DEVELOPMENT OF STANDARDS FOR THE DELIVERY OF AVIATION MAINTENANCE TECHNICIAN CERTIFICATION USING DISTANCE LEARNING TECHNOLOGY

Charles W. White
Aviation Technical Training & Consulting

Michael J. Kroes
Purdue University

Jean Watson
Federal Aviation Administration
Flight Standards Service
Aircraft Maintenance Division

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EXECUTIVE SUMMARY

The demand for AMT technicians has grown steadily during the past decade. This increased demand is predicted to continue for several years with demand outpacing supply. After experiencing a 45% enrollment decline over the past decade, AMT technician enrollment has reversed direction and is showing slight increases. This enrollment increase is generally attributed to the current high industry demand for technicians. However, in order to meet forecasted industry manpower projections, enrollments will need to increase significantly over current levels during the next ten years. Add to this increase the older, employed technicians seeking skills enhancement, and the demand for technical education may be greater than schools can accommodate under existing campus-based models.

Today's AMT technician requires more skills than ever before. The ability to check, repair, and troubleshoot sophisticated aircraft systems is critical, but so are communication skills, computer skills, and a broad understanding of the aviation industry. Finding students with those varied interests will require looking beyond traditional recruiting strategies. Many programs are working hard to find ways to attract non-traditional and minority students into AMT education.

For many years, the efficiency and effectiveness of the knowledge delivery has remained unchanged. By regulatory interpretation, AMT training has been limited to the use of traditional delivery methods. This may be contributing to the decline of persons entering the field of aviation maintenance.

Technology can improve access to educational opportunities by removing barriers facing learners. Common barriers include location, time, and access. For many, educational opportunities are lost or constrained because the "expert" is not accessible at the same time or in the same location as the learner. Through distance education, many of these barriers can be removed.

Distance Education is defined, for the purposes of this report, as a formal learning activity that occurs when students and instructors are separated by geographic distance or by time, often supported by communications technology such as computers, the Internet, television, or videotape.

The authors reviewed all common and accepted distance education methodologies and determined that Internet-based technology holds the best opportunity for consistent high quality educational experience of a broad spectrum of subject matter and allows for the efficient monitoring of course content by FAA personnel.

Current aviation maintenance technician training regulations were not written to specifically include distance education yet; there is no language that precludes distance learning methods from being incorporated into the typical AMT training program. Federal Aviation Regulations (FAR) Section 147.21 requires that an Aviation Maintenance Technician School have an approved curriculum. The curriculum requirement does not specify the method of presentation. In approved curriculum areas, Internet-based learning would be substituted for traditional classroom instruction. While there are no restrictions on Internet-based learning, there are several sections of FAR Part 147 that would need to be addressed in the school's approved curriculum. This report identifies these sections and provides a reasonable method for addressing these issues.

An additional complicating factor in the incorporation of distance learning into an AMT training program is geographic boundaries. Traditionally FAR Part 147 certificated programs have a fixed student attendance location. A program completely located within a FSDO geographic boundary provides for easy program surveillance. Issues of permission and oversight must be addressed for institutions considering offering distance education courses in another FAA district or region. This report addresses these issues and provides a recommended procedure for the approval of a distance learning delivered course to insure standardization on a national level.

While it is recognized that there are several regulatory and procedural details to be complied with, the overriding principle in the approval of a distance education proposal should be that the level of instruction and evaluation to be utilized will provide the student with knowledge and skills equivalent to the level of proficiency as defined in 14CFR FAR Part 147. Distance education does not provide for teaching items to levels less than that shown in the approved curriculum.

While Internet-based distance learning can provide a quality educational experience, there are many requirements within the AMT curriculum that are best presented using traditional classroom and lab/hands-on based instruction. This report specifies which 14CFR FAR Part147 subject matter items can and cannot be taught using distance learning.

In an increasingly cost-conscious educational environment, it is easy to think of aviation maintenance as an expensive out-dated program to be judged simply by monetary cost and declining enrollments without regard to the great technological and employment opportunities that lie ahead. The future of AMT education will belong to those educational programs that can attract and train students in a cost effective manner. The 21st century educational breakthroughs will come from creative educators who can implement recent technological advances into AMT training.

1.0 INTRODUCTION

The Increasing Need for Aviation Technical Education

Throughout the aviation industry a highly trained technical workforce is seen as the key to economic growth and safety. There is no question that aviation maintenance education will continue to be a competitive differentiator among nation's air transportation systems. The importance of aviation maintenance education will continue to grow as aircraft become more complex and automated. For the U.S. air transport industry to remain economically competitive, aviation maintenance technician (AMT) education is a critical resource.

The demand for AMT technicians has grown steadily during the past decade. This increased demand is predicted to continue for several years with demand outpacing supply. After experiencing a 45% enrollment decline over the past decade, AMT technician enrollment has reversed direction and is showing slight increases. This enrollment increase is generally attributed to the current high industry demand for technicians. However, in order to meet forecasted industry manpower projections, enrollments will need to increase significantly over current levels during the next ten years. Add to this increase the older, employed technicians seeking skills enhancement, and the demand for technical education may be greater than schools can accommodate under existing campus-based models.

Aviation maintenance training programs take great pride in delivering high quality education at a relatively low cost to the student and industry. However, for many years the efficiency and effectiveness of the knowledge delivery has remained unchanged. By regulatory interpretation, AMT training has been limited to the use of traditional delivery methods. This may be contributing to the decline of persons entering the field of aviation maintenance. High school students typically cannot obtain aviation training until graduation, unlike other careers such as automotive maintenance, which provide introductory training to high school students in a manner consistent with high school scheduling requirements. This early introduction into the automotive industry creates interest and motivates students to seek automotive careers. Distance education would allow high school students or individuals who are currently employed in other fields to explore and begin the education process necessary to obtain an A&P certificate. Authorized distance learning would also provide military personnel who have not fulfilled all of the experience requirements for the A&P to complete additional AMT training prior to discharge allowing for a faster, more efficient transition into civilian careers.

The competition to recruit people to work in the various technical careers has never been greater. It is essential for the future of aviation maintenance that all possible tools including distance education be utilized to expand the number of students exploring aviation maintenance as a possible career choice. The Internet offers tremendous possibilities for providing learning beyond the walls of the classroom or campus.

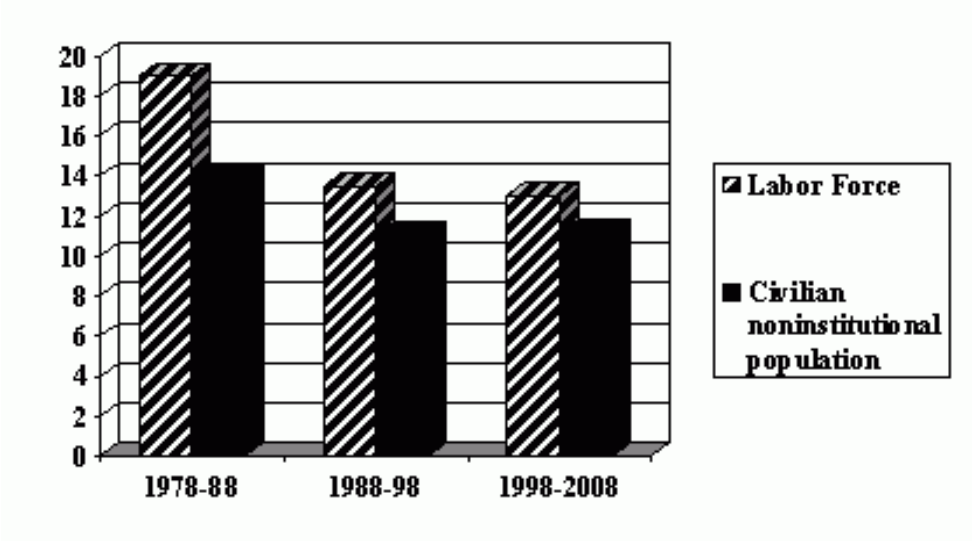
1.1 Population Demographics

Population trends affect aviation maintenance employment opportunities in a number of ways. Changes in population influence the demand for goods and services. For example, a growing and aging population has increased the demand for health services and transportation. Equally important, population changes produce corresponding changes in the size and demographic composition of the labor force.

The U.S. population is expected to increase 23 million over the 1998-2008 period, at roughly the same rate of growth as during the 1988-98 period but much slower than over the 1978-88 period (chart 1). Continued growth will mean more consumers of goods and services, spurring demand for workers in a wide range of occupations and industries. The effects of population growth in various occupations will differ. The differences are partially accounted for by the age distribution of the future population.

