Oklahoma City Community College

Program Review Self-Study Year: FY 2018

Division of: Science, Engineering and Mathematics

Engineering Technology AAS (101)	

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I. INTRODUCTION

I. Introduction

This section should reference the general process of the review and any unique features of the review (such as the use of outside consultants or conducting the review in relation to an accreditation visit).

If the program has been reviewed previously, this section should include a brief summary of prior recommendations and how they were addressed.

This review is somewhat unique in that OCCC's Engineering Technology program has previously been named Aviation Maintenance Technology -Airframe and Powerplant Technician. The change in program name reflects a change in focus for the program and is a response to HLC requirements regarding the number of credit hours that could be taught at an institution outside of OCCC that was not an HLC accredited body. The Airframe and Powerplant Technician program was part of a cooperative agreement with local technology centers that had the equipment and personnel needed for the program. They provided instruction and expertise. The new Engineering Technology program teaches a core curriculum of mathematics, computer-aided design, engineering, science, and general education and then gives prior learning assessment credit (PLA) for nationally recognized technician certifications, for example, in Aviation-Airframe and Powerplant Maintenance. This new format will allow OCCC to be responsive to the needs of students and employers since it can be adapted to other industries, such as electrical apprenticeships and civil engineering technology. The review timeline covers the last years (and teach-out period) of the Airframe and Powerplant program and the new Engineering Technology program.

II. Executive Summary

The Executive Summary will include the program's connection to the institution's mission, program objectives, and the strengths and areas for improvement of the program. It will also include the key findings and recommendations of the internal or external reviews with regard to the Program Review Principles and Program Review Criteria.

The Engineering Technology program is closely tied to the college's goal of educating the local workforce, responding to the needs of employers, and fostering economic development in central Oklahoma.

This program has a rather unique structure, particularly from a program assessment/review viewpoint. All of the courses taught on campus are assessed as parts of other programmatic assessment regimens. This includes math program assessment, CAD program assessment, engineering (AS) program assessment, and general education assessment.

Credit for core technology/occupational courses in the program is given after students successfully pass a national certification exam. That exam is written by industry professionals and is itself what qualifies students to work in the field. Successful completion of that exam is evidence of the student's preparation and knowledge. This mode (PLA for national certification) will be followed for other engineering technology fields in the future.

Moving forward, the program will identify technical fields that fit this model, which will involve seeking out various industry experts to explore the existence of qualifying national certifications. Eventually, those contacts will form a program advisory committee.

III. Analysis & Assessment

This section will include a complete review and analysis of the Program Review Criteria based on the internal or external team's review. It will also assess developments since the last program review in the context of the current recommendations of the internal review and any recommendations.

A. Centrality of the Program to the Institution's Mission

An assessment and written analysis as to the centrality of the program to the institution's mission and in the context of the institution's academic plan are required. The purpose of the mission of an institution is to indicate the direction in which the institution is going now and in the future. The mission defines the fundamental reason for the existence of the institution.

Together with the planning principles and goal statements, the mission reveals the philosophical stance of the institution with respect to education and learning while at the same time providing a framework for the maintenance of institutional integrity and development.

Describe how the program is central to the institution's mission:

College Mission Statement: OCCC provides broad access to learning that empowers students to complete a certificate or degree and that enriches the lives of everyone in the community.

- Access: The community has broad and equitable access to both highly valued certificate and degree programs and non-credit educational opportunities and events.
- College Readiness: Students develop skills and knowledge required to succeed in college.
- Student Success: Students successfully complete their academic courses, persist in college, and earn certificates or degrees at OCCC or another institution.
- Graduate Success: Graduates go on to earn higher-level degrees or are successful in technical or professional careers.
- Community Development: The community's quality of life is enriched through educational, artistic, and recreational programs and events.

The AAS in Engineering Technology fulfills the college's stated mission goals of providing broad access to learning that empowers students to complete a certificate or degree that enriches the lives of everyone in the community and that OCCC's graduates go on to earn higher-level degrees or are successful in technical or

professional careers. The program is also important to the institution's academic plan since it will be used to provide a flexible degree platform for various industries and employers in central Oklahoma.

B. Vitality of the Program

Vitality of the program refers to the activities and arrangements for insuring its continuing effectiveness and efficiency. To maintain its vitality and relevance, a program must plan for the continuous evaluation of its goals, clientele served, educational experiences offered, educational methods employed, including the effective incorporation of technology, and the use of its resources. This vital principle or force can best be observed by examining the past and present initiatives to insure the vitality of the faculty, students, and program.

