

# **Portland Community College**

## **Aviation Maintenance Technology**

**2011**

### **Program Review**

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## OVERVIEW



Since 1969 PCC's Aviation Maintenance Technology (AMT) program has trained high-quality graduates to enter the field of aviation maintenance. Our program prepares students to enter an industry with both local and global career opportunities. Uniquely situated on the Rock Creek campus, our program offers numerous local resources, federal approval, and a uniquely designed curriculum that enables students to graduate in less than two years.

The AMT program total cost is very affordable at approximately \$11,000. This is less than one-third the cost of many other aviation maintenance technology schools. In addition, the program is certified by the Federal Aviation Administration and approved by the Veterans Administration. The program prepares students to take national exams with the Federal Aviation Administration.

We operate a modern, 26,000 square-foot, two-hangar complex with 16 aircraft used exclusively for AMT instruction, including five helicopters. Classes are offered in intensive, 90-hour modules. We have an advisory committee, composed of a cross-section of industry professionals that meets semi-annually to reassess our curriculum.

Federal Aviation Regulation 14 CFR Part 65 sets forth the qualification, testing, and certification requirements for mechanics and other aviation personnel.

The AMT program curriculum is the standard FAA curriculum used in all FAA Part 147 AMT schools. The program operates on a four-week modular class structure, with new students starting in fall or winter terms. Each module is four weeks long and usually contains 90 hours of instruction. The module provides a series of experiences very similar to working in the industry.

The large majority of classes are scheduled from 7am to noon, Monday through Friday with afternoons and evenings available for study, work and other activities. Classes average 50% lecture and 50% lab. Students are able to finish the program in 23 months, including summer sessions.

Practicum courses help students prepare for the FAA Mechanic's certificate Oral, Written and Practical exams. The overall FAA exam pass rate for program completers is exceptionally high.

## ***Section 1: Program/Discipline Goals***

### ***A. What are the educational goals/objectives of this program/discipline? Have they changed since the last review, or are they expected to change in the next five years?***

- The Aviation Maintenance Technology (AMT) Program provides training under Part 147 of the CFRs for those desiring certification from the FAA as Aircraft Mechanics
- Provide specialized training through industry partnerships that promote and support a growing base of aviation maintenance activity in the Northwest.
- Respond to opportunities for offering custom training in existing curriculum areas of Part 147 content or in focused subjects such as Aviation Electronics, Aircraft Systems, Aircraft Structures, or Rotary Wing Maintenance.

The goals and objectives of the AMT discipline have been consistent with both the industry and its regulatory body over the past 42 years, since the program's first association with PCC in 1969. The Aviation Maintenance Technology program has been true to its charge as a regional training organization for Airframe and Powerplant Mechanics.

***Place the Program Discipline within the context of the institution. Describe how the college's Mission, Values and Goals are addressed***  
***[http://www.pcc.edu/ir/edumasterplan/PCC VMG Feb2008.pdf](http://www.pcc.edu/ir/edumasterplan/PCC_VMG_Feb2008.pdf)***

#### **VISION**

The Aviation Maintenance Technology Program builds the futures for our Students and Communities by providing them with a complete FAA Certificated and VA approved Aircraft Airframe and Powerplant Technician Certification Program that is not offered anywhere else in the Portland area. Consequently, it serves close to 900,000 residents in a five-county, 1,500 square mile area in northwest Oregon. As a matter of fact, the nearest complete AMT Program south of PCC is Lane Community College in Eugene (approximately 110 miles). PCC and LCC are the only two complete AMT programs in Oregon. The nearest one north of PCC is Clover Park Vocational Technical Institute, Tacoma, Washington, (approximately 130 miles).

#### **MISSION**

The Aviation Maintenance Technology Program provides access to a very high quality education at a fraction of the price of many private Part 147 schools, in an atmosphere that encourages the full realization of each individual's potential. The Program offers opportunities for academic, professional, and personal growth to students of all ages, races, cultures, economic levels, and previous educational experiences which can be attested to by the variety of students enrolled in the Program at any given time. Students from thirty different nations have completed the Program over the years.

#### **WHO WE ARE**

The AMT Program is located at the Rock Creek Campus and has students attending it from all over the Portland area, and even some from out of state. The AMT Program provides its graduates with possible transfer to 4-year Aviation/Industrial Management degree programs. Completers are prepared to enter the work force in many local, regional, national, and global

areas of aviation including general, corporate, repair station, military, government, and transport category with both local and worldwide career opportunities.

### **STATEMENT OF VALUES**

The PCC AMT Program provides:

- Quality, lifelong learning experiences that helps students to achieve their personal and professional goals
- An environment that is committed to diversity as well as the dignity and worth of the individual
- Continuous professional and personal growth of our employees and students
- Effective teaching and student development programs that prepare students for their roles as citizens in a democratic society in a rapidly changing global economy
- Academic Freedom and Responsibility - creating a safe environment where competing beliefs and ideas can be openly discussed and debated
- Sustainable use of our resources
- Collaboration predicated upon a foundation of mutual trust and support
- The PCC AMT Program provides an agile learning environment that is responsive to the changing educational needs of our students and the communities we serve
- Accountability based upon an outcomes-based approach in education
- The public's trust by effective and ethical use of public and private resources

### **GOALS**

The PCC AMT Program strives to support in spirit and intent all of the college's Goals:

- Improve access to quality lifelong learning opportunities through the effective use of technology, affordable classes and the strategic location of facilities.
- Promote success for all students through outstanding teaching, student development programs, and support services in all that we do;
- Professional technical education will be responsive to industry needs and prepare students to work in a global marketplace.
- Transfer preparation will prepare students for success in obtaining baccalaureate degrees.
- College readiness will promote student preparation for college-level programs and employment.
- Community education/continuing education will provide quality education to enrich students personally, socially, culturally, and to upgrade occupational/job skills.
- Enrich the educational experience by committing to the development of diversity in our student body, faculty and staff.
- Develop, safeguard and allocate our resources (human, financial, capital, and technological) to ensure through planning and assessment the delivery of relevant, quality programs and services.
- Effectively respond to the educational needs of our students and communities through strategic alliances with business, government agencies and educational institutions.
- Facilitate growth and development of our district communities by accepting a leadership role and serving as a key educational resource to the community.

Please see Appendix E for, PCC Vision, Mission, Who We Are, Statement of Values, and Goals.

## ***Section 2: Curriculum:***

### ***A. Evaluate the curriculum using national and/or professional program/discipline guidelines where available.***

The curriculum used in the AMT program is an expanded adaptation of the basic curriculum elements required of Aviation Maintenance Technician Schools (AMTS) and listed in 14CFR Part 147, Appendices B, C, and D. These regulations are enforced by the FAA (Federal Aviation Administration), and continued certification of the department by the FAA is dependent on compliance with these regulatory provisions.

The Department is allowed to vary the details of its curriculum (with FAA approval), but not to a level that would cause it to depart from the regulation requirements. These requirements include, the minimum "level" at which a subject objective must be taught and the scope of subjects to be taught. The three "level" definitions focus on the greater or lesser emphasis on manipulative skill, and culminate in a level that requires at least simulation of a "return to service" standard; a standard that requires the working technician to document and take responsibility for that "return to service" in a public record required by the regulations.

While the industry continues to examine the FAA regulatory curriculum in the context of what it expects of the certificated Aviation Maintenance Technician that is ready for entry level employment, the FAA is willing to change regulations only with careful consideration of several things:

- What is the effect on the airworthiness of aircraft?
- What investment will be needed to administer new regulations?
- What is the cost / benefit ratio attached to the proposal?
- What is impelling this regulatory change?

Representatives of the FAA, AMT Schools and the Aviation industry recently completed a comprehensive study of the curriculum guidance found within Part 147. The recommended changes, if implemented, will allow for realignment of curriculum emphases and of program resources. There are also areas where the changes will require budget planning for short term purchases of more modern equipment.

### ***B. Identify and explain changes that have been made to course content and/or course outcomes since the last review.***

No major changes in course content have been made since the last program review. However, as a result of a reduction in the AMT budget by \$250,000 annually in 2004, several course offerings were eliminated and other content was shifted. The Math component of AMT 105 – Applied Science shifted to being a program pre-requisite. The Welding component of aircraft structures is now being taught by the Welding program through WLD 210.

