Community College *of* Philadelphia

AGENDA
Institution-Wide Committee
Monday, February 22, 2021
2:30 p.m.
via Zoom

I. Call to Order

II. Attendance

III. Approval of Minutes

a. Minutes of December 21, 2020

IV. Old Business

a. Revised Grade Appeal Policy
b. Co-chair IWC

V. New Business

a. Biological Sciences (A.A.)
b. Applied Engineering Technology (was ASET) (A.A.S.)
c. Biomedical Equipment Technology (A.A.S.)
d. Education: Middle/Secondary Level (A.A.)

VI. Adjournment

Community College *of* Philadelphia

MEETING MINUTES
Institution-Wide Committee
Monday, December 21, 2020
2:30 pm

ZOOM Meeting

I. Call to Order

The meeting was called to order at 2:35 p.m. by Sam Hirsch.

II. Attendance

Delegates
Federation: Karima Bouchenafa, Rainah Chambliss, Louise Jones
Administration: Carol de Fries, Judith Gay, Samuel Hirsch, Jacob Eapen
Students: Moria Lit, SGA President

Alternates
Federation: Jaquelyn Bryant, Sean Sauer (Voting)
Administration: Mary Anne Celenza, Bill Bromley, Leila Lawrence
Students: None

Guests
Pam Carter, Amy Birge, Elisabeth Dalianis, David Asencio, Linda Carr, Nicki Sarpolis, Jocelyn Lewis

III. Approval of Minutes of October 26, 2020

S. Hirsch asked if there were any changes to the minutes. J. Eapen indicated that he had not attended the May meeting and therefore had abstained from the meeting minutes approval for the May minutes. He requested a correction to the minutes to reflect that he did not vote on the May meeting minutes. No other corrections or comments were received. J. Eapen made a motion to approve the October 26, 2020 minutes, and J. Gay seconded the motion. All voted in favor of acceptance, with no objections or abstentions. The minutes of October 25, 2020 were approved.

IV. Old Business

Dr. Hirsch noted that Monique Hayes, who had previously been appointed as co-chair during the October meeting, has resigned from the committee. Given the presentation and faculty scheduling he deferred discussion of this matter to end of meeting.

V. New Business

a. Public Health - New Program (Curriculum Committee)

M. Celenza, Dean introduced this timely program given the nature of the pandemic. Faculty members Linda Carr, Elizabeth Dalianis, and Jocelyn Lewis reviewed the proposed new public health program. They noted that there are very few community college level public health programs and that there is great excitement for starting this program at the College. The goal is for students to obtain credits to transition to bachelors or get an AA in public health. This program aligns with Allied Health students' interest in working to improve their communities around health-related issues. Faculty have started looking at the transfer potential and are working on an articulation agreement with Temple University with the expectation to have a transfer agreement in place shortly.

S. Hirsch noted this program review had already gone through the Curriculum Committee and was recommended that IWC move it forward with a favorable recommendation to Dr. Generals.

J. Gay asked if public health programs need accreditation. Faculty responded that most public health programs are at a master's or higher level, with only a few bachelors level programs, and even fewer at the community college level. This will be the first 2-year AA public health degree in the area. They looked closely at the CUNY/SUNY program in New York that is also an AA degree. There is a professional organization that accredits master's in public health programs, few bachelor's degree programs are accredited.

J. Gay also noted that the overview indicated that there would be no financial implications for the creation of the program and asked if it was anticipated if we had faculty on staff with the appropriate expertise or if we needed to hire new faculty. L. Carr indicated that both she and E. Dalianis have PhD's in public health and are qualified to teach the program at the College. If the program grows, as anticipated, more faculty would need to be hired. J. Gay noted that their qualifications should be noted in the program document.

Hearing no further discussion or questions, J. Eapen made a motion to recommend the program to Dr. Generals, and J. Gay seconded. All voted in favor of recommendation of this new program to Dr. Generals, with no objections or abstentions. S. Hirsch thanked the faculty for their work on

this and noted the Susan Snyder article in the Inquirer recently around the growth in medical school and other health program applications because of the pandemic.

b. Technical Studies -Program Revision (Curriculum Committee)

Dr. Carter noted this is a program revision that came recommended through the Curriculum Committee. The proposal is to revise the technical studies degree program to increase its accessibility and use. The Technical Studies program was already moved from Liberal Studies to the Business & Technology division; Staff and faculty looked at the program's design and the extent it was limiting access; the program had very few students taking advantage of it; the current version focused on those who have prior background in a technical area and translating that into credit and create an opportunity for individuals to go on and complete the program; in the current version students had to choose one of two concentrations – technology or business.

The Individual Studies Program is designed to expand upon the Technical Studies focus, broaden access and make it a program for people with substantial prior learning experience; it will not only feed into technical or vocational areas; P. Carter noted that this could facilitate greater non-credit to credit programming articulation with Workforce & Economic Innovation. The overall revisions are meant to: eliminate the requirement that students have a technical area for prior learning assessment (PLA); students will not have to have a concentration, but rather after the assessment is made of their prior learning experience, the student and program coordinator will help create a personal education plan for the remaining course of work aligned with the student's career goals. The individual studies program includes prior learning assessment, general education courses, and the personal education plan developed in conjunction with the student and by person managing the program. The program will be housed and managed by the Transportation Technologies Department with Rich Saxton as Chair, and who has also overseen the Technical Studies program.

J. Gay indicated an appendix was missing. P. Carter noted that this refers to the data found on Page 13 in the materials outlining that only 1 to 3 students take advantage of this option annually. J. Gay asked how we find the program, better promote the program and get more to take advantage of this option as it would not be apparent that you should go to the Transportation Technologies Department to obtain this degree. P. Carter

noted that currently most who take advantage of the program are individuals in unions with whom the College has a relationship with for credit their apprenticeship programs. The program will be housed in the Business Entrepreneurship and Law Pathway which should provide more exposure. P. Carter and S. Hirsch have indicated that they are working with S. Rooney on more focused marketing around PLA opportunities at the College; S. Hirsch noted there is a web page for PLA; C. de Fries noted that WEI advertises those programs that have articulation agreements and that one of the current grants proposed a pilot to support more individuals to take advantage of the Individual Studies program.

With no further discussion J. Gay made the motion to recommend the program, and C. de Fries seconded. All voted in favor of recommendation of the program revision from Technical Studies to Individual Studies to Dr. Generals, with no objections or abstentions.

c. Revised Grade Appeal Process (Academic Support Committee)

D. Asencio and N. Sarpolis presented this proposed revised grade appeal process. D. Asencio noted the new policy decreases the number of steps from the current program of 9 to 5 steps. The proposal has gone through a number of revisions to get to this final stage; D. Asencio noted that they did extensive research on similar appeals processes at 7 other peer institutions. They were responding to numerous complaints from faculty, students and staff that the current process was not fair, not impartial and not equitable. Members of the Committee agreed the current process is discouraging and does not give students due process in practice; the new process will create a committee before it gets to the Vice President level. N. Sarpolis noted that the new process was presented to the academic supports committee twice; it decreases from 9 steps to 5; in the event there is a grade change, the office of records and registration will make the changes to the student's official transcript and let the student know the outcome of the process. The revision has been worked on for 2 years and feedback from 2 different committees and committee membership has been included in the final revised policy.

J. Gay noted that the process has been very unfair to the student and noted that when she first came to CCP from Montgomery County Community College a long time ago. She noted that the new policy gives the final decision to the Vice President of Academic and Student Success, and that the Department Head and Chair do not have the ability to make a change; the process automatically moves forward in the chain of steps as long as the student continues to pursue and follow the process. D. Asencio noted

that the VP can follow the recommendation of the Committee, but they don't have to.

J. Gay asked if there was a previous negotiation with the Federation for the current agreement we were following and whether there was an additional component in this approval process that had to be achieved. S. Hirsch was not aware of one. J. Gay suggested that there may have been something from the Seventies that we have been using for the current policy and recommended we double check on this front. It was agreed that S. Hirsch would research this, but the Committee agreed we should proceed on a vote as to whether we wanted to recommend the new proposed appeals process. This would enable us not to delay implementation if it is found that no further steps are necessary.

With no further discussion J. Gay made the motion to recommend the revised appeals process, and J. Eapen seconded. All voted in favor of recommendation of the revised appeals process to Dr. Generals, with no objections or abstentions. S. Hirsch noted that he will come back to let us know and fill in on investigation of any further need for review of the process.

S. Hirsch requested expedited process for the two curriculum matters to support their implementation this Fall; J. Gay noted this requires submission of a rough draft of minutes to Dr. Generals with the program documents presented today. S. Hirsch asked if there were any concerns and if members of the Committee were on board with proceeding. All consented to the expedited review. S. Hirsch noted that the grade appeal will not go through the expedited process until he can report back on his research.

VI. Additional Business

R. Chambliss asked S. Hirsch to update the Committee on M. Hayes resignation. S. Hirsch asked if the Federation had identified her replacement or if the expectation was for one of the alternates to fill M. Hayes shoes. R. Chambliss recommended S. Sauer move from alternate to delegate. It was recommended that the Federation provide official notification of that change and after that, we can discuss if there are any recommendations for a co-chair for IWC to serve with S. Hirsch.

VII. Adjournment - The meeting was adjourned at 3:33 p.m.

COMMUNITY COLLEGE OF PHILADELPHIA Degree Program Revision Template	
Name of Degree Program	Biological Sciences
Academic Pathway	Science and Technology
Department	Biology
Faculty Developer	Linda Powell
Facilitator	Amy Birge-Caracappa
Recommended Starting Semester	Fall 2021
Today's Date	February 11, 2021

I. Description of and Rationale for Revision

This program revision replaces the general elective in the first semester with a new four-credit First-Year Experience course, updates the catalog grid, course sequence, and curriculum map, updates the course titles for HIST 121 and HIST 122, and corrects an error in the second semester in the catalog grid.

New Course: When the Biological Sciences program was approved in Spring 2020, it included a three-credit general elective and the stated intention to replace it with an FYE course. The addition of the four-credit BIOL 100: Introduction to the Life Sciences raises the total number of credits from 60 to 61. In addition, the catalog grid and course sequence have been updated to reflect the College's revised general education requirements, effective Fall 2021.

BIOL 100 - Introduction to Life Sciences

3-2-4 **Credit Hours:** 4

Introduction to Life Sciences is a first-year experience course designed to assist students interested in any career related to biological/life sciences in the development of the behaviors and strategies required for college-level academic inquiry and college success. The course introduces the scientific method, including critical thinking, problem-solving, and data interpretation as well as effective communication and academic integrity. Students must demonstrate classroom behaviors associated with success (attendance, punctuality, participation) and develop college preparedness skills (such as time management, reading and note taking for comprehension, study methods, and test taking strategies). Students in the

Biological Sciences AA program will be required to enroll in BIOL 100 within the first 18 credits.

Course Learning Outcomes

Upon successful completion of the course, students will be able to:

1. Work successfully within an LMS (currently Canvas) through downloading, modifying, saving and uploading files from/to LMS.
2. Explain the importance of time management for academic success and submit assignments in a timely manner.
3. Develop an academic plan, a financial plan and a career/transfer plan based on the student's individual academic and career goals.
4. Take accurate and comprehensive notes from a lecture and by outlining material from a textbook.
5. Explain the steps in the scientific method and apply them to solve a problem.
6. Perform basic mathematical functions, standard data presentation forms, and data interpretation
7. Evaluate a word problem and define the essential question and the process necessary to solve/answer it.
8. Use of laboratory equipment commonly employed in biological research e.g. light microscope, and measuring devices.

Course Substitutions: To accommodate the new Oral Communication/Creative Expression requirement for general education, effective Fall 2021, several of the current directed elective options in areas such as humanities and social sciences have been redistributed, and ENGL 115: Public Speaking has been added to the course sequence. ENGL 115 is a particularly apt choice because it also appears in the Biology AS degree.

Course Eliminations: This revision does not eliminate any courses from the program.

Other Requirements: There are no other changes to the program.

Change in Credits: The addition of the four-credit BIOL 100: Introduction to the Life Sciences raises the total number of credits from 60 to 61.

II. Supporting Data

The Office of Institutional Research's 2019 First Year Experience Outcomes Survey shows that students enrolled in FYE 101, BUSL 101, and AH were more likely to complete college mathematics and first-year composition courses in their first full academic year and had better fall-to-fall retention outcomes compared to students who did not take a first-year experience course (see Appendix).

III. Program Learning Outcomes

This change will not affect the program learning outcomes.

IV. Effect on Other Programs

This revision will not affect other degree and certificate programs at the College.

V. Space or Technology Requirements

The revision does not involve new space or technology requirements.

VI. Current/Proposed Catalog Page

Biological Sciences (current)

Description: The Associate in Arts Degree in Biological Sciences is a non-select two-year program in the Science and Technology academic pathway primarily intended to prepare students for transfer to four-year programs in science and technology related fields, including but not limited to pharmaceuticals, biotechnology, elementary and middle school education. Students in this program include those interested in non-allied health STEM-related fields, those who wish to build prerequisites for select programs in the Science and Technology academic pathway, and those who wish to obtain a two-year Science and Technology degree with the intention of transfer into a related field.

Student Learning Outcomes:

Upon successful completion of this program, students will be able to:

- Demonstrate an understating of the Scientific Method and utilize it for the development of hypotheses, the collection and analysis of data, and the presentation of results.
- Effectively communicate, in a classroom setting, scientific information via written and graphical methods.
- Summarize the major biological and chemical concepts and processes essential to the living organism.
- Explain the hierarchy of organization in living things, from the chemical level to the biosphere.

Program Entry Requirements: This program is open to all interested students. New students are normally required to take College's placement tests at their time of entry. Students who are identified as needing developmental course work must satisfactorily complete the appropriate English and mathematics courses as part of their degree program.

Program of Study and Graduation Requirements: To qualify for the Associate in Arts (AA) degree in Biological Sciences, a student must complete a minimum of 61 credits as prescribed and attain a minimum grade point average of 2.0 ("C" average).

Course Sequence:

Semester 1

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 106 - General Biology I		4 credits	Natural Science
ENGL 101 - English Composition	ENGL 101 Placement	3 credits	ENGL 101
FNMT 118 - Intermediate Algebra	FNMT 118 Placement	3 credits	Mathematics
SOC 101 - Introduction to Sociology		3 credits	Social Sciences Interpretive Studies Writing Intensive Am/Global Diversity
General Elective		3 credits	

Semester 2

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 107 - General Biology II	BIOL 106 with a "C" or better.		
CHEM 110 - Introductory Chemistry	FNMT 118 or MATH 118 placement and ENGL 101 ready.		
CIS 103 - Computer Applications & Concepts			Technological Competency
ENGL 102 - The Research Paper			ENGL 102, Information Literacy
Humanities Elective (Choose one): FREN 101 - Elementary French or HUM 101 - Cultural Traditions or			Humanities

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
SPAN 101 - Elementary Spanish			

Semester 3

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 108 - Essentials of Human Anatomy and Physiology		4 credits	
MATH 161 - Precalculus I		3 credits	
Directed Elective (Choose two): ANTH 101 - Introduction to Anthropology or ECON 181 - Principles of Economics (Macroeconomics) or ECON 182 - 182 Principles of Economics (Microeconomics) or HIST 101 - United States History: Colonial America through the Revolutionary Era or HIST 102 - United States History: The 19th Century or HIST 103 - United States History: The 20th Century or HIST 121 - Global History I or HIST 122 - Global History II or PHIL 101 - Introduction to Philosophy or POLS 111 - American Government or PSYC 101 - Introduction to Psychology or PSYC 201 - Child Psychology or SOC 231 - Social Problems	For PSYC 201: PSYC 101 For SOC 231: SOC 101 or ANTH 112	6 credits	

Semester 4

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 104 - Forensic Biology or BIOL 123 - Principles of Biology I or BIOL 211 - Genetics or BIOL 225 - Ecology and Field Biology or BIOL 241 - Principles of Microbiology or STS 101 - Introduction to Science, Technology and Society	For BIOL 104 and STS 101: FNMT 118 or MATH 118 or higher placement For BIOL 123: CHEM 121 or CHEM 110 with a grade of "C" or better and high school biology or permission of the department head For BIOL 211: BIOL 106 or BIOL 108 or BIOL 109 or BIOL 123 with a grade of "C" or better or permission of the department head For BIOL 225: BIOL 107 or BIOL 124 with a grade of "C" or better in either For BIOL 241: BIOL 106 or BIOL 107 or BIOL 109 or BIOL 123 with a "C" or better or permission of the department head	4 credits	
CHEM 118 - Introduction to Biochemistry	CHEM 101, CHEM 110 or CHEM 121 with a grade of "C" or better.	4 credits	
MATH 162 - Precalculus II	MATH 161 with a grade of "C" or better, or placement in MATH 162 or higher.	3 credits	
ART 103 - History of Art: Ancient to Renaissance or ENGL 190 - Introduction to Literature or FREN 101 - Elementary French or MUS 103 - Introduction to Music or PHIL 101 - Introduction to Philosophy or PHIL 211 - Ethical Problems or	For ENGL 190: ENGL 101, which may be taken concurrently	3 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
SPAN 101 - Elementary Spanish			

Minimum Credits Needed to Graduate: 60

Biological Sciences (proposed)

Description: The Associate in Arts Degree in Biological Sciences is a non-select two-year program in the Science and Technology academic pathway primarily intended to prepare students for transfer to four-year programs in science and technology related fields, including but not limited to pharmaceuticals, biotechnology, elementary and middle school education. Students in this program include those interested in non-allied health STEM-related fields, those who wish to build prerequisites for select programs in the Science and Technology academic pathway, and those who wish to obtain a two-year Science and Technology degree with the intention of transfer into a related field.

Student Learning Outcomes:

Upon successful completion of this program, students will be able to:

- Demonstrate an understating of the Scientific Method and utilize it for the development of hypotheses, the collection and analysis of data, and the presentation of results.
- Effectively communicate, in a classroom setting, scientific information via written and graphical methods.
- Summarize the major biological and chemical concepts and processes essential to the living organism.
- Explain the hierarchy of organization in living things, from the chemical level to the biosphere.

Program Entry Requirements: This program is open to all interested students. New students are normally required to take College's placement tests at their time of entry. Students who are identified as needing developmental course work must satisfactorily complete the appropriate English and mathematics courses as part of their degree program.

Program of Study and Graduation Requirements: Students in the Biological Sciences program are required to enroll in BIOL 100: Introduction to Life Sciences within the first 18 credits. To qualify for the Associate in Arts (AA) degree in Biological Sciences, a student must complete a minimum of 61 credits as prescribed and attain a minimum grade point average of 2.0 ("C" average).

Semester 1

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 106 - General Biology I		4 credits	Scientific Reasoning
ENGL 101 - English Composition	ENGL 101 Placement	3 credits	Writing, Research, Info Lit 1

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
FNMT 118 - Intermediate Algebra	FNMT 017 or FNMT 019 completed or FNMT 118 (or higher) placement	3 credits	Quantitative Reasoning
SOC 101 - Introduction to Sociology* or ANTH 101 - Introduction to Anthropology or ECON 181 - Principles of Economics (Macroeconomics) or POLS 111 - American Government		3 credits	Cultural Analysis & Interpretation
BIOL 100: Introduction to Life Sciences		4 credits	

Semester 2

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 107 - General Biology II	BIOL 106 with a "C" or better.	4 credits	
CHEM 110 - Introductory Chemistry	FNMT 118 or MATH 118 placement and ENGL 101 ready.	4 credits	
CIS 103 - Computer Applications & Concepts		3 credits	Technological Competency
ENGL 102 - The Research Paper		3 credits	Writing, Research, Info Lit 2

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
Directed Elective (choose one) FREN 101 - Elementary French or HUM 101 - Cultural Traditions: Ancient to the 13th Century or SPAN 101 - Elementary Spanish		3 credits	

Semester 3

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 108 - Essentials of Human Anatomy and Physiology		4 credits	
MATH 161 - Precalculus I		3 credits	
Directed Elective (Choose two): ART 103 - History of Art: Ancient to Renaissance or ECON 182 - Principles of Economics (Microeconomics) or HIST 101 - United States History: Colonial America through the Revolutionary Era or HIST 102 - United States History: The Civil War and the 19th Century or HIST 103 - United	For ENGL 190: ENGL 101, which may be taken concurrently For PSYC 201: PSYC 101 For SOC 231: SOC 101 or ANTH 112	6 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
States History: The 20th Century and Beyond or HIST 121 - World History: The Distant Past or HIST 122 - World History: The Recent Past or ENGL 190 - Introduction to Literature or MUS 103 - Introduction to Music or PHIL 101 - Introduction to Philosophy* or PHIL 211 - Ethical Problems or PSYC 101 - Introduction to Psychology* or PSYC 201 - Child Psychology or SOC 231 - Social Problems or			

Semester 4

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
BIOL 104 - Forensic Biology or BIOL 123 - Principles of Biology I or BIOL 211 - Genetics or BIOL 225 - Ecology and Field Biology or BIOL 241 -	For BIOL 104 and STS 101: FNMT 118 or MATH 118 or higher placement For BIOL 123: CHEM 121 or CHEM 110 with a grade of "C" or	4 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
Principles of Microbiology or STS 101 - Introduction to Science, Technology and Society	better and high school biology or permission of the department head For BIOL 211: BIOL 106 or BIOL 108 or BIOL 109 or BIOL 123 with a grade of "C" or better or permission of the department head For BIOL 225: BIOL 107 or BIOL 124 with a grade of "C" or better in either For BIOL 241: BIOL 106 or BIOL 107 or BIOL 109 or BIOL 123 with a "C" or better or permission of the department head		
CHEM 118 - Introduction to Biochemistry	CHEM 101, CHEM 110 or CHEM 121 with a grade of "C" or better.	4 credits	
MATH 162 - Precalculus II	MATH 161 with a grade of "C" or better, or placement in MATH 162 or higher.	3 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
ENGL 115 - Public Speaking	ENGL 101, which may be taken concurrently	3 credits	Oral Communication/Creative Expression

Minimum Credits Needed to Graduate: 61

* Students who wish to transfer to the Associate of Science in Biology degree program should take SOC 101, PSYC 101 and PHIL 101. Students should consult an advisor and the requirements of their chosen transfer institution before choosing their directed electives.