1. List Program Objectives and Goals

1. The program will provide a core set of skills that will enable students to operate effectively in a technical environment. These skills include mathematical skills, familiarity with computer-aided design, familiarity with engineering practice, written and oral communication skills, and the ability to think critically
2. The program will include specific technical/job skills needed to secure and prosper in a technician-level job as indicated by passing a national certification exam.
3. The program will communicate and cooperate with local employers.

2. Quality Indicators

Quality indicators may vary by institutional mission; however, institutions should measure the efforts and quality of their programs by: faculty quality, ability of students, achievements of graduates of the program, curriculum, library, access to information technology resources including efficiencies and improved learner outcomes through appropriate use of this technology and appropriate use of instructional technology to achieve educational objectives, special services provided to the students and/or community, and other critical services.

As appropriate, institutions should evaluate the program against industry or professional standards utilizing internal or external review processes. Institutions must provide specific documentation of student achievement. Such documentation should include programs outcomes assessment data consistent with the State Regents' *Assessment Policy*. Program quality may also be reflected by its regional or national reputation, faculty qualifications, and the documented achievements of the graduates of the programs. This includes a program self-review that provides evidence of student learning and teaching effectiveness that demonstrates it is fulfilling its educational mission and how it relates to Higher Learning Commission Criteria and Components listed below:

a. The program's goals for student learning outcomes are clearly stated for each educational program and make effective assessment possible. List of the student learning outcomes.

1. Students will be able to use mathematics to perform moderately complex (non-calculus) analysis and correctly interpret results.
2. Students will be able to design and analyze projects using computer-aided design techniques and software.
3. Students will be able to work effectively in a team to design and produce a project that solves a specific problem
4. Students will pass a national certification exam in their field.

Well-defined criteria for measurement and how the criteria were used in the program.

1. Program students will be assessed in their Algebra and/or Trigonometry classes. A minimum of 70% of students will perform satisfactorily on one or more problems identified by faculty.

2. Program students will be assessed in their CAT/CAD courses. A minimum of 70% of students will perform satisfactorily on a major course project.

3. Program students will be assessed in their Introduction to Engineering Course. A minimum of 70% of students will perform satisfactorily on a major course project.

4. All program students will pass the national certification exam in their area.

The evaluation, results, and recommendations based upon the criteria used.

1) See information presented in the general education assessment section (below) for details on Mathematics courses.

2) CAT Courses (CAT 1043 and 1214):

2017

It was determined that 37% of students in CAT 1043 had difficulty building a 3D parametric part accurately and were not able to determine the mass, volume, and surface area of the part.

Recommendation: More emphasis will be placed on correctly designing in 3D during class. Students will be given more practice problems prior to the exam.

2016

Forty-six student projects were reviewed. These students were enrolled in the CAT 1214 course during the spring, fall, and summer. The average score on the assessment was 89%. Two areas of weakness have been identified: (1) Dimension style setup and placement of dimensions, (2) Annotation size and placement.

3) Engineering Courses (ENGR 1113 and 2002):

2017

All students taking Introduction to Engineering (Spring of 2017) were assessed on a major course project (presentation on sumobots). 89 students were assessed. 88 (99%) passed with a C or better.

2016

Prior to 2017, the Engineering Technology program required Engineering 2002 (Professional Development). Students in ENGR 2002 "Professional Development" were required to come up with a novel invention and give a 10-12 minute PowerPoint presentation in front of their class. A total of 42 students were assessed, and all 42 of them (100%) scored a "C" or higher.

4) All program graduates passed their national certification exam.

The General Education Core

General Education at Oklahoma City Community College is an integral component of each student's experience. Every student receiving an Associate Degree (AAS, AA, or AS) must complete at least one course from each of the following areas, indicating a general understanding of that area.

Human Heritage, Culture, and Institutions
Public Speaking
Writing
Mathematical Methods
Critical Thinking

Strategy:

The General Education Committee will create five interdisciplinary teams with members from multiple divisions. Each team will consist of five members with two members specifically teaching in one of the General Education Core Areas. Also, at least one team member will be a representative of the General Education Committee.

Twice a year these teams will evaluate one hundred artifacts from students having attained at least 35 hours of General Education Courses from OCCC. Reports, recommendations, and actions created from the General Education Assessment Process will be stored on the General Education Committee Website.

General Education Assessment Plan

Objective:
To assess and recommend actions for the general education component of Oklahoma City Community College's curriculum.

