



Portland Community College



## *Aviation Maintenance Technology*

### PROPELLERS & ENGINE INSTALLATION

#### AMT 120

#### COURSE SYLLABUS

<b><u>INSTRUCTOR:</u></b>	Gilbert Bynoe	Term/Year: _____
		Credits: 4
Office:	Rock Creek Campus Building 6, Room 108	CRN _____
Office Hours:	During breaks, before class or after class.	Class Time: 7:00 am - 12:00 pm
Mailing Address:	Portland Community College P.O. Box 19000 Portland, OR 97219-0990	Building/Classroom: _____
Telephone:	Voice Mail: 971-722-7030; Division Office: 971-722-7246	Add/Drop Date: Within first 4 days
E-Mail:	gbynoe@pcc.edu	
C.C.O.G.:	<a href="http://www.pcc.edu/ccog/default.cfm?fa=course&amp;subject=AMT">http://www.pcc.edu/ccog/default.cfm?fa=course&amp;subject=AMT</a>	
Instructor Page & Syllabus:	<a href="http://www.pcc.edu/staff/index.cfm/299.html">http://www.pcc.edu/staff/index.cfm/299.html</a>	
Department Website:	<a href="http://pcc.edu/academ/amtpages">pcc.edu/academ/amtpages</a>	
Add/drop/withdraw deadlines for the term are at:	<a href="http://www.pcc.edu/registration/dropping.html">http://www.pcc.edu/registration/dropping.html</a>	

**REQUIRED MATERIALS:** You must have all "**Required Materials**" in class every day

**Texts:** A & P Technician Powerplant Textbook with Workbook  
*Jeppesen Sanderson, Inc JS312794-000*

Aircraft Powerplants Seventh Edition  
*Kroes, Wild Glencoe 0-07-723155-2*

Aircraft Inspection, Repair, and Alteration Handbook  
**AC 43.13-1B & AC 43.13-2A**

Aircraft Propeller Maintenance (Now in Student Packet)

**AC 20-37E:** Also available as a downloadable PDF file from:

[http://www.faa.gov/regulations\\_policies/](http://www.faa.gov/regulations_policies/)

(Click on Advisory Circulars in left hand column, then click on **Current** Advisory Circulars, type in: AC 20-37E, open the AC, click on the PDF icon, print PDF)

Vibration and Fatigue, Evaluation of Airplane Propellers (Now in Student Packet)

**AC 20-66A:** Use the same procedure as stated for the AC 20-37E to download PDF file.

FAR AMT Handbook for Aviation Maintenance Technicians  
**ASA-09-FAR-AMT**

Aviation Mechanic Powerplant - Practical Test Standards  
**AMT-PTS, FAA-S-8081-28**

**Other:** Complete AMT Tool Box  
Propellers & Engine Installation Student Packet (Bookstore)  
Scantron Form No. 882-ES (for final exam) (Bookstore)

## **INSTRUCTIONAL APPROACH:**

This includes lecture, discussion, demonstration, student interaction and lab projects supported by visual aids and note-taking opportunity. Feel free to ask questions, make observations and share your experiences related to the subject. Raise your hand to be recognized so as not to interrupt the lesson. Your involvement is critical to the success of this class. You have the right to disagree with what is being taught, I just request the courtesy of you being able to support your position with an acceptable reference. It's okay to get up and move about the room, just try not to disturb others. Please let me know if you cannot hear me and I will try to talk louder.

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## **NONHARASSMENT POLICY:**

The college's goal is to provide an atmosphere that encourages individuals to realize their potential. Under the college policy harassing or discriminatory behaviors will not be tolerated.