A major effort at improving the wording of Course Outcome statements to better reflect skills and knowledge for the workplace was recently undertaken. The AMT SAC saw approval of revisions to the Course Outcome statements for 19 of 24 courses.

In 2007, the department made three minor adjustments in the AMT Practicum series, moving content from two practicum's to a total of three, providing for a more even distribution of the

capstone evaluation coursework. The General coursework components were removed from AMT Practicum / Airframe and AMT Practicum / Powerplant. AMT Practicum / General was developed into a standalone class, providing a review and quality assurance course earlier in the program.

Within the year following implementation, this change proved beneficial for student success and retention. This was demonstrated by significantly higher completion of the coursework within the allotted time for the class and far fewer course incompletes.

### **C. Assessment of course outcomes:**

#### **1. Are assessments that address the course outcomes described in the Course Content and Outcome Guides (CCOGs)?**

Individual course outcomes, program wide, are assessed by three general methods, written, oral and practical examination. An example of the course outcome being addressed in the CCOG is found in Appendix D.

#### **2. Describe evidence that students are meeting course outcomes.**

Evidence that students meet course outcomes is shown through two methods. Within each course, students complete a series of readings, quizzes and tests, designed to indicate comprehension of the course material through a written medium. Students indicate practical knowledge of and skill with course material through completion of a set of prescribed projects. All three assessment components, written, oral and practical, have been developed to meet a set of FAA prescribed knowledge and skill objectives, outlined in 14 CFR Part 147.

Course outcomes are defined for each course and also for the program. The expectation that students will become problem solvers, able to draw upon many sources and engage in a process of synthesis and analysis in their efforts to find solutions is basic in the AMT course of study and industry employment settings. The department continues to seek additional methods of providing feedback regarding accomplishment of student outcomes.

Some current methods of determining that students are meeting course outcomes include:

1. Lab projects on aircraft and aviation equipment based upon the content and outcomes for each course that are evaluated by instructors, and documented in the student's progress records.
2. Course final testing required by the FAA curriculum, with results also recorded in the students' progress records.

Program review, confirmation of competencies, and identification of weaknesses is accomplished in the Practicum portion of the program that is scheduled at the end of the program courses for each certification rating (Airframe, Powerplant). Deficiencies that have either persisted or developed since specific courses were taken, are identified and addressed through assigned work, including applicable hands-on projects, focused in the deficient areas.

Successful completion of each course, accompanied by the instructor certification of specific student competencies, provides documentation of outcomes being met.

Graduates of the program apply to the FAA for certification tests including written, oral and practical components. Written test results are published and show that graduates of the PCC AMT program are achieving a near 100% first time take pass rate with an average test score of 89%, (These data are well above the national norm) and have been doing so for a significant period. Oral and practical test results are not reported, but anonymous and informal data is available from the FAA Designated Mechanic Examiners (DMEs) that are administering these tests. The two DMEs that have provided oral and practical tests to PCC program graduates over the past few years report that 95% of the applicants are passing these tests on the first attempt. Based on this feedback, program and course outcomes are being met.

**3. *Identify/give examples of assessment-driven changes made towards improving attainment of course-level outcomes***

The recent change, described above, is an example of an assessment-driven change to improve outcomes. Through a change in the distribution of the program assessments made through the AMT Practicum experiences, instructors now have additional, more focused time to spend evaluating the oral knowledge and practical skills of the students. This is occurring when students have a chance to show comprehensive knowledge and skills, in a “whole-aircraft” scenario.

**D. *Assessment of College Core outcomes***

**1. *Describe how courses in the program/discipline address the College Core Outcomes.***  
<http://www.pcc.edu/resources/academic/core-outcomes/index.html>

The college’s Core Outcomes are addressed in the AMT program by the following means:

**Communication**

The AMT program requires the graduate to have abilities in: preparing public records and documents of responsibility regarding maintenance performed on aircraft; communicating orally, and in writing the current status of ‘work in progress’ on certificated aircraft; understanding of a variety of legal and technical information and publications upon which depends the proper maintenance and airworthiness determination of aircraft used by the general public. Maintenance teams are typical in the industry, including the necessary communication for such teams to be successful. All facets of maintenance are carefully and completely documented including handing off incomplete work to oncoming shifts. Certificated mechanics have the privilege and responsibility of supervising non-certificated persons engaged in aircraft maintenance; a communication-intensive activity.

**Community and Environmental Responsibility**

Certificated Aircraft Mechanics are well aware of their community and environmental responsibilities through the fact that they are carrying the direct responsibility for the airworthiness of aircraft on which they have performed maintenance. Environmental responsibilities are well established through a variety of occupational demands to obey

applicable environmental laws, and be aware of human factors in the proper executing of aircraft maintenance. To be successful, the mechanic must fully participate in the team social structure of the workplace. All these elements are integral to the courses and projects accomplished in the program.

### **Critical Thinking and Problem Solving**

Critical thinking and problem solving is a consistent theme throughout the program. The AMT program outcomes are very focused on this subject. These outcomes are embraced in each course, with a progressive degree of emphasis and the capstone courses that are in the program focus on this summative skill development. Program outcomes are listed:

- Make independent and accurate airworthiness judgments in the process of inspecting and maintaining aircraft structures and powerplants in accordance with applicable airworthiness requirements.
- Develop and implement a plan for aircraft maintenance action based on research and understanding of appropriate maintenance and inspection data.
- Troubleshoot aircraft structures, powerplants and their associated systems with a discerning recognition of the specific malfunction within the scope of the overall aircraft and associated systems and accomplish the correct maintenance action that will allow approval for return to service of the affected items.
- Develop and act upon a personal attitude and plan of "Safety Awareness" and compliance that includes one's self, ones' co-workers, the work area, and the aircraft.
- Satisfy the FAA required competencies for completing the required written, oral and practical exams for the Airframe and Powerplant ratings of the FAA Mechanic certificate.
- Integrate airframe and powerplant knowledge to create adaptable solutions to evolving problems satisfying the greater aviation maintenance industry need. 1.2010

(Refer to Appendix C for a list of all AMT Program Outcomes)

### **Cultural Awareness**

The AMT program curriculum does not specifically address the issue of Cultural Awareness; however, throughout the courses in the AMT program, students are exposed to the aspects of industry and FAA culture (a natural result of the industry being FAA regulated), ethnic culture, and how these interplay with the performance of aircraft maintenance. Workplace teamwork, the fact of aircraft maintenance being an international activity with FAA certificated mechanics worldwide, and the need to study and understand human factors related to aircraft maintenance - these are reasons for including these cultural components in the program. Students are exposed to a variety of ethnic and cultural backgrounds and students are encouraged to appreciate diversity.

### **Professional Competence**

Students graduating from the AMT program apply to the FAA for mechanic certification testing. Demonstrating their mastery to the FAA through approximately 30 hours of written, oral, and practical testing, these graduates are then ready for the employment of their competencies. The FAA has found them qualified to provide aircraft maintenance services to the community and the aviation industry.

## **Self-Reflection**

Graduates of the AMT program at PCC are taught to evaluate their skills and equipment in the performance of specific aircraft maintenance and to seek what is necessary for the proper execution of the work. This is not only necessary for the industry to produce proper results, but is a regulatory requirement. Aircraft maintenance is an intensive activity, and all are required to participate in the responsibility for proper techniques and practices - their creation, revision, and documentation. Please see Appendix F for The Aircraft Mechanic's Creed.

1. ***Please revisit the Core Outcomes Mapping Matrix for your SAC and update as appropriate.*** <http://www.pcc.edu/resources/academic/core-outcomes/mapping-index.html>.

Refer to the Core Mapping in Appendix B.

2. ***What strategies are used to determine how well students are meeting the College Core outcomes?***

Each course within the AMT program uses a threefold strategy of written, oral and practical assessment to determine that program students are making successful coursework progress.

The FAA mandates that AMTS graduates be exposed to course material through effective classroom and laboratory experiences. Students are able to gain a significant base of factual knowledge through modern subject material textbooks and then demonstrate that knowledge through written tests. However, because aviation is kinesthetic practice, successful students must also demonstrate adequate knowledge and manipulative skills through oral and practical assessment.