Chart 1. **Population and labor force growth – 1978-88, 1988-98, and projected 1998-2008**

Percent change



The youth population, ages 16 to 24, is expected to increase as a share for the first time since the 1970s. Overall, the 25 to 54 age group is expected to decrease as a share of the population. Within this group, however, the 45 and over age group will grow the fastest, increasing from 26.6 to 30 percent over the 1998-2008 period.

Minorities and immigrants will constitute a larger share of the U.S. population in 2008 than they do today. Substantial increases in the Hispanic, African-American, and Asian populations are forecasted, reflecting high birth rates as well as a continued flow of immigrants.

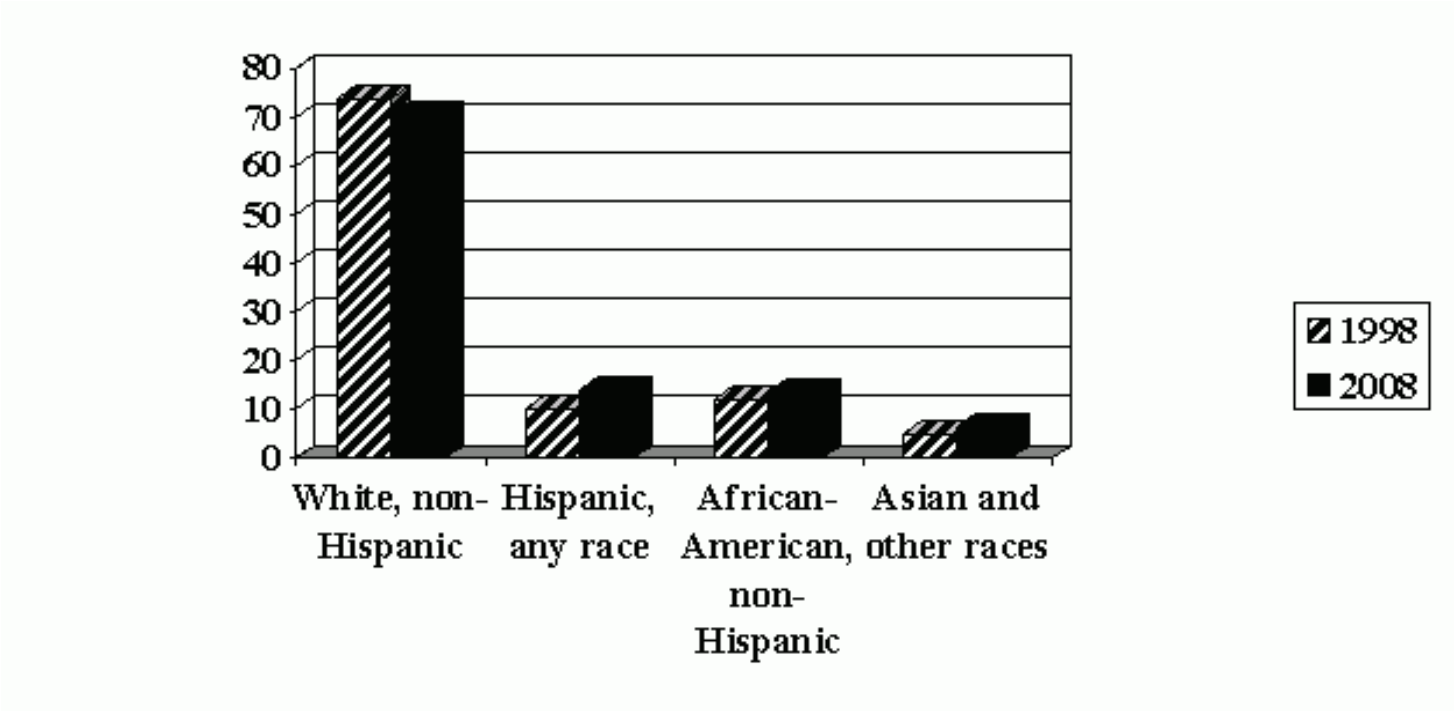
1.2 Labor Force

Population is the single most important factor in determining the size and composition of the labor force—comprised of people who are either working or looking for work. The civilian labor force is expected to increase by 17 million, or 12 percent, to 154.6 million over the 1998-2008 period. This increase is almost the same as the 13 percent increase during the 1988-98 period but much less than the 19 percent increase during the 1978-88 period.

The U.S. workforce will become more diverse by 2008. White, non-Hispanic persons will make up a decreasing share of the labor force, from 73.9 to 70.7 percent. Hispanics, non-Hispanic African-Americans, Asians, and other racial groups are projected to comprise an increasing share of the labor force by 2008, 10.4 to 12.7 percent, 11.6 to 12.4 percent, and 4.6 to 5.7 percent, respectively (chart 2). However, despite relatively slow growth, the white non-Hispanics will have the largest numerical growth in the labor force between 1998 and 2008, reflecting the large size of this group.

Chart 2. **Percent of labor force by race and ethnic origin, 1998 and Projected 2008**

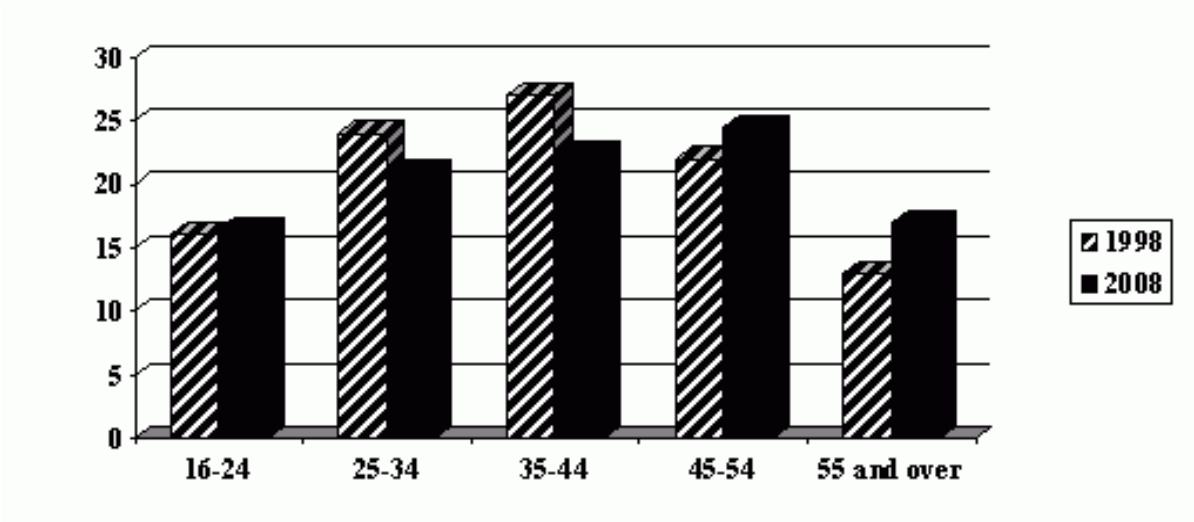
Percent



The youth labor force, ages 16 to 24, is expected to slightly increase its share of the labor force to 16 percent in 2008, growing more rapidly than the overall labor force for the first time in 25 years. The large group of workers 25 to 44 years old, who comprised 51 percent of the labor force in 1998, is projected to decline to 44 percent of the labor force by 2008. Workers 45 and older, on the other hand, are projected to increase from 33 to 40 percent of the labor force between 1998 and 2008, due to the aging baby-boom generation (chart 3).

Chart 3. Percent of labor force by age group, 1998 And Projected 2008

Percent



1.3 Projected Airline Maintenance Employment

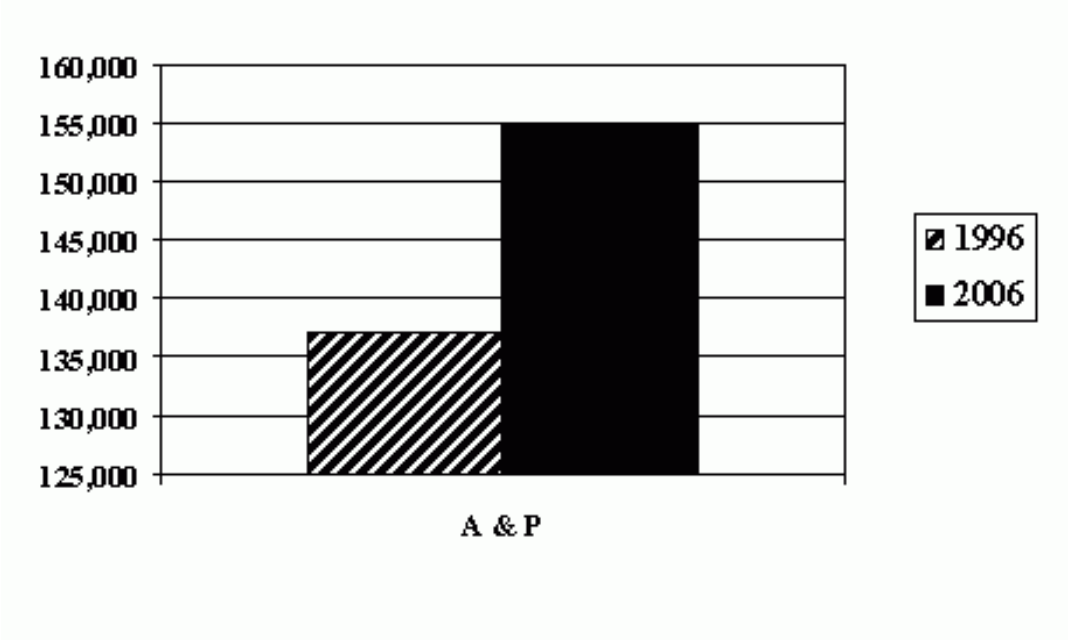
The inadequate number of aircraft mechanics and avionics technicians in the U.S. is predicted to worsen in the years ahead and threatens to jeopardize both aviation industry expansion and safety.