VII. Current/Proposed Courses and Completion Sequence

Courses and Completion Sequence (current)

The following courses and sequence of courses is designed for the optimal success and completion of the AA in Biological Sciences degree/certificate. Any alterations should be discussed with your academic advisor.

Semester 1

Course Number and Name	Credits	Advisory Notes	Course Type
BIOL 106 - General Biology I	4 credits		Natural Science
ENGL 101 - English Composition I	3 credits		Fulfills English 101 General Education Requirement
FNMT 118 - Intermediate Algebra	3 credits		Fulfills Mathematics General Education Requirement
SOC 101 - Introduction to Sociology	3 credits		Fulfills Social Science General Education and Interpretive Studies, Writing Intensive, and American/Global Diversity requirements
General Elective	3 credits		

Semester 2

Course Number and Name	Credits	Advisory Notes	Course Type
BIOL 107 - General Biology II	4 credits		Major Course

Course Number and Name	Credits	Advisory Notes	Course Type
CHEM 110 - Introductory Chemistry	4 credits		
CIS 103 - Applied Computer Technology	3 credits		Fulfills Technological Competency General Education Requirement
ENGL 102 - The Research Paper	3 credits		Fulfills ENGL 102/Information Literacy General Education Requirement
Choose one: FREN 101 - Elementary French HUM 101 - Cultural Traditions SPAN 101 - Elementary Spanish	3 credits		Fulfills Humanities General Education requirement

Semester 3

Course Number and Name	Credits	Advisory Notes	Course Type
BIOL 108 - Essentials of Human Anatomy and Physiology	4 credits		
MATH 161 - Precalculus I	3 credits		
Choose two: ANTH 101 - Introduction to Anthropology ECON 181 - Principles of Economics (Macroeconomics) ECON 182 - Principles of Economics (Microeconomics) HIST 101 - United States History: Colonial America thorough the Revolutionary Era HIST 102 - United States History: The 19th Century HIST 103 - United States History: The 20th Century	6 credits		Directed Elective

Course Number and Name	Credits	Advisory Notes	Course Type
HIST 121 - Global History I HIST 122 - Global History II PHIL 101 - Introduction to Philosophy POLS 111 - American Government PSYC 101 - Introduction to Psychology PSYC 201 - Child Psychology SOC 231 - Social Problems			

Semester 4

Course Number and Name	Credits	Advisory Notes	Course Type
Biology Elective (choose one): BIOL 104 - Forensic Biology BIOL 123 - Principles of Biology BIOL 211 - Genetics BIOL 225 - Ecology and Field Biology BIOL 241 - Principles of Microbiology STS 101 - Science, Technology and Society	4 credits	If students desire to transfer to Associate of Science in Biology degree program, BIOL 123 is recommended at this time.	Concentration Elective
CHEM 118 - Introductory Chemistry	4 credits	If students desire to transfer to Associate of Science in Biology degree program, CHEM 121 is recommended at this time.	
MATH 162 - Precalculus II	4 credits		

Course Number and Name	Credits	Advisory Notes	Course Type
ART 103 - History of Art: Ancient to Renaissance ENGL 190 - Introduction to Literature FREN 101 - Elementary French MUS 103 - Introduction to Music PHIL 101 - Introduction to Philosophy PHIL 211 - Ethical Problems SPAN 101 - Elementary Spanish	3 credits		

Courses and Completion Sequence (proposed)

The following courses and sequence of courses is designed for the optimal success and completion of the AA in Biological Sciences degree/certificate. Any alterations should be discussed with your academic advisor.

Semester 1

Course Number and Name	Credits	Advisory Notes	Course Type
BIOL 106 - General Biology I	4 credits		Fulfills Scientific Reasoning General Education Requirement
ENGL 101 - English Composition I	3 credits		Fulfills Writing/Research/ Info Lit 1 General Education Requirement
FNMT 118 - Intermediate Algebra	3 credits		Fulfills Quantitative Reasoning General Education Requirement
SOC 101 - Introduction to Sociology or ANTH 101 - Introduction to Anthropology or ECON 181 - Principles of Economics (Macroeconomics) or POLS 111 - American Government	3 credits	Students who wish to transfer to the Associate of Science in Biology degree program should take SOC 101. Students should consult an advisor and the	Fulfills Cultural Analysis & Interpretation General Education Requirement

Course Number and Name	Credits	Advisory Notes	Course Type
		requirements of their chosen transfer institution before choosing their directed electives.	
BIOL 100: Introduction to Life Sciences	4 credits		

Semester 2

Course Number and Name	Credits	Advisory Notes	Course Type
BIOL 107 - General Biology II	4 credits		Major Course
CHEM 110 - Introductory Chemistry	4 credits		
CIS 103 - Applied Computer Technology	3 credits		Fulfills Technological Competency General Education Requirement
ENGL 102 - The Research Paper	3 credits		Fulfills Writing/Research/ Info Lit 2 General Education Requirement
Choose one: FREN 101 - Elementary French HUM 101 - Cultural Traditions: Ancient to the 13th Century SPAN 101 - Elementary Spanish	3 credits		

Semester 3

Course Number and Name	Credits	Advisory Notes	Course Type
BIOL 108 - Essentials of Human Anatomy and Physiology	4 credits		Major Course
MATH 161 - Precalculus I	3 credits		
Choose two:	6 credits	Students who wish to transfer	Directed Elective

Course Number and Name	Credits	Advisory Notes	Course Type
ART 103 - History of Art: Ancient to Renaissance ECON 182 - Principles of Economics (Microeconomics) ENGL 190 - Introduction to Literature HIST 101 - United States History: Colonial America thorough the Revolutionary Era HIST 102 - United States History: The Civil War and the 19th Century HIST 103 - United States History: The 20th Century and Beyond HIST 121 - World History: The Distant Past or HIST 122 - World History: The Recent Past or MUS 103 - Introduction to Music PHIL 101 - Introduction to Philosophy PHIL 101 - Introduction to Philosophy PHIL 211 - Ethical Problems PSYC 101 - Introduction to Psychology PSYC 201 - Child Psychology SOC 231 - Social Problems		to the Associate of Science in Biology degree program should take PSYC 101 and PHIL 101. Students should consult an advisor and the requirements of their chosen transfer institution before choosing their directed electives.	

Semester 4

Course Number and Name	Credits	Advisory Notes	Course Type
Biology Elective (choose one): BIOL 104 - Forensic Biology	4 credits	If students desire to transfer to Associate of Science in	Concentration Elective

Course Number and Name	Credits	Advisory Notes	Course Type
BIOL 123 - Principles of Biology BIOL 211 - Genetics BIOL 225 - Ecology and Field Biology BIOL 241 - Principles of Microbiology STS 101 - Science, Technology and Society		Biology degree program, BIOL 123 is recommended at this time.	
CHEM 118 - Introductory Chemistry	4 credits	If students desire to transfer to Associate of Science in Biology degree program, CHEM 121 is recommended at this time.	
MATH 162 - Precalculus II	4 credits		
ENGL 115 - Public Speaking	3 credits		Fulfills Oral Communication/Creative Expression General Education Requirement

VIII. Current and Proposed Curriculum Map (current)

Curriculum Map (current)

Key: **I**—Introduced **R**—Reinforced and opportunity to practice
M—Mastery at exit level **A**—Assessment evidence collected

Required Courses ↓	**Program Learning Outcomes**			
	Demonstrate an understating of the Scientific Method and utilize it for the development of hypotheses, the collection and analysis of data, and the presentation of results.	Effectively communicate, in a classroom setting, scientific information via written and graphical methods.	Summarize the major biological and chemical concepts and processes essential to the living organism.	Explain the hierarchy of organization in living things, from the chemical level to the biosphere.
BIOL 104	I, R, A	I, A		
BIOL 106	I, R, A	I	I, R, A	I, A
BIOL 107	R, A			R, A
BIOL 108	I, R, A	I, A	I, R, A	I, A
BIOL 123	R, M, A,	R, A	R, A	R, A
BIOL 211	R, A	R, A	R, A	
BIOL 225	R, A	R, M, A	R, M, A	R, M, A
BIOL 241	R, M, A	R, M, A	R, M, A	R, M, A
STS 101	I, R, A	I, R, A	I, R, A	
CHEM 110	I, A	I, A		
CHEM 118	I, A	I, A		

Curriculum Map (proposed)

Key: **I**—Introduced **R**—Reinforced and opportunity to practice
M—Mastery at exit level **A**—Assessment evidence collected

Required Courses ↓	**Program Learning Outcomes**			
	Demonstrate an understating of the Scientific Method and utilize it for the development of hypotheses, the collection and analysis of data, and the presentation of results.	Effectively communicate, in a classroom setting, scientific information via written and graphical methods.	Summarize the major biological and chemical concepts and processes essential to the living organism.	Explain the hierarchy of organization in living things, from the chemical level to the biosphere.
BIOL 100	I	I		
BIOL 104	I, R, A	I, A		
BIOL 106	I, R, A	I	I, R, A	I, A
BIOL 107	R, A			R, A
BIOL 108	I, R, A	I, A	I, R, A	I, A
BIOL 123	R, M, A,	R, A	R, A	R, A
BIOL 211	R, A	R, A	R, A	
BIOL 225	R, A	R, M, A	R, M, A	R, M, A
BIOL 241	R, M, A	R, M, A	R, M, A	R, M, A
STS 101	I, R, A	I, R, A	I, R, A	
CHEM 110	I, A	I, A		
CHEM 118	I, A	I, A		

IX. Appendix

First Year Experience Outcomes Summary

The Guided Pathways research finds that students are more likely to succeed when they understand the steps they need to complete a certificate or degree – and understand the institutional support systems in place to help them achieve their goals.

Momentum-based Key Performance Indicators (KPI)

Credit Momentum It is clear that students who enroll full-time rather than part-time are more likely to graduate. First-year experience courses are designed to support the successful academic and social transition of new students into the CCP community. As Astin[1] writes, student success requires intentional efforts to establish, develop, and nurture student connections within the institution. Credit-momentum is a near-term measure tracking students through their first-term progress toward their goals. A first-step toward improvement in students' long-term success is increasing the percent of FTIC[2] students who successfully complete a full-time, college-level credit load in their first-term; credit-momentum provides a summary review of this measure.

FTIC Populations

To establish comparable measures, the populations used in calculating momentum-based KPIs, include only students that were first-time in college, completed high school, and enrolled in a credit program in the associated terms.

	Fall 2016	Fall 2017	Fall 2018
AH 101[3]	352	328	275
BUSL 101		192	194
FYE 101	249	264	216
FTIC Baseline[4] (No FYE course)	3,457	2,915	2,850

[1] Astin, A. W. (1993). "What Matters in College? Four Critical Years Revisited." San Francisco, CA: Jossey-Bass.

[2] FTIC refers to First-time in college students, incudes full-time and part-time enrollment and excludes transfer and non-degree seeking students. The count varies from semester to semester fall 2016 represented 4,058 students; fall 2017 represented 3,702 students.

[3] For comparison purposes, KPI Momentum outcomes are based on the subgroup of FYE the students that meet the FTIC student definition.

[4] FTIC Baseline refers to the corresponding First-time in college cohort not enrolled in a First Year Experience Course (FYE 101, AH 101, or BUSL 101), incudes full-time and part-time enrollment and excludes transfer and non-degree seeking students.

Earned 12+ College Credits in 1st Term

Percent of fall cohort students who earned 12 or more college-level (i.e., non-developmental) credits (with grade A-D or P) in the first term

	Fall 2016	Fall 2017	Fall 2018
AH 101	15.3 %	11.3 %	14.9%
BUSL 101		14.1 %	25.8%
FYE 101	15.7 %	20.8 %	15.3%
FTIC Baseline (No FYE course)	8.6 %	10.1 %	9.6%

FTIC Fall to Spring Retention

Percent of fall cohort students who enrolled in at least one credit-bearing course (including developmental) in term 2 (spring term)

	Fall 2016	*Fall 2017*	*Fall 2018*
AH 101	81.0 %	83.5 %	Available Fall 2019
BUSL 101		70.3 %	
FYE 101	83.1 %	82.6 %	
FTIC Baseline (No FYE course)	72.0%	71.1 %	

Medium-term indicators, such as courses completed/credits earned in the first year and fall to fall retention, to assess student persistence and progression.

Earned 15+ College Credits in 1st Year

Number and % of fall cohort students who earned 15 or more college-level (i.e., non-developmental) credits (with grade A-D or P) in first full academic year

	Fall 2016	Fall 2017	Fall 2018
AH 101	40.1 %	37.8 %	Available Fall 2019
BUSL 101		33.9 %	
FYE 101	45.0 %	47.7 %	
FTIC Baseline (No FYE course)	23.2 %	24.3 %	

Gateway Momentum

Completion of College Math in 1st Year

Percent of fall cohort students who attempted and passed at least one college level (i.e., non-developmental) Math 118 or higher (with grade A-D or P) in the first full academic year. Withdrawals are counted as attempting but not passing the course.

	Fall 2016	Fall 2017	Fall 2018
AH 101	34.1 %	29.0%	Available Fall 2019
BUSL 101		32.8 %	
FYE 101	32.9 %	35.6 %	
FTIC Baseline (No FYE course)	23.2 %	23.6 %	

Completion of College English in 1st Year

Percent of fall cohort students who attempted and passed English 101, college level (i.e., non-developmental) (with grade A-D or P) in the first full academic year. Withdrawals are counted as attempting but not passing the course.

	Fall 2016	Fall 2017	Fall 2018
AH 101	56.3 %	58.8%	Available Fall 2019
BUSL 101		44.8 %	
FYE 101	61.4 %	63.3 %	
FTIC Baseline (No FYE course)	41.2 %	42.1 %	

Completion of Both College Math & English in 1st Year

Percent of fall cohort students who attempted and passed Math 118 or higher and English 101, college level (i.e., non-developmental) (with grade A-D or P) in the first full academic year. Withdrawals are counted as attempting but not passing the course.

	Fall 2016	Fall 2017	Fall 2018
AH 101	27.0 %	24.7%	Available Fall 2019
BUSL 101		21.9 %	
FYE 101	28.9 %	29.9 %	
FTIC Baseline (No FYE course)	15.2 %	17.0%	

FTIC Fall to Fall Retention

Percent of fall cohort students who enrolled in at least one credit-bearing course (including remedial) in the second fall term

	Fall 2016	Fall 2017	Fall 2018
AH101	57.4 %	50.6%	Available Spr 2020
BUSL 101		41.1%	
FYE 101	64.7 %	51.5%	
FTIC Baseline (No FYE course)	46.9 %	46.5%	

COMMUNITY COLLEGE OF PHILADELPHIA Degree Program Revision Template	
Name of Degree Program	Applied Science and Engineering Technology (ASET)
Faculty Developer(s)	Randy Libros & Linda Gerz
Facilitator	Amy Birge-Caracappa
Recommended Starting Semester	Fall 2021
Today's Date	February 11, 2021

I. Description of and Rationale for Revision

The Applied Science and Engineering Technology degree is being revised to align better with the "pathways" model that has become more prevalent in community colleges (see **Appendix**) Students will have the option of taking courses that lead to different pathway outcomes. Choices include an engineering technology pathway and a transfer pathway. In the future, a pathway for new programs can be developed (e.g., solar, robotics, and/or drone technology). Creating future proficiency certificate programs that seamlessly fit without loss of credit into the overall associate degree program will make for a more successful program.

The engineering technology pathway is geared towards the student who wishes to complete the A.A.S. degree and seek employment upon graduation in an electrical and/or technical field where knowledge of basic electronics is essential. This pathway includes core electronics courses and program electives. The electives include in-context principles and concepts relative to the workplace environments that students may be employed in.

The transfer pathway is designed to allow a student to transfer into a bachelor's degree engineering technology program. Locally, both Temple and Drexel offer engineering technology degree programs at the bachelor's level. College level chemistry and physics are components of these curricula along with precalculus math courses.

Additional pathways could include future courses in areas such as solar and drone technology. Preliminary surveys and focus group meetings show that these are areas of interest with both students and potential employers.

Name Change: The name of the degree is changing from Applied Science and Engineering Technology to simply "Applied Engineering Technology (AET)". The new program name is in alliance with the new Classification of Instructional Programs (CIP) codes, which will allow the College to market the program more effectively. The new CIP code for Applied Engineering Technology is 15.001. Accordingly, the course designation will change from ASET to AET.

In addition, the course sequence has been revised to reflect the new general education requirements that will go into effect in Fall 2021 as well as the addition of AET 101: Introduction to Robotics.

New Course:

AET 101 - Introduction to Robotics

3-2-4 **Credit Hours:** 4

This course introduces students to the field of robotics with a focus on investigating careers in STEM fields. Students will be introduced to concepts in electronics, nanotechnology, medical technology, computer science, and advanced manufacturing techniques while applying the topics to create functioning robots.

Course Learning Outcomes

Upon successful completion of the course, students will be able to:

1. Identify and properly apply terminology related to the field of robotics.
2. Create simple circuits and produce basic circuit diagrams.
3. Produce basic computer programs and identify components of them including variables, data types, conditional statements and loops.
4. Use the Scientific Method to apply principles of scientific reasoning to the solution of problems
5. Demonstrate an understanding of legal and ethical issues related to robotics
6. Identify and describe STEM careers and their associated educational requirements.
7. Produce financial plan and timeline related to an academic and career plan.
8. Demonstrate the ability to work as part of a team

Course Revisions: The prerequisite for ELEC 130 has been clarified.

Course Substitution: Several courses have been reshuffled or substituted to meet general education requirements (e.g., ENGL 115: Public Speaking now appears in all three pathways and meets the Oral Communication/Creative Expression requirement) or to provide more guided choices for students, depending on their chosen pathway (e.g., SOC 105 or ECON 181).

Course Designation: The designation of all courses will change from ASET to AET.

Course Eliminations: Biomedical Equipment Technician (BMET) courses are to be eliminated from the AET program.

Other Requirements: There are no additional changes to the program requirements.

Change in Credits: The minimum number of credits is reduced from 62 to 60 for the Engineering Technology pathway and from 62 to 61 for the Transfer pathway.

II. Supporting Data

Please see the Appendix for institutional data provided by Eric Shannon (January 2020) and employment data from Emsi (Economic Modeling Specialists International; see economicmodeling.com).

III. Program Learning Outcomes

Changes to the Program Learning Outcomes are minor. PLO #1, "Demonstrate foundational knowledge in at least one technology field" has been deleted as it is no longer relevant. The language in PLO #3 has been adjusted to make the learning outcome more assessable.

IV. Effect on Other Programs

This revision will affect the Biomedical Equipment Technician Proficiency Certificates (BMET Levels 1 and 2), which are currently listed in the ASET curriculum. BMET is going to become its own separate program with associated proficiency certificates at the College.