Method:
Developed rubrics will provide common criteria for assessing "artifacts" gathered from various courses. Artifacts may include, but are not limited to, recorded performances, PowerPoint Presentations, essays, lab reports, research projects, service-learning projects, or any assignment pre-existing in a faculty's course.

Nevertheless, the underlying principle of this method is (1) to reduce the intrusive nature of assessment within faculty courses, (2) to create a real environment of student performances within a classroom setting instead of a contrived environment of a forced examination (*i.e.* CAAP exams not counting for a classroom grade), and (3) to collect artifacts already designed and administered by our professional faculty at OCCC.

Data Collection:
The Office of Institutional Effectiveness will identify each semester students completing at least 35 credit hours in General Education Courses.

Program Response to General Education Assessment Data
General Education requirements represent just over sixty percent of each Associate of Science or Associate of Arts degree, making the careful assessment of these broad competencies OCCC considers essential for all graduates very important. All programs (terminal or transfer) to be evaluated contain at least 18 general education hours within the curriculum. OCCC has five general education learning outcomes that we expect all of our students to be proficient in upon graduation, they are: human heritage, culture, and institutions; writing; public speaking; mathematical methods; and critical thinking. Provide evidence that shows your participation in submission of artifacts, what types of artifacts are being submitted, and how you have used the general education assessment data to inform curricular refinement and to achieve these general education outcomes in your students in your program.

MATH 1513 (College Algebra), MATH 1533 (Pre-Calculus), and MATH 1613 (Trigonometry) each submitted artifacts for assessment as General Education courses in the mathematical methods category. Forty–nine artifacts were submitted. Performance was satisfactory in choosing the correct mathematical operation or technique and carrying out the technique correctly, although students in these classes tend to have difficulty interpreting results. This is a common thread in the math general education assessment.

b. The program values and supports effective teaching.

Faculty Performance Review and Evaluation

Faculty will be evaluated on the basis of the established standards of performance and objectives established in the person's contract and any subsequent memorandums of agreement established for the position/person. Faculty are defined as employees who primarily perform teaching and instruction-related duties and who are employed on the basis of a written contract setting forth the duties to be performed and the compensation to be paid. The performance appraisal for each faculty member will be conducted by the Division Dean or Director as appropriate.

Course and Faculty Evaluation

The Student Input on Instruction process is a means of gathering student perceptions of instruction at the college. The results are intended to be used by you and your dean in identifying ways to improve instruction.

Students will receive an email during the 6th and 7th week for the first 8- week classes, and during the 14th and 15th week for the second 8-week/16-week courses and 16-week c. The email will include the information to evaluate each course. The window for replying to these surveys will be closed at the end of the designated weeks. Faculty will not have access to their SII results until after grades have been turned in.

c. The program creates effective learning environment.

The program's core courses are in Computer Aided Technology, Engineering Design, Introduction to Engineering, and Mathematics (Algebra and Trigonometry). All students in these courses benefit from OCCC's institutional model of well-explicated course learning objectives. Additionally, students will be repeatedly exposed to a learning environment that includes hands-on work and group work. Each classroom and lab is equipped with technology appropriate for the course. Class sizes are small (less than 30) so students are able to interact directly with their professors.

Although Engineering Technology program students make up only a small percentage of students enrolled in the courses listed above, they benefit from the fact that these courses are central to other degrees. Each of the areas listed above is supported by a dedicated learning lab (Computer Science, Mathematics, and Engineering). Each of these labs is open for walk-in students for at least 60 hours per week and staffed by tutors and lab assistants who are there to work with students. Each lab is funded adequately through E&G budget lines, as well as monies from the student technology fee, which ensures that students have access to the most recent technology available. Additionally, all faculty in these courses have at least a master's degree and 18 graduate hours in the field.

d. The program's learning resources support student learning and effective teaching.

Instruction and Reference

Reference librarians (3.5 FTE) provide instruction and reference assistance to students. In the past two years the number of librarian positions decreased from 6.5 to 4.5 positions including one that is currently vacant. Many students receive hands on introduction to the Library's resources, as well as instruction on selecting and evaluating sources, as part of the required Success in College and Life course. Additional instruction is provided to a variety of other classes, usually with a focus on the appropriate resources for that discipline.

Librarians are available at the Library Assistance Desk 40 hours per week, a decrease from 65 hours two years ago. Students may also request additional research help outside those hours. Video tutorials and online LibGuides on the Library's website also supplement instruction by providing "just-in-time" research tips.