Statistics compiled by the U.S. Labor Department indicate that at least 12,000 new airframe and powerplant mechanics (A&P) will be needed in the years ahead to keep pace with forecast expansion and to compensate for the retirement of experienced technicians, creating a projected annual deficit of about 4,000 mechanics. By 2006, the industry will require about 155,000 mechanics, up 13% from the current workforce.

During the 10-year period from 1988-97, the number of A&P licenses issued fell to 10,694 from 14,907, a 28% decrease, according to the FAA. This decrease, when coupled with an aviation industry annual growth rate of 7%, may seriously impact the future of the air transportation system.

Projected Need

Source: NATA



1.4 Challenges to AMT Education

In an increasingly cost-conscious educational environment, it is easy to think of aviation maintenance as an expensive out-dated program to be judged simply by monetary cost and declining enrollments without regard to the great technological and employment opportunities that lie ahead. The future of AMT education will belong to those educational programs that can attract and train students in a cost effective manner. The 21st century educational breakthroughs will come from creative educators who can implement recent technological advances into AMT training.

A career as an AMT technician requires more skills than ever before. The ability to check, repair, and troubleshoot sophisticated aircraft systems is critical, but so are communication skills, computer skills, and a broader understanding of the aviation industry. Finding students with those varied interests will require looking beyond traditional recruiting strategies. Many programs are working hard to find ways to attract non-traditional and minority students into AMT education. Distance learning will provide an additional tool that educators can use to recruit and train future technicians.

Few would argue the past success of AMT education in the United States; however, many are calling for significant changes in its current content and organization. Calls for change come from among AMT training providers as well as from the aviation industry.

Among the issues accelerating the pressure for change in AMT education are:

- Student recruitment challenges multiply as students shop for competitive starting salaries in other career paths.

- Declining federal and state government funding for publicly supported programs has forced faculty, staff, and program reductions.

- Tuition increases have spiraled out of control. While the cost of living in the United States increased 80 percent since 1980, tuition costs increased 300 percent. Students and parents have reached the limits of their ability to pay.

- Changing demographics predict a greater percentage of "non-traditional" and minority students in the future, many of who will need special services and remedial education in order to be successful in AMT education.

- High fixed costs of providing quality AMT education (e.g., high equipment costs and small class sizes) give programs a hefty bill to pay regardless of the number of students they attract and retain.

2.0 DISTANCE EDUCATION

In a broad sense, technology can improve access to educational opportunities by removing barriers facing learners. Common barriers include location, time, and access. For many, educational opportunities are lost or constrained because the "expert" is not accessible at the same time or in the same location as the learner. Through distance learning many of these barriers can be removed.

Time is a common barrier for many learners. The course an individual would like to take is not always offered at a time that it is possible to take it. A variety of technologies can help make the classroom less of a place and more of a state of mind by enabling interaction 24 hours a day. The utilization of distance-learning technology allows us to minimize location space, time, and access barriers. A number of institutions in a wide variety of academic disciplines have pursued distance education programs because of the potential to improve educational opportunities to geographically remote students and non-traditional students.

Distance Education is defined, for the purposes of this report, as a formal learning activity that occurs when students and instructors are separated by geographic distance or by time, often supported by communications technology such as computers, the Internet, television, or videotape.

The "distance" in the term doesn't imply any particular degree of separation. A distance learner may be located only across campus from the instructor, or can be thousands of miles away. Whatever the physical space between the student and instructor, they are connected to each other by video, voice, or computer technologies.

Distance learning is not a new concept. Today's distance learning programs are descendants of the correspondence courses that were first offered early in the 20th century and are still available today. Correspondence courses rely on written course materials sent through the mail, while most distance education courses now use computer technology to deliver some or all of the course materials and to communicate with the instructor.

The technologies used in distance learning have evolved rapidly. Radio was used to deliver education at a distance in the first half of the 20th century, and in the 1950s, local educational television stations developed. In the 1980s videotape and satellite broadcasting technologies were developed. In the 1990s, computer and multimedia technologies have become the latest telecommunications media used in distance learning. Distance learning technologies are developing at a rapidly increasing rate. It is important that any guidelines developed for distance education be written in such a manner that future distance learning technologies can be adapted to them.

There are two basic ways of thinking about distance learning. The terms synchronous communication and asynchronous communication explain the essential differences by defining the extent to which a course is bounded by place and/or time.

Synchronous communication is communication in which all parties participate at the same time. Synchronous communication in distance learning emphasizes a simultaneous group learning experience. Teachers and students communicate in "real time," usually via interactive audio – or videoconferencing from a classroom to one or more remote classrooms. If a course uses synchronous conferencing communication, attendance must be at a specified time and in a specified place.

Synchronous communication may also be thought of as an extended classroom. Media used for synchronous delivery include interactive audio and video, audio-graphics, and some GroupWare applications, such as online "chat rooms" in which students communicate via the computer at the same time but from different places.

Asynchronous communication is communication in which parties participate at different times. Asynchronous communication offers a choice of where and, above all, when access learning will take place. In a class using asynchronous communication, learning can take place at any chosen time and place. Web-based courses belong to this category, as do videotapes, and correspondence courses. In an asynchronous course, the instructor usually posts, on the Internet, the lesson materials and assignments for the course. Viewing or reading of these materials may be done at the student's convenience. After completing the assigned activities, the completed work may be sent to the instructor for evaluation. Asynchronous learning is particularly suited to classes that emphasize individual learning such as AMT education.

2.1 History of Distance Learning in AMT Education

Internet based training and a Federal Aviation Regulation curriculum is currently being offered at the University of Alaska Fairbanks (UAF). On April 27, 1998, the Federal Aviation Administration gave approval for a University of Alaska Fairbanks course on Federal Aviation Regulations to be offered on the Internet. This approval came after a six-month coordinated effort of the Fairbanks Flight Standards District Office and the Airworthiness Systems and Air Agencies Branch, FAA National Headquarters in Washington DC. Since this time, UAF has developed four FAA approved Internet courses.

3.0 DISTANCE LEARNING TECHNOLOGY

Over the years, several different technologies have been used in distance education. Recent advances of Internet technology have greatly increased the awareness and possibilities of on-line learning. The technologies used in distance learning are enablers. They are only tools, not the real point of distance learning. The technology that is most appropriate for one course or one student may be totally unsuitable for another.

Following is a list of many of the currently used technologies in distance education.

Telephone

- Audio conferencing enables participants at multiple sites to use telephones to communicate with each other.
- Audio graphics uses a combination of voice and data communications. Students can speak with the instructor and students at other sites and, via computer, can view graphics and pictures developed by the instructor. In addition, students may also be able to use an electronic pen and tablet to mark on the visuals, as on a board in a regular classroom.

Video

- Telecourses are taped or live television programs carried by broadcast or cable television stations. A study guide for each course provides direction and assignments to students.
- Videotapes are videos recorded during a class period or tapes reproduced especially for a distance learning class. They can be viewed later by a student via TV and videocassette recorder (VCR) at home.
- One-way video systems equip two or more locations with cameras, monitors, and microphones, enabling those at the origin site and those in off-site classrooms to see and hear each other.

Computer

- Stand-alone computer-based programs deliver self-paced instruction via CD-ROM, diskette, or connection to a local area or wide area network.
- Internet-based education requires a student to have a computer connected to the Internet. Recent applications have increased the interactivity of the Web and created collaborative virtual workspaces for student-student and student-instructor interactivity.
- Electronic mail (e-mail) enables instructors and students to communicate quickly across time and distance by typing messages to each other.
- Computer conferencing can be set up either as real-time "chat" spaces so that participants can interact at the same time or as systems that do not require participants to be present at the same time.
- GroupWare packages create an "electronic work space" for collaborative efforts and group processes.