V. Space or Technology Requirements

This revision does not involve new space or technology requirements.

VI. Current/Proposed Catalog Page

Applied Science and Engineering Technology (current)

Description: The Applied Science and Engineering Technology program curriculum leads to an Associate in Applied Science (A.A.S.) degree and 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 engineering technology, among others that are developed as industry trends demand. Students will be prepared to demonstrate scientific observation skills, to operate equipment and/or relevant software, and to promote safety and quality in the workplace.

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.

Student Learning Outcomes:

Upon completion of the Applied Science and Engineering Technology curriculum, the student will be able to:

- 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.

In addition, students will be prepared to work in a range of industries at the technician level. Below is a list of some of the positions a graduate of the program could fill (depending on which certificate or certificates are completed).

- Process technician or operator in industries such as oil refining, food processing and water purification.
- Biotechnology technician in the bio-pharmaceutical industry.
- Biomedical research technician.

Program Entry Requirements: This program is open to all interested students. All new students are normally required to take the College's placement test at their time of entry. Students who are identified as needing developmental course work must satisfactorily complete the appropriate English and mathematics courses as a part of their degree program.

Program of Study and Graduation Requirements: A minimum of 62 credits as prescribed must be completed with a minimum grade point average of 2.0. A minimum grade of "C" must be achieved in all certificate and required program courses. Specific certificates taken in conjunction with the degree will require more than 62 credits.

Course Sequence:

Semester 1

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
FNMT 118 - Intermediate Algebra*		3 credits	Mathematics
ASET 101 - Science Technology and Public Policy** or BMET 101 - Biomedical Equipment Technology I ***	For BMET 101: BIOL 108 or BIOL 110, which may be taken concurrently	3 or 4 credits	Natural Science

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
Directed Electives **** [Prior Learning Assessment may be applied] †		15 credits	

Semester 2

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ENGL 101 - English Composition I		3 credits	ENGL 101
CIS 103 - Computer Applications & Concepts		3 credits	Tech Comp
ELEC 120 - Direct and Alternating Current Circuits	FNMT 118 or higher MATH with a grade of "C" or better or placement in MATH 161 or higher.	4 credits	
BMET 102 - Biomedical Equipment Technology II ***or ASET 140 - 3D Printing or ASET 201 - Introduction to Nanotechnology	For BMET 102: BMET 101 with a grade of "C" or better and ELEC 120, which may be taken concurrently For ASET 140: FNMT 017 or FNMT 118 or higher MATH with a grade of "C" or better or placement in FNMT 118 or higher MATH. For ASET 201: CHEM 110 and FNMT 118 or higher MATH with a grade of "C" or better or placement in MATH 161 or higher.	4 credits	

Semester 3

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ENGL 102 - The Research Paper	ENGL 101 with a grade of "C" or better	3 credits	ENGL 102, Info Lit
ELEC 130 - Digital Electronics or ELEC 124 - Semiconductor Devices	For ELEC 130: FNMT 118 or MATH 118 with a grade of "C" or better For ELEC 124: ELEC 120 with a grade of "C" or better	4 credits	
CHEM 110 - Introductory Chemistry or higher level chemistry*	FNMT 118 ready and ENGL 101 ready	4 credits	Natural Sciences
ASET 110 - Safety, Health and the Environment or BMET 201 - Medical Devices *** or ASET 140 - 3D Printing or ASET 201 - Introduction to Nanotechnology	For BMET 201: BMET 103 with a grade of "C" or better For ASET 140: FNMT 017 or FNMT 118 or higher MATH with a grade of "C" or better or placement in FNMT 118 or higher MATH. For ASET 201: CHEM 110 and FNMT 118 or higher MATH with a grade of "C" or better or placement in MATH 161 or higher.	3 or 4 credits	
Humanities Course Any World language course (ARAB, CHIN, FREN, HEBR, ITAL, JAPN, SPAN, SWAH) or Any Humanities course (HUM) or Any Philosophy course (PHIL)		3 credits	Humanities

Semester 4

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
PHYS 105 - Survey of Physics or higher *		4 credits	
ASET 130 - Quality Control/Quality Assurance or BMET 202 - Medical Devices in a Networked Environment*** or ASET 140 - 3D Printing or ASET 201 - Introduction to Nanotechnology	For ASET 130: FNMT 118 For BMET 202: BMET 201; ELEC 130, which may be taken concurrently; CIS 105; and CIS 150 with a grade of "C" or better in all courses For ASET 140: FNMT 017 or FNMT 118 or higher MATH with a grade of "C" or better or placement in FNMT 118 or higher MATH. For ASET 201: FNMT 118 or higher MATH with a grade of "C" or better or placement in MATH 161 or higher.	3 or 4 credits	
Social Science courses (choose one) ANTH 112 - Cultural Anthropology or HIST 142 - Food History or HIST 150 - History of American Health Care or SOC 101 - Introduction to Sociology or SOC 115 - Gender and Society		3 credits	Social Sciences

Note: Students may have more than 62 credits to qualify for graduation depending upon courses chosen.

Notes

Note: Students may have more than 62 credits to qualify for graduation depending upon courses chosen.

Minimum Credits Needed to Graduate: 62

* 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.
** ASET 101 meets the College's Natural Sciences requirement.
*** Students interested in obtaining the BMET Proficiency Certificates should take BMET 101, BMET 102, BMET 201 and BMET 202.
**** Directed Electives should be chosen in consultation with an Advisor, from the list below:

- BMET 103 needed for BMET Proficiency Certificate I
- BMET 203 needed for BMET Proficiency Certificate II
- BIOL 108 needed for BMET Proficiency Certificate I
- CIS 105, 106, 130, 150
  - CIS 105 needed for BMET Proficiency Certificate I
  - CIS 150 needed for BMET Proficiency Certificate II
- Any ELEC course above ELEC 120
  - ELEC 124 and ELEC 130 needed for BMET Proficiency Certificate II
- Management MNGT 121 or MNGT 141
- Any Chemistry course above CHEM 110
- Any Engineering course
- Any Physics course above PHYS 105 except PHYS 108 Descriptive Astronomy
- Any Math course above FNMT 118 or MATH 118 except MATH 153 Mathematics of Personal Finance
- CSCI 111 or 112
- ADC 103
- EASC 111 or EASC 111H

† Students submit industry certifications and/or other documentation for consideration for prior learning assessment. Credits awarded through prior learning assessment may be utilized as general ASET credit and applied toward the directed elective requirement, even if there is not a specific course offered by the College that aligns with the prior learning.

Applied Science And Engineering Technology Proficiency Certificates

Students are strongly encouraged to meet with a program advisor to assure completion of the ASET degree in conjunction with a proficiency certificate.
Biomedical Equipment Technician Proficiency Certificate I
Biomedical Equipment Technician Proficiency Certificate II

General Education Requirements: All general education requirements necessary for graduation are met through the courses in the program as indicated above. Students who wish to take courses that differ from the general education courses indicated above must

complete a course substitution request form. To access the form, login to the MyCCP portal, and in the **Student** tab, under **Electronic Forms**, click on the **Records and Registration Forms** link, then choose **Request For Course Substitution Of Graduation Requirement** link. A more detailed explanation of the College's general education requirements is also available.

Applied Engineering Technology (proposed)

Description: The Applied Engineering Technology program curriculum leads to an Associate in Applied Science (A.A.S.) degree and 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 engineering technology, among others that are developed as industry trends demand. Students will be prepared to demonstrate scientific observation skills, to operate equipment and/or relevant software, and to promote safety and quality in the workplace.

Students in the Applied Engineering Technology program may choose courses from three pathways: engineering technology, transfer, or prior learning.

The engineering technology pathway is geared towards the student who wishes to complete the A.A.S. degree and seek employment upon graduation in an electrical and/or technical field where knowledge of basic electronics is essential. This pathway includes core electronics courses and AET electives. The electives include in-context principles and concepts relative to the workplace environments that students may be employed in.

The transfer pathway is designed to allow a student to transfer into a bachelor's degree engineering technology program. Locally, both Temple and Drexel offer engineering technology degree programs at the bachelor's level. College level chemistry and physics are components of these curricula along with precalculus math courses.

Engineering technology programs emphasize problem solving and having lab and technical based skills. Engineering technology programs prepare individuals for application oriented careers in industry, such as manufacturing, field-service, marketing, technical sales, or as technical members of an engineering team.

Student Learning Outcomes:

Upon completion of the Applied Engineering Technology curriculum, the student will be able to:

- ~~Demonstrate foundational knowledge in at least one technology field.~~
- Demonstrate laboratory skills in basic science and technology areas.
- Explain 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.

Program Entry Requirements: This program is open to all interested students. All new students are normally required to take the College's placement test at their time of entry. Students who are identified as needing developmental course work must satisfactorily

complete the appropriate English and mathematics courses as a part of their degree program.

Program of Study and Graduation Requirements: Depending on the students' pathway, a minimum of 60-62 credits as prescribed must be completed with a minimum grade point average of 2.0. A minimum grade of "C" must be achieved in all required program courses.

Engineering Technology Pathway

Course Sequence:

Semester 1

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
AET 101 - Introduction to Robotics		4 credits	Scientific Reasoning
ENGL 101 - English Composition I		3 credits	Writing/Research/Info Lit 1
FNMT 118 - Intermediate Algebra or higher	FNMT 017 or FNMT 019 completed or FNMT 118 (or higher) placement	3 credits	Quantitative Reasoning
CHEM 110 - Introductory Chemistry or higher level chemistry	FNMT 118 ready and ENGL 101 ready	4 credits	
CIS 103 - Computer Applications & Concepts		3 credits	Technological Competency

Semester 2

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ENGL 102 - The Research Paper	ENGL 101 with a grade of "C" or better	3 credits	Writing/Research/Info Lit 2
ELEC 120 - Direct and Alternating Current Circuits	FNMT 118 or higher MATH with a grade of "C" or better or	4 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
	placement in MATH 161 or higher.		
Any AET course above AET 101 or Prior Learning Experience	Please see the catalog for prerequisites	3 or 4 credits	
ENGL 115 - Public Speaking	ENGL 101, which may be taken concurrently	3 credits	Oral Communication/ Creative Expression

Semester 3

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ELEC 124 - Semiconductor Devices	ELEC 120 with a grade of "C" or better	4 credits	
Any **TWO** AET courses above AET 101 or Prior Learning Experience	Please see the catalog for prerequisites	6 to 8 credits	
PHYS 105 - Survey of Physics		4 credits	
ANTH 112 - Cultural Anthropology or HIST 142 - Food History or HIST 150 - History of American Health Care or SOC 101 - Introduction to Sociology or SOC 115 - Gender and Society		3 credits	Cultural Analysis and Interpretation

Semester 4

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ELEC 130 - Digital Electronics	FNMT 118 completed or higher math placement	4 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
Any **TWO** AET courses above AET 101 or Prior Learning Experience	Please see the catalog for prerequisites	6 to 8 credits	
General Elective		3 or 4 credits	

Minimum Credits Needed to Graduate: 60

Transfer Pathway Course Sequence:

Semester 1

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
AET 101 - Introduction to Robotics		4 credits	Scientific Reasoning
ENGL 101 - English Composition I		3 credits	Writing/Research/Info Lit 1
MATH 161 - Precalculus I	FNMT 118 with a grade of "C" or better	3 credits	Quantitative Reasoning
CIS 103 - Computer Applications & Concepts		3 credits	Technological Competency
General Elective		3 or 4 credits	

Semester 2

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ENGL 102 - The Research Paper	ENGL 101 with a grade of "C" or better	3 credits	Writing/Research/Info Lit 2
ELEC 120 - Direct and Alternating Current Circuits	FNMT 118 or higher MATH with a grade of "C" or better or placement in MATH 161 or higher.	4 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
MATH 162 - Precalculus II	MATH 161 with a grade of "C" or better, or placement in MATH 162 or higher	3 credits	
CHEM 110 - Introductory Chemistry or higher level chemistry	FNMT 118 ready and ENGL 101 ready	4 credits	
CSCI 111 - Computer Science I	FNMT 118 prerequisite or placement in MATH 161 or higher	4 credits	

Semester 3

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ELEC 130 - Digital Electronics	FNMT 118 completed or higher math placement	4 credits	
CHEM 121 - College Chemistry I or General Elective*	CHEM 110 with a "C" or better and FNMT 118 or MATH 118.	3 or 4 credits	
PHYS 111 - General Physics I	MATH 162 or Math 171 or MATH 171 placement.	4 credits	
Technical Elective (choose one): Any AET course above AET 101 or ELEC 124 - Semiconductor Devices	Please see the catalog for AET prerequisites For ELEC 124: ELEC 120 with a grade of "C" or better	3 or 4 credits	

Semester 4

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
Technical Elective (choose one): Any AET course above AET 101 or ELEC 124 - Semiconductor Devices	Please see the catalog for AET prerequisites For ELEC 124: ELEC 120 with a grade of "C" or better	3 or 4 credits	
PHYS 112 - General Physics II	PHYS 111 or permission of the department head.	4 credits	
ENGL 115 - Public Speaking	ENGL 101, which may be taken concurrently	3 credits	Oral Communication/ Creative Expression
ECON 181 - Principles of Economics (Macroeconomics)	FNMT 118 or higher	3 credits	Cultural Analysis & Interpretation

Minimum Credits Needed to Graduate: 61

* Students planning to transfer to Temple University should take CHEM 121.

General Education Requirements: All general education requirements necessary for graduation are met through the courses in the program as indicated above. Students who wish to take courses that differ from the general education courses indicated above must complete a course substitution request form. To access the form, login to the MyCCP portal, and in the **Student** tab, under **Electronic Forms**, click on the **Records and Registration Forms** link, then choose **Request for Course Substitution Of Graduation Requirement** link. A more detailed explanation of the College's general education requirements is also available.

For More Information, Contact: The Division of Math, Science and Health Careers, Room W1-1, 1700 Spring Garden Street, Philadelphia, PA 19130, Telephone (215) 751-8430; or the College Information Center (215) 751-8010.

VII. Current/Proposed Curriculum Map

Curriculum Map (current)

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			I, R, A	I, R, A	
BMET 101	I, R, A	I, R, A			
ELEC 120	I, R, A	I, R, A			
BMET 102			I, R, A	I, R, A	R, M, A
CHEM 110		I, R, A			
ASET 130					R, M, A
ASET 140	I, R, A	I, R, A			
ASET 201	I, R, A	I, R, A	R, A		

Curriculum Map (proposed)—BMET courses removed and ASET changed to AET. New courses created will have curriculum maps developed at time of course creation.

Required Courses	Programmatic Student Learning Outcomes			
	Demonstrate laboratory skills in basic science and technology areas	Explain 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
AET 101	I, R, A	I, R, A	I, R, A	I, R, A
AET 102		I, R, A	I, R, A	
ELEC 120	I, R, A	I	I, R	I, R, A
CHEM 110	I, R	I	I, R	I, R
AET 110		I, R, A	I, R	
AET 130		I, R	I	R, M, A
AET 140	I, R, A	I, R	I, R	I, R
AET 201	I, R, A	R, A	I, R	I, R

VIII. Courses and Completion Sequence (current)

The following courses and sequence of courses is designed for the optimal success and completion of the Applied Science and Engineering Technology degree/certificate. Any alterations should be discussed with your academic advisor.

Semester 1

Course Number and Name	Credits	Advisory Notes	Course Type
ENGL 101 - English Composition I	3 credits	ENGL 101 A grade of "C" or better is required to register for ENGL 102	ENGL 101
ASET 101 - Science Technology and Public Policy or BMET 101 - Biomedical Equipment Technology I	3 or 4 credits	For ASET 101, a grade of "C" or better is required for completion of the ASET degree For BMET 101, A grade of "C" or better is required for completion of the BMET Proficiency Certificate	
FNMT 118 - Intermediate Algebra	3 credits	FNMT 118 with a grade of "C" or better, or a higher level MATH class, or placement above FNMT 118 is a prerequisite for ASET 201, ELEC 120, and ELEC 130	Mathematics
CHEM 110 - Introductory Chemistry or BIOL 108 - Essentials of Human Anatomy and Physiology	4 credits	Both CHEM 110 and BIOL 108 fulfill the natural science requirement. A grade of "C" or better is required to complete BMET I Proficiency Certificate. BIOL 108 is a pre or co-requisite for BMET 101 Students pursuing the BMET I Proficiency Certificate will need to complete CHEM 110 in order to fulfill ASET program requirements	Natural Science

Semester 2

Course Number and Name	Credits	Advisory Notes	Course Type
ELEC 120 - Direct and Alternating Current Circuits	4 credits	Prerequisite: A grade of "C" or better is required to register for ELEC 124, and for completion of the BMET I certificate and ASET degree. FNMT 118 or higher with a grade of "C" or better or placement in MATH 161 or higher	Major Course
CIS 103 - Applied Computer Technology	3 credits	CIS 103 Students must earn a grade of "C" or better. Students will be required to create PowerPoint presentations in subsequent ASET program courses.	Technological C ompetency
BMET 102 - Biomedical Equipment Technology II or ASET 140 - 3D Printing or ASET 201 - Introduction to Nanotechnology 4 credits A grade of "C" or better is required for completion of the ASET degree. BMET 102 required for BMET I Proficiency Certificate. A			Concentration Elective

Course Number and Name	Credits	Advisory Notes	Course Type
grade of "C" or better is required for completion of the BMET I Proficiency Certificate. A grade of "C" or better is required for completion of the ASET degree			
ASET 110: Safety, Health and the Environment or CIS 105 - Computer Systems Maintenance or ASET 140 - 3D Printing or ASET 201 - Introduction to Nanotechnology	3 or 4 credits	A grade of "C" or better in ASET 110 is required for completion of the ASET degree. CIS 105 required for BMET I Proficiency Certificate. A grade of "C" or better is required for completion of the BMET I Proficiency Certificate and ASET degree	Concentration Elective
ENGL 102 - The Research Paper	3 credits		ENGL 102 Information Literacy

Semester 3

Course Number and Name	Credits	Advisory Notes	Course Type
ELEC 124 - Semiconductor Devices or Directed Elective	3 or 4 credits	ELEC 124 required for BMET II Proficiency Certificate. A grade of "C" or better is required for completion of the BMET I Proficiency Certificate and ASET degree.	Concentration/ Directed Elective

Course Number and Name	Credits	Advisory Notes	Course Type
		ELEC 124 may be applied as directed elective or to fulfill requirement for ASET degree (ELEC 124 or ELEC 130 required).	
BMET 201 - Medical Devices or ASET 140 - 3D Printing or ASET 201 - Introduction to Nanotechnology or Directed Elective	3 or 4 credits	BMET 201 is required for the BMET II Proficiency Certificate and fulfills a directed elective requirement for the ASET degree. A grade of "C" or better is required for completion of the BMET I Proficiency Certificate and ASET degree. Fulfills directed elective requirement for students not taking the BMET II certificate.	Concentration /Directed Elective
PHYS 105 - Survey of Physics or higher	4 credits	Fulfills requirement for ASET degree. A grade of "C" or better is required for completion of the ASET degree	Major Course
Humanities Course: Any World Language course (ARAB, CHIN, FREN, HEBR, ITAL, JAPN, SPAN, SWAH) or Any Humanities course (HUM) or Any Philosophy course (PHIL)	3 credits		Humanities Elective

Semester 4

Course Number and Name	Credits	Advisory Notes	Course Type
BMET 202 - Medical Devices in a Networked Environment or ASET 130 - Quality Control/Quality Assurance or ASET 140 - 3D Printing or ASET 201 - Introduction to Nanotechnology	3 or 4 credits	BMET 202 is required for the BMET II Proficiency Certificate. BMET 202 is an ASET degree requirement for students not taking ASET 130. A grade of "C" or better is required for completion of the BMET II Proficiency Certificate and ASET degree. A grade of "C" or better is required for completion of the ASET degree. ASET 130 is an ASET degree requirement for students not taking BMET 202.	Concentration Elective
ELEC 130 - Digital Electronics or Directed Elective	4 credits	ELEC 130 required for BMET II Proficiency Certificate. Fulfills a directed elective requirement for ASET degree for students taking the BMET II Proficiency Certificate. A grade of "C" or better is required	Concentration/ Directed Elective

Course Number and Name	Credits	Advisory Notes	Course Type
		for completion of the BMET I certificate and ASET degree. Fulfills directed elective requirement for ASET degree	
CIS 150 - Network Technology or Directed Elective	4 credits	Required for BMET II certificate Fulfills a directed elective requirement for students taking the BMET II Proficiency Certificate. A grade of "C" or better is required for completion of the BMET II Proficiency Certificate and ASET degree. Fulfills directed elective requirement for ASET degree	Concentration/ Directed Elective
Directed Elective	3 or 4 credits	A grade of "C" or better is required.	Directed Elective
Social Science courses (choose one) ANTH 112 - Cultural Anthropology or HIST 142 - Food History or HIST 150 - History of American Health Care or SOC 101 - Introduction to Sociology or	3 credits		Social Science Elective Fulfills all of the Major Academic Approaches (American/Global Diversity, Interpretive Studies, and Writing Intensive)

Course Number and Name	Credits	Advisory Notes	Course Type
SOC 115 - Gender and Society			

Courses and Completion Sequence (proposed)

The following courses and sequence of courses is designed for the optimal success and completion of the Applied Engineering Technology degree/certificate. Any alterations should be discussed with your academic advisor.