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## **EVALUATION & FINAL GRADE:**

**PCC Grading Guidelines are available at:** <http://www.pcc.edu/resources/academic/standards-practices/AcademicStandardsandPractices-GradingGuidelines.html>]

Percentage grades shall be awarded in the following categories:

<b><u>CATEGORY</u></b>	<b><u>WEIGHT OF GRADE</u></b>
1. Subject Area Test Average	25%
2. Final Examination (70% minimum to pass class with "D" or higher)	25%
3. Projects (Shop Average, 70% minimum to pass class with "D" or higher)	25%
4. Participation Grade (See below)	25%

The Participation Grade (category #4) is based on a scale of 0-100%. The items that are evaluated include all aspects of student participation, (see page 5). Some examples include: homework completed on time, teamwork, cooperation, academic integrity, staying awake, punctuality, quality and quantity of work, professionalism, (professionalism is defined on the second page of your Project Instruction & Information Sheets). Compliance with all applicable college policies, Code of Conduct, including the AMT Accident Prevention manual are also part of this grade. Video notes must be turned-in for each video shown. The amount missing video notes reduces this grade depends on how many videos were shown. Attendance is also part of this grade and is determined by the following: 99-100% attendance = 10 points, 95-99% attendance = 5 points, 90-95% attendance = 0 points. The more time you are here, the more opportunity there is for you to learn the material. You can miss up to 0.8 hours before affecting your grade, and a maximum of 10% before failing the class. You are required to do all your own work unless the instructor authorizes collaboration. Failure to do so will result in a failing grade for the test and a Final Average reduction of 10%. PCC Academic Integrity Policy is at: <http://www.pcc.edu/about/policy/student-rights/student-rights.pdf#academic-integrity>

PCC Student Code of Conduct can be found at: [www.pcc.edu/about/policy/student-rights/](http://www.pcc.edu/about/policy/student-rights/)

Each category, #1 through #4 is worth 25% of your Final Grade and will be based on a scale of 0-100%. All grades earned in categories #1 and #3 will be averaged. Then the totals of each category will be averaged together thereby resulting in the Final Percentage Grade. The Final Percentage Grade will be converted to a Letter Grade based on the following:

Percentage Grade to Letter Grade:	92-100%	= A
	84-91%	= B
	76-83%	= C
	70-75%	= D (Failing Grade for FAA Certification purposes)
	Below 70%	= F

**SUBJECT AREA READING ASSIGNMENTS:**

Reading assignments will be assigned by subject area as the class progresses. The course content and requirements may be adjusted in response to institutional, weather or class situations as needed, with adequate notice to students. These references are provided so you can both study for up-coming lessons, and review for tests and exams. Remember, material presented in lecture always takes precedence over material covered in texts so it is imperative for you to take good notes in class.

The following are the reading assignments broken down by Subject Areas:

	<u>Date Due</u>	<u>Test Date</u>
<b>PROPELLERS</b>	_____	_____
<u>Powerplant Textbook; Jeppesen:</u> Chapter 12, pages 12-1 through 12-35		
<u>Aircraft Powerplants; Glencoe:</u> Chapter 19, pages 537 through 562	Principles & Theory	_____
<u>Aviation Mechanic Powerplant - Practical Test Standards:</u> Pages 5-11 & 5-12		
<u>Federal Aviation Regulations, AMT Handbook</u>		
Part 23.905 Propellers	Adjustable/Controllable-Pitch	_____
Part 23.907 Propeller vibration		
Part 23.925 Propeller clearance		
Part 23.1027 Propeller feathering system		
Part 23.1149 Propeller speed and pitch controls		
Part 23.1153 Propeller feathering controls		
<b>AUXILIARY PROPELLER SYSTEMS</b>	_____	_____
<u>Powerplant Textbook; Jeppesen:</u> Chapter 12, pages 12-51 through 12-56		
<u>Aircraft Powerplants; Glencoe:</u> Chapter 19, pages 562 through 567		
<b>PROPELLER INSPECTION, MAINTENANCE, AND INSTALLATION</b>	_____	_____
<u>Powerplant Textbook; Jeppesen:</u> Chapter 12, pages 12-57 through 12-78		
<u>Aircraft Powerplants; Glencoe:</u> Chapter 21, pages 601 through 632		
<u>Aircraft Inspection, Repair, and Alteration Handbook; AC 43.13-1B</u>		
Chapter 8, Section 4, 5, and 6, PROPELLERS		
<u>Aircraft Propeller Maintenance; AC 20-37E:</u> Pages 1-31		
<u>Vibration and Fatigue, Evaluation of Airplane Propellers, AC 20-66A:</u>		
Pages 1-22		
<u>Federal Aviation Regulations, AMT Handbook</u>		
Part 65.81 General privileges and limitations		
Part 65.87 Powerplant rating; additional privileges		
Part 43, Appendix A: Major/Minor repairs/alterations		
Part 43, Appendix D: Scope of items on 100 Hour or Annual		
<b>ENGINE REMOVAL AND INSTALLATION</b>	_____	_____
<u>Powerplant Textbook; Jeppesen:</u>		
Chapter 2, Section B, pages 2-25 thru 2-32 ENGINE REMOVAL		
Chapter 2, Section B, pages 2-54 thru 2-60 ENGINE INSTALLATION		
<b>TURBOPROP PROPELLERS</b>	_____	_____
<u>Powerplant Textbook; Jeppesen:</u> Chapter 12, pages 12-36 through 12-50		
<u>Aircraft Powerplants; Glencoe:</u> Chapter 20, pages 569 through 600		