In evaluating all of the currently available technologies for distance learning, it is apparent that Internet-based instruction offers some significant advantages over other methods for AMT education. Some of these include:

- Providing asynchronous communication.
- Currently available technology offers a wide range of resources and instructional tools.
- Required technology available to the students at an affordable price.
- Easy revision of course material.
- Generic courses may be readily modified to facilitate meeting specific program objectives.
- Instructor / Student communication is readily available.
- Instructor monitoring of student progress.

4.0 ISSUES RELATED TO DEVELOPING DISTANCE EDUCATION COURSES

4.1 FAA Regulations

Current 14CFR FAR Part 147 regulations were not written to specifically include distance education. Federal Aviation Regulations (FAR) Section 147.21 requires that an Aviation Maintenance Technician School have an approved curriculum. The curriculum requirement does not specify the method of presentation. In approved curriculum areas Internet-based learning would be substituted for traditional classroom instruction. While there are no restrictions on Internet-learning, there are several sections of FAR Part 147 that would need to be addressed in the school's approved curriculum.

An additional complicating factor of distance learning is geographic boundaries. Traditionally, FAR Part 147 certificated programs have a fixed student attendance location. A program completely located within a FSDO geographic boundary provides for easy program surveillance. Issues of permission and oversight must be addressed for institutions considering offering distance education courses in another FAA district or region.

While it is recognized that there are several regulatory details to be complied with, the overriding principle in the approval of a distance education proposal should be, if it can be, demonstrated that the level of instruction and evaluation to be utilized will provide the student with knowledge and skills equivalent to the level of proficiency as defined in 14CFR FAR Part 147. Distance education does not provide for teaching items to levels less than that shown in the approved curriculum.

It is paramount when evaluating a course to be delivered using distance learning, that a student's level of competency in the knowledge and skills as set forth in the appropriate FAR Part 147 appendices is met.

While no rule change is required for implementation of distance learning, there are sections of a school's approved curriculum that would require revision and approval prior to implementation. Following is a table specifying the sections of FAR 147 to be addressed when providing distance learning.

PARAGRAPH	TITLE	EFFECT
FAR 147.1	Applicability	NONE
FAR 147.3	Certificate Required	NONE
FAR 147.5	Application and Issue	147.5 (a) (1) Courses to be delivered by distance education methods should be clearly identified. 147.5 (a) (2) Hardware and software specifications for distance learning courses must be listed. 147.5 (a)(3) Instructors authorized to provide courses through distance learning will be designated. 147.5 (a)(4) The maximum number of students enrolled in traditional distance learning courses will be listed separately.
FAR 147.7	Duration of Certificates	NONE
FAR 147.11	Ratings	NONE
FAR 147.13	Facilities, Equipment, and Material Requirements	NONE
FAR 147.15	Space Requirements	NONE
FAR 147.17	Instructional Equipment Requirements	The AMT provider must detail the required computer hardware, software, and internet access necessary to successfully conduct the listed distance learning courses.

FAR 147.19	Materials, Special Tools, and Shop Equipment Requirements	NONE
FAR 147.21	General Curriculum Requirements	Compliance with FAR 147.21 as it pertains to distance learning will need to address the following items: A description of the course content and a listing of specific student course requirements. A breakdown of the number of hours to be replaced in the approved traditional curriculum. A specified limit on the number of students enrolled in a class. A system and methods to be used for timely and appropriate interaction between students and instructor(s). A description of how the distance education class is administered. A specification on the calendar time allowed to complete the course.
FAR 147.23	Instructor Requirements	A statement as to the selection, qualifications and intended usage of the test proctor.
FAR 147.31	Attendance and Enrollment, Tests and Credit for Prior Instruction or Experience	NONE
FAR 14.33	Records	A description of distance learning attendance and academic recordkeeping procedures should be provided.
FAR 147.35	Transcripts and Graduation Certificates	NONE
FAR 147.36	Maintenance of Instructor Requirements	Distance learning classes are exempt from meeting the student –teacher ratio of 25 to 1.
FAR 147.37	Maintenance of Facilities, Equipment, and Material	The AMT provider must detail the required computer hardware, software, and internet access necessary to successfully conduct the listed distance learning courses.
FAR 147.38	Maintenance of Curriculum Requirements	An AMT training provider may not offer a course utilizing distance-learning methodology without prior FAA approval.
FAR 147.38a	Quality of Instruction	NONE
FAR 147.39	Display of Certificate	NONE
FAR 147.41	Change of Location	NONE

FAR 147.43	Inspection	A description of the methods of how distance learning courses and testing may be monitored by the FAA will be included.
FAR 147.45	Advertising	NONE
FAR 147 Appendix A	Curriculum Requirements	NONE
FAR 147 Appendices B, C, D	General Curriculum Subjects, Airframe Curriculum Subjects, Powerplant Subjects	NONE

4.2 Course Development

Computer technology is always evolving. In order to develop courses to meet educational requirements, many considerations need to be addressed when planning an on-line learning program. These include clearly defined learning objectives, technology to be utilized, and certification requirements.

Transferring a course from a traditional classroom format to an e-learning platform is a formidable task. Many programs and most instructors do not have the time nor expertise to develop and offer Internet instruction without significant technical assistance. Fortunately, several commercial products are available that can provide assistance. Companies commonly referred to as “application service providers” allow instructors to create and manage courses without learning HTML. Commonly provide features include:

- Personal information management tools
- Course content management tools
- Course communication and collaboration tools
- Assessment tools
- Academic Web resources
- Course management tools
- System management tools

4.3 Cost

The ultimate success or failure of most Internet learning initiatives is dependent on the ability to allocate proper resources to the development and implementation of the program. Institutions must be willing to invest money for technology infrastructures including hardware and software, support networks, access fees, linking fees, and supplementary services for marketing, registration and testing. While distance education has the potential to reduce long-term educational costs, the initial implementation does carry a substantial burden in developmental expenses. Initially, distance education costs more to deliver than traditional learning. Distance education does have an economy of scale. Once developed and implemented, additional students may be added at minimal expense.

Because of the high initial development costs, collaboration between AMT providers will be essential for the successful and widespread adoption of Internet-based training. Most AMT curriculum areas suitable for Internet instruction are fairly generic in content and are not dependent on laboratory specific equipment. Internet training readily lends itself to jointly developed courses that may be later modified to meet program specific objectives. Many of the past distance education failures may be attributed to the "one-size-fits-all" approach that did not provide a method for individual programs to tailor the content to meet specific program requirements. The successful implementation of distance education requires that the host AMT provider take "ownership" of the distance-education component.

4.4 Faculty – Student Interaction Outside Class

Distance education is designed to allow the student to work on his or her own with the written guidance provided in the program. However, a concern often expressed about distance learning is the lack of student - instructor interaction. Online classes may offer many ways for students and instructors to communicate. Instructors can set up a variety of computer-based methods for communication such as: E-mail; chat rooms: bulletin boards and FAQ lists. A reliable method of student - instructor communication must be considered an essential component of any distance-learning proposal.

4.5 Student Evaluation and Course Quality Control

One of the greatest challenges for distance learning is student evaluation. Distance education has been most readily implemented in situations where evaluation is not an essential part of the instructional program. This will not be the case in FAR Part 147 programs where both student and course evaluation is a key component of the FAA approved curriculum.

Student evaluation is the single most limiting factor in the utilization of distance learning. The integrity of the examination process is fundamental to distance learning because it provides the only supervised check of the student's knowledge and capability.

Classes taught via distance learning technologies face a special problem when it comes to evaluating the student's work. The issue of exam integrity is a difficult one when everyone is working on a computer at home. There is no easy way to guarantee that the work submitted online is really the work of the enrolled student. A number of online security systems have been developed, which require every user to log on with a user name and a password. However, even these systems cannot ensure that the only person in the room is the enrolled student. To be fair to all students in the course, an instructor must make sure that the person whose work is being evaluated is actually the one enrolled in the class. One way to handle this is to require everyone to come to campus for a comprehensive summative examination. This may be unfair, or impractical, especially if the students in the course are widely dispersed. An alternative method that has proven to work satisfactorily is to have the colleges appoint off-site proctors to check the identity of students and administer the tests. While future technological advances may provide additional options for student evaluation, the most reliable option currently available requires the physical presence of a proctor to provide for the proper student identification and monitoring.

The program designates proctors with the following guidelines in mind. Proctors should be education officials at a university, community college or private school site, other government or community officials, or, if such persons are unavailable, other people approved in advance by the institution. Relatives or individuals that have any association with the student cannot be proctors. Students must submit identification documents to the examination proctor. Written examinations will typically be sent to the proctor in sealed envelopes with instructions for supervising the exam process or available via a web-based file secured with a password that will only be available to the proctor. To insure the integrity of the testing process, it is important that, upon request, proctored exams be open to FAA surveillance.