Print and Electronic Resources

The Science Engineering and Mathematics librarian selects and purchases science and biological related materials. Items are evaluated for content and to ensure they are appropriate for college freshman and sophomores. Most book purchases are based on reviews in *Choice*, *Booklist* and related scholarly journal reviews. Recommendations by faculty are also encouraged. The collection is weeded periodically to maintain currency. Ebooks are also purchased but have not yet been fully embraced by students.

Course textbooks are available at the Library Circulation Desk for in-library use. Texts for the Clinical Research Assistant are heavily utilized.

Print periodicals specifically for Clinical Research Assistant do not exist. Instead students must use several databases available via *EBSCOhost*. *CINAHL, Medline, Health Source: Nursing,* and *Academic Search Premier* and *MasterFILE Premier* provide substantial resources which includes relevant mass market periodicals and full text, peer-reviewed scholarly journals. A complete list of full text periodicals accessible via the Library's databases is available at http://bit.ly/2cyW7w4.

Films on Demand, a collection of academic and scholarly videos, is utilized by faculty teaching online courses as well as in the on-campus classrooms. Over 2,000 videos related to the field of medicine and medical research are available.

The Library also strives to support the professional development of faculty. The circulating book collection is updated with books on teaching, learning, technology in the classroom and curriculum development. Additionally, in 2014 the Library added the *Education Source* database (available via *EBSCOhost*) to provide faculty access to periodical literature on teaching and andragogy.

In summary, the Library supports this program and the faculty comprehensively and well.

e. The institution's curricular evaluation involves alumni, employers, and other external constituents who understand the relationship among the course of study, the currency of the curriculum, and the utility of the knowledge and skills gained.

OCCC has established specific curriculum patterns for transfer programs leading to the Associate in Arts (A.A.) or Associate in Science (A.S.) degrees. Describe program coordination efforts, partnerships and relationships with transfer institutions.

Engineering Technology is an A.A.S. program. Even though it is not a program designed for transfer, faculty do coordinate program efforts with the local technology centers and intend to work with more industry partners in the area to establish employment relationships for students. The requirement of a national certification in the field ensures that students are operating at levels of knowledge and critical thinking that are considered sufficient by industry professionals.

f. The organization learns from the constituencies it serves and analyzes its capacity to serve their needs and expectations.

Working with the program's constituencies is critical for the future development of the program. Currently, engineering technology students are working through the Airframe and Powerplant curriculum at local technology centers. Upon completion of that program, they take a certification test. Successful completion of the test allows OCCC to assign PLA credit that constitutes roughly half of the program's hours. Little communication is needed with the technology centers since their courses are not used as transfer credit to OCCC. As the program expands to other fields, it will be important to communicate directly with employers so that OCCC can either provide courses they need (outside of topics covered by certification exams) or accept educational opportunities they (the employers) provide for credit.

3. Minimum Productivity Indicators

The following are considered to be the minimum standards for degree program productivity (averaged over five years). Programs not meeting these standards may be identified for early review as low producing programs. Institutions will be notified of programs not meeting either one of the two standards listed below and other quantifiable measures in this section.

a. Number of degrees conferred (averaged over five years, minimum standard: AA/AS/AAS 5)

The review timeline covers the last years and teach-out period of the Associate in Applied Science in Aviation Maintenance Technology and the Certificate of Mastery in Aviation Maintenance Technology—Airframe and Powerplant Technician. Both of these programs were cooperative alliance programs discontinued according to HLC requirements. The data indicate the teach-out of Aviation Maintenance Technology and Airframe and Powerplant Technician, as well as the new Engineering Technology program.

Total AAS and Certificate:
FY 13: 174
FY 14: 76
FY 15: 57
FY 16: 53
FY 17: 49
Five-year average: 81.8

Total AAS:
FY 13: 26
FY 14: 16
FY 15: 16
FY 16: 17
FY 17: 18
Five-year average: 18.6

Total Certificate:
FY 13: 148
FY 14: 60
FY 15: 41
FY 16: 36
FY 17: 31
Five-year average: 63.2

	FY13	FY14	FY15	FY16	FY17
AAS Aviation Maintenance Technology	26	16	16	17	17
Certificate Airframe & Powerplant Technician	148	60	41	36	31
AAS Engineering Technology	0	0	0	0	1

b. Number of majors enrolled (averaged over five years, minimum standard: AA/AS-25 AAS-17)

The review timeline covers the last years and teach-out period of the Associate in Applied Science in Aviation Maintenance Technology and the Certificate of Mastery in Aviation Maintenance

Technology—Airframe and Powerplant Technician. Both of these programs were cooperative alliance programs discontinued according to HLC requirements. The data indicate the teach-out of Aviation Maintenance Technology and Airframe and Powerplant Technician, as well as the new Engineering Technology program.