The AMT program has mapped 129 unique FAA mandated skill and subject knowledge areas across 24 courses. This prepares the program completer move through standardized FAA testing to gain the mechanic certificate.

3. ***Describe evidence that students are meeting the Core outcomes***

The Core Mapping matrix, completed in November of 2009, illustrates that the AMT program students are meeting average to excellent skill levels in three of the six core outcomes. Continued effort needs to be made in the core outcome areas not related specifically to professional skills, but increasing important in the global and diverse work environment.

The ultimate indicator that students are meeting Core outcomes is the evidence provided by the data points of the SCHOOL NORMS VS. NATIONAL PASSING NORMS provided by the FAA.

4. ***Describe changes made towards improving attainment of the Core outcomes.***

Definition and recognition are two of the first steps toward improved attainment of the

Core outcomes. AMT faculty seeks assistance in further clarification of the outcome integration into the AMT curriculum.

***E. To what degree are courses offered in a Distance modality? Have any significant revelations, concerns or questions arisen in the area of DL delivery?***

Currently, one course offered within the AMT curriculum containing many components in a Distance modality is AMT 101 – Introduction to A&P. This one credit hour course is a pre-requisite for program entrance. It serves as an overview of the aviation maintenance career field and as an orientation to the AMT coursework and program requirements.

This course requires that students attend class for ten hours total on two consecutive weekends. The onsite component to this class enhances the student’s understanding of the depth and breadth of the program’s teaching day, as well as introducing them to the environment of the program’s facilities. The remaining coursework is accomplished through the distance learning framework, including such tasks as writing responses to industry-related articles posted by the instructor, searching industry websites, and researching job opportunities and career paths through information found at the Bureau of Labor Statistics website.

Generally, this course has had significant enrollment. Its offering over the past five years has helped increase the average AMT program enrollment. The lead instructor for this course will be seeking an IIP grant for this academic year. He will investigate possibilities for expanding the offering of the course through more online research components and virtual classroom/lab experiences.

Additionally, the instructor hopes to develop a learning module approach to subjects such as, fire safety, machine safety, program time card management and other appropriate subjects that can be presented online. Also being considered is expansion of the open time of the course which would allow increased access to this course by students that might not be able to attend the current two consecutive Saturday offerings per term.

***F. Has the SAC made any curricular changes as a result of exploring/adopting educational initiatives (e.g. Service Learning, Internationalization of the Curriculum, Inquiry-Based Learning)? If so, please describe.***

The major emphasis of the Aviation Maintenance Technology coursework is to facilitate students successfully meeting the requirements of Federal Aviation Administration’s competencies for the Mechanic certificate, with either an Airframe or Powerplant rating or both.

The curriculum is currently composed of 93 credit hours, which is a significantly full requirement for students to complete in a 23 month program. It is difficult to incorporate additional educational initiatives that will not also lead to further hours of investment by the students into course completion.

Completers of this program are presented with Global skills. Part 147 has international implications.

**Section 3: Needs of Students and the Community**

**A. What is the effect of student demographics on instruction and have there been any notable changes since the last review?**

We continue to offer instruction to a diverse student demographic group. There have been no significant shifts in the demographics of students since the previous program review. AMT students come from a wide range of backgrounds and experiences.

An informal survey of the AMT students indicates that 22% of students moved to Oregon or Washington, from outside the Portland area, to be in region so as to be able to attend AMT classes at PCC. Recent data indicated that 38% of our students have prior military service experience. The age of our students ranges from 17 to above 60, with the average age around 28.

Women constitute generally between 5-7 percent of our student group. This average is higher than that within the Aviation Maintenance industry itself, where women make up approximately 1% of the work force.

COLLEGEWIDE TABLES (Excl Campus 6): Gender Distribution			Female	Male
		N	%	%
Collegewide, Excl Campus 6				
	2007-2008	140	5.7	94.3
	2008-2009	150	4.7	95.3
	2009-2010	170	7.6	92.4

The AMT program has seen students of a variety of minority ethnic and cultural backgrounds enter and succeed in the program. A quick glance overhead, when entering the East Hangar, reveals the flags of over thirty nations, representing students who have completed AMT program of study.

Aviation Maint Technology

COLLEGEWIDE TABLES (Excl Campus 6): Race/Ethnicity Distribution		Total	African American	Asian/Pacific Islander	American Indian/Alaska Native	Hispanic	White Non-Hispanic
		N	%	%	%	%	%
Collegewide, Excl Campus 6							
	2007-2008	115	4.3	4.3	1.7	0.9	88.7
	2008-2009	124	0.8	5.6	1.6	2.4	89.5
	2009-2010	110	.	4.5	1.8	4.5	89.1

***B. Has feedback from students, community groups, transfer institutions, business and industry or government been used to make curriculum or instructional changes? If so, describe.***

Anecdotal feedback from students on a daily and class by class basis, as well as informal evaluation of student retention and general coursework completion rates by individual instructors has led timely revision of the program curriculum. A case in point is the recent set of changes made to the AMT Practicum classes. Content from the formerly two 4-credit hour Practicum classes was divided into three 2-credit hour Practicum classes. The added third Practicum was placed earlier in the AMT class sequence. This has allowed students exposure to the FAA certificate testing rigor earlier in the program. This strategy has also allowed for improved Practicum class completion by students.

***C. Describe current and projected demand and enrollment pattern. Include discussion of any impact this will have on the program or discipline.***

For the two previous academic years to this report, enrollment pressure has increased steadily for the AMT program. The program has two cohort entry points each academic year; the Fall and Winter terms. The past four cohort entry points has seen increasing numbers on the PCC registration. The 2010 Fall term saw three to five students on the waitlists for each of the three entry term classes. Demand for entry into the AMT program should stay steady, if not continue to increase. The factors that contribute to the increase in demand are several; a well-publicized increased need for additional trained aircraft mechanics worldwide, following the increasing number of retirees from the industry.

***D. What strategies are used within the program/discipline to facilitate access and diversity?***

We continue to welcome everyone into the AMT Program who is qualified to attend, based on placement testing. Program entrance is offered twice yearly, once each during the Fall and Winter terms. Due to the increased number of prospective students, some students have been delayed in their opportunity to enroll in the program.

## ***Section 4: Faculty composition, qualifications and professional development***

### ***A. Provide information on:***

#### ***1. Rationale for the size, distribution and composition of the faculty in the subject area.***

The AMT program consists of 44 distinct FAA prescribed subject knowledge areas. Each of these subject areas represents a vertical expertise within aircraft maintenance. The duration and structure of the AMT program class offerings and the number of subjects of study compels the use of full time faculty, where possible. 50% of all the sections offered in an academic year are taught by part-time faculty. Four full-time and two part-time faculty are able to cover all the sections offered throughout the academic year. Typically, the four full-time instructors teach as part-time faculty during the summer term and are able to cover all the summer term classes.

#### ***2. Quantity and quality of the faculty needed to meet the needs of the program/discipline.***

The quantity of both full and part-time faculty adequately meets the needs for all the currently offered AMT sections. There is an overall increased interest in the AMT coursework, indicated by substantially increased enrollment in the introductory course sections. This increased prospective student interest precipitated the use of the PCC registration Wait List function Fall of 2009. Discussions in the department are ongoing as to how additional sections may be offered to meet this increased interest.

#### ***3. Extent of faculty turnover and changes anticipated for the future.***

Faculty retirements are not anticipated for another three to four years. Following that another retirement is anticipated every four to five years.

#### ***4. Extent of the reliance upon adjunct faculty and how they compare with full-time faculty in terms of educational and experiential backgrounds.***

The use and retention of adjunct faculty within the AMT program presents several challenges. Generally, adjunct faculty have less industry experience than their full-time colleagues. They tend to be more recent graduates of an AMT program and/or are between full time employment opportunities.

The AMT program schedule makes it difficult to find and retain qualified adjunct candidates, as it is difficult to teach from 7am to 12pm for four weeks on an intermittent basis and maintain full time employment within the aviation industry, as is required for certificate currency.

**5. *How the faculty composition reflects the diversity and cultural competency goals of the institution.***

The diversity of the AMT faculty presents a challenge for change. In the history of the AMT program, only one person of color has served as a faculty member. The aviation maintenance industry itself is not as diverse as the population as a whole. So, to discover qualified candidates of diverse culture, color or gender poses many challenges.