Written, oral and practical exams are recognized parts of the FAA technician certification process. These same testing components have a place in the distance learning evaluation process. Depending on the material being examined, any combination of these methods may be required to assess the student's learning. All exams are conducted in the presence of a proctor.

- Written exams are used to test a student's knowledge of a subject. Written exams may be conducted via computer or by a paper copy that has previously been mailed to the proctor. Generally, written exams are conducted without the aid of reference material.

- Oral exams are effective in assessing if a student's learning has progressed beyond basic knowledge and the student possesses a comprehension of the material. These exams can be conducted by telephone with the class instructor.

- Practical exams may be necessary to assess the student's ability to apply the knowledge in a practical manner. The practical exam may be conducted via computer or with other written materials previously sent to the proctor. Practical exams generally allow for the student to have access to learning resource materials.

5.0 RECOMMENDED GUIDELINES FOR THE DEVELOPMENT OF DISTANCE LEARNING COURSES

Introduction

Distance education is not suitable for teaching certain aspects of the subject matter listed in an AMT curriculum. It is primarily suited for, but not restricted to, subjects in the general portion of the curriculum and theory portions of the airframe and powerplant curriculum. Some subject matter may be totally taught using distance education. Subjects that have been typically taught using only lecture or lecture and paper laboratory assignments are suitable for distance learning. Where appropriate, a program may design a course that would combine lecture material presented utilizing distance education with an on-campus session(s) to cover required laboratory material.
After a review of the subject material detailed in 14CFR FAR Part 147 Appendix B, C, & D and balancing other programmatic requirements, 400 hours of an approved curriculum requirements, delivered in the traditional manner, is believed to be a reasonable limit for distance learning.

5.1 Curriculum Subjects Eligible for Distance Delivery

Following is a listing of FAR Part 147 Appendix B, C, & D curriculum subjects. This table may be used for identifying those subjects that are suitable for distance delivery. **A maximum total of 400 hours of the approved curriculum may be delivered with distance education.**

FAR PART 147 APPENDIX B - GENERAL CURRICULUM SUBJECTS

A. BASIC ELECTRICITY

Teaching Level	Subject Item	Distance Learning Applicability
2	Calculate and measure capacitance and inductance.	This subject item well suited for delivery using distance learning instruction.

2	Calculate and measure electrical power.	This subject item well suited for delivery using distance learning instruction.
3	Measure voltage, current, resistance, and continuity.	This subject item well suited for delivery using distance learning instruction.
3	Determine the relationship of voltage, current, and resistance in electrical circuits.	This subject item well suited for delivery using distance learning instruction.
3	Read and interpret aircraft electrical circuit diagrams, including solid state devices and logic functions.	This subject item well suited for delivery using distance learning instruction.
3	Inspect and service batteries.	This subject item is NOT suited for delivery using distance learning instruction.

B. AIRCRAFT DRAWINGS

Teaching Level	Subject Item	Distance Learning Applicability
3	Use aircraft drawings, symbols, and system schematics.	This subject item well suited for delivery using distance learning instruction.
3	Draw sketches of repairs and alterations.	This subject item well suited for delivery using distance learning instruction.
3	Use blueprint information.	This subject item well suited for delivery using distance learning instruction.
3	Use graphs and charts.	This subject item well suited for delivery using distance learning instruction.

C. WEIGHT AND BALANCE

Teaching Level	Subject Item	Distance Learning Applicability
2	Weigh aircraft.	This subject item is NOT suited for delivery using distance learning instruction.
3	Perform complete weight and balance check and record data.	This subject item well suited for delivery using distance learning instruction.

D. FLUID LINES AND FITTINGS

Teaching Level	Subject Item	Distance Learning Applicability
3	Fabricate and install rigid and flexible fluid lines and fittings.	This subject item is NOT suited for delivery using distance learning instruction.

E. MATERIALS AND PROCESSES

Teaching Level	Subject Item	Distance Learning Applicability
1	Identify and select appropriate nondestructive testing methods.	This subject item well suited for delivery using distance learning instruction.
2	Perform dye penetrate, eddy current, ultrasonic, and magnetic particle inspections.	This subject item is NOT suited for delivery using distance learning instruction.
1	Perform basic heat treating processes.	This subject item is NOT suited for delivery using distance learning instruction.
3	Identify and select aircraft hardware and materials.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect and check welds.	This subject item is NOT suited for delivery using distance learning instruction.
3	Perform precision measurements.	This subject item is NOT suited for delivery using distance learning instruction.

F. GROUND OPERATION AND SERVICING

Teaching Level	Subject Item	Distance Learning Applicability
2	Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards.	The subject item “identify” is well suited for delivery using distance learning instruction. The remaining subject items are NOT suitable for delivery using distance learning instruction.
2	Identify and select fuels.	This subject item well suited for delivery using distance learning instruction.

G. CLEANING AND CORROSION CONTROL

Teaching Level	Subject Item	Distance Learning Applicability

3	Identify and select cleaning materials.	This subject item well suited for delivery using distance learning instruction.
3	Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning.	The subject item "identify" is well suited for delivery using distance learning instruction. The remaining subject items are NOT suitable for delivery using distance learning instruction.

H. MATHEMATICS

Teaching Level	Subject Item	Distance Learning Applicability
3	Extract roots and raise numbers to a given power.	This subject item well suited for delivery using distance learning instruction.
3	Determine areas and volumes of various geometrical shapes.	This subject item well suited for delivery using distance learning instruction.
3	Solve ratio, proportion, and percentage problems.	This subject item well suited for delivery using distance learning instruction.
3	Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.	This subject item well suited for delivery using distance learning instruction.

I. MAINTENANCE FORMS AND RECORDS

Teaching Level	Subject Item	Distance Learning Applicability
3	Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.	This subject item well suited for delivery using distance learning instruction.
3	Complete required maintenance forms, records, and inspection reports.	This subject item well suited for delivery using distance learning instruction.

J. BASIC PHYSICS

Teaching Level	Subject Item	Distance Learning Applicability

2	Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.	This subject item well suited for delivery using distance learning instruction.

K. MAINTENANCE PUBLICATIONS

Teaching Level	Subject Item	Distance Learning Applicability
3	Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory Material.	This subject item well suited for delivery using distance learning instruction.
3	Read technical data.	This subject item well suited for delivery using distance learning instruction.

L. MECHANIC PRIVILEGES AND LIMITATIONS

Teaching Level	Subject Item	Distance Learning Applicability
3	Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.	This subject item is NOT suited for delivery using distance learning instruction.

FAR PART 147 APPENDIX C-AIRFRAME CURRICULUM SUBJECTS

I. AIRFRAME STRUCTURES

A. WOOD STRUCTURES

Teaching Level	Subject Item	Distance Learning Applicability
1	Service and repair wood structures.	This subject item well suited for delivery using distance learning instruction.

1	Identify wood defects.	This subject item well suited for delivery using distance learning instruction.
1	Inspect wood structures.	This subject item well suited for delivery using distance learning instruction.

B. AIRCRAFT COVERING

Teaching Level	Subject Item	Distance Learning Applicability
1	Select and apply fabric and fiberglass covering materials.	This subject item well suited for delivery using distance learning instruction.
1	Inspect, test, and repair fabric and fiberglass.	This subject item well suited for delivery using distance learning instruction.

C. AIRCRAFT FINISHES

Teaching Level	Subject Item	Distance Learning Applicability
1	Apply trim, letters, and touchup paint.	This subject item is NOT suited for delivery using distance learning instruction.
2	Identify and select aircraft finishing materials.	This subject item well suited for delivery using distance learning instruction.
2	Apply finishing materials.	This subject item is NOT suited for delivery using distance learning instruction.
2	Inspect finishes and identify defects.	This subject item is NOT suited for delivery using distance learning instruction.

D. SHEET METAL AND NONMETALLIC STRUCTURES

Teaching Level	Subject Item	Distance Learning Applicability
2	Select, install, and remove special fasteners for metallic, bonded, and composite structures.	This subject item is NOT suited for delivery using distance learning instruction.
2	Inspect bonded structures.	This subject item is NOT suited for delivery using distance learning instruction.

2	Inspect, test and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.	This subject item is NOT suited for delivery using distance learning instruction.
2	Inspect, check, service, and repair windows, doors, and interior furnishings.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect and repair sheet metal structures.	This subject item is NOT suited for delivery using distance learning instruction.
3	Install conventional rivets.	This subject item is NOT suited for delivery using distance learning instruction.
3	Form, layout, and bend sheet metal.	This subject item is NOT suited for delivery using distance learning instruction.