Total AAS and Certificate:
FY 13: 14
FY 14: 11
FY 15: 31
FY 16: 50
FY 17: 45
Five-year average: 30.2

Total AAS:
FY 13: 14
FY 14: 11
FY 15: 30
FY 16: 50
FY 17: 45
Five-year average: 30

Total Certificate:
FY 13: 0
FY 14: 0
FY 15: 1
FY 16: 0
FY 17: 0
Five-year average: 0.2

	FY13	FY14	FY15	FY16	FY17
AAS Aviation Maintenance Technology	14	11	3	0	0
Certificate Airframe & Powerplant Technician	0	0	1	0	0
AAS Engineering Technology	0	0	27	50	45

4. Successful Course Completion

a. Report the successful completion rates of all major courses in the program.

	FY13	FY14	FY15	FY16	FY17
ENGR-1113	NA	NA	NA	NA	93.6%
ENGR-1213	NA	NA	NA	NA	NA
ENGR-2002	NA	NA	NA	93.2%	NA
MATH-1513	67.2%	70.38%	73.7%	72.5%	74.4%
MATH-1533	58.4%	55.32%	62.7%	61.4%	63.2%
MATH-1613	NA	NA	NA	61.3%	65.7%
CAT-1043	75.%	80.0%	87.7%	60.0%	80.8%
CAT-1214	60.8%	76.%	80.3%	65.8%	67.9%

b. Report the successful completion rates of all general education courses in the program.

	FY13	FY 14	FY 15	FY 16	FY17
MATH-1513	67.2%	70.38%	73.7%	72.5%	74.4%

MATH-1533	58.4%	55.32%	62.7%	61.4%	63.2%

c. Describe program student success initiatives.

As a newer program at OCCC, Engineering Technology is working on developing many success strategies through proactive advising, helping students take the right math classes for the program needed for career goals, looking for more PLA blocks that could create pathways for students, looking at computer-aided technology opportunities related to Engineering Technology, working with more industry partners to find national certifications, and looking into direct transfer opportunities with technology centers.

d. Describe results from success initiatives and future plans to increase student success based on success initiative results.

Engineering Technology is a newer program to OCCC but presents many possibilities for future expansion. Going forward from here, administration and faculty will begin a deliberate campaign to reach out to declared engineering majors, particularly those who are not well prepared mathematically. This is a natural recruiting base for potential engineering technology students. Faculty will contact them early in their college career and encourage them to take their on-campus courses first. Students further along in their studies of engineering will also be informed that most of the college credit they have earned in engineering can be applied to engineering technology either directly or by course substitution.

5. Other Quantitative Measures

a. The number of courses taught exclusively for the major program for each of the last five years and the size of classes for each program level listed below:

The Associate in Applied Science in Aviation Maintenance Technology and the Certificate of Mastery in Aviation Maintenance Technology—Airframe and Powerplant Technician were cooperative alliance programs discontinued according to HLC requirements. The data indicate the teach-out of Aviation Maintenance Technology and Airframe and Powerplant Technician, as well as the new Engineering Technology program.

1000 Level Courses Exclusive for the Major

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Number of Courses Taught	43	42	37	27	29
Average Class Size	14.3	13.1	16.1	19.6	23.2

2000 Level Courses Exclusive for the Major

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Number of Courses Taught	4	5	5	2	^0
Average Class Size	18.5	18.2	16	20.5	NA

^Now that AMT has transitioned to Engineering Technology, Engineering Technology has 1000-level major courses: CAT 1043, CAT 1214, ENGR 1113, MATH 1513 or 1533, and MATH 1613.

b. Student credit hours by level generated in all major courses that make up the degree program for five (5) years.

1000 Level Courses within Program

FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
NA	NA	NA	1,905	2, 133

2000 Level Courses within Program

FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
NA	NA	*81	^0	^0

*Teach-out of AMT 2222; 1 section with 27 students = 81 credit hours
^Now that AMT has transitioned to Engineering Technology, Engineering Technology has 1000-level major courses: CAT 1043, CAT 1214, ENGR 1113, MATH 1513 or 1533, and MATH 1613.

c. Direct instructional cost for the program for the review period.

