| ELEC 130 - Digital Electronics or ELEC 125 - Semiconductor Devices   | ELEC 120  | 4               |                    |
| CHEM 110 - Introductory Chemistry or higher*   | FNMT 118 or MATH 118 ready and ENGL 101 ready   | 4               | Science            |
| ASET 110 - Safety, Health and the Environment or BMET 201- Medical Devices   | BMET 103: BMET 201  | 3 or 4          |                    |
| Humanities – Elective  |   | 3               | Humanities         |
| <b>Fourth Semester</b>   |   |                 |                    |
| PHYS 105 - Survey of Physics or higher*  |   | 4               |                    |
| ASET 130 - Quality Control Quality Assurance<br>or BMET 202 - Medical Devices in a Networked Environment                                     | ASET 130: FNMT 118 or MATH 118<br><br>BMET 201: BMET 202, ELEC 130 and, CIS 150 "C" or better | 3 or 4<br><br>3 |                    |
| Social Science – Elective  |   | 3               | Social Sciences    |
| <b>Minimum Credits Needed to Graduate:</b>   |   | <b>62</b>       |                    |

\*Qualified students, especially those interested in transfer to a 4-year Engineering Technology program, are encouraged to take higher level courses in Math, Physics and Chemistry.

\*\* Students may submit industry certifications and/or other proof of prior learning for credit consideration.

### D. Curriculum Map

The following table demonstrates how learning activities in specific courses map to these program learning outcomes.

| Required Courses | Programmatic Student Learning Outcomes                              |   |  |  |                                    |
|------------------|---|---|--|--|------------------------------------|
|                  | Demonstrate foundational knowledge in at least one technology field | Demonstrate laboratory skills in basic science and technology areas | Demonstrate an understanding of the interplay between scientific information and public policy and standards | Present technical information in oral, written or graphic format | Work effectively as part of a team |
| ASET 101         |   |   | *  | *  |                                    |
| B:\ifET 101      | ●   | *   |  |  |                                    |
| ELEC 120         | ●   | *   |  |  |                                    |
| PTEC 103         | ●   |   |  |  |                                    |
| B:\ifET 102      |   |   | ●  | *  | *                                  |
| CHEM 110         |   | *   |  |  |                                    |
| ASET 130         |   |   |  |  | *                                  |

### E. Advisory Committee

Recent ASET meeting discussions have focused on the local industry, students' math background, marketing the program to students, industry requirements for jobs (associates versus bachelors), an articulation agreement with Drexel University, and other possible certificates that the program could offer. Additionally, the Advisory Committee discussed the Mayor's taskforce on manufacturing, Philadelphia School District's Center for Advanced Manufacturing (Ben Franklin High School), local jobs, placement tests, the proportion of developmental students, the civil servant test for Philadelphia Water Department jobs, the age bubble at Monroe Energy (average age 57 years), graduates' interviewing skills, internships, the possible creation of an engineering and design course, paid internships, and the possible expansion into other industry clusters. The ASET program is further supported by an active advisory board for the proficiency certificate in Biomedical Equipment Technology (BMET); who are specifically evaluating and advising on curricular development.

### F. Future Directions of the Field/Program

Opportunities in the technical fields are changing and growing due to economic improvement, innovations in technology and the aging workforce. In order to address emerging opportunities, the program offers proficiency certificates that provide students with knowledge and skills in a specialized area through credit courses, which also apply toward the AAS degree. Some areas of concentration could include maritime technology, food and beverage processing, and nanotechnology based on available resources. The College was recently included as a partner on an NSF grant to explore and potentially develop a nanotechnology certificate program as part of the ASET program, in conjunction with the Sigh Center for Nanotechnology and the University of Pennsylvania.

## III. Profile of the Faculty

### A. Program Faculty

| Faculty         | Position                                 | Courses Taught  |
|-----------------|--|---|
| Randy Libros    | Program Director,<br>Associate Professor | Science, Technology and Public Policy (ASET 101)<br>Introduction to Process Technology (PTEC 101) |
| Kathleen Harter | Associate Professor                      | Science, Technology and Public Policy (ASET 101)  |
| William Eisen   | Adjunct                                  | Quality Assurance/Quality Control (ASET 130)<br>PTEC 102/103                                      |
| Linda Gerz      | Adjunct                                  | Health, Safety and the Environment (ASET 110)<br>Science, Technology and Public Policy (ASET 101) |
| Edward Snyder   | Adjunct                                  | Biomedical Equipment Technology I (BMET 101)  |

Note: There are no faculty members assigned full time to the program. All faculty who teach ASET or related certificate courses, both full time and part time, have primary assignments either in the Physics Department or the Chemistry Department.

**IV. Program Characteristics**

**A. Student Profile**

Since the Applied Science and Engineering Technology Program opened in 2009, enrollment has been steadily increasing each fall. In the fall of 2013, enrollment was 63 students.

Table 1: Headcounts

|  |               | <b>Fall<br/>2009</b> | <b>Fall<br/>2010</b> | <b>Fall<br/>2011</b> | <b>Fall<br/>2012</b> | <b>Fall<br/>2013</b> | <b>5 Year<br/>Average</b> | <b>5 Year<br/>Change</b> |
|--|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------------|--------------------------|
| Applied Services &<br>Engineering Technology | Headcount     | 5                    | 17                   | 32                   | 50                   | 63                   | 33                        | 1160%                    |
|  | FTE Headcount | 4                    | 15                   | 22                   | 33                   | 43                   | 23                        | 975%                     |
| Math, Science, and<br>Health Careers         | Headcount     | 6188                 | 6637                 | 6912                 | 6702                 | 6857                 | 6,659                     | 11%                      |
|  | FTE Headcount | 4339                 | 4701                 | 4796                 | 4651                 | 4762                 | 4,650                     | 10%                      |
| College                                      | Headcount     | 19047                | 19502                | 19752                | 18951                | 19065                | 19,263                    | 0%                       |
|  | FTE Headcount | 13361                | 13697                | 13682                | 13106                | 13163                | 13,402                    | -1%                      |

The Applied Science and Engineering Technology is one of four programs in the Division that is non-select (Culture, Science and Technology, Health Services Management (HSVM)<sup>2</sup>, Chemical Technology, and ASET), the other 9 programs are all select. When making comparisons between students in the ASET Program and the MSH Division, one should keep in mind that the select programs in the Division have higher standards for acceptance. The Applied Science and Engineering Technology Program enrolls students with similar demographics as the Division and the College in terms of age and level of college readiness. Some differences exist in gender, race/ethnicity, and full-time status. The program enrolls approximately three times the proportion of males compared to the Division and the College; however, approximately 91% of medical equipment repairers are male and 83% of industrial engineering technicians are male. Approximately 10% more students in the Program are African American compared to the Division and College, while 7.5% fewer students in the Program are Caucasian. The Program records a higher proportion of students enrolled full-time than the Division and the College.

Table 2: Demographics: Running 5 Year Average

|                    | <b>ASET</b> | <b>MSH</b> | <b>College</b> |
|--------------------|-------------|------------|----------------|
| Female             | 23.6%       | 74.8%      | 64.2%          |
| Male               | 76.4%       | 24.9%      | 35.4%          |
| Unknown            | 0.0%        | 0.3%       | 0.5%           |
| <hr/>              |             |            |                |
| Native American    | 1.2%        | 0.3%       | 0.4%           |
| Asian              | 9.1%        | 8.5%       | 7.3%           |
| African American   | 57.8%       | 48.0%      | 48.8%          |
| Latino/a           | 8.5%        | 10.1%      | 10.5%          |
| Multiracial        | 3.3%        | 2.1%       | 2.3%           |
| Pacific Islander   | 0.0%        | 0.3%       | 0.2%           |
| Unknown            | 3.3%        | 6.4%       | 6.8%           |
| Caucasian          | 16.7%       | 24.2%      | 23.8%          |
| <hr/>              |             |            |                |
| 16 – 21            | 29.1%       | 29.7%      | 32.5%          |
| 22 – 29            | 43.5%       | 38.6%      | 36.6%          |
| 30 – 39            | 17.5%       | 20.5%      | 17.0%          |
| 40 +               | 8.8%        | 10.5%      | 13.0%          |
| Unknown            | 1.2%        | 0.7%       | 0.9%           |
| <hr/>              |             |            |                |
| Full Time          | 35.0%       | 27.6%      | 31.2%          |
| Part Time          | 65.0%       | 72.4%      | 68.8%          |
| <hr/>              |             |            |                |
| All Developmental  | 30.3%       | 32.9%      | 28.3%          |
| Some Developmental | 48.0%       | 45.4%      | 43.9%          |
| College Level      | 21.7%       | 21.8%      | 27.8%          |

<sup>2</sup> HSVM has been non-select from its inception until spring 2016; the Program will become select in the fall of 2016, per the approval of the March 2016 program revision. (Health Care Studies has been revised to become non-select

and the Chemical Technology Program has been closed)

The Applied Science and Engineering Program records weaker outcomes than that of the Division and the College in most areas. The Program records a higher rate of students on probation and a lower rate of students in good academic standing compared to the Division and the College. Students leave the school and the Program at a higher rate than the Division and the College. A lower proportion of students depart the Program due to graduation and a higher proportion of students depart unsuccessfully compared to the Division and the College. The Program records a lower course completion rate than the Division and the College, and the average GPA of students in the Program is marginally lower than the average GPA across the College and Division.