**Final Exam Date:** \_\_\_\_\_

## **SPECIAL ACCOMMODATIONS:**

Students who have a documented disability and require a classroom adjustment or accommodation should contact the Office for Students with Disabilities at 971-722-7550 or <http://www.pcc.edu/resources/disability/> and provide the OSD Approved Academic Accommodation to the Instructor.

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## **STUDENT SUCCESS:**

The Community College exists to help you to be a success, so if there is anything at all I can do to help you, please let me know. The College has a vast number of resources that are available to you as a student to help you succeed. Please refer to the Student Services section of the PCC Schedule for a list of these resources.

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**EMERGENCY PROCEDURES:** if appropriate; call 911 and/or Public Safety at x4444 (dial 9 to get out first)

Fire: Activate Fire Alarm, use fire extinguisher if trained to do so and fire is small, and proceed to Safe Assembly Area.

Large Fuel Spill: Evacuate hangar and proceed to Safe Assembly Area.

Earthquake: If indoors --Drop, Cover, and Hold. If outdoors--move to open area.

Active Shooter: If in your building, exit building immediately if safe to do so, (do **not** pull fire alarm). If in another building (alarm sounds): Secure, Conceal and Cover, (close doors, turn off lights, shut window blinds, and stay low).

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## **NOTES:**

1. Due to the critical nature of the material covered, see the instructor if you miss the first day of class. You are responsible for all information provided on the first day, or other missed days. The FAA requires that all missed material; including required lab projects be made up to take the Final Exam, or pass the class. Nothing may be made-up after the last day of class. You must be here on the last day and take the Final Exam with the class.
2. Some projects that you fail to perform correctly may have to be retaken on the next lab day. This is to ensure you remember how to properly perform the project and have retained the skill.
3. It is the student's responsibility to make arrangements with the instructor for him to determine how the missed material will be made-up. Each project that is completed late, which is either past the Due Date or during clean-up, will cause your Final Average to be reduced by 5 points for each one.
4. Subject Area Tests will usually be given first thing in the morning. Tests that are missed will count as a "0" against your Subject Area Test average. You can make-up missed tests due to absence, but they will only count 50% of what you earn on the make-up test. You are encouraged to be on time for class, just as you should be on time for an employer. As you know, if you are not on the "Time Clock," you cannot receive credit for being here.
5. You must place your timecard in the classroom timecard rack after punching in. Write the class ending date on your timecard. You may not punch another student's card. Only instructors may make hand-written entries on timecards.
6. To pass the class with a "D" or higher you must achieve a 70% minimum on the Final Exam and Shop Average.
7. Food and drinks are permitted in the classroom during class. However, food may be consumed only during breaks. For health and safety reasons no food or drinks are permitted in the shop/lab or hangar areas. As you know, PCC is a tobacco free college.
8. Cell phones must be either turned off, or on vibrate. Do not use phone in class.
9. You can miss no more than 10% of the course time for FAA Certification purposes. Make-up time for hours missed beyond 10% must be; authorized by the instructor, supervised, content related, and can't exceed 3 hours.
10. Compliance with all appropriate safety precautions is required, including those found in the Aviation Maintenance Technology Accident Prevention Manual. Cleanup will be done on the last day of class. Either not participating in clean-up or Safety Infractions will cause your Total Average to be reduced by 10%.