Even so, the student population within the AMT program reflects a higher than average female enrollment and an average diversity. The retention of these students over the years reflects adequate cultural competencies on the part of the AMT faculty.

**B. *Report changes the SAC has made to instructor qualifications and the reason for the changes.*** <http://www.pcc.edu/resources/academic/instructor-qualifications.pdf>

The SAC described Instructor Qualifications for teaching in the AMT program were reviewed and revised in the Spring of 2010. Essentially, all newly hired full time faculty must hold both the Airframe and Powerplant ratings, have at least five years of aviation maintenance experience in the industry and earned an AAS in Aviation Maintenance Technology or a related transportation field. Please see Appendix G for Instructor Qualifications.

**C. *How have professional development activities of the faculty contributed to the strength of improvements? If such activities have resulted in instructional or curricular changes, please describe.***

**The AMT faculty has participated in one or more of each of these activities or services since the previous program review.**

- 8 hour - Inspection Authorization renewal course – A variety of subjects related to the skills needed as advanced Airworthiness Inspectors.
- 3 day - International Association of Missionary Aviation conference - An annual gathering of agencies and training organizations focused on aircraft operations conducted in remote regions, providing logistical support for relief and development, education and medical services.
- 3 day - Aviation Technician Education Council (ATEC) Conference
- 40 hour and 8 hour respectively - FAA Technical Personnel Examiners Training – Initial & Recurrent
- 2 hour - Inspection Authorization refresher on Human Factors
- 40 hour - Teledyne Continental Motors Factory Training course

Much of the professional development has resulted in enhancing the curriculum in terms of exposure to current technology / trends and awareness of issues that affect our industry. Examples include;

- The Engine Inspection courses have been enhanced to include latest techniques and requirements from the manufacturer.
- Recent changes in regulations have been included in the CFR course content; Activities associated with FAA testing of mechanic applicants gives the department informal feedback concerning areas of weakness, and provides a usable level of quality control;
- Human Factors in Maintenance is currently the most crucial area of emphasis as regards the safety of flight. Increased availability of curriculum and training opportunities are constantly being pursued by AMT faculty
- Associations with ATEC, PNWAEA, IAMA and others allow instructors to be aware of what colleagues at other schools are doing; how they are recruiting, and retaining students, how they are working with FAA representatives, how they are sourcing and obtaining equipment for their curriculums, etc. These knowledge pieces support the upgrading and improving of curriculum in a variety of ways.

## ***Section 5: Facilities and Support***

### ***A. If impact on success of classroom space, computers/technology and library/media, laboratory space and equipment.***

#### Facilities:

The program is housed in a 26,000 square foot, two-hangar complex. The facility includes five classroom/lab spaces, eight shops, complete tool room, and a computer resource center.

#### Aircraft:

Fifteen aircraft, including five helicopters, are used exclusively for maintenance training.

#### Equipment:

A partial list includes sixteen Allison 250 turbine engines, eight turbojet J-34 engines, and twenty Lycoming O-290 reciprocating engines. Also included are aircraft component training aids such as carburetors, magnetos, instrument system mockups, heating, air-conditioning, and other system mockups. An extensive instructional video collection with a variety of VHS's and DVD's are used for instruction in each of the program's classes.

#### Challenges:

The addition of a turboprop aircraft, turboprop engine, run-stands for the Allison 250 turbine engines, engine dynamometer run-stands, and overhead crane in hangar all would improve the instruction in the program.

### ***B. Describe how students are using the library or other outside-the-classroom information resources.***

#### AMT Resource Center:

Students use the AMT resource center in many of our courses to research aircraft data, parts information, FAA regulations, FAA Advisory Circulars, service letters, service bulletins, Type Certificate Data Sheets (TCDS's), Supplemental type Certificates (STC's), and other publications. The media sources utilized for this research include hardcover aircraft manuals, textbooks, microfiche, CD ROM, electronic aircraft maintenance information, and the internet.

#### PCC Library:

AMT students use the Rock Creek campus library for research projects and presentations. They also use this, in conjunction with the program's resource center, to conduct job searches.

#### Tool Room:

The program's tool room accommodates the students with the most often used aircraft and component maintenance information as well as specialized tooling for class projects.

Wireless Internet:

Recent wireless connections in the building allow for greater access to the internet based resources.

Challenges:

Cost of program text books is sometimes a financial burden for students. One possible solution is to offer text books for temporary use by such students, possibly on reserve in the library.

***C. Provide information on clerical, technical, administrative and/or tutoring support.***

Learning Skills Specialist:

The Learning Skills Specialist offers tutoring for students needing additional instruction in general subjects such as aircraft electricity and math. Support in academic advising, registration, searching for academic financial support and location of other student services is also offered through the Learning Skills Specialist.

Challenges:

The Aviation Maintenance Program has a distinct requirement for relatively expensive and technical equipment, namely aircraft and aircraft components. The upkeep of this equipment is a time consuming job, and requires a considerable level of attention to detail. Added to this is the anticipated increase in student enrollment that will increase demand on the maintenance of this equipment. Some of this is addressed by hiring student help with funds from the department budget. However, the level of skill and hours available from students does not fully address this situation. The AMT Program needs two part-time lab technicians in addition to the existing Instructional Support Technician.

Lab Technicians: The AMT department needs two part-time lab technicians. The first one is needed to support the repair and maintenance of our tools and training aids. This is especially needed because of the increased student retention in our program. The second part-time lab technician is needed to support the tool counter during the afternoon practicum classes (AMT108, AMT216, and AMT225). These practicum classes have more student enrollment than can be supported by the instructors.

***D. Provide information on how Advising, the Office for Students with Disabilities and other student services impact students.***

Student Services:

All of the school's student services are useful in the ways intended. Those that are the most valuable to AMT students are as follows:

The Financial Aid office assists students with funding for the program.

Student employment and cooperative education office offers assistance with resume writing, interviewing, and other job searching skills.

The Academic Advising office assists with advising for general education requirements.

Counseling services helps students overcoming barriers to learning inside and outside of classroom and offers excellent “at-risk” student intervention.

Veterans' Services primarily assists students with acquiring funding from U. S. military services. As the Aviation Maintenance Technology program is a degree/certificate program at PCC, students who are veterans qualify for funding through these sources. The office also assists veterans in finding additional resources outside of the school, such as counseling services. The office recently hired a third staff member and is currently developing their web site with more on-line services to better aid the students that use these resources. Unfortunately, the only office for Veteran's Services is located at the Sylvania Campus.

Department Faculty:

In addition, the faculty plays an important role in the advising of students during normally required office hours.

***E. Describe [how] current patterns of scheduling (such as class size, duration, times, location, or other) address the pedagogy of the discipline and the needs of students.***

Full-time:

Focused modules of 90-hours of instruction start every 3-1/2 to 4 weeks. This schedule follows the industry model of fulltime instruction (approximately 8 hours/day). Students attend classes 5 hours per day, 5 days a week providing the optimum use of the student’s time, minimizing distractions, and all instruction is geared towards the same subject for each class.

Accessibility:

Accessibility is maximized by scheduling classes from 7am to noon daily. Classes are short-term intensive modules lasting 18 consecutive days.

The earlier daily dismissal accommodates afternoon employment situations. Entry into the program is possible twice each year. Students are carefully scheduled into modules so as to optimize the student’s schedule and flow through the program and to give planning information for future offerings of modules. The forecast for each student is laid out for their entire tenure with us. We continue to welcome everyone into the AMT Program who is qualified to attend based on placement testing. Due to the increased number of prospective students, some students have been delayed in their opportunity to enroll in the program. The anticipated increase in enrollment may boost the number of delays.

Timely:

FAA A&P Mechanic Certification possible in 22-23 months

Class Sizes:

With current classroom space and instructional/project equipment, class sizes above 20 students are difficult. The department faculty has, in general, recommended that

the maximum class sizes be 20 students for general classes and 18 for airframe and powerplant classes. These recommendations were made after considering factors such as student/instructor contact, safety, quality of education, and current facilities and equipment.