NOTE: There are various skill tasks typically taught to insure the student can perform the specific subject items that would be well suited for delivery using distance learning instruction. Typical skills would include: rivet and fastener identification; rivet pattern layout and design; bend radius calculations; repair layouts and safety related skills involving composite structures and their repair.

E. WELDING

Teaching Level	Subject Item	Distance Learning Applicability
1	Weld magnesium and titanium.	This subject item is NOT suited for delivery using distance learning instruction.
1	Solder stainless steel.	This subject item is NOT suited for delivery using distance learning instruction.
1	Fabricate tubular structures.	This subject item is NOT suited for delivery using distance learning instruction.
2	Solder, braze, gas weld, and arc weld steel.	This subject item is NOT suited for delivery using distance learning instruction.
1	Weld aluminum and stainless steel.	This subject item is NOT suited for delivery using distance learning instruction.

F. ASSEMBLY AND RIGGING

Teaching Level	Subject Item	Distance Learning Applicability
1	Rig rotary wing aircraft.	This subject item well suited for delivery using distance learning instruction.

2	Rig fixed wing aircraft.	This subject item is NOT suited for delivery using distance learning instruction.
2	Check alignment of structures.	This subject item is NOT suited for delivery using distance learning instruction.
3	Assemble aircraft components, including flight control surfaces.	This subject item is NOT suited for delivery using distance learning instruction.
3	Balance, rig, and inspect moveable primary and secondary flight control surfaces.	This subject item is NOT suited for delivery using distance learning instruction.
3	Jack aircraft.	This subject item is NOT suited for delivery using distance learning instruction.

G. AIRFRAME INSPECTION

Teaching Level	Subject Item	Distance Learning Applicability
3	Perform airframe conformity and airworthiness inspections.	This subject item is NOT suited for delivery using distance learning instruction.

II. Airframe Systems and Components

A. AIRCRAFT LANDING GEAR SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
3	Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.	This subject item is NOT suited for delivery using distance learning instruction. The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

B. HYDRAULIC AND PNEUMATIC POWER SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Repair hydraulic and pneumatic power systems components.	This subject item is NOT suited for delivery using distance learning instruction.

3	Identify and select hydraulic fluids.	This subject item well suited for delivery using distance learning instruction.
3	Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

C. CABIN ATMOSPHERE CONTROL SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
1	Inspect, check, troubleshoot, service, and repair heating, cooling, air conditioning, pressurization systems, and air cycle machines.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
1	Inspect, check, troubleshoot, service, and repair heating, cooling, air conditioning, and pressurization systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
2	Inspect, check, troubleshoot, service and repair oxygen systems.	This subject item is NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

D. AIRCRAFT INSTRUMENT SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
1	Inspect, check, service, troubleshoot, and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems to include the use of built-in test equipment.	This subject item well suited for delivery using distance learning instruction.
2	Install instruments and perform a static pressure system leak test.	This subject item is NOT suited for delivery using distance learning instruction.

E. COMMUNICATION AND NAVIGATION SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
1	Inspect, check, and troubleshoot autopilot, servos, and approach coupling systems.	This subject item well suited for delivery using distance learning instruction.
1	Inspect, check, and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static discharge devices, aircraft VOR, ILS, LORAN, Radar beacon transponders, flight management computers, and GPWS.	This subject item well suited for delivery using distance learning instruction.
2	Inspect and repair antenna and electronic equipment installations.	This subject item is NOT suited for delivery using distance learning instruction.

F. AIRCRAFT FUEL SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
1	Check and service fuel dump systems.	This subject item well suited for delivery using distance learning instruction.
1	Perform fuel management transfer, and defueling.	This subject item well suited for delivery using distance learning instruction.
1	Inspect, check, and repair pressure fueling systems.	This subject item well suited for delivery using distance learning instruction.
2	Repair aircraft fuel system components.	This subject item is NOT suited for delivery using distance learning instruction.
2	Inspect and repair fluid quantity indicating systems.	This subject item is NOT suited for delivery using distance learning instruction.
2	Troubleshoot, service, and repair fluid pressure and temperature warning systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

3	Inspect, check, service, troubleshoot, and repair aircraft fuel systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

G. AIRCRAFT ELECTRICAL SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications, and repair pins and sockets of aircraft connectors.	This subject item is NOT suited for delivery using distance learning instruction.
3	Install, check, and service airframe electrical wiring, controls, switches, indicators, and protective devices.	This subject item is NOT suited for delivery using distance learning instruction.
1	Inspect, check, troubleshoot, service, and repair alternating and direct current electrical systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
1	Inspect, check, and troubleshoot constant-speed and integrated-speed drive generators.	This subject item well suited for delivery using distance learning instruction.

H. POSITION AND WARNING SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Inspect, check, and service speed and configuration warning systems, electrical brake controls, and antiskid systems.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect, check, troubleshoot and service landing gear position indicating and warning systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

I. ICE AND RAIN CONTROL SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction, the remaining sub-skills are NOT suited for delivery using distance learning instruction. The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

J. FIRE PROTECTION SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
1	Inspect, check, and service smoke and carbon monoxide detection systems.	This subject item well suited for delivery using distance learning instruction.
3	Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

FAR PART 147 APPENDIX D-POWERPLANT CURRICULUM SUBJECTS

I. POWERPLANT THEORY AND MAINTENANCE

A. RECIPROCATING ENGINES

Teaching Level	Subject Item	Distance Learning Applicability
1	Inspect and repair a radial engine.	This subject item well suited for delivery using distance learning instruction.
2	Overhaul reciprocating engine.	This subject item is NOT suited for delivery using distance learning instruction.

3	Inspect, check, service, and repair reciprocating engines and engine installations.	This subject item is NOT suited for delivery using distance learning instruction.
3	Install, troubleshoot, and remove reciprocating engines.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

B. TURBINE ENGINES

Teaching Level	Subject Item	Distance Learning Applicability
2	Overhaul turbine engine.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect, check, service, and repair turbine engines and turbine engine installations.	This subject item is NOT suited for delivery using distance learning instruction.
3	Install, troubleshoot, and remove turbine engines.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

C. ENGINE INSPECTION

Teaching Level	Subject Item	Distance Learning Applicability
3	Perform powerplant conformity and airworthiness inspections.	This subject item is NOT suited for delivery using distance learning instruction.

II. Powerplant Systems and Components

A. ENGINE INSTRUMENT SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability

2	Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
3	Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and rpm indicating systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

B. ENGINE FIRE PROTECTION SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
3	Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction, the remaining sub-skills are NOT suited for delivery using distance learning instruction. The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction

C. ENGINE ELECTRICAL SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Repair engine electrical system components.	This subject item is NOT suited for delivery using distance learning instruction.
3	Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.	This subject item is NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

D. LUBRICATION SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability

2	Identify and select lubricants.	This subject item well suited for delivery using distance learning instruction.
2	Repair engine lubrication system components.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect, check, service, troubleshoot, and repair engine lubrication systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

E. IGNITION AND STARTING SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Overhaul magneto and ignition harness.	This subject item is NOT suited for delivery using distance learning instruction.
2	Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
3	Inspect, service, troubleshoot, and repair turbine engine electrical starting systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
1	Inspect, service, and troubleshoot turbine engine pneumatic starting systems.	This subject item well suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

F. FUEL METERING SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
1	Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls.	This subject item well suited for delivery using distance learning instruction.
2	Overhaul carburetor.	This subject item is NOT suited for delivery using distance learning instruction.

2	Repair engine fuel metering system components.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

G. ENGINE FUEL SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Repair engine fuel system components.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect, check, service, troubleshoot, and repair engine fuel systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

H. INDUCTION AND ENGINE AIRFLOW SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
1	Inspect, check, service, troubleshoot and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
3	Inspect, check, service, and repair carburetor air intake and induction manifolds.	This subject item is NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

I. ENGINE COOLING SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Repair engine cooling system components.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect, check, troubleshoot, service, and repair engine cooling systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

J. ENGINE EXHAUST AND REVERSER SYSTEMS

Teaching Level	Subject Item	Distance Learning Applicability
2	Repair engine exhaust system components.	This subject item is NOT suited for delivery using distance learning instruction.
3	Inspect, check, troubleshoot, service, and repair engine exhaust systems.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
1	Troubleshoot and repair engine thrust reverser systems and related components.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.

K. PROPELLERS

Teaching Level	Subject Item	Distance Learning Applicability
1	Inspect, check, service, and repair propeller synchronizing and ice control systems.	This subject item well suited for delivery using distance learning instruction.
2	Identify and select propeller lubricants.	This subject item NOT suited for delivery using distance learning instruction.
1	Balance propellers.	This subject item well suited for delivery using distance learning instruction.
2	Repair propeller control system components.	This subject item is NOT suited for delivery using distance learning instruction.