Table 3: Outcomes Data: 5 Year Averages (Fall 2010- Spring 2014)

|                          |                    | Applied Science &<br>Engineering Technology | Math, Science, &<br>Health Careers | College |
|--------------------------|--------------------|---|------------------------------------|---------|
| Standing                 | Good Standing      | 81%   | 86%                                | 85.0%   |
|                          | Probation          | 18%   | 13%                                | 13.5%   |
|                          | Dropped            | 1%  | 1%                                 | 1.6%    |
| Fall-Spring<br>Retention | Returned/Same      | 64.4%                                       | 70.5%                              | 65.8%   |
|                          | Returned/Different | 11.7%                                       | 3.6%                               | 5.2%    |
|                          | Graduated          | 0.6%  | 1.5%                               | 2.1%    |
|                          | Did Not Return     | 23.3%                                       | 24.4%                              | 26.9%   |
| Fall-Fall<br>Retention   | Returned/Same      | 26.2%                                       | 36.7%                              | 36.7%   |
|                          | Returned/Different | 14.1%                                       | 8.6%                               | 8.6%    |
|                          | Graduated          | 4.6%  | 8.4%                               | 8.4%    |
|                          | Did Not Return     | 55.2%                                       | 46.4%                              | 46.4%   |
| Success at<br>Departure  | Graduated          | 2.2%  | 10.0%                              | 10.0%   |
|                          | Long Term Success  | 38.9%                                       | 38.8%                              | 36.2%   |
|                          | Short Term Success | 16.1%                                       | 13.9%                              | 17.2%   |
|                          | Unsuccessful       | 42.8%                                       | 37.3%                              | 36.6%   |
| Course<br>Outcomes       | Course Completion  | 85.3%                                       | 89.5%                              | 88.2%   |
|                          | GPA                | 2.53  | 2.63                               | 2.65    |

“Graduated” are students who earned certificates or associates degrees at the College. “Long term success” is defined as departure with a GPA of 2.0 or greater and 12 or more cumulative credit hours earned. “Short term success” is defined as departure with a GPA of 2.0 or greater and 11 or fewer cumulative credit hours earned. The “unsuccessful” departure group includes all departing students not otherwise classified including students who never complete a college-level course.

**Transfer and Graduation**

Applied Science and Engineering Technology is an A.A.S. and, therefore, the focus of this program is direct-to-work as opposed to transfer. Looking at the students who entered the Program between the fall of 2009 and the spring of 2013, approximately 34% of Applied Science and Engineering Technology students who departed transferred.

Among students who entered the Program between 2009 and 2013, 74 students departed. The majority (64%) of those students departed with less than twelve credits (count of 47). Of those former students, 34%(count of 25) transferred. Four students graduated from the Program between 2010 and 2014.

Table 4: Degrees Awarded

|  | 2010 | 2011 | 2012 | 2013 | 2014 | Total |
|--|------|------|------|------|------|-------|
| Applied Science & Engineering Technology | -    | -    | 3    | 0    | 1    | 4     |
| Math, Science, and Health Careers        | 594  | 617  | 705  | 713  | 709  | 3947  |
| College                                  | 1908 | 1949 | 2101 | 2039 | 2246 | 12368 |

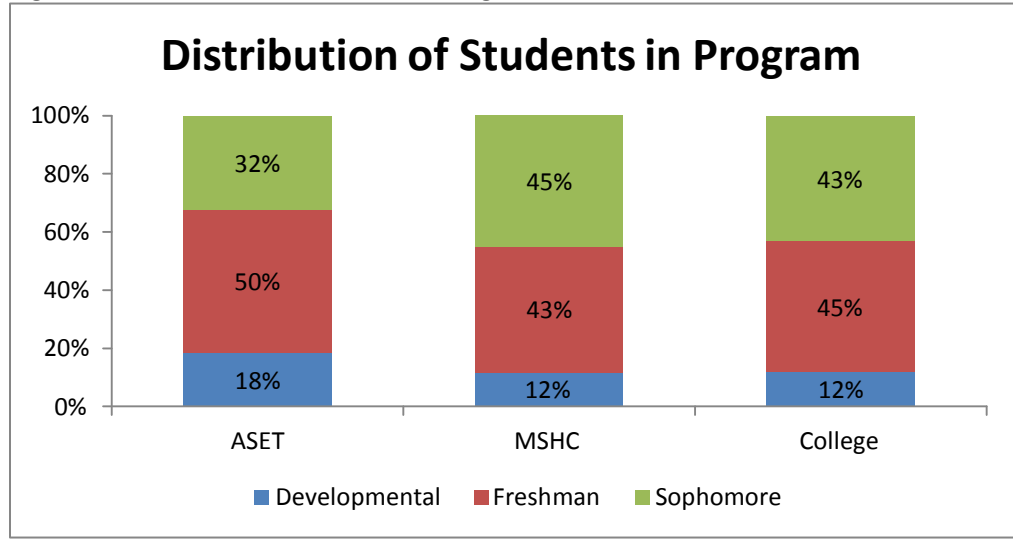
Figure 1: Transfer at Departure

| Exit Status                 | Transferred |         | Did Not Transfer |         | Total Count of Departing Students |
|-----------------------------|-------------|---------|------------------|---------|-----------------------------------|
|                             | Count       | Percent | Count            | Percent |                                   |
| Graduate                    | 4           | 67%     | 2                | 33%     | 6                                 |
| Earned 45 or more credits   | 2           | 29%     | 5                | 71%     | 7                                 |
| Earned 24 to 44 credits     | 5           | 56%     | 4                | 44%     | 9                                 |
| Earned 12 to 23 credits     | 0           | 0%      | 5                | 100%    | 5                                 |
| Earned less than 12 credits | 14          | 30%     | 33               | 70%     | 47                                |
| Grand Total                 | 25          | 34%     | 49               | 66%     | 74                                |



The College and Division record almost equal proportions of freshmen and sophomores. However, within the Applied Science and Engineering Technology Program, there are 18% more freshmen than sophomores. This could be explained by the program being new, the population increasing and/or by students not passing gatekeeper courses.

Figure 2: Distribution of Students in Program



On average, the Applied Science and Engineering Program runs approximately 3.5 sections per semester, with average enrollments of approximately 25 students during the fall and 22 in the spring semester. On average, fall sections are at 69% of capacity and spring sections run at 66% of capacity. These capacities are 19% lower than the Division (16% lower than the College) in the fall and 22% lower than the Division (18% lower than the College) in the spring. (See table on page 7)

Table 5: Section Enrollments- Applied Science & Engineering Technology

|          |                | <b>Fall<br/>2009</b> | <b>Spring<br/>2010</b> | <b>Fall<br/>2010</b> | <b>Spring<br/>2011</b> | <b>Fall<br/>2011</b> | <b>Spring<br/>2012</b> | <b>Fall<br/>2012</b> | <b>Spring<br/>2013</b> | <b>Fall<br/>Average</b> | <b>Spring<br/>Average</b> |
|----------|----------------|----------------------|------------------------|----------------------|------------------------|----------------------|------------------------|----------------------|------------------------|-------------------------|---------------------------|
| Program  | Sections       | 4                    | 6                      | 4                    | 2                      | 3                    | 3                      | 3                    | 3                      | 3.50                    | 3.50                      |
|          | Avg Enrollment | 22.50                | 17.67                  | 27.00                | 21.50                  | 23.00                | 25.67                  | 27.33                | 21.67                  | 24.96                   | 21.63                     |
|          | Percent Filled | 63%                  | 74%                    | 75%                  | 60%                    | 64%                  | 71%                    | 76%                  | 60%                    | 69%                     | 66%                       |
| Division | Sections       | 972                  | 1043                   | 993                  | 893                    | 962                  | 973                    | 930                  | 836                    | 957.60                  | 938.40                    |
|          | Avg Enrollment | 22.14                | 21.53                  | 22.16                | 22.25                  | 22.06                | 21.72                  | 22.06                | 22.40                  | 21.97                   | 21.78                     |
|          | Percent Filled | 89%                  | 88%                    | 88%                  | 88%                    | 89%                  | 87%                    | 88%                  | 88%                    | 88%                     | 88%                       |
| College  | Sections       | 2881                 | 3096                   | 3023                 | 2940                   | 2939                 | 3007                   | 2756                 | 2738                   | 2858.60                 | 2922.00                   |
|          | Avg Enrollment | 22.29                | 21.97                  | 21.87                | 22.13                  | 21.84                | 21.63                  | 22.23                | 22.06                  | 21.88                   | 21.80                     |
|          | Percent Filled | 87%                  | 86%                    | 85%                  | 85%                    | 84%                  | 83%                    | 86%                  | 84%                    | 85%                     | 84%                       |

## **V. Learning Outcomes and Assessment**

### **A. Student Learning Outcomes**

Upon completion of the Applied Science and Engineering Technology program, graduates will be able to:

1. Demonstrate foundational knowledge in at least one technology field
2. Demonstrate laboratory skills in basic science and technology areas
3. Demonstrate an understanding of the interplay between scientific information and public policy and standards
4. Present technical information in oral, written or graphic format
5. Work effectively as part of a team

### **B. Assessment**

The Program has completed assessment for PLO #1 and had assessed some measures of the other four PLOs. The full cycle of assessment is scheduled to be completed by spring of 2016. In response to assessment, the Program has evaluated benchmarks, utilized industry training videos, introduced clearer directions with a clearer structure defined, incorporated modeling of different aspects of the final project into the class, and clarified expectations of students regarding the final project.

A few issues were noted in the way that faculty carry out assessment. First, the Program's curricular plan includes a choice of pathways. However, the curriculum map does not provide clear evidence that, as an individual makes course selections, the program has ensured introduction and practice to every program outcome. Additionally, the curriculum map does not indicate where outcomes are introduced, reinforced, mastered, and assessed. The program should edit the curriculum map so that the document maps the pathways equally. Second, summarizing assessment activities, the program faculty state that they have made changes but do not describe the specific changes. For example, PLO #3 was assessed in the fall of 2015, program faculty state that, "Changes implemented during the Spring 2015 semester based upon data from the previous semester appears to have had a positive impact, though the outcome this semester was more aligned to the outcomes of the Fall 2012 and Fall 2013 semesters. We will continue to monitor the outcome and consider increasing the benchmark to 75%." Future assessments should be more specific as to the type of program changes that are being made to address assessment results. Third, the program faculty state that assessment results pertain to a course in a different department and since the course is in a different department faculty are unable to directly change the practices in the course even though the course is an important means to assessing the PLO. The action plans should address how they plan to overcome this challenge. The Program is using a final lab grade (indirect measure) to assess the outcome, because the course is not housed within the ASET Program. Lastly, the program faculty noted that overall students are scoring lower on writing assignments than in previous semesters and note that this may be an outcome of weaker writing ability among students. Faculty will be modeling the writing assignment differently and reassess the results for impact.