## ***Section 6: CTE Programs - changing employer needs***

### ***A. Evaluate the impact of the Advisory Committee on curriculum and instructional content methods, and/or outcomes.***

The curriculum is governed by 14CFR Part 147 regulations. While our program meets the regulatory minimums, our program is not prevented from going above and beyond such minimums to satisfy the demands of rapid technological advancement that is characteristic in the industry.

Although the advisory committee typically meets with the department two times a year, the curriculum, defined by regulation, is not open to significant revision resulting from advisory committee input. The advisory committee assists with curriculum emphasis, instructional methods, equipment and tooling resources, and industry training opportunities for our staff.

Over the years, the advisory committee has helped us change the content emphasis in the areas of welding, fabric covering, and wood construction but all within our prescribed curriculum. Use of maintenance software is another area where the advisory committee input has been helpful.

FAA inspectors are invited to attend the Advisory committee meetings in an ex-officio capacity, and provide appropriate support and input.

### ***B. Degree and Certificate Outcomes:***

#### ***1. Identify and explain any changes that have been made to degree and certificate learning outcomes since the last program review*** ***<http://www.pcc.edu/resources/academic/degree-outcome/> .***

Revision to the Degree and Certificate Outcomes were proposed just this year as a follow through to the evaluation of Embedded Related Instruction within the AMT curriculum. Significant outcome changes were primarily in the form of better alignment of the course outcome wording, enhancing the clarity for outside evaluators.

Essential technical content has not changed since the last program review. Course technical content is governed by 14CFR Part 147 regulations and is only changed when initiated by the FAA.

#### ***2. What strategies are in place to assess degree and certificate outcomes?***

At the course level, course outcomes are defined for each course and also for the program. The expectation that students will become problem solvers, able to draw upon many sources and engage in a process of synthesis and analysis in their efforts to find solutions is basic in the AMT course of study and industry employment settings. The department continues to seek additional methods of providing feedback regarding accomplishment of student outcomes.

Some current methods of determining that students are meeting course outcomes include:

- Lab projects on aircraft and aviation equipment based upon the content and outcomes for each course that are evaluated by instructors, and documented in the student's progress records.
- Course final testing required by the FAA curriculum, with results also recorded in the students' progress records.
- At the practicum level, confirmation of competencies, and identification of weaknesses is accomplished in the Practicum portion of the program that is scheduled at the end of the program courses including the General courses and for each certification rating, Airframe and Powerplant. Deficiencies that have either persisted or developed since specific courses were taken, are identified and addressed through assigned work, including applicable hands-on projects, focused in the deficient areas.
- Successful completion of each course, accompanied by the instructor certification of specific competencies, provides documentation of outcomes being met.
- At the certification level, to receive FAA certification as Airframe and Powerplant Mechanics, our students must pass FAA written, as well as oral and practical, exams.

**3. *Give evidence that students are meeting these outcomes.***

Graduates of the AMT Program have, for the past several years, been achieving a near 100 percent pass rate on of the written tests required by the FAA for mechanic certification. This written test result information is available through the following web site, and is updated regularly: <http://av-info.faa.gov/atssn/>

**4. *Describe any changes made towards improving attainment of the degree and/or certificate outcomes.***

In 2008 the AMT Department changed the way it offers the Practicum courses. It used to offer two Practicum courses, Airframe and Powerplant. It now offers three practicum courses; General, Airframe and Powerplant. By adding a General Practicum course the material taught in the other General courses is tested in the General Practicum course while the students have just completed the General courses. This permits them to have the General course information more current in their memory, instead of about a year after taking the other General courses as it was before the change. The credit hours for the Practicum courses went from four to two credit hours. However, with the addition of General Practicum, the total Credit Hours for all three courses is now six. Additionally, the written test part of the Practicum courses is now done "on-line" and there is significantly more instructor one-on-one contact time for Oral/Practical assessment. Since this change is relatively new, the AMT Department is still evaluating the effectiveness of this change. This change should improve student retention and program outcome awareness.

***C. Review job placement data for students over the last five years, including salary information where available.***

Students completing the AMT Program are prepared to enter an industry with both local and global career opportunities. A Faculty conducted survey of local employers revealed the following.

**Companies with higher percentages of our graduates are:**

- Global Aviation, Hillsboro: 80% of their maintenance personnel are PCC AMT graduates.
- Horizon Air, Portland: Estimates are 40% to 50% of their maintenance personnel are PCC AMT graduates.
- Columbia Helicopters, Aurora: Approximately 50% of their maintenance personnel are PCC AMT graduates.
- Additionally, United Airlines, Flightcraft, Nike Flight Services, Hillsboro Aviation, and Aero Air are among the many operators that welcome the applications of our graduates.

Additionally, the following information was obtained from the United States Department of Labor, Bureau of Labor Statistics, Occupational Outlook Handbook, 2008-09 Edition, in relationship to Job Placement Data for the Aircraft Mechanics and Service Technicians Position:

“Aircraft and avionics equipment mechanics and service technicians held about 138,000 jobs in 2006; about 5 in 6 of these workers was an aircraft mechanic and service technician.

Employment of aircraft and avionics equipment mechanics and service technicians primarily is concentrated in a small number of industries. More than half of aircraft and avionics equipment mechanics and service technicians worked in air transportation and support activities for air transportation. Around 18 percent worked in aerospace product and parts manufacturing and about 16 percent worked for the Federal Government. Most of the rest worked for companies that operate their own planes to transport executives and cargo.

Most airline mechanics and service technicians work at major airports near large cities. Civilian mechanics employed by the U.S. Armed Forces work at military installations. Mechanics who work for aerospace manufacturing firms typically are located in California or in Washington State. Others work for the FAA, many at the facilities in Oklahoma City, Atlantic City, Wichita, or Washington, DC. Mechanics for independent repair shops work at airports in every part of the country.”

The Handbook went on to say the following concerning Salary Information for Aircraft Mechanics:

“Median hourly earnings of aircraft mechanics and service technicians were about \$22.95 in May 2006. The middle 50 percent earned between \$18.96 and \$28.12. The lowest 10 percent earned less than \$14.94, and the highest 10 percent earned more than \$34.51. Median hourly earnings in the industries employing the largest numbers of aircraft mechanics and service technicians in May 2006 were:

Scheduled air transportation	\$27.46
Nonscheduled air transportation	23.33
Federal Government	23.19
Aerospace product and parts manufacturing	21.58
Support activities for air transportation	19.57

Median hourly earnings of avionics technicians were about \$22.57 in May 2006. The middle 50 percent earned between \$19.02 and \$26.65. The lowest 10 percent earned less than \$15.65, and the highest 10 percent earned more than \$30.33.

Mechanics who work on jets for the major airlines generally earn more than those working on other aircraft. Those who graduate from an aviation maintenance technician school often earn higher starting salaries than individuals who receive training in the Armed Forces or on the job. Airline mechanics and their immediate families receive reduced-fare transportation on their own and most other airlines.

About 3 in 10 aircraft and avionics equipment mechanics and service technicians are members of unions or covered by union agreements. The principal unions are the International Association of Machinists and Aerospace Workers, and the Transport Workers Union of America. Some mechanics are represented by the International Brotherhood of Teamsters.”

***D. Forecast future employment opportunities for students.***

While it is rather difficult to forecast the destiny of air transport, in view of global instability, experience has shown that there is, there has been, and there will always be a shortage of A&P mechanics.

The following information was obtained from the United States Department of Labor, Bureau of Labor Statistics, Occupational Outlook Handbook, 2008-09 Edition, in relationship to Employment Opportunities for the Aircraft Mechanics and Service Technicians Position:

- “Most workers learn their jobs in 1 of about 170 schools certified by the Federal Aviation Administration (FAA).
- Job opportunities should be favorable for persons who have completed an aircraft mechanic training program, but keen competition is likely for jobs at major airlines, which offer the best pay and benefits.
- Job opportunities are likely to continue to be best at small commuter and regional airlines, at FAA repair stations, and in general aviation.”

The Handbook went on to say the following concerning Employment Opportunities for Aircraft Mechanics:

“Job growth for these mechanics and technicians is expected to be about as fast as the average for all occupations. Job opportunities should be favorable for people who have completed an aircraft mechanic training program, but keen competition is likely for jobs at major airlines.