3	Inspect, check, service, and repair fixed pitch, constant speed, and feathering propellers, and propeller governing systems.	This subject item is NOT suited for delivery using distance learning instruction.
3	Install, troubleshoot, and remove propellers.	The troubleshooting sub-skill within this subject item may be taught using distance learning instruction. The remaining sub-skills are NOT suited for delivery using distance learning instruction.
3	Repair aluminum alloy propeller blades.	This subject item is NOT suited for delivery using distance learning instruction.

Note: The theoretical knowledge necessary for successful completion of these skills is well suited for delivery using distance learning instruction.

L. UNDUCTED FANS

Teaching Level	Subject Item	Distance Learning Applicability
1	Inspect and troubleshoot unducted fan systems and components.	This subject item well suited for delivery using distance learning instruction.

5.2 Submission & Approval Process

The inclusion of distance education into a school's approved curriculum will be handled by the local FAA Airworthiness Inspector as a standard curriculum change. The distance education curriculum requests submitted should include the following bulleted items. The material contained in the gray shadowed box provides further explanation of the content in the curriculum request submission. A sample submission is shown in Appendix A.

5.21 Curriculum and Instruction

- A description of the course content and a listing of specific student course requirements.

  This should include information typically found in a course outline such as:

  -Course title

  -Course objectives

  -Breakdown of course units

- A listing of the course practical projects.

  If the course instruction includes practical projects that are required for the successful completion of the school's approved FAR Part 147 curriculum, these projects should be listed.

- A breakdown of the number of hours to be replaced in the approved traditional curriculum.

This is the number of hours that would apply toward meeting the requirements of the school's approved curriculum. Typically these hours would correspond with the hours of the traditional course or unit that is being replaced.

- A specified limit on the number of students enrolled in a class.

This number is not limited to the 25-1 ratio set in FAR Part 147.23. The limit should be governed by the ability of the instructor to conduct necessary and timely interaction with the students enrolled in the class.

- A system and methods to be used for timely and appropriate interaction between students and instructor(s).

This should include a description of the communication tools to be used in the class such as e-mail, chat room, bulletin boards, etc.

- A description of how the distance education class is administered.

This section should include a description of how the distance education class fits into the school's approved program and how it will be administered. Typical questions to be answered: Is the distance education course to be developed and administered within the aviation program, or, are additional support units within the institution involved? Is the course being provided from an outside source? Will an application service provider (such as Blackboard.com) be utilized, or does the institution have its own course management capabilities?

This section should also include a description of how the program's approved instructor(s) assume responsibility for and exercise oversight of the distance education class, ensuring both the quality of the course material and instruction.

- A specification on the calendar time allowed for the completion of the course.

A distance learning course is not restricted to the constraints of a normal academic calendar. However, it is recognized that some time limit (such as one year) needs to be placed on successfully completing the class. Any provisions for extending this time limit should also be listed.

5.22 Student Evaluation

- A description of the student evaluation process.

Provide a complete listing of the types of evaluation procedures to be utilized. Include a description of any written, oral, practical exams or quizzes that are part of the course. This section should include a complete listing of all required tests and or/quizzes, their sequence in the course, and how students are scheduled for these evaluations. Include information on how course grades will be determined.

- Methods for ensuring the integrity of student work and compliance with FAA minimum standards as listed in 14FCR FAR Part 147 Appendices A, B, C, & D.

Provide a description of the how and where tests are administered, and the security and monitoring procedures implemented to protect their integrity.

- A description of the proctor selection and qualification standards to be utilized.

Provide a detailed description of the criteria and qualifications to be utilized in the selection of proctors. Also include the proctor's duties, responsibilities, and procedures for administering the exams.

5.23 Record Keeping

- A description of the course attendance recordkeeping procedures.

Provide a description of how compliance with FAR Part 147.31 will be demonstrated. If student time is to be tracked, the procedures for counting and recording the time should be detailed. Detail the procedures and restrictions that a student should follow in "logging" time. Provide a sample of the forms to be utilized.

- A description of the course academic recordkeeping procedures.

This section should include a description of the system that will be used for recording and storing a record of the student's course performance in compliance with FAR Part 147.31 & 147.33. The content provided should include a listing of students enrolled, assignments completed, test scores, and the course grade.

5.24 Learning Resources

- A description of the technology hardware and software to be utilized.

This section should list the computer hardware requirements such as minimum operating speed, internet connectivity and web browser requirements. Software that the student will need to successfully complete the course should also be listed.

- A listing of the course textbooks or other reference material required for the successful completion of the course.

If the student will require any additional reference material to successfully complete the course, this material should be listed along with a description of how the student may access it.

5.25 Security & Inspection

- A description of the distance education system security.

Provide an overview of the system security arrangements that will protect the system from "unauthorized" individuals and insure the integrity of the distance education process.

- A description of how the distance-learning courses and testing may be monitored by the FAA.

An overview of how the FAA Airworthiness Inspector will be able to access the distance learning courses and monitor the testing process should be provided.

6.0 GUIDELINES FOR THE DEVELOPMENT OF DISTANCE EDUCATION FOR MEETING FAA CONTINUING EDUCATION REQUIREMENTS

Aviation maintenance has entered an era with a focus on the continuous enhancement of one's knowledge, skills, and competencies. Currently, the FAA requires only holders of an Inspection Authorization to meet recurrent training requirements. However, many new technicians now accept that lifelong learning has become a reality. Obtaining additional education and training throughout one's career will become the norm. Standard industry safety practices and FAA regulations also undergo continual revision. There is an increasing need for a consistent and readily available system for conveying this information to the technician.

Distance learning can improve access to educational opportunities by removing barriers facing practicing technicians. Common barriers such as location, time, and affordable access training prevent many technicians from pursuing currency training. Most currency training focuses on regulatory or technological updates. This type of material readily lends itself to distance learning. For example, a serious safety issue such as suspected unapproved parts could be addressed in a consistent, uniform manner on a national level. This would assist in providing all technicians with access to current FAA practices and requirements related to this safety issue.

Distance learning courses may be developed using the standards and procedures recommended in this report combined with current I.A. training approval processes to fulfill Inspection Authorization recurrent training requirements.

6.1 Submission & Approval Process

All courses delivered using distance learning technology and to be submitted for IA renewal or other continuing education purposes must comply with the following procedures. The person or persons developing the course is responsible for obtaining FAA approval prior to offering the course.

All requests submitted should include the following bulleted items. The material contained in the gray shadowed box provides further explanation of the content in the curriculum request submission. A sample submission is shown in Appendix xx.

6.2 Curriculum and Instruction

- A description of the course content, and a listing of specific student course requirements.

  This should include information typically found in a course outline such as:

  -Course title

  -Course objectives

  - Breakdown of course units

- A breakdown of the number of hours to complete the course and the number of hours requested for IA renewal credit.

  This is the number of hours that would apply toward meeting the requirements of 14 CFR FAR Part 65.93(a)(4). Typically these hours would correspond with the hours of the course if presented in a traditional method.

- A specified limit on the number of students enrolled in a class.

  The limit should be governed by the ability of the instructor to conduct necessary and timely interaction with the students enrolled in the class.

- A system and methods to be used for timely and appropriate interaction between students and instructor(s).

  This should include a description of the communication tools to be used in the class such as e-mail, chat room, bulletin boards, etc.

- A description of how the distance education class is administered.

This section should include a description of how the distance education class will be administered. Typical questions to be answered: Who developed and what resources/ references were used? This section should also include a description of the course instructor's background and experience (i.e. a resume or vita detailing specific information relevant to the course content and course delivery); how the course's approved instructor (s) assume responsibility for and exercise oversight of the distance education class, ensuring both the quality of the course material and instruction.

- A specification on the calendar time allowed for the completion of the course.

A distance learning course is not restricted to the constraints of a typical IA renewal meeting. However, it is recognized that some time limit (such as 6 months) needs to be placed on successfully completing the class. Any provisions for extending this time limit should also be listed.

6.3 Student Evaluation

- A description of the student evaluation process.

Provide a complete listing of the types of evaluation procedures to be utilized. Include a description of any written, oral, practical exams or quizzes that are part of the course. This section should include a complete listing of all required tests and or/quizzes, their sequence in the course, and how students are scheduled for these evaluations. Include information on how course grades will be determined.

- Methods for ensuring the integrity of student work and compliance with FAA minimum standards.

Provide a description of the how and where tests are administered, and the security and monitoring procedures implemented to protect their integrity.

- A description of the proctor selection and qualification standards to be utilized.

Provide a detailed description of the criteria and qualifications to be utilized in the selection of proctors. Also include the proctor's duties, responsibilities, and procedures for administering the exams.

6.4 Record Keeping

- A description of the course attendance recordkeeping procedures.