**Audit Assessment Overview: ASET**

| <b>PLO Assessed (2010-2015): Demonstrate foundational knowledge in at least one technology field</b> |  |   |   |   |
|--|--|---|---|---|
| <b>Semester Evidence is Collected</b>  | <b>Source of Evidence / Type of Assignment</b>   | <b>Population &amp; Benchmark</b>                                       | <b>Results</b>                                      | <b>Plan for Improvement</b>   |
| Spring 2012  | PTEC 101 SLO 7: Understand and interpret flow diagrams that are integral to process systems. Students will correctly answer embedded questions on final exam                                   | Students in PTEC 101<br>70% of students will answer questions correctly | 85% of students answered correctly<br><br>n = 13    | Benchmark met. Establishing baseline  |
| Spring 2012  | PTEC 101 SLO 7: Understand and interpret flow diagrams that are integral to process systems. Students will correctly answer embedded questions on final exam                                   | Students in PTEC 101<br>70% of students will answer questions correctly | 80% of students answered correctly<br><br>n = 15    | Benchmark met. Review to ensure sufficient challenge for students.                                    |
| Fall 2013  | PTEC 102 SLO 2. The student will explain the operating principles and function of pumps, motors, tanks and vessels used in the process industry in order to demonstrate foundational knowledge | Students in PTEC 102<br>70% of students will answer questions correctly | 50% of students scored 70% or better.<br><br>n = 4  | Utilize training DVD produced by Sunoco and still used by Honeywell, companies in process industries. |
| Fall 2013  | PTEC 102 SLO 3. The student will explain the operating principles and function of turbines and heat exchangers used in the process industry in order to demonstrate foundational               | Students in PTEC 102<br>70% of students will answer questions correctly | 100% of students scored 70% or better.<br><br>n = 4 | Benchmark met, however with n = 4 this SLO will be further monitored.                                 |

**PLO Assessed (2010-2015): PLO 2: Demonstrate laboratory skills in basic science and technology areas**

|                    |  |   |   |  |
|--------------------|--|---|---|--|
| <p>Spring 2016</p> | <p>Laboratory activities and lab reports where students utilize digital multimeters and/or oscilloscopes to make basic circuit measurements, important laboratory skills for technology.</p>   | <p>All students in ELEC 120 (course will be offered for the first time Spring 2016)</p> <p>Class average on assignment is at least 70%</p>    |   |  |
|                    | <p>Lab final where students will be given a schematic diagram and asked to build a circuit based on that diagram, and use appropriate instruments to measure specific circuit parameters. Interpretation of simple schematic diagrams and the ability to build a circuit based on the diagram is an important technical skill.</p> | <p>All students in ELEC 120 (course will be offered for the first time Spring 2016)</p> <p>At least 70% of class will pass the lab final)</p> |   |  |
| <p>Fall 2015</p>   | <p>Test questions where students must read and interpret sections of a technical service manual, an important technical skill</p>  | <p>All students in BMET 101 (This course is being offered for the first time Fall 2015)</p> <p>70% of students</p>                            | <p>To be assessed in fall 2015. This is a new course being offered for the first time in fall 2015.</p> |  |

|             |  |   |  |  |
|-------------|--|---|--|--|
|             |  | answer questions correctly  |  |  |
| Fall 2015   | Lab exercise where students must refer to a technical service manual and apply information from the manual in testing of a medical device.   | All students in BMET 101 (This course is being offered for the first time Fall 2015)<br><br>Class average on lab assignment is at least 70% | To be assessed in fall 2015. This is a new course being offered for the first time in fall 2015. |  |
| Fall 2015   | Students will demonstrate an ability in the laboratory to work safely and proficiently in handling the common laboratory equipment and chemicals used to carry out laboratory procedures, and to collect, record and analyze data. | All students taking CHEM 110<br><br>80% of students will achieve a grade of C or better for their lab grade                                 | To be assessed in fall 2015  |  |
| Spring 2015 | Students will demonstrate an ability in the laboratory to work safely and proficiently in handling the common laboratory equipment and chemicals used to carry out laboratory procedures, and to collect, record and analyze       | All students taking CHEM 110<br><br>80% of students will achieve a grade of C or better for their lab grade                                 | 93.0% n = 264  | The benchmark has been exceeded by a significant margin for two semesters in a row. We will consider increasing the benchmark. Note that this is a course in a different department so we cannot directly change their practice, even though the results |

|  |  |   |               |  |
|--|--|---|---------------|--|
|  | data.  |   |               | clearly support that the course is providing important laboratory skills to program students.  |
| Fall 2014  | Students will demonstrate an ability in the laboratory to work safely and proficiently in handling the common laboratory equipment and chemicals used to carry out laboratory procedures, and to collect, record and analyze data. | All students taking CHEM 110<br><br>80% of students will achieve a grade of C or better for their lab grade | 95.2% n = 398 | The benchmark has been exceeded by a significant margin. Note that this is a course in a different department so we cannot directly change their practice, even though the results clearly support that the course is providing important laboratory skills to program students. |
| Up until now this outcome has been assessed based on the lab grades of CHEM 110 students. The benchmark for this assessment has been exceeded by a significant margin, indicating that CHEM 110 effectively helps the program fulfill this PLO. We will review the benchmark and consider increasing it. In addition, as of the Fall, 2015 semester, a new course will be offered (BMET 101) which includes two course level SLOs relevant to this PLO. The outcome will be assessed again during the Fall, 2015 semester. |  |   |               |  |
| <b>PLO #3: Demonstrate an understanding of the interplay between scientific information and public policy and standards</b>  |  |   |               |  |
| Spring 2016  | Test questions where students must Demonstrate understanding of basic safety and safety standards in in the following areas:<br>•Electrical<br>•Fire<br>•Pressurized gas   | Students in BMET 102 (offered for the first time in Sp 2016)<br><br>70% of students answer question         |               |  |

|             |  |  |   |   |
|-------------|--|--|---|---|
|             | <ul style="list-style-type: none"> <li>•Infection control/universal precautions</li> <li>•Chemical/MSDS</li> <li>•Radiology safety</li> <li>•Laser safety . Students will need to understand the scientific foundation for these safety standards.</li> </ul>                          | correctly  |   |   |
| Fall 2015   | Final project where students discuss how new technologies impact society in a variety of ways, such as creating ethical and legal issues, altering employment trends, and shifting government priorities and spending. Students must base their discussion on a scientific foundation. | <p>All students taking ASET 101</p> <p>Class average on final project is 70% or better</p> | <p>class average was 72.4%</p> <p>n =37</p> | This is slightly above the benchmark. Changes implemented during the Spring 2015 semester based upon data from the previous semester appears to have had a positive impact, though the outcome this semester was more aligned to the outcomes of the Fall 2012 and Fall 2013 semesters. We will continue to monitor the outcome and consider increasing the benchmark to 75%. |
| Spring 2015 | Final project where students discuss how new technologies impact society in a variety of ways, such as creating ethical and legal issues, altering employment trends, and shifting government priorities and spending. Students must base their discussion on a scientific foundation. | <p>All students taking ASET 101</p> <p>Class average on final project is 70% or better</p> | Class average: 68.0%                        | This is slightly below the benchmark. The previous two cycles the class average was above the benchmark. It is noted that the two written sections of the final project used to assess written communication are also lower than previous cycles, so the lower class average here may be  |



|           |   |  |                                |  |
|-----------|---|--|--------------------------------|--|
|           |   |  |                                | <p>an artifact of weaker writing ability among the students in general. Changes being implemented for the Energy Resource Description section of the final project will likely have a positive impact on the overall final project grade. We will monitor this outcome in the next cycle. (See files: ASET 101 Final Project for Spring 2015, Fall, 2014, Fall 2013 and Fall 2012 to see changes in the assignment to better clarify requirements, add additional sections, and provide modeling to students.)</p> |
| Fall 2014 | <p>Final project where students discuss how new technologies impact society in a variety of ways, such as creating ethical and legal issues, altering employment trends, and shifting government priorities and spending. Students must base their discussion on a scientific foundation.</p> | <p>All students taking ASET 101</p> <p>Class average on final project is 70% or better</p> | Fall 2013 class average: 72.3% | Benchmark met. Still establishing baseline. Continue to monitor.   |
| Fall 2013 | <p>Final project where students discuss how new technologies impact society in a variety of ways, such as creating ethical and legal issues, altering employment trends, and</p>  | <p>All students taking ASET 101</p> <p>Class average on final project is 70%</p>           | Fall 2012 Class average: 76.1% | Benchmark met. Still establishing baseline. Continue to monitor.   |

|  |  |   |  |  |
|--|--|---|--|--|
|  | shifting government priorities and spending. Students must base their discussion on a scientific foundation.   | or better   |  |  |
| Fall 2012  | Final project where students discuss how new technologies impact society in a variety of ways, such as creating ethical and legal issues, altering employment trends, and shifting government priorities and spending. Students must base their discussion on a scientific foundation. | All students taking ASET 101<br><br>Class average on final project is 70% or better |  |  |
| <p>While the benchmark for this learning outcome has been met 3 of the 4 semesters when data was collected there is clearly room for improvement. It appears that recently introduced changes to the final project in ASET 101 have had a positive impact, but at this point we have data for only one semester since the change was introduced. We will collect data from the ASET 101 final project again in the Fall of 2015 and make a determination of what action may be needed at that time. In addition BMET 102, which has a course level outcome that supports this program level outcome, will be offered for the first time in the Spring, 2016. This will provide a second assessment for this PLO.</p> |  |   |  |  |
| <p><b>PLO Assessed (2010-2015): PLO 4: Present technical information in oral, written or graphic format.</b></p>   |  |   |  |  |
| Spring 2016  | Classroom Presentation where students explain technical aspects of a specific medical device, safety issues related to the device, and discuss a common repair problem for the device. Requires that students present technical information in oral form.                              | All students in BMET 102<br><br>Class average is 70% or better                      | To be assessed in spring 2016 (new course which will be offered for the first time in Spring 2016) |  |