**Employment change.** Employment is expected to increase by 10 percent during the 2006-16 period, about as fast as the average for all occupations. Passenger traffic is expected to increase as the result of an expanding economy and a growing population, and the need for aircraft mechanics and service technicians will grow accordingly.

**Job prospects.** Most job openings for aircraft mechanics through the year 2016 will stem from the need to replace the many mechanics expected to retire over the next decade. In addition, some mechanics will leave to work in related fields, such as automobile repair, as their skills are largely transferable to other maintenance and repair occupations.

Also contributing to favorable future job opportunities for mechanics is the long-term trend toward fewer students entering technical schools to learn skilled maintenance and repair trades. Many of the students who have the ability and aptitude to work on planes are choosing to go to college, work in computer-related fields, or go into other repair and maintenance occupations with better working conditions. If this trend continues, the supply of trained aviation mechanics may not keep up with the needs of the air transportation industry.

Job opportunities will continue to be the best at small commuter and regional airlines, at FAA repair stations, and in general aviation. Commuter and regional airlines is the fastest growing segment of the air transportation industry, but wages in these airlines tend to be lower than those in the major airlines, so they attract fewer job applicants. Also, some jobs will become available as experienced mechanics leave for higher paying jobs with the major airlines or transfer to other occupations. At the same time, general aviation aircraft are becoming increasingly sophisticated, boosting the demand for qualified mechanics. Mechanics will face more competition for jobs with large airlines because the high wages and travel benefits that these jobs offer generally attract more qualified applicants than there are openings. Also, there is an increasing trend for large airlines to outsource aircraft and avionics equipment mechanic jobs overseas; however, most airline companies prefer that aircraft maintenance be performed in the U.S. because overseas contractors may not comply with more stringent U.S. safety regulations.

In spite of these factors, job opportunities with the airlines are expected to be better than they have been in the past. But, in general, prospects will be best for applicants with experience. Mechanics who keep abreast of technological advances in electronics, composite materials, and other areas will be in greatest demand. Also, mechanics who are mobile and willing to relocate to smaller rural areas will have better job opportunities. The number of job openings for aircraft mechanics in the Federal Government should decline as the Government increasingly contracts out service and repair functions to private repair companies.”

Based upon a Feb 2003 survey update from ATEC, data from A&P schools like ours is revealing that there are at least 3 openings for every graduate of an A&P school. ATEC, Aviation Technician Education Council, is a national organization representing 84% of FAA certificated A&P schools in the US.

“With many Vietnam War-era mechanics nearing retirement, there’s a growing need for maintenance technicians in the U.S. aviation industry.” – Jeffrey Leib, The Denver Post, March 12, 2000.

“There is a huge shortage of mechanics in the airline industry. It has almost come to a crisis situation.” – Debbie Heath, director of the A&P mechanics department at Fox Valley Tech, Oshkosh, Wisconsin, quoted in a story by Brian Sharkey, *The Business Journal* (Milwaukee), October 13, 2000.

***E. Analyze any barriers to degree or certificate completion that your students face, and consider the reason that students may leave before completion.***

Studies on this subject reveal that the above barriers have to do in part with being prepared for program participation. Since the program has implemented entry level prerequisites, it expects and is experiencing improvement in the retention rate. The lack of preparation issue is expected to diminish in time.

In addition to the above, we have identified other barrier issues including finances, time management skills, study habits/skills, intensity of program content, etc.

Being aware of these issues over a significant period of time, we have implemented remedies, and continue to seek opportunities to create solutions. Examples include an AMT Faculty-funded scholarship program, changes in the daily schedule to an earlier dismissal, thereby accommodating afternoon employment situations, greater AMT Faculty-contributed availability of Shop Practice course opportunities, etc.

## ***Section 7: Recommendations for program improvement***

### ***A. Assess the strengths in your program/discipline.***

Fifteen unique program strengths are listed in detail in Appendix A

### ***B. Identify the areas in need of improvement.***

Areas needing improvement include:

1. Lab Technicians: The AMT department needs two part-time lab technicians. The first one is needed to support the repair and maintenance of our tools and training aids. This is especially needed because of the increased student retention in our program. The second part-time lab technician is needed to support the tool counter during the afternoon practicum classes (AMT108, AMT216, and AMT225). These practicum classes have more student enrollment than can be supported by the instructors.

2. Internships: Securing internships for AMT students with local or regional aviation maintenance services providers has been a continual challenge for the AMT program. It is difficult for companies to place our students into “real” shop positions where those students can actually perform maintenance. Companies must assure that the products they place on their aircraft have been scrupulously inspected to insure reliability. This then places a significant burden on a hosting company to assure that the intern is continually supervised while performing maintenance.

We would like to make a concerted effort to work with local or regional aviation industry partners to affect the establishment of at least two continuing student internships of one term duration each, by the end of academic year 2011-2012. We will work with the appropriate PCC programs to help establish this. We also feel that additional, non-traditional assistance from PCC administration and college legal resources might need to be involved to creatively address liability concerns.

3. Industry Interface: There has been on the part of the AMT program, over the past several years, an overall weakness in connectedness with the local and regional aviation industry. This weakness is not just in the conducting of Advisory Committee meetings, but in all aspects of mutual consultation and interface. This lack of connection has been due to factors on both sides. From the industry perspective, the global aviation industry has been affected by the severe economic recession. From the department perspective, there has been a change in faculty leadership with associated spool-up time. There have also been significant college requirements associated with accreditation, program review and GCAC China partnership.

The AMT Faculty Department Chair will be making a concerted effort with the AMT staff, in this academic year, to assist key industry representatives in the re-establishment the industry Advisory Committee, following the revised guidelines Advisory Committee Guidelines. Further, this effort will also assist in renewing the AMT program connectedness with our local and regional industry partners.

4. Turbofan powered Aircraft: This would supplement our turbofan powered aircraft curriculum so that students could see, and perform projects on an actual turbofan aircraft.
5. Overhead crane: This would provide the ability to remove and move engines throughout the hangar. Right now the only way to do this is with the mobile engine hoists.
6. Both turbine and reciprocating engine run stands: This would make it possible for students to perform run-ups on turboprops and reciprocating engines on run stands. Many Part 147 schools have the PT-6 turboprop on engine run stands to provide the ability for students to perform turboprop run-ups as part of their curriculum.
7. Office furniture: The AMT Department needs new office furniture. The office furniture in the office is all from property disposal.

**C. Given the above analysis and other findings of the SAC,**

1. ***Prepare a set of recommendations relevant to areas such as curriculum and professional development, access and success for students, obtaining needed resources, and being responsive to community needs.***

***Curriculum Support:***

New FAA and industry emphasis on transport category aircraft, electronics/avionics, equipment, NDT, and composites will require significant additional resources as these changes are implemented. The program lacks necessary storage areas at the hangar to store and provide common, identifiable storage for course training aids.

***Professional Development:***

Training opportunities for both full time and adjunct faculty need to be made available for factory schools, industry courses, conventions, and other professional development events. This includes FAA regulatory and other industry changes. These training experiences are essential to provide maximum utilization of faculty talent throughout the program. The need exists to increase the use of local industry provided opportunities for professional development. Instructors within the program continue to solicit and receive grant and funding for training opportunities. Limitations also continue to arise in releasing faculty through substitutes. The AMT faculty is developing a long-term plan for taking advantage of professional development opportunities, local and national.

***Access and Success for Students:***

The Department's web-site helps with recruitment. We continue collaboration with the Aviation Science Program at conventions, fairs, and other recruiting activities. The Department does have a marketing plan that needs to be revisited and discussed. Some "action" items are needed in the area of recruitment such as another mailing to the military bases. A budget needs to be developed for the marketing plan "action" items. We already take advantage of some workforce training opportunities, but need to do more of this, such as the Employment Skills Training Certificates.

Student retention improved through program identification of appropriate placement testing. The department continues to monitor completion rates and retention issues. Student success

needs to be evaluated based upon repeat rates on a course-by-course basis. We also need to evaluate how effectively each course is preparing students for success in future courses.

**Obtaining Needed Resources:**

The Department is always ready to take advantage of any resources and donations made available to it. We continue to seek donations industry. The program still needs on-going equipment maintenance requirements, lab technicians, and replacement equipment. Some of these equipment needs are an overhead crane, turbofan powered aircraft, tooling, both turbine and reciprocating engine run stands, office furniture, etc.