Technology use in the classroom continues to expand to meet the needs of our students. 190 of our classrooms are equipped with permanent multimedia equipment with the availability of mobile carts to increase the number of high tech classrooms to 100%. The cost incurred with this multiyear effort was $1.55 Million. A faculty committee submitted a proposal for a classroom design that supports flexibility in classroom functionality including thin clients, a smaller folding presentation station, and moveable furniture. This committee's proposal was adopted and supported by the Academic Affairs' Deans and President's Cabinet. Through a multi-department effort a total of $400,000 were spent to redesign 8 classrooms to support active learning and cooperative learning formats of instruction as well as a more traditional lecture style.

Faculty members are continuing to utilize student response software, interactive whiteboards and projectors, tablets, and network computing devices in classrooms. OCCC continues to support the utilization of technology in the classroom so faculty can continue to engage students. The Center for Learning and Teaching offers multiple learning opportunities for faculty related to strategies for incorporating technology into instruction effectively as well as the use of the College's Learning Management System, Moodlerooms. The CLT team has strategically worked to meet the needs of our 144 full-time faculty as well as the 428 adjunct faculty members. They support them through organized workshops, online training modules, and individual faculty consultations conducted via phone, email, or in person. The consultations focus on instructional strategies, course design/redesign, assessment construction, selection and use of instructional technology, and aspects of using the College's LMS.

d. The number of credits and credit hours generated in the degree program that support the general education component and other major programs including certificates.

For the two math courses (MATH 1513 and MATH 1533):
Six credit hours in the program account for 9204 total hours received by students.

e. A roster of faculty members including the number of full-time equivalent faculty in the specialized courses within the curriculum.

The following faculty taught mathematics, engineering, and CAT courses. These courses now comprise the Engineering Technology program, which has the following 1000-level major courses: CAT 1043, CAT 1214, ENGR 1113, MATH 1513 or 1533, and MATH 1613.

Holland, Gregory	Kowalczyk, Christina
Agbor, Humphrey	Malmstrom, Gail
Alli, Ali	Malmstrom, Jay
Anderson, Frank	McNair-Moore, Danielle
Bakewell, Daniel	Mitchell, Janet
Bates, Rachel	Oates, Charles
Benton, Daniel	Oehrlein, Christopher
Bridges, John	Ray, Sherry
Buckelew, Lisa	Rho, Ku
Buckelew, Paul	Tomson, Brandon
Coleman, Betty	Vo, Nhanh
Daneshfar, Jamal	Wilson, Cory
Duke, Dale	
Ghosh, Shanta	
Harrelson, James	
Jones, Alan	
Knox, Linda	

f. If available, information about employment or advanced studies of graduates of the program over the past five (5) years.

Students who completed the AAS in Aviation Maintenance Technology and the Certificate of Mastery in Aviation Maintenance Technology - Airframe and Powerplant Technician were equipped with viable workforce skills that allowed them to find employment in the field. Engineering Technology stills gives students the opportunity to gain skills. The Airframe and Powerplant certification for PLA credit in Engineering Technology is granted by the Federal Aviation Administration and gives students the knowledge to work in important industries in Oklahoma. The certification gives students qualifications for the workforce, while the AAS in Engineering Technology also includes relevant courses in computer-aided technology, math, engineering, and general education that can allow students to pursue degrees and other college programs. Jobs for Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (SOC 51-2011) projected 72 jobs in 2016 and 120 jobs in 2021. Jobs for Aircraft Mechanics and Service Technicians (SOC 49-3011) are also increasing (2,210 in 2016 and 2,289 in 2021). In addition to giving students pathways through the Airframe and Powerplant certification, the Engineering Technology program can also help students become equipped for jobs related to Engineering Technicians (SOC 17-3029) at a projected hourly wage of $33.61 and Operations Technicians (SOC 17-3021) at a projected hourly wage of $29.50. Additional PLA blocks will provide additional opportunities for students. The program will be looking to expand PLA credit to include other industries and could help students find jobs as engineering technicians in various fields (electrical, industrial, mechanical, environmental, etc.).

g. If available, information about the success of students from this program who have transferred to another institution.

Engineering Technology is an AAS program designed for the workforce, but the program will be looking into transfer opportunities with direct transfer credits from technology centers.

6. Duplication and Demand

   a. Demand from students, taking into account the profiles of applicants, enrollment, completion data, and occupational data.