Engineering Technology Pathway Courses and Completion Sequence (proposed)

Semester 1

Course Number and Name	Advisory Notes	Credits	Course Type
AET 101 - Introduction to Robotics		4 credits	Scientific Reasoning
ENGL 101 - English Composition I	Prerequisite for ENGL 102 and ENGL 115; must earn a C or better	3 credits	Writing/Research/Info Lit 1
FNMT 118 - Intermediate Algebra or higher	Prerequisite for AET 130, AET 201, ELEC 120, ELEC 130, MATH 161; must earn a C or better for MATH 161.	3 credits	Quantitative Reasoning
CHEM 110 - Introductory Chemistry or higher level chemistry	Prerequisite for AET 201	4 credits	
CIS 103 - Computer Applications & Concepts		3 credits	Technological Competency

Semester 2

Course Number and Name	Advisory Notes	Credits	Course Type
ENGL 102 - The Research Paper		3 credits	Writing/Research/Info Lit 2

Course Number and Name	Advisory Notes	Credits	Course Type
ELEC 120 - Direct and Alternating Current Circuits	Prerequisite for ELEC 124; must earn a C or better	4 credits	
Any AET course above AET 101 or Prior Learning Experience	Please see the catalog for prerequisites	3 or 4 credits	AET Elective
ENGL 115 - Public Speaking		3 credits	Oral Communication/ Creative Expression

Semester 3

Course Number and Name	Advisory Notes	Credits	Course Type
ELEC 124 - Semiconductor Devices		4 credits	
Any TWO AET courses above AET 101 or Prior Learning Experience	Please see the catalog for prerequisites	6 to 8 credits	AET Elective
PHYS 105 - Survey of Physics		4 credits	
ANTH 112 - Cultural Anthropology or HIST 142 - Food History or HIST 150 - History of American Health Care or SOC 101 - Introduction to Sociology or SOC 115 - Gender and Society	Students should consult with an advisor or program faculty to choose courses that transfer	3 credits	Cultural Analysis & Interpretation

Semester 4

Course Number and Name	Advisory Notes	Credits	Course Type
ELEC 130 - Digital Electronics		4 credits	
Any TWO AET courses above AET 101 or Prior Learning Experience	Please see the catalog for prerequisites	6 to 8 credits	AET Elective
General Elective	Students should consult with an advisor or program faculty to choose courses that transfer	3 or 4 credits	

Transfer Pathway Courses and Completion Sequence (proposed)

Semester 1

Course Number and Name	Advisory Notes	Credits	Course Type
AET 101 - Introduction to Robotics		4 credits	Scientific Reasoning
ENGL 101 - English Composition I	Prerequisite for ENGL 102; must earn a C or better	3 credits	Writing/Research/Info Lit 1
MATH 161 - Precalculus I	Students must place at MATH 161 or higher or pass FNMT 118 with a grade of "C" or better; prerequisite for MATH 162 and ECON 181	3 credits	Quantitative Reasoning
CIS 103 - Computer Applications & Concepts		3 credits	Technological Competency
General Elective	Students should consult with an advisor or program faculty to choose courses that transfer	3 or 4 credits	

Semester 2

Course Number and Name	Advisory Notes	Credits	Course Type
ENGL 102 - The Research Paper		3 credits	Writing/Research/Info Lit 2
ELEC 120 - Direct and Alternating Current Circuits	Prerequisite for ELEC 124; must earn a C or better	4 credits	

Course Number and Name	Advisory Notes	Credits	Course Type
MATH 162 - Precalculus II		3 credits	
CHEM 110 - Introductory Chemistry	Students must be both FNMT 118 ready and ENGL 101 ready; prerequisite for CHEM 121; must earn a C or better	4 credits	
CSCI 111 - Computer Science I		4 credits	

Semester 3

Course Number and Name	Advisory Notes	Credits	Course Type
ELEC 130 - Digital Electronics		4 credits	
CHEM 121 - College Chemistry I or General Elective	Students planning to transfer to Temple University should take CHEM 121.	3 or 4 credits	
PHYS 111 - General Physics I	Students must have completed MATH 162 or Math 171 or placed in MATH 171; prerequisite for PHYS 112	4 credits	
Technical Elective (choose one): Any AET course above AET 101 or ELEC 124 - Semiconductor Devices	Please see the catalog for AET prerequisites	3 or 4 credits	

Semester 4

Course Number and Name	Advisory Notes	Credits	Course Type
Technical Elective (choose one): Any AET course above AET 101 or ELEC 124 - Semiconductor Devices	Please see the catalog for AET prerequisites	3 or 4 credits	
PHYS 112 - General Physics		4 credits	
ENGL 115 - Public Speaking		3 credits	Oral Communication/ Creative Expression
ECON 181 - Principles of Economics (Macroeconomics)		3 credits	Cultural Analysis & Interpretation

IX. Appendix

Applied Science & Engineering Technology Program Registration
Prepared by: Eric Shannon – Research and Data Analyst, Academic Quality and Student Success
Prepared on: January 24, 2020

Table 1 ASET Course Enrollments

	Primary Program ASET?		
	No	**Yes**	**Sum**
ASET101	22 (78.6%)	6 (21.4%)	28
ASET201	2 (22.2%)	7 (77.8%)	9
Sum	24	13	37
Unduplicated	24	13	37

- Table 1 displays the enrollment of ASET courses for the Fall 2019 term separated by whether the students enrolled are housed within the ASET curriculum or not.

Table 2Non ASET Major Pathways

Pathway	Number of Students
Business Entrepreneurship Law	2
Education Human Services	2
Health Care	1
Liberal Arts	4
N/A	11
Science Technology	4

- Table 2 displays the Pathway of non-ASET students who are enrolled in ASET courses.

Table 3 ASET Course Demographics

Unduplicated New	1	7.7%
Unduplicated Returning	12	92.3%

- Table 3 displays the number of ASET students enrolled in ASET coursework separated by whether they are new or returning students.

Table 4 ASET Enrollment Patterns

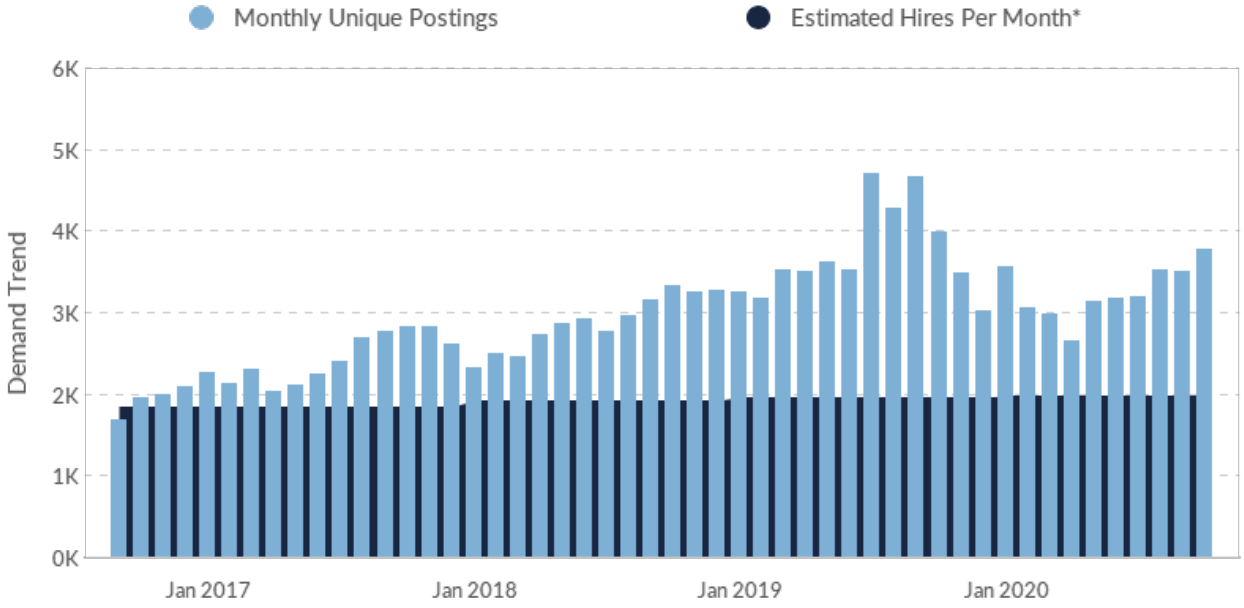
Spring '20 ASET Students in ASET Courses	13
Spring '20 ASET Students (Enrolled)	67
Spring '20 % Enrolled in ASET Courses	19.4%
Spring '20 % Enrolled in Dev Ed	10.4%
Spring '20 % Part Time	65.7%
Fall '19 ASET Students (Enrolled)	69
Spring '19 ASET Students (Enrolled)	80
Total ASET Students Past 2 Years	592[1]

[1] This number includes any student who was last housed within the ASET curriculum code in the past two years – excluding graduates – regardless of whether a student enrolled in coursework or not.

- Table 4 displays the total ASET enrollment for Fall ’19 term including the proportion of students who are enrolled in developmental courses as well as the proportion of students who are part time.

JOB POSTING ACTIVITY

FOR PHILADELPHIA-CAMDEN-WILMINGTON, PA-NJ-DE-MD (Emsi)



Occupation	Avg Monthly Postings (Sep 2016 - Oct 2020)	Avg Monthly Hires (Sep 2016 - Oct 2020)
Maintenance and Repair Workers, General	1,786	920
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	341	408
Industrial Machinery Mechanics	257	169
Electrical and Electronic Engineering Technologists and Technicians	191	54
Industrial Engineering Technologists and Technicians	169	25

Occupation	Avg Monthly Postings (Sep 2016 - Oct 2020)	Avg Monthly Hires (Sep 2016 - Oct 2020)
Telecommunications Equipment Installers and Repairers, Except Line Installers	121	73
Aircraft Mechanics and Service Technicians	61	67
Telecommunications Line Installers and Repairers	25	159
Mechanical Engineering Technologists and Technicians	16	27
Wind Turbine Service Technicians	6	7

*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Emsi hires are calculated using a combination of Emsi jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

COMMUNITY COLLEGE OF PHILADELPHIA New Degree Program Proposal	
Name of Degree Program	Biomedical Equipment Technology
Academic Pathway	Science and Technology
Department	Physics
Faculty Developer(s)	Randy Libros
Facilitator	Amy Birge-Caracappa
Recommended Starting Semester	Fall 2021
Today's Date	February 11, 2021
Abstract	The Biomedical Equipment Technology (BMET) program currently exists as a stackable certificate program that leads to an AAS degree in Applied Science and Engineering Technology (ASET). The ASET program is undergoing a revision intended, in part, to create a student pathway that will be clearer to students. At the same time, the BMET certificate program has a clear pathway to completion, and has graduated 54 students in the past 4 years, with around 85% of them finding sustainable employment in the field. The contents and structure of the curriculum will not change. The program will continue to be guided by the Core Curriculum project developed by the Association for the Advancement of Medical Instrumentation (AAMI), the international professional organization. Establishing the BMET program as a stand-alone AAS degree program, while retaining the stackable credentials model, will provide an associate degree that is clearer to students and clearer to employers. In addition, enabling students to earn an AAS in Biomedical Equipment Technology will make them eligible to become a Certified Biomedical Equipment Technician more quickly.

I. Alignment with the College Mission

The Biomedical Equipment Technology Program already exists as a stackable credentials program, consisting of two proficiency certificates that build towards an Associates of Applied Sciences in Applied Science and Engineering Technology. In its current form, the program is aligned with the College Mission in that it provides a coherent foundation for employment and

lifelong learning. The traditional entry level degree in this field has been the associates degree, however we have found that around 75% of students who successfully complete only the BMET I Proficiency Certificate—which can be completed in a year—have been able to find sustainable employment as Biomedical Equipment Technicians in the field of Healthcare Technology Management (HTM). For students who complete the BMET II Proficiency Certificate and/or the associate's degree in Applied Science and Engineering Technology, the percentage of students who have found employment in the field rises to around 85%. Note that these numbers may be low due to the challenges inherent in tracking all student employment outcomes.

The field of HTM faces ongoing change, as new technologies are introduced in the field of medicine. Inherent in the profession is the need for lifelong learning on the part of Biomedical Equipment Technicians (BMETs), and the program is designed to provide a strong foundation in the operating principles of medical devices, electronics, and networking, so that students who later work in the field are prepared to learn and apply new knowledge.

HTM is currently facing a major challenge, both regionally and nationally, due to the large number of retirements that are occurring in the field, which are expected to continue in upcoming years. The BMET program fulfills an important role in the economic life of the city and the region by providing graduates who are ready to enter the field ready to work in support of our healthcare system.

Students in the program represent a broad range of backgrounds who benefit from the program by attaining knowledge and skills which give them entre to sustainable employment in the HTM field.

II. Expected Program Participants

The BMET Program will prepare students to repair and maintain medical equipment utilized in hospitals and other healthcare environments. The program will be of particular interest to students who want to work in the healthcare arena but are more interested in working with medical technology and supporting the healthcare providers who utilize the equipment than in providing direct patient care. The program is intended to provide students with direct entry to the work environment, and students are expected to find employment in hospitals, with third-party organizations that hospitals may contract with for healthcare technology management services, and with medical device manufacturers who need to provide technical support to their customers. Additional employment opportunities may be found at dialysis centers, medical equipment rental companies, etc.

Since the program has been running as a stackable certificate program leading to an AAS degree in Applied Science and Engineering Technology, we already have a good idea of where students come from who enter the program and why. Some students who enter the program may initially come to the College for Nursing or Allied Health careers, but for various reasons they may decide that BMET is a better fit for them. Employees of area hospitals who interface with their own Biomedical Engineering departments may also seek out further education to move into the field. High school students looking for a hands-on technical career would also find the program interesting. In addition, students may independently learn about the program and search out a

place where they can gain the necessary credentials to enter the field. Since this is the only such program in the region, we also have seen a small number of students who come to the College specifically for the program from other Pennsylvania counties and even from New Jersey.

Enrollment in the program will be limited to 24 in each cohort. There are several reasons for this:

- We do not want to exceed the expected job market capacity with too large a number of students.
- The program includes two internship experiences, and we do not want to exceed the capacity of the region to support the number of students we have.
- Lab space cannot accommodate more than 24 students.

Students will need to be college-ready in both Math and English in order to take courses in the program. Once in the program, student progress is monitored, and students are provided guidance in being successful in their courses, as well as ensuring that they are appropriately registered for courses. This is carried out by the Program Coordinator, who also carries out student recruitment efforts to ensure full enrollment in the program.

III. Opportunities and/or Problems that the Proposed Program Addresses

The program provides students with a direct pathway to sustainable employment as Biomedical Equipment Technicians. While national employment **growth** in the field is projected to be about average (https://www.bls.gov/ooh/installation-maintenance-and-repair/medical-equipment-repairers.htm), the need for **replacement** of employees due to retirement is significant. According to TechNation, an industry journal, "It is estimated that a fifth to a quarter of the entire HTM field will retire in the next 10 years and many already have." (9/1/2017). 24x7, another industry journal, referring to their annual industry salary survey, stated, "More than one-third—36% to be exact—of 2019 respondents were in the 55-and-older age bracket." (January 2020). The presence of this need regionally has been consistently reinforced by our Advisory Board. Advisory Board members have consistently related their frustrations with trying to find qualified job applicants for openings in their departments, and they are invested in the success of the BMET program at the College because it addresses a critical need in the industry. There are currently no other Associate Degree BMET programs in the region.

Data from EMSI clearly indicates a large number of positions posted both in the City and in the region. Further information about employment demand in the region can be found in the appendix.

IV. Program Structure and Coherence

The safe and effective use of medical technology is the central focus of Healthcare Technology Management (HTM), and BMETs are an important component of this field. The web site of the Association for the Advancement of Medical Instrumentation puts it this way:

> As a healthcare technology management (HTM) professional, you are a key member of the healthcare delivery care team by managing, repairing, and utilizing health technology. Working with clinicians and patients, HTM professionals ensure the highest standards

and best practices in medical device safety, security, interoperability, and functionality. (www.aami.org/htm)

In particular, BMETs are responsible for regularly inspecting medical devices used in hospitals and other healthcare settings to ensure they are working safely, properly, and within industry defined specifications. BMETs need to understand the operation of medical devices, so they can troubleshoot and repair medical equipment that is not functioning properly, and increasingly they must have a clear understanding of computer networks, as hospitals have become highly networked environments. To be effective in their jobs, BMETs must be able to communicate equally well with clinicians (such as nurses, respiratory therapists, clinical lab technicians, and doctors) and with network specialists. This requires basic knowledge, understanding and vocabulary of these fields, as well as effective customer service skills. Much of these topics are addressed in the existing BMET courses; however, some basic knowledge is best addressed by other courses, some in other departments.

For example, a basic understanding of human anatomy and physiology (e.g., BIOL 108) helps BMETs understand what clinicians are trying to accomplish when they use medical devices such as heart monitors and blood pressure monitors to measure physiological parameters, or when they use a medical device such as a defibrillator or ventilator to provide treatment to a patient.

Basic principles of physics and chemistry are important for understanding the operation of many medical devices. For example, pulse oximeters, that measure the oxygen saturation of the blood, rely on an understanding of light absorption and the effect of concentration and light wavelength. Chemistry and physics courses provide a foundation in these, and other areas that help students understand the specific applications in medical devices.

The program will retain the stackable credentials model that has been very successful while the program was under the umbrella of the ASET program.

Rationale for the Number of Credits: The BMET program requires a minimum of 70 credits for graduation. The need for 70 credits is based on our efforts to come as close as possible to the recommendations of the Association for the Advancement of Medical Instrumentation (AAMI) in their document, "Core Competencies for the HTM Entry-level Technician A Guide for Curriculum Development in Academic Institutions Second Edition, 2016", which can be made available upon request. The document lists core competencies in 10 content areas, divided into Functional Core Competencies and Personal Core Competencies, as follows:

I. Biomedical Equipment Technology
II. Electronics
III. Information Technology
IV. Anatomy and Physiology
V. Mathematics
VI. Physics
VII. Chemistry
VIII. Communication Skills
IX. Professional

X. Clinical Competency—Internship/Laboratory

The proposed course sequence attempts to fulfill as much of these core competencies as possible.

The curriculum has also been vetted and reviewed by the BMET Advisory Board. Ongoing assessment of the efficacy of the program is carried out during internship site visits. At that time, internship site supervisors, who are typically supervisors or managers in the Healthcare Technology department where students are placed, are asked if students seemed well prepared for the internship and if they had any suggestions for areas subject areas where there seemed to be gaps in students' knowledge. There were some early suggestions of small adjustments (such as giving students more exposure to use of hand tools, which we were able to easily accomplish through adjustments to the labs) but no real gaps in overall knowledge. Further, when asked if they would consider hiring the intern(s) they had supervised to an entry level position, the answer has been an overwhelming yes, with only a very few exceptions over the past five years. This is, of course a testament not only to the efficacy of the program, but also to the dedication and competency of our students.