**Being Responsive to Community Needs:**

Local Aviation Community

Our advisory committee continues to keep us apprised of what our program needs are for improvement, change, and the local aviation community needs. Local Fixed Based Operators (FBO”S) continue to hire our graduates. An increase in industry contact would be beneficial to the program. The program needs to identify what it expects to achieve from its industry contacts.

Regional Aviation Community

Students completing the program are finding employment with regional air carriers and other operators within the region.

National/International Aviation Community

Many of our students find employment with the national and international air carriers. The program continues the inclusion of Transport Category Aircraft technology into the curriculum.

Local Residents

We meet a need of the local community by providing the only local opportunity for FAA Part 147 school training with the consequent opportunity for A&P Mechanic certification. We need to continue to evaluate as to how we can best meet this need and get the word out to the community about the programs availability.

**2. *For recommendations that require additional funding , please identify those that are of greatest importance to the SAC***

1. Lab Technicians
2. Turbofan powered aircraft
3. Overhead crane
4. Both turbine and reciprocating engine run stands
5. Office furniture

## APPENDIX A

### PROGRAM STRENGTHS

#### Certification:

FAA approved Part 147 School certificated since 1969.

#### Approved:

Approved by the Veterans Administration

#### Accredited:

Approved by the State Division of Vocational Education

#### Reputation:

Thousands of students have completed the program over the years and are working for local, national, and international employers.

#### Local and world-wide career opportunities:

Some local companies that hire our students are: Global Aviation, 80% of their maintenance personnel are PCC AMT graduates. Horizon Air, estimates are between 40% to 50% of their maintenance personnel are PCC AMT graduates. Columbia Helicopters, approximately 50% of their maintenance personnel are PCC AMT graduates. Additionally, United Airlines, Flightcraft, Aero Air are among the operators that await graduation of our students with great anticipation. Our Aviation Advisory Committee has told us at a recent meeting that our graduates are meeting their expectations and are very employable.

#### Facilities:

The program is housed in a 26,000 square foot, two-hangar complex. The facility includes five classroom/lab spaces, eight shops, complete tool room, and a computer resource center.

#### Faculty/Experience:

There are four A&P certificated instructors, two of which are Designated Mechanic Examiners, (DME's), and four hold Inspection Authorizations (IA). Several instructors have pilot experience and hold up to Certified Flight Instructor Certificates.

#### Cost:

As of January, 2011, the total cost of the AMT Program is under \$11,000, approximately 1/3 that of many other AMT programs.

#### Aircraft:

Sixteen aircraft (including five helicopters) used exclusively for maintenance training.

#### Equipment:

Partial list includes sixteen Allison 250 turbine engines, eight turbojet J-34 engines, and twenty Lycoming O-290 reciprocating engines.

Timely:

FAA A&P Mechanic Certification possible in 22-23 months.

Fulltime:

Focused 90-hour, 18 day modules. This follows the industry model of fulltime instruction (approximately 8 hours/day). Attend classes 5 hours/day, 5 days/week providing the optimum use of the students' time. No distractions, all instruction is geared towards the same goal.

Degree Possible:

Associate of Applied Science degree available

Possible transfer to 4-year Aviation/Industrial Management degree programs

Unique Availability:

PCC's AMT Program is the only complete AMT program available in the Portland area. Consequently, it serves close to 900,000 residents in a five-county, 1,500 square mile area in northwest Oregon. As a matter of fact, the nearest complete AMT Program south of PCC is Lane Community College in Eugene (approximately 110 miles). PCC and LCC are the only two complete AMT programs in Oregon. The nearest one north of PCC is Clover Park Vocational Technical Institute, Tacoma, Washington, (approximately 130 miles).

Student Services Available:

Student Services available including Financial Aid and Job Placement

## APPENDIX B

### Mapping Level Indicators:

1. Not Applicable.
2. Limited demonstration or application of knowledge and skills.
3. Basic demonstration and application of knowledge and skills.
4. Demonstrated comprehension and is able to apply essential knowledge and skills.
5. Demonstrates thorough, effective and/or sophisticated application of knowledge and skills.

### Core Outcomes:

1. Communication.
2. Community and Environmental Responsibility.
3. Critical Thinking and Problem Solving.
4. Cultural Awareness.
5. Professional Competence.
6. Self-Reflection.

Course #	Course Name	CO1	CO2	CO3	CO4	CO5	CO6
AMT 101	Intro to Airframe & Powerplant	2	1	2	0	0	0
AMT 102	Aircraft Electricity I	3	1	4	1	4	4
AMT 105	Aviation CFRs & Related Subjects	3	1	4	1	4	4
AMT 106	Aircraft Applied Science	3	1	4	1	4	4
AMT 107	Materials and Processes	3	2	4	1	4	4
AMT 109	Assembly & Rigging	3	1	4	1	4	4
AMT 115	Aircraft Structures & Inspection	3	1	4	1	4	4
AMT 117	Reciprocating Engine Theory & Maintenance	3	2	4	1	4	4
AMT 120	Propellers & Engine Installation	3	2	4	1	4	4
AMT 121	Turbine Engine Theory & Maintenance	3	2	4	1	4	4
AMT 123	Ignition Systems	3	2	4	1	4	4
AMT 124	Fuel Metering Systems	3	2	4	1	4	4
AMT 203	Aircraft Electricity II	3	1	4	1	4	4
AMT 204	Aircraft Electricity III	3	1	4	1	4	4
AMT 208	Aircraft Systems	3	2	4	1	4	4
AMT 211	Composite Structures	3	2	4	1	4	4
AMT 212	Sheet Metal	3	1	4	1	4	4
AMT 213	Hydraulic, Pneumatics & Landing Gear	3	2	4	1	4	4
AMT 214	Instruments, Comm & Nav Systems	3	1	4	1	4	4
AMT 216	AMT Practicum / Airframe	3	2	4	1	4	4
AMT 218	Powerplant Inspection	3	2	4	1	4	4
AMT 219	Turbine Engine Overhaul	3	2	4	1	4	4
AMT 222	Reciprocating Engine Overhaul	3	2	4	1	4	4
AMT 225	AMT Practicum / Powerplant	3	2	4	1	4	4

Updated August 2010

## **Appendix C**

### **AMT - Aviation Maintenance Technology Outcomes**

#### **AAS: Aviation Maintenance Technology**

- Make independent and accurate airworthiness judgments in the process of inspecting and maintaining aircraft structures and powerplants in accordance with applicable airworthiness requirements.
- Develop and implement a plan for aircraft maintenance action based on research and understanding of appropriate maintenance and inspection data.
- Troubleshoot aircraft structures, powerplants and their associated systems with a discerning recognition of the specific malfunction within the scope of the overall aircraft and associated systems and accomplish the correct maintenance action that will allow approval for return to service of the affected items.
- Develop and act upon a personal attitude and plan of "Safety Awareness" and compliance that includes one's self, ones' co-workers, the work area, and the aircraft.
- Satisfy the FAA required competencies for completing the required written, oral and practical exams for the Airframe and Powerplant ratings of the FAA Mechanic certificate.
- Integrate airframe and powerplant knowledge to create adaptable solutions to evolving problems satisfying the greater aviation maintenance industry need.
- Be prepared to transfer to a college or university for upper level studies in aviation or industrial management. 1.2010

#### **Two-Year Certificate: Aviation Maintenance Technology**

- Make independent and accurate airworthiness judgments in the process of inspecting and maintaining aircraft structures and powerplants in accordance with applicable airworthiness requirements.
- Develop and implement a plan for aircraft maintenance action based on research and understanding of appropriate maintenance and inspection data.
- Troubleshoot aircraft structures, powerplants and their associated systems with a discerning recognition of the specific malfunction within the scope of the overall aircraft and associated systems and accomplish the correct maintenance action that will allow approval for return to service of the affected items.
- Develop and act upon a personal attitude and plan of "Safety Awareness" and compliance that includes one's self, ones' co-workers, the work area, and the aircraft.
- Satisfy the FAA required competencies for completing the required written, oral and practical exams for the Airframe and Powerplant ratings of the FAA Mechanic certificate.
- Integrate airframe and powerplant knowledge to create adaptable solutions to evolving problems satisfying the greater aviation maintenance industry need. 1.2010