|           |   |  |                             |  |
|-----------|---|--|-----------------------------|--|
| Fall 2015 | The energy resource section of the final project requires a written description of technical information  | All students taking ASET 101<br><br>Class average is 70% or better | To be assessed in fall 2015 |  |
| Fall 2015 | The energy recommendation section of the final project requires students to utilize technical information to support their viewpoint in written format. | All students taking ASET 101                                       | To be assessed in fall 2015 |  |
| Fall 2015 | Homework or exam question that requires interpretation and drawing of graphs in order to communicate information visually                               | All students taking ASET 101<br><br>Class average is 70% or better | To be assessed in fall 2015 |  |
| Fall 2015 | Section of final project that requires students to visually communicate information comparing two different energy sources                              | All students taking ASET 101<br><br>Class average is 70% or better | To be assessed in fall 2015 |  |
| Fall 2015 | Oral communication of results of final project to the class   | All students taking ASET 101<br><br>Class average is 70% or better | To be assessed in fall 2015 |  |

|             |   |  |                     |  |
|-------------|---|--|---------------------|--|
| Spring 2015 | The energy resource section of the final project requires a written description of technical information  | All students taking ASET 101<br><br>Class average is 70% or better | 70.5%<br><br>n = 42 | This is the first semester since this particular assessment tool has been used that the benchmark has been met, albeit by a narrow margin. Pedagogical changes related to the final project may be responsible for the increased performance by students (improvement ranges between 9%--17% over the last three years). We will assess this outcome again in Fall 2015 to see if the improvement holds before introducing any additional changes. |
| Spring 2015 | The energy recommendation section of the final project requires students to utilize technical information to support their viewpoint in written format. | All students taking ASET 101<br><br>Class average is 70% or better | 78.5%<br><br>n = 34 | Benchmark met.   |
| Spring 2015 | Homework or exam question that requires interpretation and drawing of graphs in order to communicate information visually                               | All students taking ASET 101<br><br>Class average is 70% or better | 90.1%<br><br>n = 38 | Benchmark met.   |

|             |   |  |                     |  |
|-------------|---|--|---------------------|--|
| Spring 2015 | Graph interpretation questions on unit test (average of correct answers for 3 questions). In order to communicate information visually it is necessary to be able to understand and interpret information presented in a graphical format. Since this does not directly measure their ability to actually present data visually this is an indirect measure that demonstrates a highly related skill. | All students taking ASET 101<br><br>Class average is 70% or better | 88.6%<br><br>n = 38 | Benchmark met. This is an additional assessment that was added during this assessment round to identify any potential areas for increased student success in this area.  |
| Spring 2015 | Oral communication of results of final project to the class   | All students taking ASET 101<br><br>Class average is 70% or better | 89.5%<br><br>n = 37 | Benchmark met  |
| Fall 2014   | The energy resource section of the final project requires a written description of technical information  | All students taking ASET 101<br><br>Class average is 70% or better | 52.6%               | Benchmark not met. Introduction of clearer directions, with greater structure defined for students, has not had the desired effect. We will incorporate modeling of different aspects of the final project into the class. |

|           |   |  |                     |  |
|-----------|---|--|---------------------|--|
| Fall 2014 | The energy recommendation section of the final project requires students to utilize technical information to support their viewpoint in written format. | All students taking ASET 101<br><br>Class average is 70% or better | 71.3%               | Benchmark met. However there is clear room for improvement. We will incorporate modeling of different aspects of the final project into the class.   |
| Fall 2014 | Homework or exam question that requires interpretation and drawing of graphs in order to communicate information visually                               | All students taking ASET 101<br><br>Class average is 70% or better | 88.6%<br><br>n = 38 | Benchmark met  |
| Fall 2014 | Oral communication of results of final project to the class   | All students taking ASET 101<br><br>Class average is 70% or better | 87.3%               | Benchmark met  |
| Fall 2013 | The energy resource section of the final project requires a written description of technical information  | All students taking ASET 101<br><br>Class average is 70% or better | 61.2%               | Benchmark not met. Instructions for this section of the final project were modified previously, and there is some improvement over the previous assessment cycles. Further modifications will be incorporated to ensure that students fully understand what is expected of them. |
| Fall 2013 | The energy recommendation section of the final project requires students to utilize   | All students taking ASET 101                                       | 78.5%               | Benchmark met  |

|           |   |  |       |   |
|-----------|---|--|-------|---|
|           | technical information to support their viewpoint in written format.   | Class average is 70% or better                                 |       |   |
| Fall 2013 | Homework or exam question that requires interpretation and drawing of graphs in order to communicate information visually                               | All students taking ASET 101<br>Class average is 70% or better | 77.9% | Benchmark met. Additional assessment will be added to identify any potential areas for increased student success in this area.  |
| Fall 2012 | The energy resource section of the final project requires a written description of technical information  | All students taking ASET 101<br>Class average is 70% or better | 56.1% | Benchmark not met. Students may not fully understand expectations for this section of the final project. Instructions to students will be modified to clarify expectations. |
| Fall 2012 | The energy recommendation section of the final project requires students to utilize technical information to support their viewpoint in written format. | All students taking ASET 101<br>Class average is 70% or better | 74.3% | Benchmark met.  |
| Fall 2012 | Homework or exam question that requires interpretation and drawing of graphs in order to communicate information visually                               | All students taking ASET 101<br>Class average is 70% or better | 86.7% | Benchmark met. Establishing baseline  |
|           |   |  |       |   |

|             |   |   |   |  |
|-------------|---|---|---|--|
| Spring 2012 | PTEC 101 SLO 2. Work effectively as part of a team such as those which would be encountered when working in process industries        | Students in PTEC 101<br><br>70% of students will earn a grade of 70% or better for their team presentations | 92% of students scored 70% or better<br><br>n = 12  | Benchmark met. Establishing baseline                               |
| Spring 2013 | PTEC 101 SLO 2.<br><br>Work effectively as part of a team such as those which would be encountered when working in process industries | Students in PTEC 101<br><br>70% of students will earn a grade of 70% or better for their team presentations | 100% of students scored 70% or better<br><br>n = 15 | Benchmark met. Review to ensure sufficient challenge for students. |



### **C. QVIs/335s**

The Program is up-to-date on all Act 335s. QVIs for the program from 2012 through 2014 were evaluated for this audit. The QVI scores reflect the program quality and viability at a specific point in time. Although certain areas may have changed since the Program was scored, scores from the past remain on record.

The Program recorded a quality score of three in 2012; by 2014, the score had increased to 3.5. The increase in score can be explained by the creation and implementation of an assessment plan. Over the same time period, the Program experienced a decrease in viability from 2.5 to 1.2. The decrease can be attributed to poor retention, graduation rates, and degrees awarded.

### **VI. Resources**

The Biomedical Equipment courses in the Program require significant resources that are funded by the College and a National Science Foundation grant. Resources provided by the College include: renovation (widening of space, outfitting with laboratories, installation of a compressed air manifold, installation of window shades), furniture, and computers. The NSF grant includes specialized equipment for the lab (specialized equipment over \$5000: Infusion Device Analyzer, Vital Signs Simulator, Physiologic Monitor, Electrosurgery Unit Testers, Defibrillator/pacer, Defib/Pacer Analyzer (Delta 3000A), Ventilator Tester with test lung, Network Equipment for Lab) .

A previous Department of Labor grant covered the cost of the Process Technology courses in the Program.

### **VII. Demand**

The objective of the Applied Science and Engineering Technology Program is to train graduates for careers as process technicians and medical equipment repairers. The Program also intends to prepare students for transfer into an Engineering Technology Program.

Locally, regionally, and nationally careers in these three areas are projected to grow over the next ten years. In Philadelphia, jobs in industrial engineering technology (process technology) and medical equipment repair are projected to grow at approximately twice the rate of jobs nationwide.

The majority of industrial engineering technician and medical equipment repair jobs are filled by people with some college or an associate's degree. The growth and the level of education both speak to the importance of offering these programs at the associate's level.

Locally (in a 15 mile radius), 15 colleges offer certificates, associates, and/or bachelor's degrees in engineering technology and engineering related fields, chemical process technology, and biomedical technology. This includes 10 associates programs, three bachelors programs, and seven certificates. However, the College's ASET Program does not align with the requirements of other Engineering Technology programs.

Curricular discrepancies between similarly titled programs and the ASET Program make it challenging to place it among its peers. Institutions offer programs in Engineering Technology, Process Technology, and Biomedical Equipment Repair. Other institutions

surveyed differentiate between engineering technology programs and career programs. Coursework in career programs focuses on the specific career field in which the program prepares graduates to enter, either biomedical equipment repair or process technology. Other institutions' career programs are commonly named after the field that they prepare students to enter. "Engineering Technology" programs more typically offer a variety of courses including engineering, physics, and math. The Engineering Technology programs prepare students for employment or transfer, while the career programs exclusively prepare students for employment. Conversely, the ASET program is designed with a strong focus in workforce development, and also serves as a foundational program for those seeking transfers. Students intending to transfer may require higher level math or physics coursework than that required by the program. The program believes these distinctions are adequately clarified for students in advising.