V. Assessment Plan

Student Learning Outcome	**Frequency of Assessment**	**How Assessed***	
		Direct Assessment	**Indirect Assessment**
Apply knowledge of medical devices, electronics, computer networks and anatomy and physiology to resolving medical equipment repair problems.	Alternate years	BMET 201: CLOs 1,3,4,6 BMET 102: CLO 10	Percent of BMET students achieving a grade of C or better in CIS 150 and ELEC 130
		BMET 103: CLO 1	
		BMET 202: CLOs 3,4,7	
		BMET 203: CLO 2,3	
Demonstrate professional behavior in the workplace such as teamwork, communication, etc.	Alternate years	BMET 103: CLO 4	
		BMET 203: CLO 6	
Work in accordance with applicable safety procedures to ensure their own safety, as well as that of patients and other employees.	Alternate years	BMET 103: CLO 2	
		BMET 201: CLO 2	
		BMET 203: CLO 4	
Follow applicable department, hospital and	Alternate years	BMET 103: CLO 2	

Student Learning Outcome	Frequency of Assessment	How Assessed*	
		Direct Assessment	Indirect Assessment
legal guidelines in relation to record keeping, patient privacy, etc.		BMET 201: CLO 5	
		BMET 202: CLO 1	
		BMET 203: CLO 4,5	

In addition to the assessments listed above, the following indirect assessment methods will also be utilized: tracking of student persistence; tracking of graduation rates; percentage of students who find employment in the field.

Curriculum Map:

	Program Learning outcomes			
Required Courses	Apply knowledge of medical devices, electronics, computer networks and anatomy and physiology to resolving medical equipment repair problems.	Demonstrate professional behavior in the workplace such as teamwork, communication, etc.	Work in accordance with applicable safety procedures to ensure their own safety, as well as that of patients and other employees.	Follow applicable department, hospital and legal guidelines in relation to record keeping, patient privacy, etc.
BMET 101	I	I	I	I
BIOL 108	I, R			
BMET 102	I, R, A	I, R	I, R	I, R
BMET 103	R, A	R, A	R, A	R, A
BMET 201	R, A	R	R, A	R, A
ELEC 130	I, R			
CIS 150	I, R			
BMET 202	R, A	R	R	R, A
BMET 203	R, A	R,A	R, A	R, A

Key: **I**—Introduced, **R**—Reinforced and opportunity to practice, **A**—Assessment evidence collected

VI. Effect on Other Programs and Courses

The BMET proficiency certificate program has been embedded in the Applied Science and Engineering Technology (ASET) program for the past six years. The ASET program is undergoing a revision and will be renamed Applied Engineering Technology. In order to provide clearer pathways to students, it was decided to separate the BMET program into its own associate's degree program. An additional advantage for students is that they can be eligible to become a Certified Biomedical Equipment Technician more quickly. The BMET AAS will also further clarify what jobs students are qualified for to professionals in industry.

VII. Proposed New Courses and Course Revisions

No new courses are proposed as all of the program courses already exist.

VIII. Fiscal Implications

As the BMET I and II PCs have already been functioning since Fall 2015, there are no associated startup costs. There is an ongoing need for an operating budget to cover the cost of supplies and for a program coordinator.

Labs for the program are carried out in W4-37. This lab was designed with the BMET program in mind.

IX. Catalog Page

Biomedical Equipment Technology

Program Description: The Biomedical Equipment Technology Program prepares students to repair and maintain medical equipment utilized in hospitals and other healthcare environments. The program will be of particular interest to students who want to work in the healthcare arena but are more interested in working with medical technology and supporting the healthcare providers who utilize the equipment than in providing direct patient care. The program is intended to provide students with direct entry to the work environment, and students are expected to find employment in hospitals, with third-party organizations that hospitals may contract with for healthcare technology management services, and with medical device manufacturers who need to provide technical support to their customers. Additional employment opportunities may be found at dialysis centers, medical equipment rental companies, etc.

Program Learning Outcomes:

Upon successful completion of this program, students will be able to:

- Apply knowledge of medical devices, electronics, computer networks and anatomy and physiology to resolving medical equipment repair problems.

- Demonstrate professional behavior in the workplace such as teamwork, communication, etc.
- Work in accordance with applicable safety procedures to ensure their own safety, as well as that of patients and other employees.
- Follow applicable department, hospital and legal guidelines in relation to record keeping, patient privacy, etc.

Program Entry Requirements: This program is open to interested students. However, new students are normally required to take the College's placement test at their time of entry. Students' placement test results must show readiness for ENGL 101 and FNMT 118 or higher for admission to the program. Internship is required for completion of the program and adds significantly to student learning and preparation to enter the workforce. The hospitals where students perform their internships require various clearances, such as medical clearances, criminal and child abuse background checks and drug screening.

Program of Study and Graduation Requirements: To qualify for the A.A.S. degree in Biomedical Equipment Technology, students must complete a minimum of 70 credit hours as prescribed and attain a grade point average of 2.0 ("C" average). A grade of "C" or better is required for all courses applied towards the degree. Students who follow the course sequence below may complete the degree in two years.

Course Sequence:

Semester 1

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
FNMT 118 - Intermediate Algebra or a higher level math course	FNMT 017 or FNMT 019 completed or FNMT 118 (or higher) placement	3 credits	Quantitative Reasoning
BIOL 108 - Essentials of Human Anatomy and Physiology or BIOL 110 - Anatomy and Physiology II*		4 credits	Scientific Reasoning
BMET 101 - Biomedical Equipment Technology I	BIOL 108 or BIOL 110, which may be taken concurrently	4 credits	
CIS 103 - Computer Applications & Concepts		3 credits	Technological Competency

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ENGL 101 - English Composition I		3 credits	Writing/Research/Info Lit 1

Semester 2

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ENGL 102 - The Research Paper	ENGL 101 with a grade of "C" or better	3 credits	Writing/Research/Info Lit 2
ELEC 120 - Direct and Alternating Current Circuits	FNMT 118 or higher MATH with a grade of "C" or better or placement in MATH 161 or higher	4 credits	
BMET 102 - Biomedical Equipment Technology II	BMET 101 with a grade of "C" or better	4 credits	
CIS 105 - Computer Systems Maintenance		4 credits	
ENGL 115 - Public Speaking or ENGL 116 - Interpersonal Communication or ENGL 117 - Group and Team Communication or ENGL 118 - Intercultural Communication	ENGL 101, which may be taken concurrently	3 credits	Oral Communication/ Creative Expression

Summer

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
BMET 103 - Biomedical Equipment Technology Internship I	BMET 102 with a "C" or better and FNMT 118 or higher. Department Head approval is required to ensure that students have	1 credit	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
	completed the necessary clearances.		

Semester 3

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
ELEC 124 - Semiconductor Devices	ELEC 120 with a grade of "C" or better	4 credits	
CHEM 110 - Introductory Chemistry or higher level chemistry	FNMT 118 ready and ENGL 101 ready	4 credits	
BMET 201 - Medical Devices	BMET 103 with a grade "C" or better	4 credits	
CIS 150 - Network Technology		4 credits	

Semester 4

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
PHYS 105 - Survey of Physics or higher physics course (except PHYS 108 - Astronomy)		4 credits	
BMET 202 - Medical Devices in a Networked Environment	BMET 201; ELEC 130, which may be taken concurrently; CIS 105; and CIS 150 with a grade of "C" or better in all courses	4 credits	
ANTH 112 - Cultural Anthropology or HIST 150 - History of American Health Care or PSYC 101: Introduction to		3 credits	Cultural Analysis & Interpretation

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
Psychology or SOC 101 - Introduction to Sociology or SOC 105: Health and Society, or SOC 115 - Gender and Society			
ELEC 130 - Digital Electronics	FNMT 118 completed or higher math placement	4 credits	

Summer

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Req.
BMET 203 - Biomedical Equipment Technology Internship II	BMET 202 (with a "C" or better) Department Head approval is required to ensure that students have completed the necessary clearances.	3 credits	

Minimum Credits Needed to Graduate: 70

* Students who choose to take BIOL 109-110: Anatomy and Physiology I & II will earn an additional four credits.

General Education Requirements: All general education requirements necessary for graduation are met through the courses in the program as indicated above. Students who wish to take courses that differ from the general education courses indicated above must complete a course substitution request form. To access the form, login to the MyCCP portal, and in the **Student** tab, under **Electronic Forms**, click on the **Records and Registration Forms** link, then choose **Request for Course Substitution of Graduation Requirement** link. A more detailed explanation of the College's general education requirements is also available.

For More Information, Contact: The Division of Math, Science, and Health Careers, Room W1-1, 1700 Spring Garden Street, Philadelphia, PA 19130, Telephone (215) 751-8430 or the College Information Center (215) 751-8010.

X. Courses and Completion Sequence

The following courses and sequence of courses is designed for the optimal success and completion of the Biomedical Equipment Technology degree/certificate. Any alterations should be discussed with your academic advisor.

Semester 1

Course Number and Name	Credits	Advisory Notes	Course Type
FNMT 118 - Intermediate Algebra or a higher level math course	3 credits	Prerequisite for ELEC 120	Quantitative Reasoning
BIOL 108 - Essentials of Human Anatomy and Physiology or BIOL 110 - Anatomy and Physiology II *	4 credits	Prerequisite for BMET 101, which may be taken concurrently	Scientific Reasoning
BMET 101 - Biomedical Equipment Technology I	4 credits	Prerequisite for BMET 102	Major Course
CIS 103 - Computer Applications & Concepts	3 credits		Technological Competency
ENGL 101 - English Composition I	3 credits	Prerequisite for ENGL 102; Must earn a C or better	Writing/Research/ Info Lit 1

Semester 2

Course Number and Name	Credits	Advisory Notes	Course Type
ENGL 102 - The Research Paper	3 credits		Writing/Research/Info Lit 2
ELEC 120 - Direct and Alternating Current Circuits	4 credits	Prerequisite for ELEC 124	Major Course
BMET 102 - Biomedical Equipment Technology II	4 credits	Prerequisite for BMET 103	Major Course

Course Number and Name	Credits	Advisory Notes	Course Type
CIS 105 - Computer Systems Maintenance	4 credits	Prerequisite for BMET 202, must earn a C or better	Major Course
ENGL 115 - Public Speaking or ENGL 116 - Interpersonal Communication or ENGL 117 - Group and Team Communication or ENGL 118 - Intercultural Communication	3 credits		Oral Communication/ Creative Expression

Summer

Course Number and Name	Credits	Advisory Notes	Course Type
BMET 103 - Biomedical Equipment Technology Internship I	1 credit	Prerequisite for BMET 201. BMET 103 requires Department Head approval to ensure that students have completed the necessary clearances.	Major Course

Semester 3

Course Number and Name	Credits	Advisory Notes	Gen Ed Req.
ELEC 124 - Semiconductor Devices	4 credits		Major Course
CHEM 110 - Introductory Chemistry or higher level chemistry	4 credits		
BMET 201 - Medical Devices	4 credits	Prerequisite for BMET 202	Major Course

Course Number and Name	Credits	Advisory Notes	Gen Ed Req.
CIS 150 - Network Technology	4 credits	Prerequisite for BMET 202; must earn a C or better	

Semester 4

Course Number and Name	Credits	Advisory Notes	Course Type
PHYS 105 - Survey of Physics or higher physics course (except PHYS 108 - Astronomy)	4 credits		
BMET 202 - Medical Devices in a Networked Environment	4 credits	Prerequisite for BMET 203	Major Course
ANTH 112 - Cultural Anthropology or HIST 150 - History of American Health Care or PSYC 101: Introduction to Psychology or SOC 101 - Introduction to Sociology or SOC 105: Health and Society, or SOC 115 - Gender and Society	3 credits		Cultural Analysis & Interpretation
ELEC 130 - Digital Electronics	4 credits	Prerequisite for BMET 202, may be taken concurrently	Major Course

Summer

Course Number and Name	Credits	Advisory Notes	Course T ype
BMET 203 - Biomedical Equipment Technology Internship II	3 credits	Department Head approval is required to ensure that students	Major Course

Course Number and Name	Credits	Advisory Notes	Course T ype
		have completed the necessary clearances.	

XI. Appendix / Data

Emsi

Occupation Overview

Medical Equipment Repairers
in 4 Pennsylvania Counties

Medical Equipment Repairers (SOC 49-9062):
Test, adjust, or repair biomedical or electromedical equipment.

Sample of Reported Job Titles: Biomedical Equipment Technician (BMET) Service Technician
Repair Technician
Certified Biomedical Equipment Technician (CBET)
Biomedical Equipment Support Specialist Biomedical Equipment Specialist
Biomedical Engineering Technician (BMET)
Biomedical Electronics Technician
Biomed Tech (Biomedical Technician)
X-ray Service Technician

Related O*NET Occupation:
Medical Equipment Repairers (49-9062.00)

Contents

What is Emsi Data?

Emsi data is a hybrid dataset derived from official government sources such as the US Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics. Leveraging the unique strengths of each source, our data modeling team creates an authoritative dataset that captures more than 99% of all workers in the United States. This core offering is then enriched with data from online social profiles, resumés, and job postings to give you a complete view of the workforce. Emsi data is frequently cited in major publications such as *The Atlantic*, *Forbes*, *Harvard Business Review*, *The New York Times*, *The Wall Street Journal*, and *USA Today*.

Report Parameters

1 Occupation

49-9062 Medical Equipment Repairers

4 Counties

42017	**Bucks County, PA**	**42091**	**Montgomery County, PA**
42045	**Delaware County, PA**	**42101**	**Philadelphia County, PA**

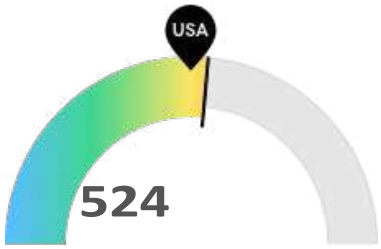
Class of Worker

QCEW Employees

The information in this report pertains to the chosen occupation and geographical areas.

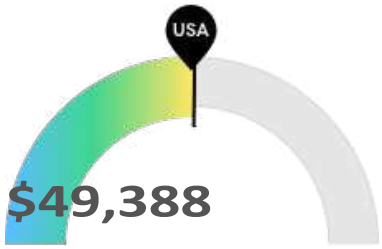
Executive Summary

Aggressive Job Posting Demand Over an Average Supply of Regional Jobs



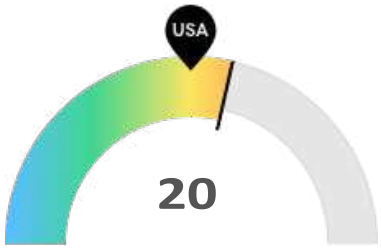
Jobs (2014)

Your area is about average for this kind of job. The national average for an area this size is 482* employees, while there are 524 here.



Compensation

Earnings are about average in your area. The national median salary for Medical Equipment Repairers is $49,213, compared to $49,388 here.



Job Posting Demand

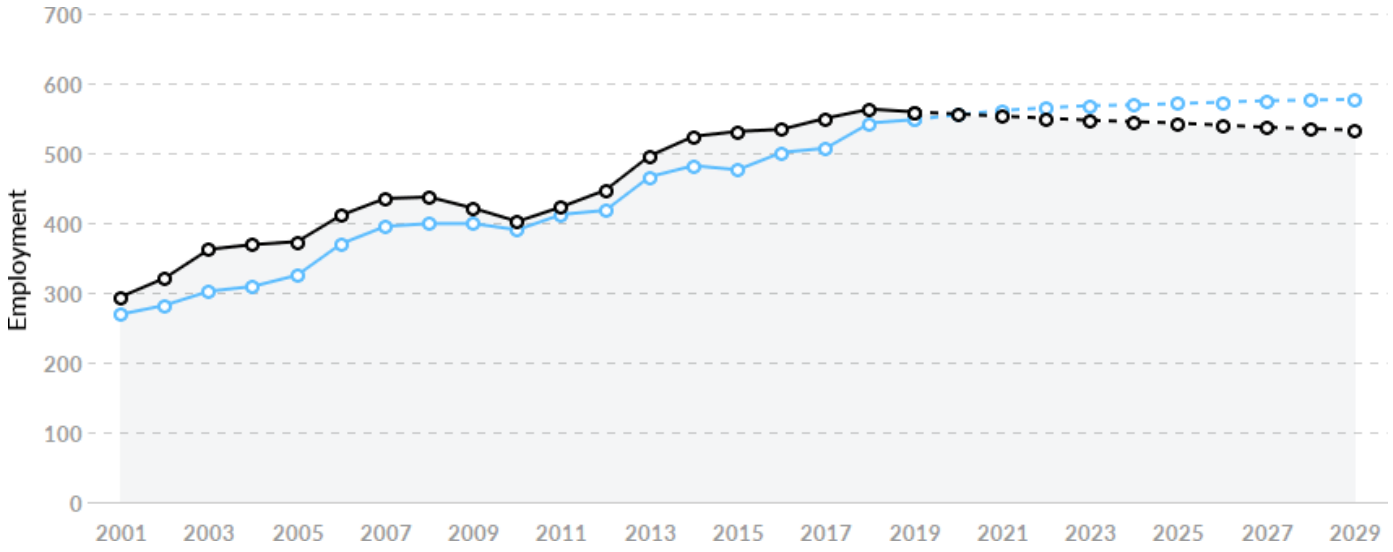
Job posting activity is high in your area. The national average for an area this size is 16* job postings/mo, while there are 20 here.

***National average values are derived by taking the national value for Medical Equipment Repairers and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.**

Jobs

Regional Employment Is About Equal to the National Average

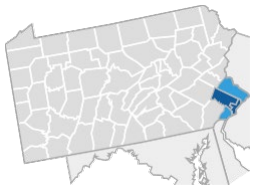
An average area of this size typically has 482* jobs, while there are 524 here.



Region	2014 Jobs	2020 Jobs	Change	% Change
4 Pennsylvania Counties	524	556	32	6.1%
National Average	482	555	74	15.3%

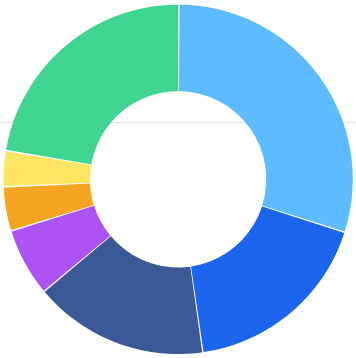
***National average values are derived by taking the national value for Medical Equipment Repairers and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.**

Regional Breakdown



County	2014 Jobs
Montgomery County, PA	190
Philadelphia County, PA	175
Bucks County, PA	88
Delaware County, PA	70

Most Jobs are Found in the Professional and Commercial Equipment and Supplies Merchant Wholesalers Industry Sector

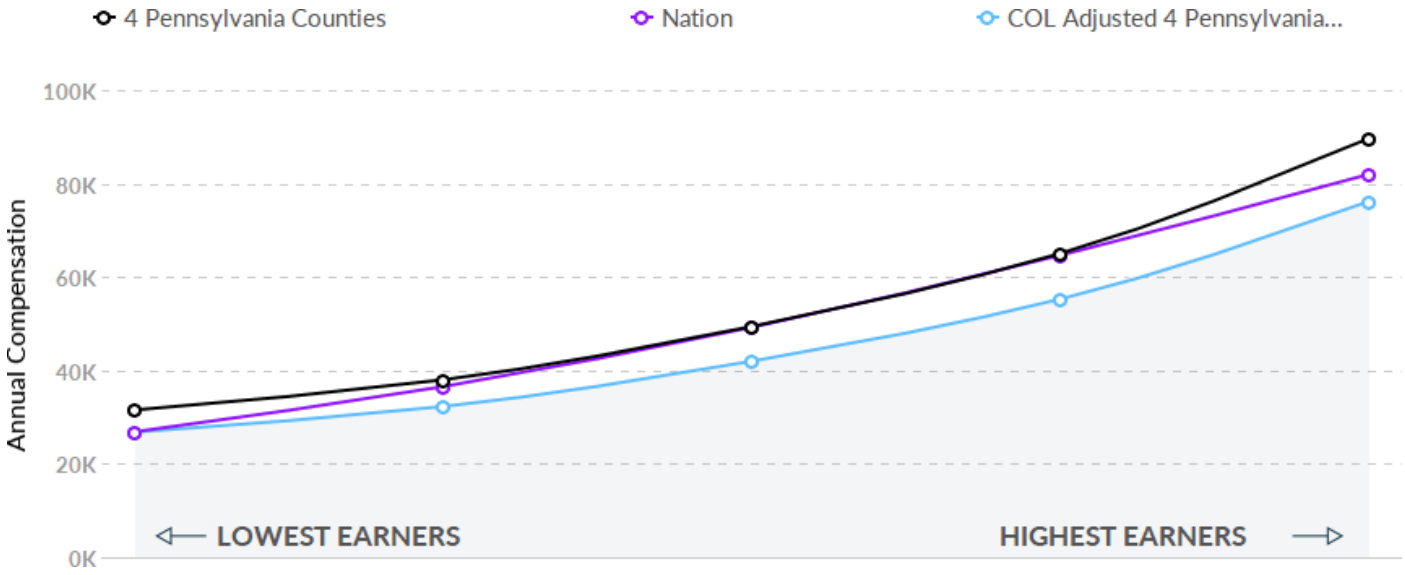


Industry	% of Occupation in Industry (2014)
Professional and Commercial Equipment and Supplies Merchant Wholesalers	29.8%
General Medical and Surgical Hospitals	17.8%
Electronic and Precision Equipment Repair and Maintenance	16.2%
Health and Personal Care Stores	6.3%
Outpatient Care Centers	4.1%
Management of Companies and Enterprises	3.3%
Other	22.4%

Compensation

Regional Compensation Is the Same Cost as the Nation

For Medical Equipment Repairers, the 2018 median wage in your area is $49,388, while the national median wage is $49,213.