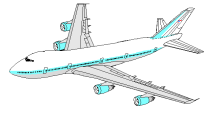
# Participation Grade

	<b><u>CRITERIA COMPLETELY MET</u></b> (10 Points each)	<b><u>CRITERIA MOSTLY MET:</u></b> <b>MINOR IMPROVEMENT NEEDED</b> (5 Points each)	<b><u>CRITERIA PARTIALLY MET:</u></b> <b>MORE IMPROVEMENT NEEDED</b> (2 Points each)	<b><u>CRITERIA NOT SUFFICIENTLY MET:</u></b> <b>MAJOR IMPROVEMENT NEEDED</b> (0 Points each)	<b>POINTS EARNED</b>
Required <u>Materials</u> in class every day					
All <u>Homework</u> completed on-time					
<u>Teamwork</u> in Classroom & Shop					
<u>Cooperation/Participation</u> Sleeping: Once= 5 points, twice= 2 points, 3 times= 0 points.					
<u>Punctuality</u> , not late from breaks. Late once = 5 points, late twice= 2 pts, late 3 times= 0 pts.					
* <u>Attendance</u> (see note below)					
<u>Quality &amp; Quantity</u> of Work					
<u>Professionalism</u> in Classroom & Shop					
Compliance with college <u>Policies/Regulations</u> and <u>Code of Conduct</u>					
<u>Safe Worker</u>					
<b>TOTAL POINTS EARNED</b> (100 possible)					

\***Attendance:** The Attendance Grade is determined by the following: 99-100% attendance = 10 points, 95-99% attendance = 5 points, 90-95% attendance = 0 points.

**Video Notes:** Must be turned-in for each video shown. The amount missing video notes reduces the Participation Grade depends on how many videos were shown.

3/30/11



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## **For Effective Team Building**

- Students must see themselves as positively interdependent so that they take a personal responsibility for working to achieve group goals.
- Students must engage in considerable face-to-face interaction in which they help each other, share resources, give constructive feedback to each other, challenge other members' reasoning and ideas, keep an open mind, act in a trustworthy manner, and promote a feeling of safety.
- Effective group process skills are necessary for the first two to prevail.

## **Characteristics Of A Good Team**

- **A clear purpose**: The team has a clear purpose or mission that is accepted by all members.
- **Relaxed**: The team is relaxed and informal, with no obvious tension among members.
- **Participation**: There is a lot of discussion between members, and everyone participates in decisions and/or activities.
- **Listening**: Each team member actively listens to one another.
- **Disagreement**: Team members are comfortable enough to disagree with one another if the situation calls for it.
- **Openness**: There is full and open communication with no hidden agendas.
- **Clear Expectations**: There are clear expectations about the roles each member plays in the team, and work assignments are fairly distributed.
- **Shared Leadership**: Although there may be a formal team coordinator, each team member may share leadership responsibilities, as the situation arises.
- **Relations with others**: The team maintains credibility and good relations with others who may be outside the formal team but who can still affect its functioning.
- **Team maintenance**: Team members not only focus on their primary goal but also spend time recognizing and maintaining the functions of the team itself.



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## Airworthiness Determination

By Gil Bynoe

The need for the student to develop the skill to make **Individual Airworthiness Determinations** cannot be overstated. To do this you will find yourself being asked often if something is airworthy or not. In this industry, and consequently here in this program, this is not a committee decision, or group, or even a team of specialists decision. The **Return To Service** is an **Individual** Airworthiness Determination, just as it implies. That's why we will endeavor to develop these skills in you as an individual. In an organization, the responsibility for Airworthiness lies with the Director of Maintenance, but making Airworthiness Determinations lies with each individual A&P. During your routine maintenance you will find yourself making these decisions many times a day as you work on and around aircraft and discover new discrepancies. Airworthiness is determined when the aircraft, (or aircraft part) meets the following two criteria:

1. **You have determined that the aircraft (or aircraft part) conforms to a type design for which there is a type certificate, and**
2. **It is in a condition for safe operation.**

The variables in reaching this decision are numerous. The **type certificate** for instance is a list of design specifications, all of which must be in compliance. The **condition for safe operation** may include being in compliance with the Service Manual, Airworthiness Directives, Service Bulletins, and Service letters, to name just a few. This process may not always lend itself to contemporary collaborative and cooperative learning techniques.