Table 7a: Expected Job Growth (Data from EMSI)

| Occupation                         | 2014-2024 Job Outlook |             |                 | Av. Yearly Salary |
|------------------------------------|-----------------------|-------------|-----------------|-------------------|
|                                    | Philadelphia          | MSA         | USA             |                   |
| Industrial Engineering Technicians | -6.3% (75)            | -2.8% (713) | -1.2% (67,006)  | \$47,888          |
| Medical Equipment Repairers        | 25.7% (230)           | 21.1%(1093) | 25.3% (115,573) | \$42,480          |

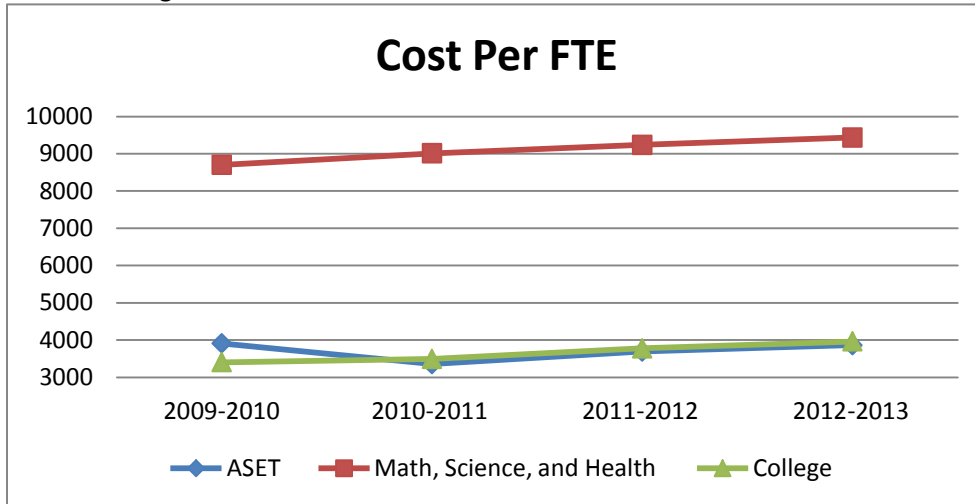
Table 7b: Educational Attainment (Data from EMSI)

| Occupation                         | National Education Attainment |              |             |            |          |
|------------------------------------|-------------------------------|--------------|-------------|------------|----------|
|                                    | HS Diploma or Less            | Some College | Associate's | Bachelor's | Graduate |
| Industrial Engineering Technicians | 26.80%                        | 33.1%        | 22.6%       | 14.5%      | 2.9%     |
| Medical Equipment Repairers        | 26.90%                        | 29.40%       | 24.00%      | 16.40%     | 3.30%    |

**VIII. Operating Costs**

Over the past four years, the Program’s operating costs have been very close to the cost of the College and approximately 1/3 the average cost of the Math, Science, and Health Division. The Program has been funded by the College, Pell Grants, the NSF, and the Department of Labor.

Table 8: Program Cost Data



## **IX. Findings & Recommendations**

### **1. Evaluate the overlap between Applied Science and Engineering Technology and Technical Studies.**

Technical Studies is intended to serve students transitioning or becoming credentialed mid-career. Applied Science and Engineering Technology is geared to workforce entry, and stackable credits towards an associate's degree. Over the past year, both underwent program revisions and the audit process simultaneously. These revisions introduced curricular changes that improved both programs, but also introduced increased congruency, in that both programs now offer credit for prior learning in the technical field, and share a technical curricular track. This overlap has the potential to create duplicative work for the faculty and confusion for students interested in a technical field.

It is recommended that the programs create a proposal for increasing coordination or distinction. This could include, but is not limited to: housing the programs in the same department, combining the programs, or leaving the programs as they are but with increased partnership. The Programs should continue to monitor the impact of the program revisions in order to clarify the distinctions between the two programs and confirm that a distinction has been achieved.

Timeline: Fall 2016

Persons Responsible: Division Deans and Program Contacts

### **2. Program Review and Evaluate the Program Name for Clarity**

Applied Science and Engineering Technology is a career program and as such, should provide students with clearer materials defining the scope and purpose of the program and courses of study leading to well defined career opportunities. The current program name is problematic because it implies that the program is similar to a two year engineering technology program. ASET does not, however, require the standard courses of an associate in engineering technology. Given the broad nature and general understanding of the term Engineering Technology, the program should determine whether including "Engineering Technology" in the title of the program accurately describes the content of the program, keeping in mind prospective students, transfer institutions, and employers.

Timeline: Spring 2017, ready for new catalog

Persons Responsible: Division Dean and Program Contact

### **3. Create a student tracking system to determine factors influencing attrition and retention. (Retention, Outcomes, and Course Efficiency)**

ASET records very poor retention. The Program's fall-fall and fall-spring retention rates are lower than the average for the college. Only 26% of students in the Program continue from one fall to the next, compared to 36.7% college-wide. Between 2009 and 2013, 74 students left the Program (and the College). Sixty-four percent of these students left with less than 12 credits (college-wide approximately 60% of students who leave do so during their first 12 credits). Additionally, approximately 14% of students in the ASET program change majors between one fall and the next, compared to approximately 8% college wide.

This audit has highlighted the need for the creation of a retention plan. The retention plan should focus on students enrolled in their first 12 credits; efforts could include a course revision to ASET 101, clarifying the goals and objectives of the program to incoming students, and/or utilizing starfish to track at risk students. The BMET mentorship program, currently in development, might be applied to all ASET students.

On average, the Applied Science and Engineering Program runs approximately 3.5 sections per semester. While courses within the Division are at 88% of capacity, ASET courses, on average, have run with an average capacity of 69% in the fall and 66% in the spring. Program faculty must develop a program management plan that addresses the low section enrollment efficiency.

The program enjoys solid student course completion rates (85.3%). However, approximately 43% of the students who leave the Program do so in poor academic standing; College-wide this figure is approximately 37% (see Table 3). The Program needs to further investigate the disconnect between course completion and program completion to improve student success.

Timeline: Fall 2016

Persons Responsible: Program Faculty

#### 4. **Assessment**

The department needs to further examine its assessment practice for quality improvement. Although assessment is occurring, the program has recorded few action plans. A renewed focus on improving teaching and learning across the curriculum is recommended. Program faculty must complete one cycle of assessment by the end of spring 2016.

Two areas of the curriculum map must be addressed. First, the Program must create a curriculum map that identifies where outcomes are introduced, reinforced, mastered, and assessed. Second, the curricular map should adequately reflect how students will meet program learning outcomes, as individuals make course selections through the program (example: students can either enroll in PTEC 103 or BMET 102 and students can either enroll in ASET 130 or BMET 202).

Timeline: Fall 2016

Persons Responsible: Program Contact

**Community College of Philadelphia**

**Academic Program Audit**

**Technical Studies A.A.S.**

(Formerly Applied Studies)

Author: Christine  
McDonnell

Contributor:  
Tom Quinn

Date: November, 2015

## **I. Executive Summary**

The Technical Studies Program is geared towards students with a variety of backgrounds, generally technical, who possess certification and technical skills, and would like to receive credit for these experiences to apply it towards an associate's degree. The Program underwent its last revision in 2014 became effective in the fall of 2015. The new Program includes four components: prior learning assessment, general education, communication, and a personal education plan.

Enrollment has averaged 21 students each fall over the past five years with declining enrollment. During the 2012-2013 and 2013-2014 school years, no new students enrolled in the program.

Technical Studies (formerly Applied Studies) targets a distinctly different population than any other program in the College. Unlike other programs, Applied Studies/Technical Studies enrolls students who already have technical skills, but are lacking in general education. The Program is aimed at people interested in promotion within their field, shifting careers, or advancing into their chosen field. The Program attracts students more likely to be older, male, and Caucasian or Asian compared to the Division and College. These students are less likely to require developmental coursework and are more likely to be in good academic standing. Program retention is very poor. Almost half of the students who leave the Program do so in good academic standing. Compared to the Division (38%) and the College (37%), a much smaller proportion of Applied Studies/Technical Studies students leave the program unsuccessfully (14%). Eight degrees have been awarded over the past five years.

Under the Applied Studies name, the Program had assessed one PLO and met the benchmark of 100%. The Program changed from Applied Studies to Technical Studies during the fall of 2015, and Technical Studies has different outcomes than Applied Studies. Modifications to teaching and learning have not been recorded.

The Program has a diverse advisory committee, with members from local flight and aviation mechanics institutions, unions, and universities with similar programs. Locally, many schools offer similar programs. However, it appears that the key to a successful program is creating a joint sponsorship between the Program and local unions and technical high schools, with the sponsorship feeding students into the program.

Audit recommendations focus on creating a program management plan for this population, creating a student tracking system to determine factors influencing attrition and retention, and evaluating the overlap between Applied Science and Engineering Technology and Technical Studies.

## **II. Program Description**

### **A. College Catalog Description (Technical Studies)**

The Technical Studies Program recognizes valuable training and/or work experience by giving students in technical fields the opportunity to receive college credits for their experiences and to apply that experience and knowledge to an associate's degree. It assists individuals in their preparation for career advancement or change. The student will develop an individualized program of study directly related to career or educational goals.

This select program has four components:

- 1) Prior learning assessment: 12-30 credits in the Technical/Occupational core from industry certifications and other demonstrated competencies
- 2) 21 credits of General Education
- 3) 3 credits in communication
- 4) 6-24 credits taken as part of a Personal Education Plan that has either a technical or a business-related focus

**B. History and Revisions to the Curriculum**

The Technical Studies and Technical Studies Programs has existed at the College since 2009. The Program underwent its last revision in 2014 which became effective in the fall of 2015. The 2014 revision was the result of recommendations made by the advisory committee, program faculty, and industry voices. Revisions included changing the name of the program from Applied Studies to Technical Studies, eliminating the second social science course, requiring a three credit communication course, renaming the 'concentration' courses 'technical / occupation competencies', increasing the number of credits of 'technical/ occupational competencies' (prior learning assessment), and creating a Personal Education Plan.