Job Posting Activity

845 Unique Job Postings

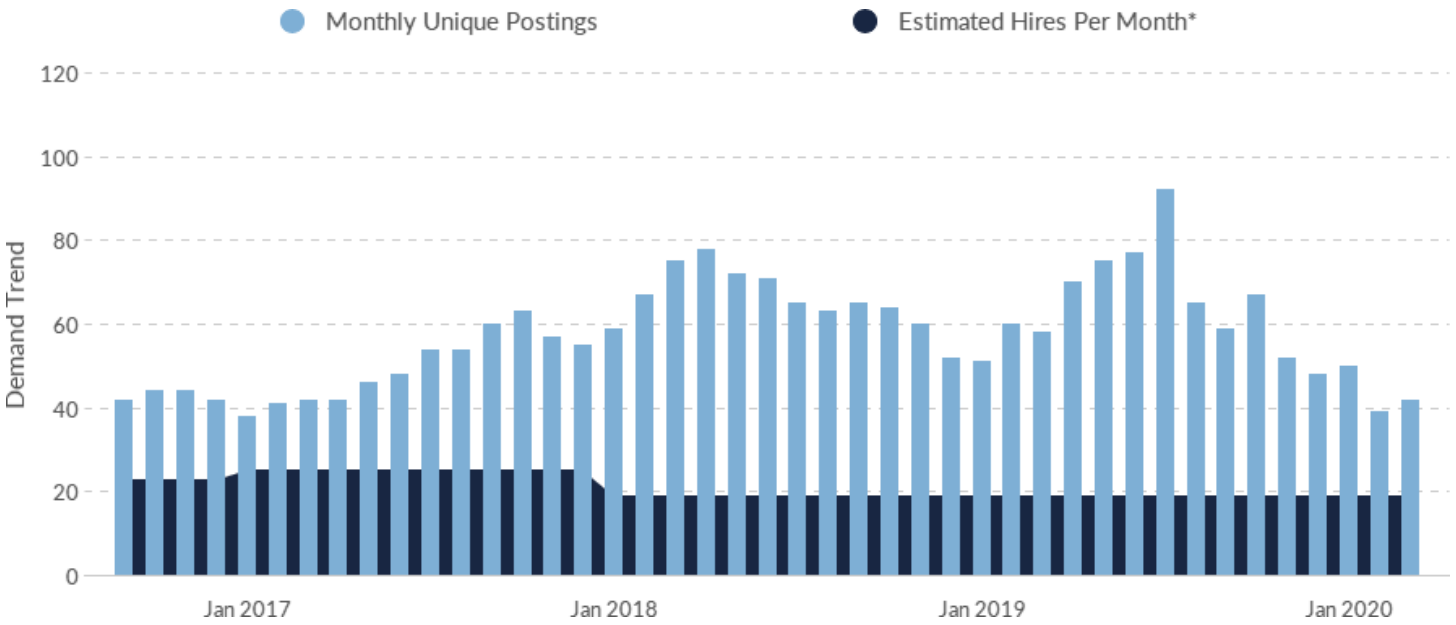
The number of unique postings for this job from Sep 2016 to Mar 2020.

216 Employers Competing

All employers in the region who posted for this job from Sep 2016 to Mar 2020.

44 Day Median Duration

Posting duration is 12 days longer than what's typical in the region.



Occupation	Avg Monthly Postings (Sep 2016 - Mar 2020)	Avg Monthly Hires (Sep 2016 - Mar 2020)
Medical Equipment Repairers	57	21

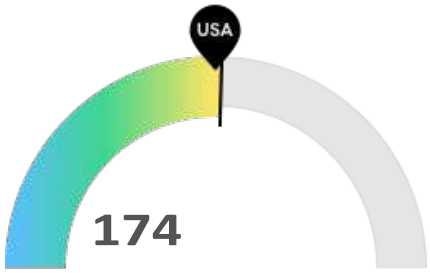
*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Emsi hires are calculated using a combination of Emsi jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

Top Companies	Unique Postings
General Electric Company	53
Fresenius Medical Care	42
COMPASS GROUP PLC	37
Universal Hospital Services,...	30
Penn Medicine	29
Aramark Corporation	28
Davita Inc.	26
The Children's Hospital of Ph...	25
Patterson Companies, Inc.	23
BSI Group America Inc.	16

Top Job Titles	Unique Postings
Biomedical Equipment Tech...	328
Equipment Technicians (Ins...	61
Maintenance Technicians (In...	60
Equipment Service Technici...	50
Field Service Engineers	29
Equipment Specialists	24
Field Service Technicians	22
Imaging Engineers (Architec...	22
Customer Service Represen...	20
Hospital Service Technician...	19

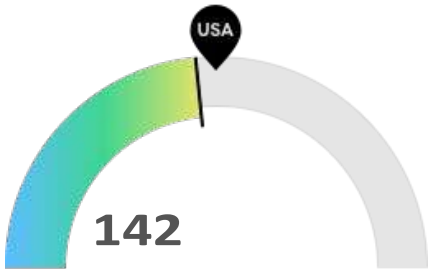
Demographics

Retirement Risk Is About Average, While Overall Diversity Is About Average



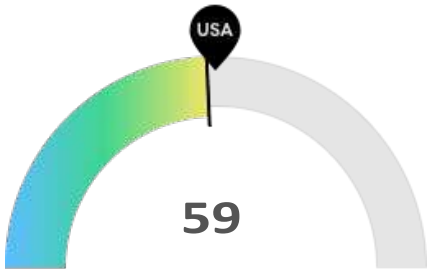
Retiring Soon

Retirement risk is about average in your area. The national average for an area this size is 169* employees 55 or older, while there are 174 here.



Racial Diversity

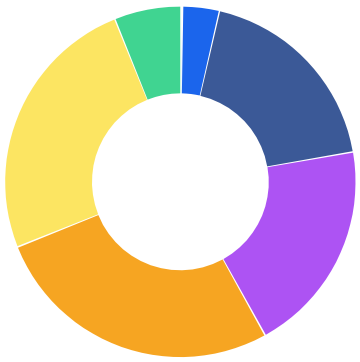
Racial diversity is about average in your area. The national average for an area this size is 156* racially diverse employees, while there are 142 here.



Gender Diversity

Gender diversity is about average in your area. The national average for an area this size is 62* female employees, while there are 59 here.

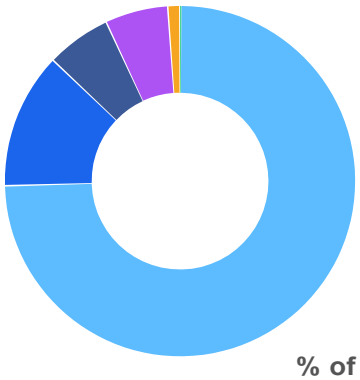
*National average values are derived by taking the national value for Medical Equipment Repairers and scaling it down to account for the difference in overall workforce size between the nation and your area. In other words, the values represent the national average adjusted for region size.



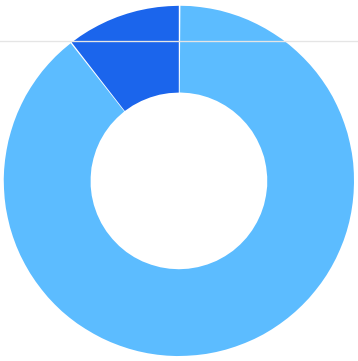
Occupation Age Breakdown

		% of Jobs	Jobs
	14-18	0.1%	1
	19-24	3.4%	19
	25-34	18.7%	104
	35-44	19.7%	110
	45-54	27.0%	151
	55-64	25.0%	139
	65+	6.2%	34

Occupation Race/Ethnicity Breakdown



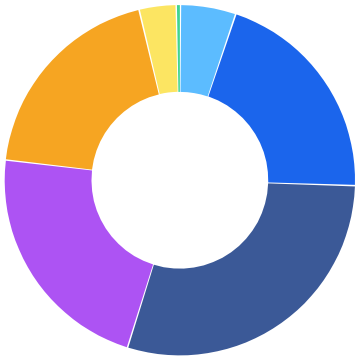
	% of Jobs	Jobs
White	74.5%	416
Black or African American	12.5%	70
Hispanic or Latino	6.0%	33
Asian	5.8%	32
Two or More Races	1.1%	6
American Indian or Alaska Native	0.1%	0
Native Hawaiian or Other Pacific Islander	0.0%	0



Occupation Gender Breakdown

	% of Jobs	Jobs
Males	89.4%	499
Females	10.6%	59

National Educational Attainment



	% of Jobs
Less than high school diploma	5.1%
High school diploma or equivalent	20.3%
Some college, no degree	29.3%
Associate's degree	22.0%
Bachelor's degree	19.4%
Master's degree	3.4%
Doctoral or professional degree	0.4%

Occupational Programs

1 Program

Of the programs that can train for this job, 1 has produced completions in the last 5 years.

23 Completions (2018)

The completions from all regional institutions for all degree types.

61 Openings (2018)

The average number of openings for an occupation in the region is 271.

CIP Code	Top Programs	Completions (2018)
15.0401	Biomedical Technology/Technician	23

Top Schools	Completions (2018)
Community College of Philadelphia	20
Pennsylvania Institute of Technology	2
DeVry University-Pennsylvania	1

Appendix A - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Emsi earnings by industry.

Staffing Patterns Data

The staffing pattern data in this report are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

Cost of Living Data

Emsi cost of living data is based on the Cost of Living Index published quarterly by the Council for Community and Economic Research (C2ER).

Emsi Job Postings

Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Medical Equipment Repairers
in Philadelphia County, PA

Medical Equipment Repairers (SOC 49-9062):
Test, adjust, or repair biomedical or electromedical equipment.

Sample of Reported Job Titles: Biomedical Equipment Technician (BMET) Service Technician
Repair Technician
Certified Biomedical Equipment Technician (CBET)
Biomedical Equipment Support Specialist Biomedical Equipment Specialist
Biomedical Engineering Technician (BMET)
Biomedical Electronics Technician
Biomed Tech (Biomedical Technician)
X-ray Service Technician

Related O*NET Occupation:
Medical Equipment Repairers (49-9062.00)

Contents

What is Emsi Data?

Emsi data is a hybrid dataset derived from official government sources such as the US Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics. Leveraging the unique strengths of each source, our data modeling team creates an authoritative dataset that captures more than 99% of all workers in the United States. This core offering is then enriched with data from online social profiles, resumés, and job postings to give you a complete view of the workforce. Emsi data is frequently cited in major publications such as *The Atlantic*, *Forbes*, *Harvard Business Review*, *The New York Times*, *The Wall Street Journal*, and *USA Today*.

Report Parameters

1 Occupation

49-9062 Medical Equipment Repairers

1 County

42101 Philadelphia County, PA

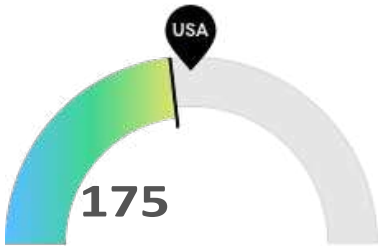
Class of Worker

QCEW Employees

The information in this report pertains to the chosen occupation and geographical area.

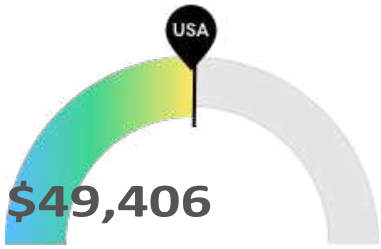
Executive Summary

Aggressive Job Posting Demand Over a Thin Supply of Regional Jobs



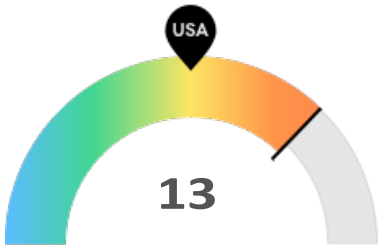
Jobs (2014)

Philadelphia County, PA is not a hotspot for this kind of job. The national average for an area this size is 195* employees, while there are 175 here.



Compensation

Earnings are about average in Philadelphia County, PA. The national median salary for Medical Equipment Repairers is $49,213, compared to $49,406 here.



Job Posting Demand

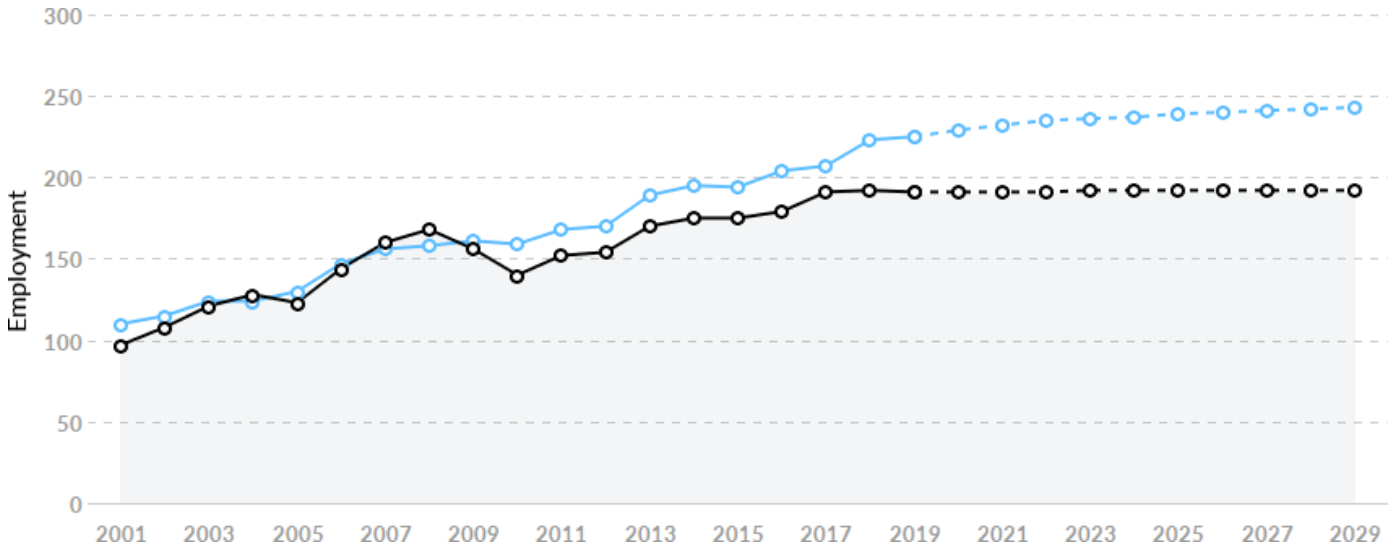
Job posting activity is high in Philadelphia County, PA. The national average for an area this size is 7* job postings/mo, while there are 13 here.

***National average values are derived by taking the national value for Medical Equipment Repairers and scaling it down to account for the difference in overall workforce size between the nation and Philadelphia County, PA. In other words, the values represent the national average adjusted for region size.**

Jobs

Regional Employment Is Lower Than the National Average

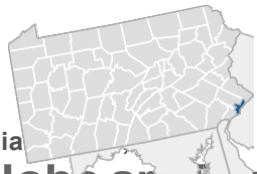
An average area of this size typically has 195* jobs, while there are 175 here. This lower than average supply of jobs may make it more difficult for workers in this field to find employment in your area.



Region	2014 Jobs	2020 Jobs	Change	% Change
Philadelphia County, PA	175	191	16	8.9%
National Average	195	229	34	17.4%

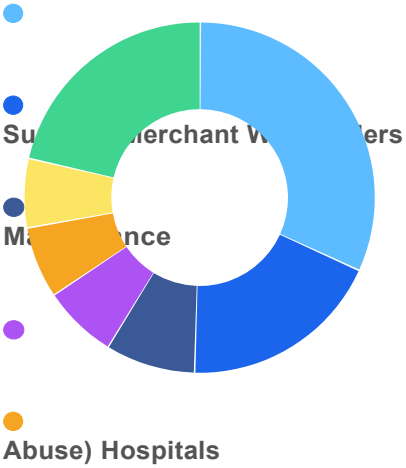
*National average values are derived by taking the national value for Medical Equipment Repairers and scaling it down to account for the difference in overall workforce size between the nation and Philadelphia County, PA. In other words, the values represent the national average adjusted for region size.

Regional Breakdown



County	2014 Jobs
Philadelphia	175

Most Jobs are Found in the General Medical and Surgical Hospitals Industry Sector

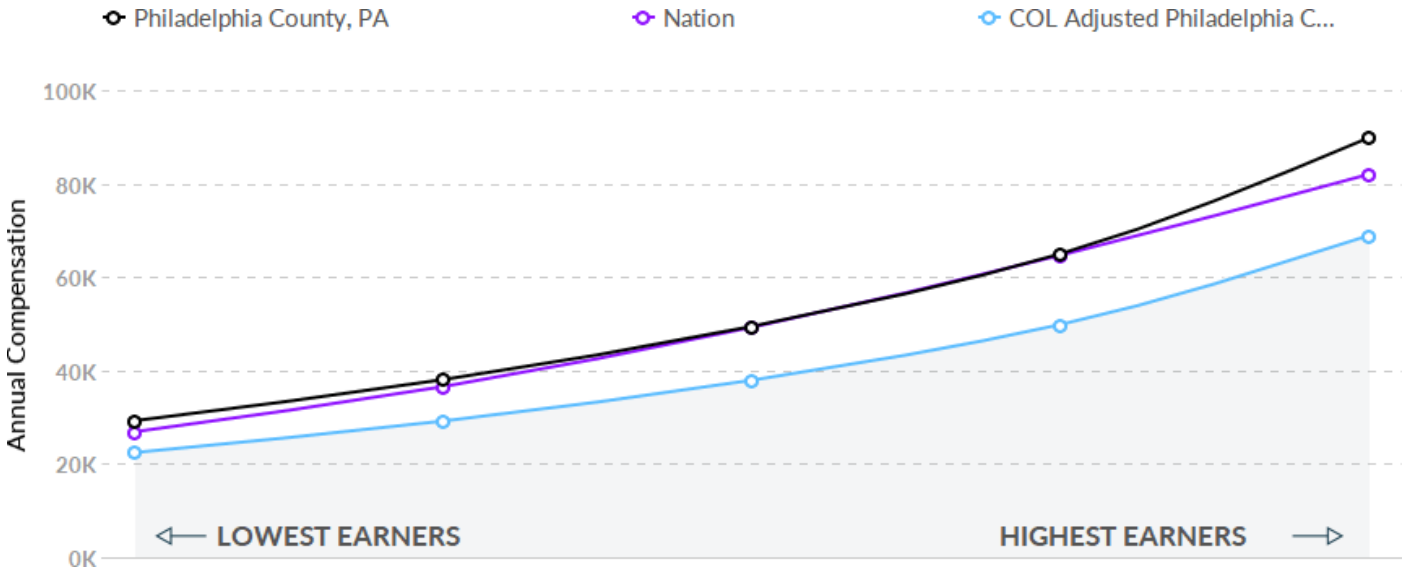


industry	% of Occupation in industry (2014)
General Medical and Surgical Hospitals	31.7%
Professional and Commercial Equipment and	18.6%
Electronic and Precision Equipment Repair and	8.3%
Health and Personal Care Stores	6.9%
Specialty (except Psychiatric and Substance	6.6%
Outpatient Care Centers	6.4%
Other	21.5%

Compensation

Regional Compensation Is the Same Cost as the Nation

For Medical Equipment Repairers, the 2018 median wage in Philadelphia County, PA is $49,406, while the national median wage is $49,213.