Over a five-year period, there have been 409 completions of a degree or certificate in the AAS Aviation Maintenance Technology, the Certificate of Mastery in Aviation Maintenance Technology-Airframe and Powerplant Technician, and the AAS Engineering Technology.

FY 13: 174
FY 14: 76
FY 15: 57
FY 16: 53
FY 17: 49
Total: 409

	FY13	FY14	FY15	FY16	FY17
AAS Aviation Maintenance Technology	26	16	16	17	17
Certificate Airframe & Powerplant Technician	148	60	41	36	31
AAS Engineering Technology	0	0	0	0	1

With the changes and developments in the cooperative alliances programs, enrollment has changed, and the goal will be to increase majors in Engineering Technology.

FY 13: 14
FY 14: 11
FY 15: 31
FY 16: 50
FY 17: 45
Total: 151

	FY13	FY14	FY15	FY16	FY17
AAS Aviation Maintenance Technology	14	11	3	0	0
Certificate Airframe & Powerplant Technician	0	0	1	0	0
AAS Engineering Technology	0	0	27	50	45

It is likely that students at the technology centers have declared this major while taking their coursework there but have either not yet passed the certification exam or have not completed the coursework required on campus. Nevertheless, the number of majors is encouraging. Additionally, with expansion of the program to cover other fields, the program expects higher numbers of declared majors and eventually higher numbers of graduates.

   b. Demand for students produced by the program, taking into account employer demands, demands for skills of graduates, and job placement data.

Job placement data for the Airframe and Powerplant certification already shows promising opportunities for students as shown below:

OKLAHOMA CITY - FIVE COUNTY METRO AREA JOB STATISTICS AND PROJECTIONS

SOC	Description	Avg. Hourly Earnings	Annual Openings	Regional Completions (2013)	2016 Jobs	2021 Jobs	2016 - 2021 Change	2016 - 2021 % Change
49-3011	Aircraft Mechanics and Service Technicians	$25.24	70	158	2,210	2,289	79	4%
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	$20.20	11	292	72	120	48	67%

By expanding the focus of the Engineering Technology program, it would be possible to help students develop skills needed for several engineering technician fields. Additional PLA blocks could help students find jobs as engineering technicians in many opportunities:

OKLAHOMA CITY - FIVE COUNTY METRO AREA JOB STATISTICS AND PROJECTIONS

SOC	Description	Avg. Hourly Earnings	Annual Openings	Regional Completions (2013)	2016 Jobs	2021 Jobs	2016 - 2021 Change	2016 - 2021 % Change
17-3021	Aerospace Engineering and Operations Technicians	$29.50	Insf. Data	7	22	27	5	23%
17-3025	Environmental Engineering Technicians	$16.40	6	12	119	132	13	11%
17-3026	Industrial Engineering Technicians	$32.20	17	18	393	424	31	8%
27-4014	Sound Engineering Technicians	$20.68	3	38	72	76	4	6%
17-3022	Civil Engineering Technicians	$26.85	12	11	320	337	17	5%
17-3027	Mechanical Engineering Technicians	$27.22	11	7	302	317	15	5%
17-3023	Electrical and Electronics Engineering Technicians	$33.71	25	29	777	788	11	1%
17-3029	Engineering Technicians, Except Drafters, All Other	$33.61	12	108	457	459	2	0%

c. Demand for services or intellectual property of the program, including demands in the form of grants, contracts, or consulting.

This is not applicable to the program.

d. Indirect demands in the form of faculty and student contributions to the cultural life and well-being of the community.

This is not applicable to the program.

e. The process of program review should address meeting demands through alternative forms of delivery.

MATH 1513 and MATH 1613 are available online, as are all of the other general education courses in the curriculum.

7. Effective Use of Resources

The resources used for a program determine, in part, the quality of the educational experiences offered and program outcomes. Resources include financial support (state funds, grants and contracts, private funds, student financial aid); library collections; facilities including laboratory and computer equipment; support services; appropriate use of technology in the instructional design and delivery processes; and the human resources of faculty and staff. The efficiency of resources may be measured by cost per student credit hour; faculty/student ratio; and other measures as appropriate. The effective use of resources should be a major concern in evaluating programs. The resources allocated to the program should reflect the program's priority consistent with the institution's mission statement and academic plan.

At this time, the Engineering Technology program is extremely cost effective since all instruction, tutoring, classroom, and lab materials would be present at the college if the program did not exist. The computer science, engineering, and mathematics labs are well supported by various student fees and E&G funding lines. Students in the Engineering Technology program have many resources available to them through the labs and centers on campus.