### C. Curriculum Sequence

| Course Number and Name                      | Pre & Co-requisites   | Credits   | Gen Ed Req.        |
|---|---|-----------|--------------------|
| Technical/Occupational Core                 | Industry certifications and/or other documentation for consideration for prior learning assessment. | 12-30     |                    |
| <b>First Semester</b>                       |   |           |                    |
| ENGL 101 - English Composition I            |   | 3         | ENGL 101           |
| FNMT 118 - Intermediate Algebra (or higher) |   | 3         | Mathematics        |
| CIS 103 - Applied Computer Technology       |   | 3         | Tech Comp          |
| Science Elective                            |   | 3 or 4    | Natural Science    |
| <b>Second Semester</b>                      |   |           |                    |
| ENGL 102 - The Research Paper               | ENGL 101 with a grade of "C" or better  | 3         | ENGL 102, Info Lit |
| Communications Elective (choose one)        | For ENGL 115 and 117: ENGL 101, may be concurrently   | 3         |                    |
| ENGL 115 - Public Speaking or               |   |           |                    |
| ENGL 116 - Interpersonal Communication or   | For ENGL 116: ENGL 101 or ENGL 114  |           |                    |
| ENGL 117 - Group & Team Communication or    |   |           |                    |
| ENGL 118 - Intercultural Communication      | For ENGL 118: No prerequisite   |           |                    |
| Humanities Elective                         |   | 3         | Humanities         |
| Social Science Elective                     |   | 3         | Social Sciences    |
| <b>Third &amp; Fourth Semester</b>          |   |           |                    |
| Personal Education Plan (PEP)*              |   | 6-24      |                    |
| <b>Minimum Credits Needed to Graduate:</b>  |   | <b>60</b> |                    |

\*In order to ensure that the PEP has a unifying focus and relates to the Technical/Occupational Core, students should select individual courses within one of the two concentrations listed below.

#### Technology Concentration:

Applied Science and Engineering Technology (ASET)  
 Architecture, Design and Construction (ADC)  
 Automotive Technology (AT)  
 Computer Information Systems (CIS)  
 Computer Science (CSCI)  
 Geographic Information Systems (GIS)  
 Process Technology (PTEC)

#### Business Concentration:

Accounting (ACCT)  
 Computer Information Systems (CIS)  
 Economics (ECON)  
 Entrepreneurship (ENTR)  
 Finance (FIN)  
 Management (MNGT)  
 Marketing (MKTG)  
 Real Estate (RE)

**D. Curriculum Map**

| <b>Student Learning Outcomes</b>                | <b>Demonstrate competence in oral and written communication</b> | <b>Demonstrate an understanding of cultural diversity</b> | <b>Demonstrate the ability to think critically in many disciplines</b> |
|---|---|---|--|
| <b>Technical and Occupational Core</b>          |   |   |  |
| <b>ENGL 101</b>                                 | I   |   | I  |
| <b>ENGL 102</b>                                 | R, A  |   | R  |
| <b>Social Science Elective</b>                  |   | I   | I  |
| <b>Humanities Elective</b>                      |   | I, R  | I  |
| <b>Natural Science Elective</b>                 |   |   | I  |
| <b>Communications Requirement</b>               | R, A  |   |  |
| <b>Courses in the Personal Educational Plan</b> |   |   |  |

**E. Advisory Committee**

The Program’s advisory committee meets twice annually. Members include individuals from the Energy Coordinating Agency, Aviation School of Maintenance, International Brotherhood of Electrical Workers (IBEW 98), Hortman Aviation Services, and Thomas Edison University. Recent discussions have focused on a renewed relationship with IBEW 98 (similar to IBEW and Pittsburgh and Allegheny Community College), the curriculum revision, enrollment, assessment, and the audit.

**F. Future Direction for the Field/ Program**

The Program Coordinator and the Associate VP of Strategic Initiatives are working together to build relationships with local unions so that union members can use their apprenticeship training towards the completion of an associate’s degree. Specifically, the Program has created an agreement with the Steamfitters Local Union 420. The Program already has agreements with Local 98, IBEW, Hortman Aviation Services Inc., and the Aviation Institute of Maintenance. There is a potential from growth in this Program due to thing recent focus on competency based education and prior learning assessment.

Additionally, a pilot shortage is projected due to a mandatory retirement age of 65 and restrictions placed on pilots between the ages of 60 and 64. A four year degree is required for pilots at major airlines and a two year degree is required for pilots at smaller, regional airlines.

### III. Profile of the Faculty

#### A. Program Faculty

There is no faculty for this program because there are no specific Technical Studies courses.

### IV. Program Characteristics

#### A. Student Profile

Enrollment in the Technical Studies Program (formerly Applied Studies) averaged 21 students over the last five years and is on a downward trend. From 2009 to 2013, enrollment decreased by 82%. During the 2012-2013 and 2013-2014 school years, no new students enrolled in the Program.

Table 1: Headcounts

|   |               | <b>Fall<br/>2009</b> | <b>Fall<br/>2010</b> | <b>Fall<br/>2011</b> | <b>Fall<br/>2012</b> | <b>Fall<br/>2013</b> | <b>5 Year<br/>Average</b> | <b>5 Year<br/>Change</b> |
|---|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------------|--------------------------|
| Applied<br>Studies/Technical<br>Studies | Headcount     | 34                   | 35                   | 16                   | 13                   | 6                    | 21                        | -82%                     |
|   | FTE Headcount | 22                   | 24                   | 10                   | 6                    | 3                    | 13                        | -86%                     |
| Liberal Studies                         | Headcount     | 8892                 | 8711                 | 8717                 | 8216                 | 8059                 | 8,519                     | -9%                      |
|   | FTE Headcount | 6313                 | 6175                 | 6137                 | 5745                 | 5649                 | 6,004                     | -11%                     |
| College                                 | Headcount     | 19047                | 19502                | 19752                | 18951                | 19065                | 19,263                    | 0%                       |
|   | FTE Headcount | 13361                | 13697                | 13682                | 13106                | 13163                | 13,402                    | -1%                      |

The Technical Studies Program (formerly Applied Studies) attracts students that lack a general education but who have careers, certification, and expertise in a technical area. The Program enrolls students with different demographics than the Division and the College. The Program enrolls a higher proportion of males (51.6%) than the Division (37.4%) and the College (35.4%). The Program enrolls a higher proportion of Asian and Caucasian students, and a marginally higher proportion of African American students than the Division and the College. The Program enrolls a lower proportion of Latino, multiracial, and Pacific Islander students than the Division and the College. The Program enrolls a much lower proportion of students ages 16 to 21. While approximately half of the students in the College are between the age of 22 and 39, 70% of students in the Program fall into that age group. While 42% of the students in the Program place at college level, only 23% of students in Liberal Studies place at college level.

Table 2: Demographics

|                    | Applied<br>Studies/Technical<br>Studies | Liberal<br>Studies | College |
|--------------------|---|--------------------|---------|
| Female             | 48.4%                                   | 62.1%              | 64.2%   |
| Male               | 51.6%                                   | 37.4%              | 35.4%   |
| Unknown            | 0%                                      | 0.5%               | 0.5%    |
| <hr/>              |   |                    |         |
| Native American    | 0%                                      | 0.5%               | 0.4%    |
| Asian              | 9%                                      | 4.9%               | 7.3%    |
| African American   | 51%                                     | 49.9%              | 48.8%   |
| Latino/a           | 4%                                      | 10.9%              | 10.5%   |
| Multiracial        | 0%                                      | 2.5%               | 2.3%    |
| Pacific Islander   | 0%                                      | 0.2%               | 0.2%    |
| Unknown            | 7%                                      | 6.9%               | 6.8%    |
| Caucasian          | 29%                                     | 24.3%              | 23.8%   |
| <hr/>              |   |                    |         |
| 16 – 21            | 15.0%                                   | 32.3%              | 32.5%   |
| 22 – 29            | 37.7%                                   | 35.6%              | 36.6%   |
| 30 – 39            | 28.7%                                   | 15.5%              | 17.0%   |
| 40 +               | 16.1%                                   | 15.8%              | 13.0%   |
| Unknown            | 2.7%                                    | 0.9%               | 0.9%    |
| <hr/>              |   |                    |         |
| Full Time          | 21.6%                                   | 33.6%              | 31.2%   |
| Part Time          | 78.4%                                   | 66.4%              | 68.8%   |
| <hr/>              |   |                    |         |
| All Developmental  | 19.1%                                   | 30.0%              | 28.3%   |
| Some Developmental | 38.9%                                   | 46.8%              | 43.9%   |
| College Level      | 42.1%                                   | 23.2%              | 27.8%   |

The Technical Studies Program (formerly Applied Studies) records outcomes similar to that of the College in many areas; however, weaker outcomes are recorded in fall-fall retention, students changing majors, and graduation rate. Although the graduation rate is low, students are achieving long-term and short-term success at substantially higher rates than in the Division and the College. Additionally, the average GPA of students in the Program is substantially higher than the average GPA in the Division and the College.

Table 3: Outcomes Data: 5 Year Averages

|                          |                    | Applied<br>Studies/Technical<br>Studies | Liberal<br>Studies | College |
|--------------------------|--------------------|---|--------------------|---------|
| Standing                 | Good Standing      | 87%                                     | 84%                | 85.0%   |
|                          | Probation          | 12%                                     | 15%                | 13.5%   |
|                          | Dropped            | 1%                                      | 2%                 | 1.6%    |
| Fall-Spring<br>Retention | Returned/Same      | 63%                                     | 64.4%              | 65.8%   |
|                          | Returned/Different | 5%                                      | 6.4%               | 5.2%    |
|                          | Graduated          | 5%                                      | 2.8%               | 2.1%    |
|                          | Did Not Return     | 28%                                     | 26.5%              | 26.9%   |
| Fall-Fall<br>Retention   | Returned/Same      | 25.2%                                   | 35.9%              | 36.7%   |
|                          | Returned/Different | 15.4%                                   | 9.7%               | 8.6%    |
|                          | Graduated          | 10.7%                                   | 8.5%               | 8.4%    |
|                          | Did Not Return     | 48.8%                                   | 45.9%              | 46.4%   |
| Success at<br>Departure  | Graduated          | 3.6%                                    | 10.5%              | 10.0%   |
|                          | Long Term Success  | 44.7%                                   | 37.3%              | 36.2%   |
|                          | Short Term Success | 35.7%                                   | 14.3%              | 17.2%   |
|                          | Unsuccessful       | 16.1%                                   | 37.9%              | 36.6%   |
| Course<br>Outcomes       | Course Completion  | 87.9%                                   | 87.4%              | 88.2%   |
|                          | GPA                | 3.27                                    | 2.66               | 2.65    |

### Transfer and Graduation

Eight Applied Studies/Technical Studies degrees have been awarded over the past five years.