Job Posting Activity

551 Unique Job Postings

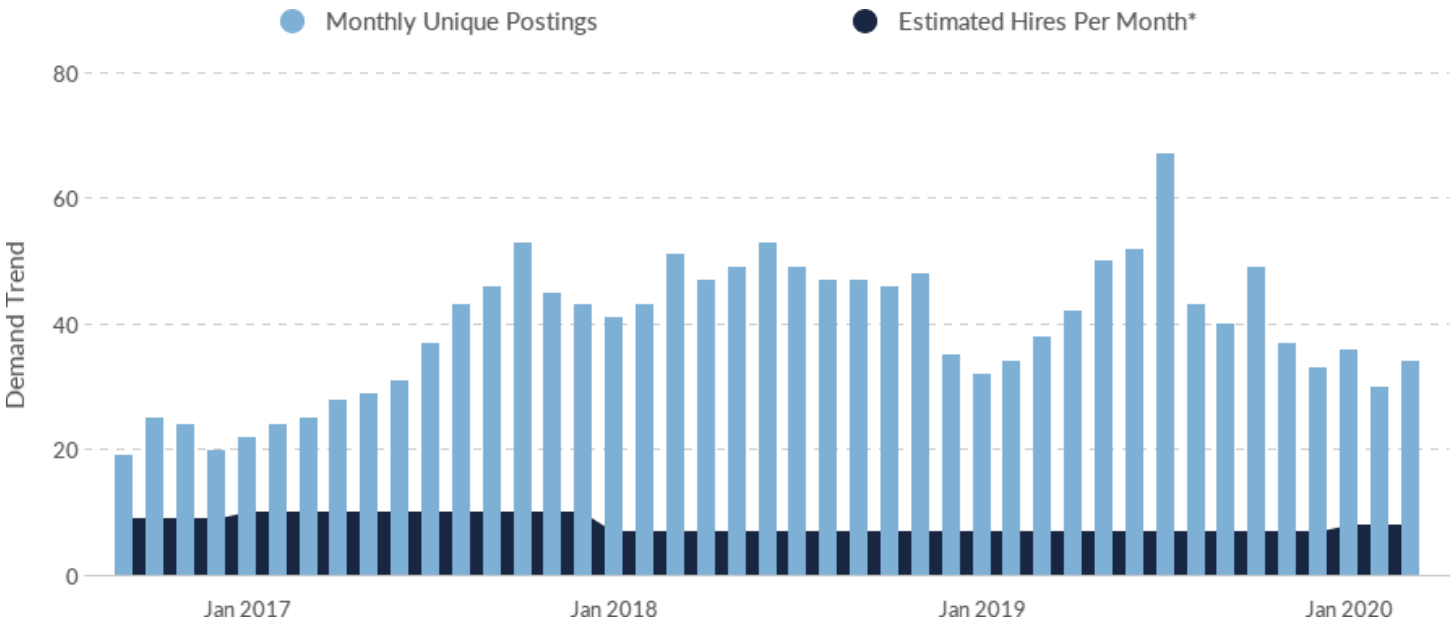
The number of unique postings for this job from Sep 2016 to Mar 2020.

155 Employers Competing

All employers in the region who posted for this job from Sep 2016 to Mar 2020.

47 Day Median Duration

Posting duration is 13 days longer than what's typical in the region.



Occupation	Avg Monthly Postings (Sep 2016 - Mar 2020)	Avg Monthly Hires (Sep 2016 - Mar 2020)
Medical Equipment Repairers	39	8

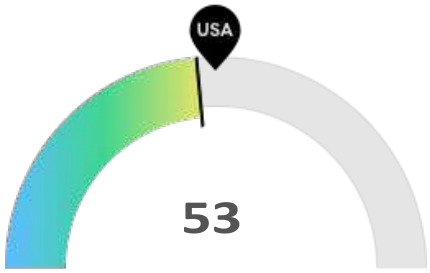
*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Emsi hires are calculated using a combination of Emsi jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

Top Companies	Unique Postings
General Electric Company	31
Penn Medicine	28
The Children's Hospital of Ph…	25
COMPASS GROUP PLC	24
Aramark Corporation	22
Davita Inc.	20
Universal Hospital Services,…	18
BSI Group America Inc.	16
SODEXO	14
Fresenius Medical Care	13

Top Job Titles	Unique Postings
Biomedical Equipment Tech…	231
Equipment Technicians (Ins…	44
Maintenance Technicians (In…	34
Equipment Service Technici…	20
Field Service Engineers	18
Imaging Engineers (Architec…	18
Medical Sales Representativ…	18
Equipment Specialists	16
Field Service Technicians	14
Assembly Mechanics	12

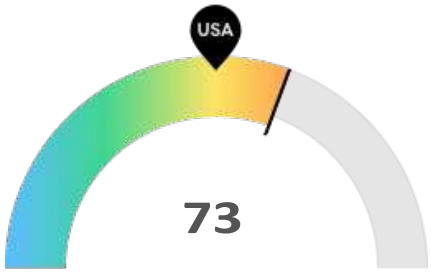
Demographics

Retirement Risk Is About Average, While Overall Diversity Is High



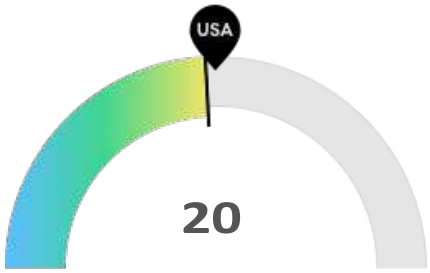
Retiring Soon

Retirement risk is about average in Philadelphia County, PA. The national average for an area this size is 58* employees 55 or older, while there are 53 here.



Racial Diversity

Racial diversity is high in Philadelphia County, PA. The national average for an area this size is 53* racially diverse employees, while there are 73 here.

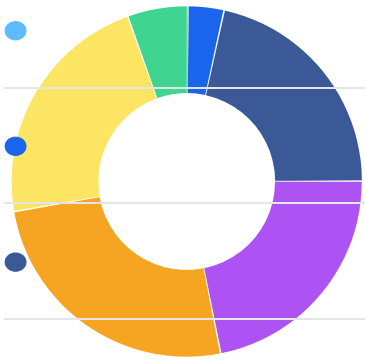


Gender Diversity

Gender diversity is about average in Philadelphia County, PA. The national average for an area this size is 21* female employees, while there are 20 here.

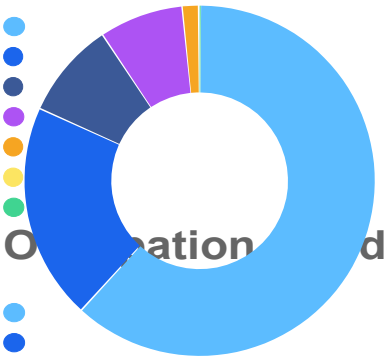
*National average values are derived by taking the national value for Medical Equipment Repairers and scaling it down to account for the difference in overall workforce size between the nation and Philadelphia County, PA. In other words, the values represent the national average adjusted for region size.

Occupation Age Breakdown



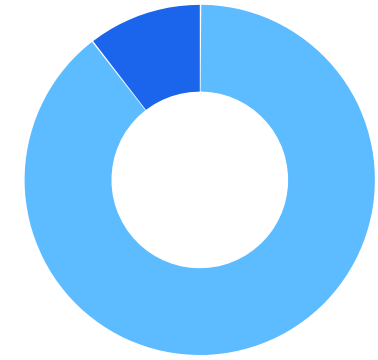
	% of Jobs	Jobs
14-18	0.1%	0
19-24	3.3%	6
25-34	21.5%	41
35-44	21.9%	42
45-54	25.4%	48
55-64	22.3%	42
65+	5.5%	11

Occupation Race/Ethnicity Breakdown



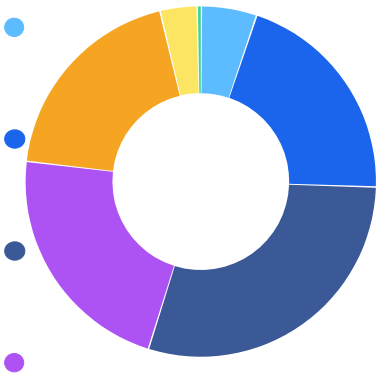
	% of Jobs	Jobs
White	61.7%	118
Black or African American	20.0%	38
Hispanic or Latino	8.9%	17
Asian	7.7%	15
Two or More Races	1.5%	3
American Indian or Alaska Native	0.1%	0
Native Hawaiian or Other Pacific Islander	0.0%	0

Occupation Gender Breakdown



	% of Jobs	Jobs
Males	89.4%	171
Females	10.6%	20

National Educational Attainment



	% of Jobs
Less than high school diploma	5.1%
High school diploma or equivalent	20.3%
Some college, no degree	29.3%
Associate's degree	22.0%
Bachelor's degree	19.4%
Master's degree	3.4%
Doctoral or professional degree	0.4%

Occupational Programs

1 Program

Of the programs that can train for this job, 1 has produced completions in the last 5 years.

20 Completions (2018)

The completions from all regional institutions for all degree types.

20 Openings (2018)

The average number of openings for an occupation in the region is 111.

CIP Code	Top Programs	Completions (2018)
15.0401	Biomedical Technology/Technician	20

Top Schools	Completions (2018)
Community College of Philadelphia	20

Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Emsi earnings by industry.

Staffing Patterns Data

The staffing pattern data in this report are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

Cost of Living Data

Emsi cost of living data is based on the Cost of Living Index published quarterly by the Council for Community and Economic Research (C2ER).

Emsi Job Postings

Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

COMMUNITY COLLEGE OF PHILADELPHIA New Degree Program Proposal	
Name of Degree Program	Education: Middle and Secondary Level
Academic Pathway	Education and Human Services
Department	Psychology, Education, and Human Services
Faculty Developer(s)	Amy Saia Sandra Spicer-Sharp Francesca DiRosa
Facilitator	Cynthia Paul
Recommended Starting Semester	Fall 2021
Today's Date	February 11, 2021
Abstract	The new Education: Middle and Secondary Level program has been developed to take the place of three current education programs: Education: Middle Level (4-8th Grades), Education/Secondary Humanities/Social Studies Education Option, and Education: Secondary Math/Science Option. Education: Middle and Secondary Level consolidates the three current curricula options into one in which students take common courses in education, psychology, and history and choose general electives and content electives based on level (Middle or Secondary), concentration (Math/Science or Humanities), and subject area. Streamlining into a single program improves alignment with federal and state regulations and program assessment, which will be monitored through the AEFIS college-wide assessment system. There are no new or revised courses in this new program.

I. Aligned with the College Mission

The new program Education: Middle and Secondary Level furthers the mission and goals of the College. It improves the ability of students to pursue paths of inquiry in the field of education and enables them to achieve self-fulfillment in education careers.

II. Expected Program Participants

In addition to students who enroll in Education: Middle and Secondary Level to enter the field of education, the program will appeal to paraprofessionals in the workforce or those seeking work as support professionals. School District of Philadelphia (SDP) employees currently working in support positions (e.g., workforce assistant teaching positions, autistic support, inclusive support, paraprofessionals) are required to have an associate degree for continued employment. The No Child Left Behind (NCLB) Act of 2001 mandated that schools receiving Title I funding must employ teachers and paraprofessionals who hold an associate's degree or higher. The Every Student Succeeds Act (ESSA) of 2015 replaced the NCLB as of the 2016-2017 school year and removed those requirements; however, Pennsylvania certification and staffing policies, statutes and regulations, and the Pennsylvania Department of Education (PDE) continue to require that all teachers and paraprofessionals in schools receiving federal funding "have completed at least two years of postsecondary study, or possess an associate degree or higher, or meet a rigorous standard of quality as demonstrated through a State or local assessment" (22 Pa. Code §14.105).

Current enrollment in the three individual Middle and Secondary programs is now 90 students. We estimate the new program will attract approximately 125 students.

III. Opportunities and/or Problems that the Proposed Program Addresses

The three current education programs (Education: Middle Level, Education: Secondary Humanities/Social Studies option(s), and Education: Secondary Math/Science option(s)) have shown a persistent decline in student enrollment. A recent program review by the Office of Assessment and Evaluation led to a recommendation by the Student Outcomes Committee (SOC) of the Board of Trustees that the three programs consider consolidation or closure. Suggested remediation included: a) program consolidation, revision, and/or closure; b) improved assessment practices; c) strengthened recruitment practices and career pathways; and d) development of an engagement strategy. Thus, a new single program has been developed that consolidates these three current curricula options into one.

The combined program also aligns with ESSA, which specifically provides equal educational opportunity for students from traditionally underserved populations, including students of color, low-income students, students with disabilities, and students who are English language learners. Working with diverse learners is a core learning outcome for the Education: Middle and Secondary Level program. Required courses ED 265: Introduction to Special Education and Inclusive Practices and ED 255: Teaching English Language Learners specifically meet the needs of SDP support professionals.

The new program also creates a solid foundation upon which to expand career pathway opportunities for students. In the near future, Education faculty will develop a proficiency certificate for special education and inclusive environments. In addition, paraprofessionals who are support staff in special education or inclusive environments who possess certifications, additional skills, classes, or experience in the profession are employed by the SDP at a higher salary range.

The combined program also improves program assessment to clearly identify course learning outcomes (CLOs) and program learning outcomes (PLOs). Every semester, assessment data will be collected through AEFIS, the college-wide assessment system. This will allow the curriculum coordinator and faculty to examine program and course outcomes continuously, noting strengths and initiating methodologies and strategies to remediate barriers or challenges. Administrators and faculty at the College are committed to a standard of excellence and high expectations for our students and their professional success.

Please see the Appendix for more information.

IV. Program Structure and Coherence

The Education: Middle and Secondary Level program provides a more organized and consistent pathway through the education degrees at the College and is more in keeping with program trends at other institutions of higher education. In the first two semesters, students begin with their first four general education courses, where they build skills in writing, research, information literacy, technological competency, cultural analysis and interpretation, quantitative reasoning, and oral communication. Students will be directed to choose their quantitative reasoning course based on their placement, level (Middle or Secondary), concentration (Humanities or Math/Science) and transfer institution.

Students begin their foundation in middle and secondary education with ED 201: Foundations of Early Childhood for Middle and Secondary Years, PSYC 209: Adolescent Psychology, and ED 265: Introduction to Special Education and Inclusive Practices. In these three courses, students explore career options, delve into theories of adolescent development, and learn how to work and communicate effectively with diverse learners. Students also take their second quantitative reasoning course, required for transfer to baccalaureate-degree granting institutions.

In the third and fourth semesters, students take additional education courses, content electives, a required United States history course, two science courses, and other courses that provide a liberal education. Students deepen their ability to use assessments effectively in ED 214: Cognition and Learning in the Classroom and ED 255: Teaching English Language Learners. Both courses further develop their ability to apply theories of adolescent development, communication skills, and facility with diverse learners. Students also choose five content electives based on their level (Middle or Secondary), their concentration (Math/Science or Humanities), and the subject area(s) in which they wish to teach. The content elective requirement is established by the PDE.

This sequence of courses helps students build the knowledge and skills needed for transfer and to prepare for careers in the field of education.

V. Assessment Plan

Program Learning Outcome	How Assessed*	Semester and Year Assessed
Identify career options open to an individual with a background in education and describe the path required to Pennsylvania Teacher Certification.	Quizzes Summative Assessment Observations Reflections Group Discussions	Every academic semester
Apply theories of adolescent development and cognitive processes to enhance student learning.	Quizzes Summative Assessment Observations Reflections Group Discussions Capstone Project	Every academic semester
Explain the education models in the United States and the impact they have on teaching and learning.	Quizzes Summative Assessment Observations Reflections Group Discussions Capstone Project	Every academic semester
Demonstrate the use of effective assessments that align with the professional teaching standards of the Pennsylvania Department of Education (PDE).	Quizzes Summative Assessment Observations Reflections Group Discussions Capstone Project	Every academic semester
Demonstrate effective teaching practices for diverse learners.	Quizzes Summative Assessment Observations Reflections Group Discussions Capstone Project	Every academic semester
Demonstrate effective oral and written communication skills.	Quizzes Summative Assessment Observations Reflections Group Discussions Capstone Project	Every academic semester

VI. Effect on Other Programs and Courses

This merger of three programs into one new program with concentrations will not affect other degree and certificate programs in this department, as students will continue their desired career

path in education. The existing three education programs will be closed, effective Fall 2021. This new program provides a more organized and consistent pathway through middle and secondary education degrees at the College and is more in keeping with program trends in other institutions of higher education.

VII. Proposed New Courses and Course Revisions

No new courses or course revisions are included in this program.

VIII. Fiscal Implications

Costs include a one-course release, per semester, for Education Program Coordination.

IX. Catalog Page

Education: Middle and Secondary Level

Description: Education: Middle and Secondary Level provides two opportunities for students. It offers a pathway for students to earn an associate of arts degree in education, which is now required for many entry-level jobs in Pennsylvania K-12 schools. It also serves as a first step for those students who wish to transfer to four-year schools so that they may earn their baccalaureate degrees in education. The program offers two levels (Middle and Secondary) with two areas of concentration for each level (Math/Science and Humanities).

The Education: Middle and Secondary Level program prepares students for transfer to baccalaureate-degree granting institutions by introducing them to the field of education while guiding them through a coherent and well-rounded sequence of courses. Within each concentration, there are several possible subject areas in which to specialize; therefore, students choose from a list of content electives in those subjects.

After successful completion of this curriculum, students receive an Associate in Arts (A.A.) degree. Most graduates then transfer to a four-year institution where they earn a Bachelor of Science or Bachelor of Arts in Education and are eligible for certification to teach at the middle or secondary levels, in areas related to their concentration.

Because transfer institutions require specific courses, it is highly recommended that students consult catalogues of schools to which they might transfer and transfer information available in the Counseling Center, as well as their advisor, to make appropriate course selections.

According to Pennsylvania mandates, under Chapter 354, students need a 3.0 G.P.A. for entry into upper-level education courses and teacher certification programs at four-year schools. In addition, they must pass the Pre-Professional Academic Performance Assessment (PAPA) before being admitted into these upper-level courses at four-year schools.

Note for Students in Middle Level: The Pennsylvania Department of Education (PDE) requires candidates for 4th-8th grade teacher certification to earn 66 credits across four content areas: mathematics, science, English/language arts/reading and social studies. Students will not earn all the necessary content electives in this A.A. program. Depending on their transfer institution, students may apply the credits earned in their content electives towards those 66 content area credits. General education courses required by the program may also apply. *Students must take additional content area courses at their transfer institution to fulfill that institution's requirements for content courses.*

Student Learning Outcomes:

Upon successful completion of the Education: Middle and Secondary Level degree program, graduates will be able to:

- Identify career options open to an individual with a background in education and describe the path required to Pennsylvania Teacher Certification
- Apply theories of adolescent development and cognitive processes to enhance student learning
- Explain the education models in the United States and the impact they have on teaching and learning
- Demonstrate the use of effective assessments that align with the professional teaching standards of the Pennsylvania Department of Education (PDE)
- Demonstrate effective teaching practices for diverse learners
- Demonstrate effective oral and written communication skills

Program Entry Requirements: New students are normally required to complete the College's placement test prior to their enrollment. Students identified as needing developmental work must satisfactorily complete the appropriate developmental English and mathematics courses as part of the program.

Since students in the Math/Science concentration begin mathematics with MATH 171: Calculus I, it is necessary for those students who have not tested into this level of mathematics to take the prerequisite math courses (MATH 161 and MATH 162, or to have taken their equivalents at another college) either before enrolling or while enrolled in the program.

Because students will be required to observe and work with children the Program requires students to meet the requirements of the Child Protective Services Law, 23 Pa. C.S.A., section 6344 (relating to prospective childcare personnel). Students must therefore present up-to-date Pennsylvania criminal history reports, Federal Bureau of Investigation criminal history reports, Department of Public Welfare (child abuse) reports, and health clearances, clearly stating that they are eligible to work with children. (Up-to-date clearance is defined as being no more than 12 months old on the first day of working with children.) Failure to produce up-to-date clearances or a change of clearance status may result in a student's removal from the program. A student who believes that an error of fact has been made in his/her removal may appeal that decision. Information regarding the appeal procedure will be provided with the letter of removal.

Program of Study and Graduation Requirements: To qualify for the Associate in Arts (A.A.) Degree in Education: Middle and Secondary Level, a student must complete a minimum of 61 credit hours as described in the course listing on the following page. Depending on the courses taken, students in the Math/Science concentration may earn additional credits. In addition, the student must have a cumulative grade point average of 2.0, and a minimum grade of "C" in all Education courses. During their matriculation in the

program, it is strongly recommended that students meet with a designated Education academic advisor to choose their courses.