There are 45 subject areas that must be covered in 25 classes. This means that you will be attending class full time and that the intensity of each subject will sometimes seem high. This focused classroom instruction format is not unlike the industry model where factory schools go eight hours a day with classroom instruction, and then have lab-time after the subject-matter has been covered in lecture. This is the same format Boeing, and most other manufacturers use in their company schools that the airlines send their mechanics to. This is also the same format that the airlines themselves typically use in their own Mechanic Training Programs.

For someone entering an industry-style classroom learning environment for the first time, it may be somewhat overwhelming. However, our experience has indicated many times over that this is the most effective way to present this amount of information, and to develop **Airworthiness Determination** skills. There usually isn't enough time for discussion groups, or other less traditional means of teaching, when you have the amount of information that we have to provide you with.

Incidentally, we have had many students come up to us during, and after completion of the Program and confess that they finally feel like someone is taking the actual time necessary to teach them what they need to know, instead of telling them to "look it up, and learn it for themselves." We hope you will also feel this way when you are done with the AMT Program, and we're confident that you will become comfortable with making **Individual Airworthiness Determinations**.



Portland Community College



## Aviation Maintenance Technology

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### LAB PROJECT SUCCESS

#### VERBAL PASS DOWN

It is a good idea to write down the verbal pass down the instructor provides you with prior to going out to the shop. You will receive both a verbal and detailed (step-by-step) written pass down for most of the projects on the Project Sheet (Pink Sheet) in the classroom prior to going out to the hangar. In addition, for many complex projects, you will receive a demo in the classroom. If there are 20 required projects on the Pink Sheet, and 20 students in the class, and the instructor was to explain each project twice to each student instead of just once, then he is explaining all the Projects 400 times. (20 projects times 20 students). I do not mind doing that at all, I will re-explain projects to you an unlimited number of times, however, then, you will discover that you do not have an instructor available to sign-off your projects because I will be explaining to everyone multiple times how to do the projects. That is why I refer you to the “written” instructions in the Project Booklet. The reality is, that out in the industry, the supervisor will give you a pass down on what aircraft to work on, and will talk to several mechanics at the same time, and give several aircraft assignments, and expect the A&P to write down the pass down and not come back to the supervisor every few minutes and ask for the pass down again. We are trying to prepare you for the work place.

#### PROJECT ASSESSMENT

On all graded projects the FAA minimum passing grade of 70% is required. On all non-graded projects you must successfully perform all required projects to take the final exam. If you do not pass a non-graded project, you may redo the project until you pass it. However, the big limiting factor is time.

#### BE PREPARED FOR PROJECT SIGN-OFFS

Have your Pink Sheet ready and initialed. Have your Project Instruction work-sheets filled-in if appropriate. Have your printed-out copies of your references highlighted or otherwise annotated for all your research projects if applicable. Have all your safety-wire and cotter pins installed if applicable. This will speed-up the Project Assessment process enormously, and free up the instructor to work with other students, (including you).

#### DEADLINES

The purpose of Project Deadlines is all time management. The instructor assigns deadlines for certain projects so that the class will be done with having those projects assessed by the instructor to enable the instructor to be free to work with the students on a different set of projects that cannot be graded at the same time due to time constraints. In other words, everything cannot be graded on the last day of class, there is not enough time. Each project that is completed late, which is either past the Due Date or during clean-up, will cause your **Final Average** to be reduced by **5 points** for each one. This is to help you to stay on task and to not fall behind on your projects.

#### ACCOUNTABILITY

As you know, we are in an extremely accountable industry. For obvious reasons, if we are not held accountable for our actions, an accident could be the result. That accident may result in the loss of a few lives, if it is a propeller aircraft. If the accident is a commercial transport, it could result in the loss of a few hundred lives.