Figure 1: Degrees Awarded

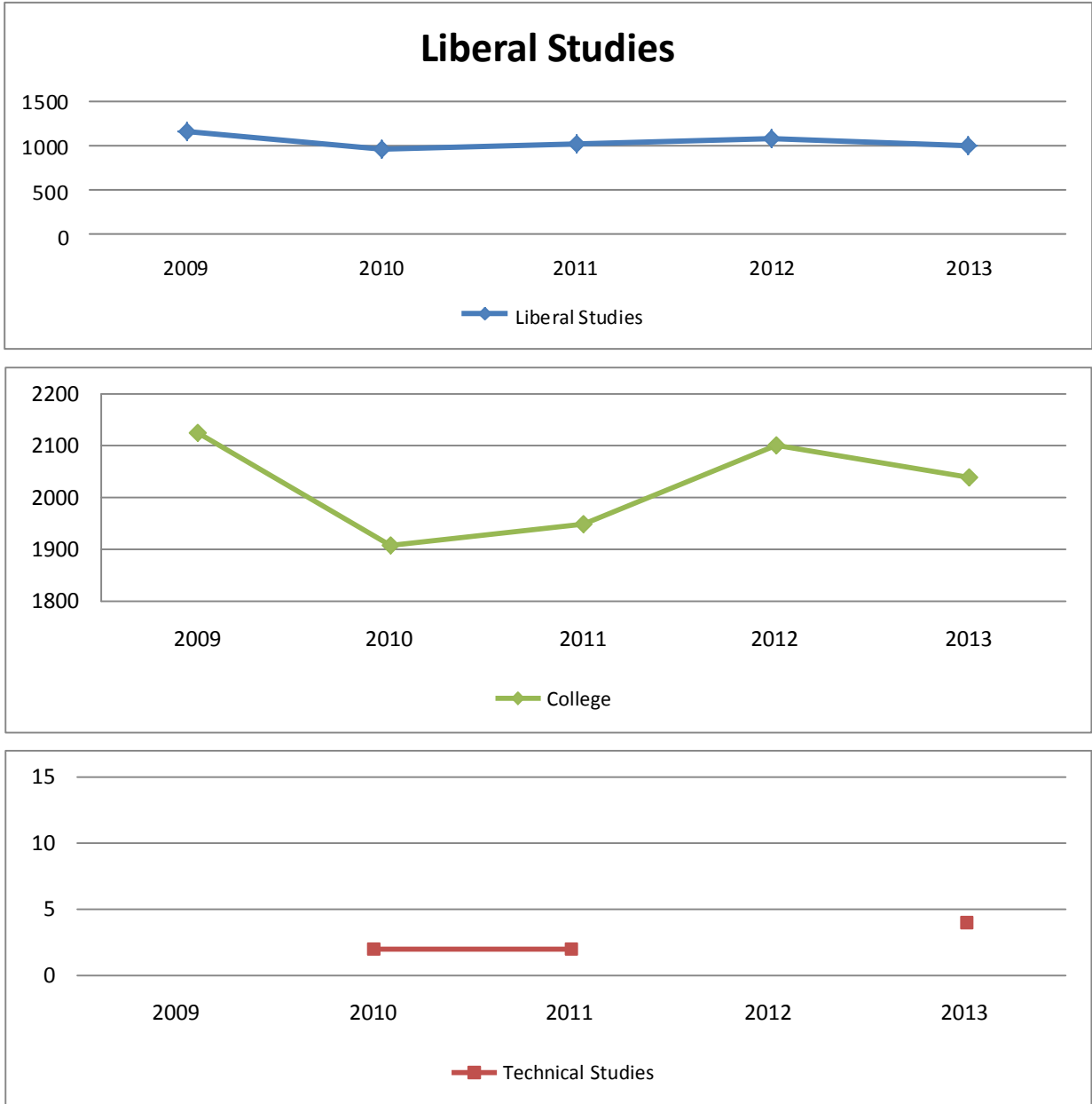


Table 4: Degrees Awarded

|                                   | 2009 | 2010 | 2011 | 2012 | 2013 | Total |
|-----------------------------------|------|------|------|------|------|-------|
| Applied Studies/Technical Studies | 0    | 2    | 2    | 0    | 4    | 8     |
| Liberal Studies                   | 1158 | 956  | 1014 | 1073 | 999  | 5200  |
| College                           | 2125 | 1908 | 1949 | 2101 | 2039 | 10122 |

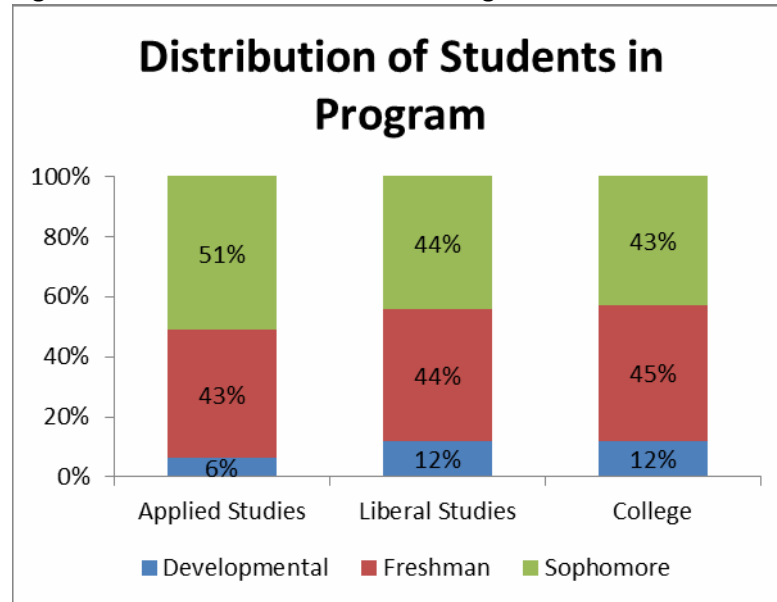
Applied Studies/Technical Studies is an A.A.S. and, therefore, the focus of this program is direct-to-work as opposed to transfer. Over a five-year period (program entry fall 2007-spring 2012), 38% percent of the students who departed the Program transferred (count of 13). Additionally, half the students who left the Program earned fewer than 12 credits.

| Exit Status                 | Transferred |              | Did Not Transfer |              | Total Count | Total Percent |
|-----------------------------|-------------|--------------|------------------|--------------|-------------|---------------|
|                             | Count       | Percent      | Count            | Percent      |             |               |
| Graduate                    | 0           | 0.0%         | 2                | 100.0%       | 2           | 100.0%        |
| Earned 45 or more credits   | 1           | 100.0%       | 0                | 0.0%         | 1           | 100.0%        |
| Earned 24 to 44 credits     | 3           | 75.0%        | 1                | 25.0%        | 4           | 100.0%        |
| Earned 12 to 23 credits     | 4           | 40.0%        | 6                | 60.0%        | 10          | 100.0%        |
| Earned less than 12 credits | 5           | 29.4%        | 12               | 70.6%        | 17          | 100.0%        |
| <b>Grand Total</b>          | <b>13</b>   | <b>38.2%</b> | <b>21</b>        | <b>61.8%</b> | <b>34</b>   | <b>100.0%</b> |

Table 5: Transfer at Departure

The College and Division record an almost equal number of freshmen as sophomores. However, within the Technical Studies Program (formerly Applied Studies), there are eight percent more sophomores than freshmen. This could be explained by students transferring in credits for certifications.

Figure 2: Distribution of Students in Program



## **V. Learning Outcomes and Assessment**

### **A. Student Learning Outcomes**

Upon completion of the Technical Studies Program graduates will be able to:

1. Demonstrate competence in oral and written communication.
2. Demonstrate an understanding of cultural diversity.
3. Demonstrate the ability to think critically in many disciplines.

### **B. Assessment**

The Program has evaluated one outcome from the Applied Studies PLOs. Since the Program is small and doesn't own any of its own courses, all students are individually assessed upon graduation. Since the Program owns none of its own courses, no course level assessment was done.



### Audit Assessment Overview: Technical Studies

| PLO Assessed (2010-2015): Demonstrate competence in oral and written communication. |  |  |  |                             |
|---|--|--|--|-----------------------------|
| Semester Evidence is Collected  | Source of Evidence / Type of Assignment  | Population & Benchmark   | Results  | Plan for Improvement        |
| Data will be collected every semester in which students graduate.                   | Because the program does not have any program specific courses (no Technical Studies courses exist), assessment occurs upon completion of the program requirements. When a student applies for graduation they will write a brief essay which will be evaluated for competence in written communication. | All graduating students.<br><br>All students will score a 3 or above on the five point rubric. | This program recently underwent a <b>major revision</b> , which included changes to assessment. No new students have applied to graduate under the new program guidelines because it was revised in fall of 2015.<br><br>Pending student graduation. | Pending student graduation. |
| PLO Assessed (2010-2015): Demonstrate an understanding of cultural diversity.       |  |  |  |                             |

|  |   |  |   |                                    |
|--|---|--|---|------------------------------------|
| <p>Data will be collected every semester in which students graduate.</p> | <p>Because the program does not have any program specific courses (no Technical Studies courses exist), assessment occurs upon completion of the program requirements. When a student applies for graduation they will take a brief quiz on cultural diversity.</p> | <p>All graduating students.</p> <p>All students will achieve a grade of 'C' or better (with 70% or more of the quiz questions answered correctly).</p> | <p>This program recently underwent a major revision, which included changes to assessment. No new students have applied to graduate under the new program guidelines because it was revised in fall of 2015.</p> <p>Pending student graduation.</p> | <p>Pending student graduation.</p> |
|--|---|--|---|------------------------------------|

|   |   |  |  |                             |
|---|---|--|--|-----------------------------|
| <b>PLO Assessed (2010-2015):</b> Demonstrate the ability to think critically in many disciplines. |   |  |  |                             |
| Data will be collected every semester in which students graduate.                                 | Because the program does not have any program specific courses (no Technical Studies courses exist), assessment occurs upon completion of the program requirements. When a student applies for graduation they will take a brief quiz on critical thinking. | All students will score a C or better in the quiz (with 70% or more of quiz questions answered correctly). | This program recently underwent a major revision, which included changes to assessment. No new students have applied to graduate under the new program guidelines because it was revised in fall of 2015.<br><br>Pending student graduation. | Pending student graduation. |

### **C. QVIs/335s**

The program does not have 335s since it owns no courses.