### **One-Year Certificate: Aviation Maintenance Technology - Airframe**

- Make independent and accurate airworthiness judgments in the process of inspecting and maintaining airframe structures and associated systems in accordance with applicable airworthiness requirements.
- Develop and implement a plan for airframe or system maintenance action based on research and understanding of appropriate maintenance and inspection data.
- Troubleshoot airframe or associated system problems with a discerning recognition of the specific malfunction within the scope of the overall aircraft and associated systems and accomplish the correct maintenance action that will allow approval for return to service of the affected items.
- Develop and act upon a personal attitude and plan of "Safety Awareness" and compliance that includes one's self, ones' co-workers, the work area, and the aircraft.
- Satisfy the FAA required competencies for completing the required written, oral and practical exams for the airframe rating of the FAA Mechanic certificate. 1.2010

### **One-Year Certificate: Aviation Maintenance Technology - Powerplant**

- Make independent and accurate airworthiness judgments in the process of inspecting and maintaining aircraft powerplants in accordance with applicable airworthiness requirements.
- Develop and implement a plan of powerplant maintenance action based on research and understanding of appropriate maintenance and inspection data.
- Troubleshoot powerplant problems with a discerning recognition of the specific malfunction within the scope of the larger engine and associated systems and accomplish the correct maintenance action that will allow approval for return to service of the affected items.
- Develop and act upon a personal attitude and plan of "Safety Awareness" and compliance that includes one's self, ones' co-workers, the work area, and the aircraft.
- Satisfy the FAA required competencies for completing the required written, oral and practical exams for the powerplant rating of the FAA Mechanic certificate. 1.2010

## **Appendix D**

### **Course Outcome Examples:**

#### **AMT 102 – Electricity I**

1. Identify and apply the factors affecting voltage, resistance and current to aircraft electrical circuits.
2. Identify and use common electrical symbols during the basic analysis of basic electrical circuits.
3. Identify and apply by measurement or mathematical calculation the values of power, voltage, current and resistance in aircraft electrical circuits.
4. Identify and apply the use of magnetism and electromagnetism during the analysis of basic aircraft electrical circuits.
5. Identify and apply basic strategies for the use of electrical test or monitoring instruments during the testing, monitoring and troubleshooting of basic aircraft electrical circuits.

#### **AMT 115 – Aircraft Structures and Inspection**

1. Inspect, and make independent airworthiness judgments of aircraft structures based on the knowledge of applicable airworthiness requirements and airframe stresses.
2. Identify and implement a strategy for accurate and timely maintenance research.
3. Identify and implement record keeping strategies that are intelligible, accurate, and in compliance with applicable regulations.
4. Communicate effectively with employers, co-workers and costumers in a professional manner.

#### **AMT 213 – Hydraulics, Pneumatics and Landing Gear**

1. Identify and apply the principles of function and safe operation of aircraft landing gear, hydraulic and pneumatic systems and their components when operating and maintaining aircraft.
2. Inspect and safely perform maintenance and troubleshooting on aircraft landing gear, hydraulic and pneumatic systems and their components, in accordance with the manufacturer's service manuals, and acceptable industry practices and applicable regulations.
3. Identify and apply basic theory and computation skills regarding hydraulic and pneumatic power as they relate to landing gear and various aircraft structure mechanical advantage devices.

## **Appendix E**

### **VISION**

Building futures for our Students and Communities

### **MISSION**

Portland Community College provides access to an affordable, quality education in an atmosphere that encourages the full realization of each individual's potential. The college offers opportunities for academic, professional, and personal growth to students of all ages, races, cultures, economic levels, and previous educational experiences.

### **WHO WE ARE**

Portland Community College is a public, multi-campus, comprehensive community college serving the lifelong learning needs of our students. We offer college transfer programs; professional technical education programs; adult basic skills; opportunities to develop English as a second language; high school completion and dual credit; community and continuing education programs; and service-learning opportunities that foster the development of civic responsibility and engagement. Through extensive partnerships with business, industry, labor, educational institutions and the public sector, we provide training and learning opportunities for the local and state workforce and promote economic and community development.

### **STATEMENT OF VALUES**

- Quality, lifelong learning experiences that helps students to achieve their personal and professional goals
- An environment that is committed to diversity as well as the dignity and worth of the individual
- Continuous professional and personal growth of our employees and students
- Effective teaching and student development programs that prepare students for their roles as citizens in a democratic society in a rapidly changing global economy
- Academic Freedom and Responsibility - creating a safe environment where competing beliefs and ideas can be openly discussed and debated
- Sustainable use of our resources
- Collaboration predicated upon a foundation of mutual trust and support
- An agile learning environment that is responsive to the changing educational needs of our students and the communities we serve
- Accountability based upon an outcomes-based approach in education
- The public's trust by effective and ethical use of public and private resources

### **GOALS**

Goal 1 – **Access:** We will improve access to quality lifelong learning opportunities through the effective use of technology, affordable classes and the strategic location of facilities.

Goal 2 – **Student Success:** We will promote success for all students through outstanding teaching, student development programs, and support services in all that we do;

- Professional technical education will be responsive to industry needs and prepare students to work in a global marketplace.
- Transfer preparation will prepare students for success in obtaining baccalaureate degrees.
- College readiness will promote student preparation for college-level programs and employment.
- Community education/continuing education will provide quality education to enrich students personally, socially, culturally, and to upgrade occupational/job skills.

Goal 3 – **Diversity:** We will enrich the educational experience by committing to the development of diversity in our student body, faculty and staff.

Goal 4 – **Continuous Improvement:** We will develop, safeguard and allocate our resources (human, financial, capital, and technological) to ensure through planning and assessment the delivery of relevant, quality programs and services.

Goal 5 – **Cultivating Partnerships:** We will effectively respond to the educational needs of our students and communities through strategic alliances with business, government agencies and educational institutions.

Goal 6 – **Community:** We will facilitate growth and development of our district communities by accepting a leadership role and serving as a key educational resource to the community.

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***CODE OF ETHICS***  
**for**  
**AVIATION MAINTENANCE**  
**TECHNICIANS**

As a certificated technician I have a responsibility to the United States, its government, and to its citizens. My performance is a public service. I must ensure that I perform my work according to the highest principles of ethical conduct so that all citizens will have confidence in my integrity. The responsibility I accept demands that I exercise my best judgment on the airworthiness of aircraft and equipment. I shall never knowingly subject others to unnecessary risks as the lives and safety of others are dependent upon my skill and judgment.

As a certificated technician I am aware that it is very difficult to possess the knowledge and skills for all aspects of aviation maintenance. I pledge that I will never undertake or approve actions for which I am not authorized or which I believe to be beyond the limits of my knowledge and skill. Furthermore I shall never allow any other person to influence me to act contrary to my best judgment nor to persuade me to approve any aircraft or equipment as airworthy when there is any doubt in my mind.

I therefore pledge that I shall hold in sacred trust the privileges and limitations conferred upon me as a certificated technician, and I pledge unyielding adherence to these principles.

**adopted by the Aviation Maintenance Department  
of Portland Community College, 1996**

## **Appendix G**

### **AMT Instructor Qualifications**

#### **Education:**

An AMT Instructor will hold at least an Associate of Applied Science in Aviation Maintenance Technology or other vehicle service field and a valid FAA Mechanic certificate with both Airframe and Powerplant ratings.

#### **Experience:**

An AMT instructor must present valid evidence of a minimum of five years recent experience exercising the privileges of both the Airframe and Powerplant mechanic ratings. Five years' experience teaching at the college level or aviation maintenance training department or a combination of experience may be substituted, year for year, for recent aviation mechanic experience.

#### **Related Instruction:**

An AMT instructor presenting valid evidence of a minimum of five years' experience exercising the privileges of an Airframe and Powerplant mechanic, or an appropriately related aviation industry, qualifies to teach the Related Instruction content regarding Computation, Communication, and Human Relations.

#### **Part time Instructors:**

An AMT Instructor presenting a valid certificate with a single rating will be limited to teaching only the subject material related to that rating. AMT Instructor education and experience still apply appropriately to the single rating.

Submitted by AMT SAC in Spring 2010