IV. Program Review Recommendations

This section is a description of recommendations that have been made as a result of the review and of actions that are planned to implement these recommendations. Recommendations should be clearly linked and supported by the information and analyses that were articulated in the previous sections and should contain a realistic strategy for implementation of any changes.

A. Describe the strengths of the program identified through this review.

The strengths of the Engineering Technology program are the following:

- The program is low cost to the institution.
- The program leverages existing courses and instructors to provide additional pathways to a college credential.
- The program's flexible design allows for approved PLA from multiple technology fields to be used for credit for this degree.

B. Describe the concerns regarding the program that have been identified through this review.

Students in the program primarily set their goal as passing the certification exam. Taking the additional courses needed to complete the AAS requirements is not always a priority for these students since initial employment only requires the certification. To address this issue, faculty and staff need to encourage students to take the on-campus courses prior to or at the same time as they pursue their technical training.

The program needs to make current OCCC students more aware of this pathway. Students on OCCC's campus who are in associated fields (Engineering, CAT, Diversified Studies) are not always being informed about the existence of the AAS in Engineering Technology. Some students in these areas are not successful in the AS programs in which they are currently enrolled. The Engineering Technology

degree may work better for them because of its reduced course load and ability to go directly to work immediately after degree completion.

Additional Engineering Technology PLA pathways need to be developed to attract a broader range of students. At present, only those interested in aircraft repair and maintenance pursue this degree. Additional pathways (PLA credit) will increase the pool of potential students.

A pathway also needs to be investigated that relies only on coursework (rather than on a combination of coursework and PLA).

C. Develop a list of recommendations for action that addresses each of the identified concerns and identify planned actions to implement recommendations.

It is important to approach those in the Airframe and Powerplant program at local technology centers early in their technical coursework and encourage them to take courses with OCCC (or transfer any prior college-level work to the program).

Students who begin on the OCCC campus (particularly engineering students who do not start in college-level mathematics) should be targeted and recruited into this program. All students in related programs should be made aware of this option from time to time during their studies. Faculty advisors should note students in those programs who are no longer making progress and remind them of this possibility.

The OCCC Curriculum Committee has approved adding an Electrical Apprenticeship track (in the form of accepting certification exams and granting PLA credit) beginning in fall 2018.

OCCC should redevelop relationships with local technology centers that will allow students to complete technical/occupational coursework there that will transfer directly to the college. The program will be investigating opportunities for direct transfer with technology centers.

D. Provide institutional recommendations as the result of the program review and planned actions to implement recommendations.

Student recruiting needs to be more vigorous and focused at the technology centers, OCCC, and local high schools for the program as it exists currently. There is an active Engineering club on campus that should be leveraged to inform students of the potential of the Engineering Technology AAS.

The program will work with local employers to help their employees understand the benefits of having an AAS credential, as well as a national certification. These benefits include higher wages and promotional opportunities. A new advisory committee drawn from local businesses will be constituted to facilitate communication and opportunities.

OCCC will acquire full or part-time faculty with expertise in the various fields included in this program with a goal of working with local technology centers to offer direct transfer of technical/occupational credits earned at those centers.

A program option that includes only coursework (at OCCC and technology centers) will be developed.

Additional PLA pathways need to be identified and added to the existing framework to meet the needs of the community and the interests of potential students.

APPENDIX

Program Curriculum:

Program Requirements:

Minimum Required Hours: 63

Major Courses		
Prefix & Number	Course Title	Credit Hours
MATH 1513	College Algebra for Business, Life Sciences and Social Sciences	OR
MATH 1533	Pre-Calculus and Analytic Geometry	3
ENGR 1113	Introduction to Engineering	3
CAT 1043	Engineering Principles	3
MATH 1613	Trigonometry	3
CAT 1214	Computer-Aided Design (CAD)	4

General Education Courses		
Prefix & Number	Course Title	Credit Hours
ENGL 1113	English Composition I	3
CS 1103	Introduction to Computers and Application	3
ENGL 1213	English Composition II	OR
ENGL 1233	Technical Writing for the Workplace	3
POLSC 1113	American Federal Government	3
HIST 1483	U.S. History to 1877	OR
HIST 1493	U.S. History 1877 to Present	3
GEN ED	Gen Ed Elective	3

Support Courses		
Prefix & Number	Course Title	Credit Hours
PLA	Prior Learning Assessment	28

Life Skills Courses		
Prefix & Number	Course Title	Credit Hours
SCL 1001	Success in College and Life	1