QVIs from 2011 and 2013 were evaluated for this audit. QVI's were not available from 2012 and 2014. The QVI scores reflect the program quality and viability at a specific point in time. Although certain areas may have changed since the Program was scored, scores from the past remain on record.

The Program recorded a quality score of 3.4 in 2011; by 2013 the quality of the Program was 'not applicable'. Since the Program does not have any of its own courses, it does not participate in course level assessment, and prior to the fall of 2013 did not participate in program level assessment. The Program's viability score dropped from 1.75 in 2011 to .6 in 2013. This change is due to poor retention, low graduation rates, and low enrollment.

### **VI. Resources**

The Program requires no special resources.

### **VII. Demand**

CCP's Technical Studies Program provides students in technical fields with an associate's degree. Avionics technician, aircraft mechanics and service technicians, electricians, commercial pilots, plumbers, pipefitters, and steamfitters are common occupations among students in the Program. Locally, occupations in avionics and aircraft mechanics are projected to grow very little over the next ten years (2.5% and 1.9%). The outlook is better nationally (8.1% and 8.5%), but still weaker than the nationwide average job growth (11%). Locally, electrician careers are projected to grow at almost double (21.2%) the rate of all jobs nationwide. Locally, commercial pilot jobs are projected to grow very little over the next ten years (4.9%); however, nationwide, projected growth (15.7%) is above the nationwide average jobs growth. Regionally, plumbers, pipefitters, and steamfitter jobs (16.6%) are projected to grow more than the nationwide average jobs growth over the next 10 years; however, this growth is projected to occur within the metropolitan statistical area, not the City.

Looking at the educational attainment of employees in these fields, approximately 20% of people working as aircraft and aviation technicians have associate degrees, while approximately 13% of electricians have associate degrees.

The majority of aviation technicians, aircraft mechanics, service technicians, electricians, plumbers, pipefitters, and steamfitters have an educational attainment of less than an associate's degree (some college, a high school diploma, or have not graduated from high school). The majority of commercial pilots have a bachelor's or graduate degree. It is difficult to determine whether an associate's degree is the appropriate level of education for people in these fields when, generally, those in jobs involving avionics, aircraft mechanics, aircraft service technicians, electricians, plumbers, pipefitters, and steamfitters have a lower level of education and commercial pilots generally have a higher level of education.

Locally, schools in the area offer similar programs. Delaware County Community College offers an associate in Technical Studies; West Chester and Thomas Edison Universities offer bachelor's degrees in Technical Studies, and Widener University offers a program in Professional and Applied Studies. These programs enable students to receive college credit for their prior learning, certifications, and/ or experiences. Allegheny Community College offers a five-year joint program

combining an electrician apprenticeship with the general education coursework and coursework applicable to the field. This program is sponsored by the Joint Apprenticeship and Training Committee (JATC) of the International Brotherhood of Electrical Workers (IBEW Local #5). Although the expected job growth projections and the educational attainment statistics of these occupations may not entice people in the field to enroll in an associate’s program, a joint program similar to Allegheny’s program, sponsored by a local union would incentivize enrollment.

Table 7: Expected Job Growth

| Occupation                                 | 2014-2024 Job Outlook |                 |                  | Av. Yearly Salary |
|--|-----------------------|-----------------|------------------|-------------------|
|  | Philadelphia          | MSA             | USA              |                   |
| Avionics Technicians                       | 2.50% (167)           | 5.4% (431)      | 8.10% (17,354)   | \$51,820          |
| Aircraft Mechanics and Service Technicians | 1.90% (943)           | 5% (1830)       | 8.50% (119442)   | \$53,820          |
| Electricians                               | 21.20% (1366)         | 13.70% (10,194) | 16.90% (589,305) | \$48,560          |
| Commercial Pilot                           | 4.90% (228)           | 4.4% (509)      | 15.70% (38,366)  | \$71,600          |
| Plumbers, Pipefitters, and Steamfitters    | -0.70% (1033)         | 16.60% (6,754)  | 20.00% (393,485) | \$48,260          |
| Nationwide Average                         |                       |                 | 11%              |                   |

MSA includes the following counties: Philadelphia, Montgomery, Bucks, Delaware, New Castle, Camden, Chester, Burlington, Gloucester, Cecil (MD), and Salem

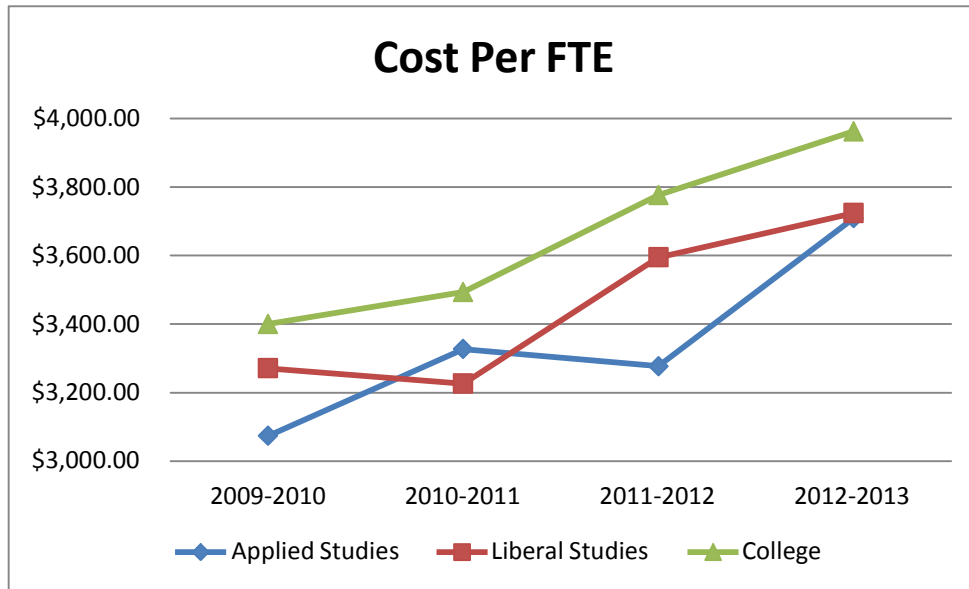
Table 8: Educational Attainment

| Occupation                                 | HS Diploma or Less | National Education Attainment |             |            |          |
|--|--------------------|-------------------------------|-------------|------------|----------|
|  |                    | Some College                  | Associate's | Bachelor's | Graduate |
| Avionics Technicians                       | 27.90%             | 36.70%                        | 21.90%      | 9.40%      | 4.00%    |
| Aircraft Mechanics and Service Technicians | 30.00%             | 38.90%                        | 20.70%      | 9.20%      | 1.30%    |
| Electricians                               | 46.70%             | 32.50%                        | 13.60%      | 6.30%      | 0.90%    |
| Commercial Pilot                           | 5.30%              | 14.10%                        | 8.60%       | 59.10%     | 12.90%   |
| Plumbers, Pipefitters, and Steamfitters    | 63.00%             | 25.70%                        | 6.90%       | 3.60%      | 0.70%    |

### VIII. Operating Cost

During three out of the past four years, Applied Studies/Technical Studies’ average operating cost has been lower than the Division and the College. During the 2010-2011 school year, the Program’s average costs were marginally higher than the Division and lower than the College.

Figure 3: Program Costs



## VIII. Findings & Recommendations

### 1. Evaluate the overlap between Technical Studies and Applied Science and Engineering Technology.

Technical Studies is intended to serve students transitioning or becoming credentialed mid-career. Applied Science and Engineering Technology is geared to workforce entry, and stackable credits towards an associate's degree. Over the past year, both underwent program revisions and the audit process simultaneously. These revisions introduced curricular changes that improved both programs, but also introduced increased congruency, in that both programs now offer credit for prior learning in the technical field, and share a technical curricular track. This overlap has the potential to create duplicative work for the faculty and confusion for students interested in a technical field.

It is recommended that the programs create a proposal for increasing coordination or distinction. This could include, but is not limited to: housing the programs in the same department, combining the programs, or leaving the programs as they are but with increased partnership. The Programs should continue to monitor the impact of the program revisions in order to clarify the distinctions between the two programs and confirm that a distinction has been achieved.

Timeline: Fall 2016

Persons Responsible: Division Deans and Program Contacts

### 2. Create a program management plan for this population

This Program enrolls a unique population of students compared to the rest of the College. Generally, students at the College enroll in programs that provide them with the skills necessary to obtain employment. Alternatively, this Program enrolls students that already have certifications and technical skills, but are lacking in general education. The Program enables students to combine these qualifications with general education courses and other relevant coursework in order to obtain an associate's degree. Because this Program recruits students

who pursue an education through a non-traditional route (obtain job skills before general education), these students require much more individualized advising in order to mold their personal education plan to their specific needs compared to traditional students. Additionally, students generally discover the program through word of mouth, through their employment or trade school, not through traditional recruitment tactics. The program must develop a program management plan that addresses the unique needs of these students including how to recruit the students. This Program management plan could include the creation of a joint sponsorship with local industries in order to increase the program pipeline and the hiring of a coordinator to develop these relationships and give the students the individualized advising that they need.

Timeline: Spring 2017

Persons Responsible: Division Deans and Program Contacts

**3. Create a student tracking system to determine factors influencing attrition and retention.**

Applied Studies/Technical Studies students generally have technical skills, are older, are less likely to place developmentally, and are more likely to attend part-time due to other obligations. These students are less likely to leave the College unsuccessfully compared to students in the Division and the College. However, these students are more likely than students in the Division and the College to depart in good academic standing prior to graduating. The Program appears to attract students capable of obtaining the degree, but who do not complete the degree due to a variety of factors.

The program needs to investigate the reasons for poor retention and create a plan to address retention and low enrollment.

Timeline: Fall 2016

Persons Responsible: Division Dean and Program Contacts