Students whose behavior is viewed as inconsistent with professional standards may be dropped from the curriculum pending a departmental hearing.

First Semester

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
ENGL 101 - College Composition I		3 credits	Writing, Research, Info Lit 1
CIS 103 - Computer Applications & Concepts		3 credits	Technological Competency
PSYC 101 - Introduction to Psychology		3 credits	Cultural Analysis & Interpretation
Middle Level (any concentration) or **Secondary Level, Humanities Concentration:** MATH 150 - Introductory Data Analysis or MATH 161 - Pre-Calculus I* **Secondary Level, Math/Science Concentration:** MATH 171 - Calculus I	MATH 150: FNMT 017 or FNMT 019 completed or FNMT 118 (or higher) placement MATH 161: FNMT 118 with a C or better or placement in MATH 161 or higher MATH 171: MATH 162 with a grade of C or better, or placement in MATH 171 or higher	3 or 4 credits	Quantitative Reasoning
ED 201 - Foundations of Early Childhood for Middle and Secondary Years	ENGL 101 with a C or better	3 credits	

Second Semester

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
ENGL 102 - The Research Paper	ENGL 101 with a C or better	3 credits	Writing, Research, Info Lit 2
ENGL 115 - Public Speaking	ENGL 101, which may be taken concurrently	3 credits	Oral Communication/ Creative Expression
PSYC 209 - Adolescent Psychology	PSYC 101	3 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
ED 265 - Introduction to Special Education and Inclusive Practices	ED 105 or ED 201 and PSYC 201 or PSYC 209 or PSYC 215	3 credits	
Middle Level (any concentration) or **Secondary Level, Humanities Concentration:** MATH 151 - Linear Mathematics or MATH 162 - Pre-Calculus II* **Secondary Level, Math/Science Concentration:** MATH 172 - Calculus II	MATH 151: FNMT 118 with a C or better or placement in MATH 161 or higher MATH 162: MATH 161 with a grade of C or better, or placement in MATH 162 or higher MATH 172: MATH 171 with a grade of C or better, or placement in MATH 172 or higher	3 or 4 credits	

Third Semester

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
ED 214 - Cognition and Learning in the Classroom	ENGL 101 and ED 105 or ED 201	3 credits	

Middle Level or **Secondary Level,** **Humanities Concentration:** BIOL 106 - General Biology I **Middle Level and Secondary Level,** **Math/Science Concentration:** CHEM 110 - Introductory Chemistry or PHYS 111 - General Physics I or PHYS 140 - Mechanics, Heat, and Sound or BIOL 123 - Principles of Biology I	PHYS 111: MATH 162 or MATH 171 or MATH 171 placement PHYS 140: MATH 171 BIOL 123: CHEM 121 or CHEM 110 with a C or better and high school biology or permission of the department head	4 or 5 credits	Scientific Reasoning
History Course (choose one): HIST 101 - United States History: Colonial America through the Revolutionary Era or HIST 102 - United States History: The Civil War and the 19th Century or HIST 103 - United States History: The 20th Century and Beyond**		3 credits	
Content Elective (see chart below for choice of content electives) ***		3, 4, or 5 credits	
Content Elective (see chart below for choice of content electives) ***		3, 4, or 5 credits	

Fourth Semester

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
ED 255 - Teaching English Language Learners	ED 105 or ED 201 and ED 204 or ED 214	3 credits	
Middle Level (any concentration) or Secondary Level, **Humanities Concentration:** BIOL 107 - General Biology II or EASC 111 - Environmental Conservation **Secondary Level,** **Math/Science Concentration:** ART 103 - History of Art: Ancient to Renaissance or ART 104 - History of Art: Renaissance to Modern or		3 or 4 credits	

Course Number and Name	Prerequisites and Corequisites	Credits	Gen Ed Requirements
MUS 103 - Introduction to Music or PHIL 101 - Introduction to Philosophy or Any 100 or 200-level World Language course or Any Religious Studies course (RS)			
Content Elective (see chart below for choice of content electives)***		3, 4, or 5 credits	
Content Elective (see chart below for choice of content electives)***		3, 4, or 5 credits	
Content Elective (see chart below for choice of content electives)***		3, 4, or 5 credits	

Minimum Credits Needed to Graduate: 61

Notes

*Students should choose math courses according to transfer institution.
**Students planning to transfer to Temple University should take HIST 101 or HIST 103, not HIST 102.
*** Students selecting their content electives must receive approval from their education faculty advisor before they can register for their content electives. **Banner will prevent students from registering without their advisor's approval.**

The Pennsylvania Department of Education (PDE) only certifies baccalaureate programs in education; PDE does not certify Associate programs. **Therefore, the College cannot guarantee that the content electives listed below will count towards the PDE requirement**. Acceptance will be determined by the four-year college to which the student transfers, and courses accepted vary by institution.

Middle Level (4th-8th) Content Electives

In consultation with an advisor, students should choose **FIVE** content electives from the chart below based on **1)** their concentration (Math/Science or Humanities) and **2)** the subject they plan to teach.

CONCENTRATION: MATH/SCIENCE

SUBJECT: Mathematics	SUBJECT: Science
MATH 162, MATH 171, MATH 172, MATH 251, MATH 270 and/or MATH 271	BIOL 106 and 107 or BIOL 123 and BIOL 124
	CHEM 105, CHEM 110, CHEM 121, and/or CHEM 122
	EASC 111
	PHYS 111 and 112 or PHYS 141 and PHYS 240

CONCENTRATION: HUMANITIES	
SUBJECT: English/Language Arts/Reading	SUBJECT: Social Studies
Any 200-level ENGL course, except 214 (includes Creative Writing courses)	ANTH 112, POLS 111, SOC 101, SOC 233, RS 101, RS 151[1]
	ECON 181 or ECON 182
	GEOG 101, GEOG 103, GEOG 180, and/or GEOG 222
	HIST 121, HIST 122, HIST 220, and/or HIST 221

Secondary Level Content Electives

In consultation with an advisor, students should choose **FIVE** courses from the chart below based on **1)** their concentration (Math/Science or Humanities) and **2)** the subject they plan to teach.

CONCENTRATION: MATH/SCIENCE		
SUBJECT: Math or Physics	SUBJECT: Chemistry	SUBJECT: Biology or General Science
MATH 270 and MATH 271	CHEM 121, CHEM 122, CHEM 221, and CHEM 222	CHEM 121 and CHEM 122
PHYS 111 and PHYS 112 or PHYS 140 and PHYS 241		BIOL 123 and BIOL 124

CONCENTRATION: HUMANITIES				
SUBJECT: Art [2]	SUBJECT: English	SUBJECT: Music [3]	SUBJECT: Social Studies	SUBJECT: World Languages [4]
ART 103 ART 104 ART 105 ART 109 ART 115	Any 200-level ENGL course, except ENGL 214 (includes Creative Writing courses)	MUS 105 MUS 106 MUS 116 MUS 118 MUS 120 MUS 121	ANTH 112 POLS 111 SOC 101 SOC 233	Students should take a minimum of **two** courses in the language they plan to teach and **three** additional courses in the Secondary Humanities content elective list.
			ECON 181 ECON 182	
			GEOG 101 GEOG 103 GEOG 180 GEOG 222	
			HIST 121 HIST 122 HIST 220 HIST 221	
			RS 101 RS 151[1]	

[1] Students who plan to attend a religiously-affiliated college or university should take Religious Studies (RS) courses.
[2] Students who intend to teach art at the secondary level should also prepare a portfolio.
[3] Most baccalaureate programs in music education require testing and/or auditions for incoming transfer students. CCP students who intend to teach music should contact their intended transfer institutions for details.
[4] Students who are already fluent in the language they intend to teach should take **five** of the other courses in the Secondary Humanities concentration content electives list instead.

GENERAL EDUCATION REQUIREMENTS: All general education requirements necessary for graduation are met through the courses in the program as indicated above. Students who wish to take courses that differ from the general education courses indicated above must complete a course substitution request form. To access the form, login to the MyCCP portal, and in the **Student** tab, under **Electronic Forms**, click on the **Records and Registration Forms** link, then choose **Request for Course Substitution of Graduation Requirement** link. A more detailed explanation of the College's general education requirements is also available.

For More Information, Contact: The Division of Liberal Studies, Room BR-21, 1700 Spring Garden Street, Philadelphia, PA 19130, Telephone (215) 751-8450 or the College Information Center (215) 751-8010.

X. Courses and Completion Sequence

The following courses and sequence of courses is designed for the optimal success and completion of the Education: Middle and Secondary Level degree/certificate. Any alterations should be discussed with your academic advisor.

First Semester

Course Number and Name	Credits	Advisory Notes
ENGL 101 - College Composition I	3 credits	General Education Requirement: **Writing, Research, Info Lit 1** ENGL 101 is a prerequisite for many courses, including ENGL 102, ENGL 115, and ED 201
CIS 103 - Computer Applications & Concepts	3 credits	General Education Requirement: **Technological Competency**
PSYC 101 - Introduction to Psychology	3 credits	General Education Requirement: **Cultural Analysis & Interpretation** Prerequisite for PSYC 209
Middle Level (any concentration) or **Secondary Level, Humanities Concentration:**	3 or 4 credits	General Education Requirement: **Quantitative Reasoning**

Course Number and Name	Credits	Advisory Notes
MATH 150 - Introductory Data Analysis or MATH 161 - Pre-Calculus I* **Secondary Level, Math/Science Concentration:** MATH 171 - Calculus I		Students should choose math courses according to transfer institution, in consultation with an advisor. While these math courses meet CCP's graduation requirements, students may need to take additional mathematics courses at their transfer institution. MATH 161 requires FNMT 118 completed with a C or better or placement in MATH 161 or higher MATH 171 requires MATH 162 completed with a grade of C or better, or placement in MATH 171 or higher. MATH 171 is also a prerequisite for PHYS 111 or PHYS 140 All students in the program must take a minimum of two semesters of college-level mathematics at MATH 150 or higher.
ED 201 - Foundations of Early Childhood for Middle and Secondary Years	3 credits	ED 201 is a prerequisite for ED 265, ED 214, and ED 255

Second Semester

Course Number and Name	Credits	Advisory Notes
ENGL 102 - The Research Paper	3 credits	General Education Requirement: **Writing, Research, Info Lit 2**
ENGL 115 - Public Speaking	3 credits	General Education Requirement: **Oral Communication/Creative Expression**
PSYC 209 - Adolescent Psychology	3 credits	Prerequisite for ED 265 (may be taken concurrently)
ED 265 - Introduction to Special Education and Inclusive Practices	3 credits	
Middle Level (any concentration) or	3 or 4 credits	Students should choose math courses according to transfer institution, in consultation with an advisor.

Course Number and Name	Credits	Advisory Notes
Secondary Level, Humanities Concentration: MATH 151 - Linear Mathematics or MATH 162 - Pre-Calculus II* **Secondary Level, Math/Science Concentration:** MATH 172 - Calculus II		While these math courses meet CCP's graduation requirements, students may need to take additional mathematics courses at their transfer institution. MATH 151 requires FNMT 118 completed with a C or better or placement in MATH 161 or higher MATH 162 requires completion of MATH 161 with a grade of C or better, or placement in MATH 162 or higher MATH 172 requires completion of MATH 171 with a grade of C or better, or placement in MATH 172 or higher and is a prereq for PHYS 241 All students in the program must take a minimum of two semesters of college-level mathematics at MATH 150 or higher.

Third Semester

Course Number and Name	Credits	Gen Ed Requirements
ED 214 - Cognition and Learning in the Classroom	3 credits	Prerequisite for ED 255
Middle Level or **Secondary Level, Humanities Concentration:** BIOL 106 - General Biology I **Middle Level** or **Secondary Level, Math/Science Concentration:** CHEM 110 - Introductory Chemistry or PHYS 111 - General Physics I or PHYS 140 - Mechanics, Heat, and Sound or	4 or 5 credits	**General Education Requirement: Scientific Reasoning** Students should choose science courses according to transfer institution, in consultation with an advisor. BIOL 106 is a prerequisite for BIOL 107 PHYS 111, or permission of the department head, is a prerequisite for PHYS 112

Course Number and Name	Credits	Gen Ed Requirements
BIOL 123 - Principles of Biology I		PHYS 140 is a prerequisite for PHYS 241 CHEM 110 completed with a C or better and FNMT 118 are prerequisites for CHEM 121 BIOL 123 with a C or better is a prerequisite for BIOL 124 CHEM 110 or permission of department head is a prerequisite for BIOL 123 All students in the program must take a minimum of two semesters of science.
HIST 101 - United States History: Colonial America through the Revolutionary Era or HIST 102 - United States History: The Civil War and the 19th Century or HIST 103 - United States History: The 20th Century and Beyond	3 credits	Students planning to transfer to Temple University should take HIST 101 or HIST 103, not HIST 102.
Content Elective (see chart for choice of content electives)	3, 4, or 5 credits	Students selecting their content electives must receive approval from their education faculty advisor before they can register for their content electives. Banner will prevent students from registering without their advisor's approval.
Content Elective (see chart for choice of content electives)	3, 4, or 5 credits	

Fourth Semester

Course Number and Name	Credits	Advisory Notes
ED 255 - Teaching English Language Learners	3 credits	
Middle Level (any concentration) and Secondary Level, Humanities Concentration: BIOL 107 - General Biology II or	3 or 4 credits	Students in Middle Level and students in Secondary Level Humanities should choose science courses according to

Course Number and Name	Credits	Advisory Notes
EASC 111 - Environmental Conservation **Secondary Level, Math/Science Concentration:** ART 103 - History of Art: Ancient to Renaissance or ART 104 - History of Art: Renaissance to Modern or MUS 103 - Introduction to Music or PHIL 101 - Introduction to Philosophy or Any 100 or 200-level World Language course or Any Religious Studies course (RS)		transfer institution, in consultation with an advisor. BIOL 107 requires BIOL 106 completed, with a grade of C or better. Students in the Secondary Level Math/Science Concentration should choose a humanities course according to transfer institution, in consultation with an advisor. Students who plan to attend a religiously-affiliated college or university should take a Religious Studies (RS) course.
Content Elective (see chart for choice of content electives)	3, 4, or 5 credits	Students selecting their content electives must receive approval from their education faculty advisor before they can register for their content electives. Banner will prevent students from registering without their advisor's approval.
Content Elective (see chart for choice of content electives)	3, 4, or 5 credits	
Content Elective (see chart for choice of content electives)	3, 4, or 5 credits	

XI. Curriculum Map

Key: **I**—Introduced **R**—Reinforced and opportunity to practice
M—Mastery at exit level **A**—Assessment evidence collected

Required Courses	**Programmatic Learning Outcomes**					
	Identify career options open to an individual with a background in education and describe the path required to Pennsylvania Teacher Certification	Apply theories of adolescent development and cognitive processes to enhance student learning	Explain the education models in the United States, and the impact they have on teaching and learning	Demonstrate the use of effective assessments that align with the professional teaching standards of the Pennsylvania Department of Education (PDE)	Demonstrate effective teaching practices for diverse learners	Demonstrate effective oral and written communication skills
ED 201	I	I	I	I	I	R
PSYC 209		R				
ED 265	R	R	I, R	R	A	R
ED 214	A	R, A, M	R, A	R, A, M	R	R
ED 255	R	R	R	R	R, A	R, A

XII. Appendix

Excerpt: Community College of Philadelphia Academic Program Review Education- Early Childhood (Birth to 4th Grade) A.A., Education Middle Level (4th - 8th Grade) A.A., Education-Secondary Humanities/ Social Studies Education Option A.A., Education--Secondary Math/ Science Option A., Summer 2017

Key Findings

1. **Birth to 4th Grade Grants**

   Teacher Preparation Transformation Initiative Sub-Grant
   The College was awarded a sub-grant by the Public Health Management Corporation (PHMC) as part of the Teacher Preparation Transformation Initiative. The grant will support the alignment of the Birth to 4th Grade Program with the Early Childhood Education Teacher Preparation Gold Standard. The Program has revised all of its course and program outcomes to align with NAEYC outcomes.

   Registered Apprenticeship in Early Childhood Education
   The College was awarded the Apprenticeship grant. The College is working with nonprofit funders to develop straightforward, articulating career pathway steps for Pre-K care providers.

   Office of Child Development and Early Learning Innovative Higher Education Grant
   The College was awarded the Office of Child Development and Early Learning Innovative Higher Education Grant in the fall of 2017. The Grant is funded by the office of Child Development and Early Learning to help support professional development for the early childhood workforce.

2. **Population Differences:**
   Early Childhood (Birth to 4th) enrolls a higher proportion of female students, African American students, students over 40 years old, and part-time students compared to Middle Level (4th to 8th Grade), Secondary Humanities/Social Studies, and Secondary Math/Science.

   Over a five-year period, Early Childhood (Birth to 4th grade) recorded an average enrollment of more than double the other three programs combined.

   Jobs are immediately available to those completing Associate's degrees in the Early Childhood (Birth to 4th grade) program; while students in the other three programs need to pursue transfer to a four-year degree granting institution.

   Current program initiatives, extra-curricular programing, and grant development will primarily benefit students in the Early Childhood (Birth to 4th grade) program.

3. **Declining Enrollment** The education programs have experienced declining enrollments over the past five years. Enrollment in Early Childhood (Birth to 4th grade) has decreased by 22%, enrollment in Middle Level: (4th to 8th Grade) has decreased by 31%, enrollment in Secondary Humanities/ Social Science has decreased by 22%, and enrollment in Secondary Math/ Science has decreased by 56%. During the same time period, enrollment in the Division and the College has decreased by approximately 9.5% and 10.5% respectively. This decline in enrollment appears to be a nationwide trend. Nationwide, between the fall of 2015 and fall of 2016, enrollments in all education programs at two- year institutions have decreased by 5%.

4. **Assessment**
   Birth to 4th Grade has completed a cycle of assessment with previous PLOs and has started assessing the newly revised and approved PLOs. The Program records thoughtful action plans. Birth to 4th Grade demonstrates evidence that multiple measures are being used.

   The Middle and Secondary programs have not completed a full cycle of assessment and it is unclear whether multiple measures of program-level data are consistently utilized. Utilizing assessment data from multiple courses throughout the curriculum is a best practice in assessment. ED 201, ED 214, and ED 265 are the core courses that make up the Middle Level and Secondary Programs. Due to the heavy reliance on these three courses for PLO assessment, data should be collected in all of these courses each semester. The programs record thoughtful action plans at the course level, however action plans in response to assessment at the program level are not documented. 5.

5. **Course offering efficiency**
   The Programs have increased their course operating efficiency over the past eight semesters, with their most recent course operating efficiency above that of the College.

6. **Special Aspects of the Program**
   Early Childhood (Birth to 4th Grade) requires students to participate in 146 hours of supervised field experience, known as Practicum. To complete the Practicum, students are placed at school or program sites selected by College faculty. Students reflect on their experiences through written assignments, weekly entries in practicum logs, and discussions of issues related to on-site learning. The Practicum is exclusively for students in the Early Childhood (Birth to 4th Grade). The other education programs require 40 hours of on-site experience.

Action Items
Recommendations

1. **Evaluate Changes from the Sub-Grant**

Recently, Early Childhood (Birth to 4th Grade) has implemented changes to align the program with the Gold Standard in Early Childhood Education. The Birth to 4th Grade Program must assess these changes in order to evaluate their success and how they contribute to retention, enrollment, and student learning.

2. **Develop Engagement Strategy**
   It is recommended that the program develop an engagement strategy for the Middle and Secondary populations

3. **Evaluate the Need for the Education Programs and Create a Recruitment Plan for Remaining Programs**
   Due to the decrease in enrollment over the past five years, the Programs should review the need for all four education programs. Once faculty have determined whether it is in the best interest of the students for all programs to remain open, the programs should create and implement retention and recruitment plans for the remaining programs. Additionally, some students remain enrolled in education programs that are no longer active. The Programs must work to move those students into the active education programs.

4. **Assessment Practices**
   The Programs must commit to assessing all PLOs as part of a comprehensive cycle of assessment. To ensure quality assessment the Middle and Secondary programs should revise their curriculum maps, assess using multiple measures, and create action plans at the program level, not just in individual courses. Due to the heavy reliance on ED 201, ED 214, and ED 265 for PLO assessment, data should be collected in all of these courses each semester.

Links

- More information about the Every Student Succeeds Act: https://www.education.pa.gov/K-12/ESSA/Pages/default.aspx

- More information about Pennsylvania Teacher's Aide requirements: https://study.com/articles/how_to_become_a_teachers_aide_in_pennsylvania.html