Provide a description of how attendance will be monitored. If student time is to be tracked, the procedures for counting and recording the time should be detailed. Detail the procedures and restrictions that a student should follow in "logging" time. Provide a sample of the forms to be utilized.

- A description of the course academic recordkeeping procedures.

This section should include a description of the system that will be used for recording and storing a record of the student's course performance. The content provided should include a listing of students enrolled, assignments completed, test scores, and if the student has met the requirements for satisfactory completion. A method for making these records available to all FSDO's with students completing the course must also be provided.

6.5 Learning Resources

- A description of the technology hardware and software to be utilized.

> *This section should list the computer hardware requirements such as minimum operating speed, internet connectivity and web browser requirements. Software that the student will need to successfully complete the course should also be listed.*

- A listing of the material required for the successful completion of the course.

> *If the student will require any additional reference material to successfully complete the course, this material should be listed along with a description of how the student may access it.*

6.6 Security & Inspection

- A description of the distance education system security.

> *Provide an overview of the system security arrangements that will protect the system from "unauthorized" individuals and insure the integrity of the distance education process.*

- A description of how the distance-learning courses and testing may be monitored by the FAA.

> *An overview of how the FAA Airworthiness Inspector will be able to access the distance learning courses and monitor the testing process should be provided.*

7.0 SUMMARY OF RECOMMENDATIONS AND FINDINGS

- The FAA should strive to create a climate that encourages programs to utilize distance learning for initial AMT education and I.A. recurrent training.

- The inclusion of distance education into an approved AMT curriculum may be accomplished without change to 14CFR FAR Part 147.

- Language should be added to the FAA Airworthiness Inspector's Handbook that establishes guidelines and procedures for the utilization of distance learning in an approved AMT curriculum. (See Appendix C)

- The local FAA Airworthiness Inspector should handle the inclusion of distance learning into an approved curriculum as a standard curriculum change.

- Subjects in the general portion of the curriculum and theory portions of the airframe and powerplant curriculum should be eligible for distance learning delivery.

- The amount of curriculum hours that may be replaced with distance learning shall not exceed 400 hours of the approved curriculum using traditional methods of instruction.

- The validity and integrity of the examination process is fundamental to distance learning. In certain cases this process will consist of a combination of written, oral, and practical tests. All exams shall be proctored with proper verification of student I.D.

- The FAA should encourage collaboration among schools for the development and delivery of distance education courses.
- Due to the dynamic nature of distance education, these guidelines should be re-evaluated in three years.
- The FAA should move to implement these recommendations as soon as possible.

APPENDIX A - (SAMPLE) CURRICULUM CHANGE REQUEST SUBMISSION FOR DISTANCE EDUCATION DELIVERY

Curriculum Change Request Submission for Distance Education Delivery

SAMPLE

1. Curriculum & Instruction

A. Course Description

Title: AVT 100D, Aircraft Drawing

Course Objectives:

The objectives of this class are to:

- Develop the ability to utilize Computer Aided Drafting (CAD) tools.
- Develop the student' competence in the use of graphic materials, especially technical drawings.
- Develop basic orthographic and isometric sketching skills.
- Develop the ability to plan and document repairs by a dimensioned sketch.

Course Units:

1. Drawings, Symbols, and Diagrams
2. Blueprint Information and Reading
3. Interpreting Graphs and Charts
4. Introduction to AutoCAD
5. Single View Drawings and Dimensions in CAD
6. Isometric Drawings
7. Orthographic Projections
8. Aviation Drawing Applications

B. Practical Projects

1. Given samples of various sketches and drawings, the student will identify lines and symbols and answer questions in regard to dimensions. (Ref. FAR Part 147, App. B-7, Level 2 & B-9, Level 3)
2. The student will make various drawings & sketches of aircraft repairs and alterations. (Ref. FAR Part 147, App. B-8, Level 3)
3. Given samples of various types of charts and graphs, the student will demonstrate the ability to extract information. (Ref. FAR Part 147, App. B-10, Level 3)

C. Hours

The successful completion of this course will count for 72 hours of instruction in the general section of the school's approved curriculum. Therefore, the student must log a minimum of 72 hours of study to successfully complete the course.

D. Student Enrollment

The maximum number of students enrolled in this class will be 48. This class does not run on a defined calendar. Students will be allowed to enroll on-demand throughout the year. In addition, students will complete the course at various times. Students who have completed the course will not count against the course-approved limit.

E. Student Communication

This course will utilize the communication features of Blackboard.Com as the principle method of student/instructor communication. This system will provide students with e-mail, a discussion forum, chat room, student pages and course pages. In addition to the computer communications, enrolled students will be provided telephone numbers to reach computer technical assistance and the course instructor.

F. Course Administration

The Aviation Technology department is responsible for the content and delivery of the distance education classes. The courses are internally developed by the department and will have the same title, description, and content as the traditionally delivered course. Having a suffix “D” added after the course number will designate the distance-education courses. For instance AT 102D, Federal Aviation Regulations, would be the equivalent course as the on-campus AT 102 but delivered through distance-education technology.

Class registration and fee collection will be handled through the Center for Continuing Education. The instructor(s) assigned to the course will be one of the school’s approved instructors. As with traditionally delivered courses, the instructor will be responsible for the delivering the course according to the school’s approved curriculum guidelines.

The application service provider, Blackboard, is being used to provide course management and administration support. Blackboard services include the following features:

1. Announcements - This area is used to display announcements, updates, and reminders. This area appears in the main course window each time a student enters the course.

2. Course Information - This area is used to display general information about the course. Typically, this contains an approved course description, a listing of pre-requisites, and times/ locations for lecture components.

3. Staff Information - This area contains specific information about staff or faculty who are involved in the course.

4. Course Documents - This content-specific area is used to hold the majority of information that will be delivered online such as course outlines, handouts, lecture materials, and related readings.

5. Assignments - This area holds course assignments, tests, quizzes, and surveys.

6. Communication - This area holds all of the communication tools. Discussion, chat, and e-mail are located here, along with student and group pages.

7. External Links - This area lists helpful URL’s the student can use to take virtual "field trips" or view related course material.

8. Student Tools - This area holds the tools needed to submit information to the instructor, view a course calendar, check grades, manage a homepage, and edit profiles.

G. Course Time Completion Requirements

Students are responsible for completing the coursework within 12 months of enrolling in the class. If satisfactory progress is being made toward successful completion of the class, a time extension, not to exceed a maximum of 6 months, may be given at the discretion of the instructor.

2. Evaluation

A. Course Evaluation Process

The course evaluation will consist of 24 practical laboratory exercises (3 per unit), 8 unit quizzes, and a comprehensive final exam. Students will submit laboratory exercises as they are completed. Submitted exercises will be graded and returned to the students within one week. Unsatisfactorily completed laboratory exercises will be returned to the student for correction. The grade on the originally submitted work will count for purposes of course grade computation. Unit quizzes are available on-line. No advance scheduling is required for a unit quiz. Students are allowed to use all available resource material in completion of the quizzes. Students may take the unit quiz after they have submitted the unit's 3 laboratory exercises. Quizzes will be graded and returned to the student within one week.

B. Final Examination Procedures

The final exam will be comprehensive in nature and will consist of written, oral and practical sections. The written portion of the exam will be conducted in paper format in the presence of a proctor. No resource material will be allowed for the final exam.

The oral exam will be conducted in person or by telephone with the class instructor. If a proctor is used, the proctor will identify the student, call the instructor in accordance with a pre-arranged agreement, introduce the student, and hand the student the telephone for the oral exam. The proctor shall be available and within supervisory distance. At the conclusion of the exam, the proctor will again verify the student's identity to the instructor.

The practical exam will be conducted in the presence of the instructor or proctor. Students are allowed access course reference material for use on the practical exam.

Final exams that will be taken on campus must be scheduled a minimum of one week in advance. Exams that will be taken off campus, with the utilization of a proctor, should be scheduled a minimum of three weeks in advance.

C. Course Grading

Course Grades will be determined and assigned on the following basis:

24 Laboratory Exercises*.....35%

Unit Quizzes.....15%

Final Exam.....50%

***Note: All laboratory exercises must be successfully completed in order to pass the course.**

Grade Scale

100% to 92%.....	A
91% to 86%.....	B
85% to 78%.....	C
77% to 70%.....	D
Below 70%.....	F

D. Evaluation Security Procedures

The course instructor, or an approved proctor, will monitor all sections of the final exam. Written examinations will be sent to the proctor in sealed envelopes with instructions for supervising the exam process. Completed exams will be certified by the proctor and be returned in a sealed envelope. Exams will not be faxed. Proctored exams will be open to FAA surveillance.

E. Test Proctor Qualification & Selection Process

Proctors will be selected and approved by the department head with the following guidelines in mind. Proctors should be education officials at a university, community college or private school site, other government or community officials, or, if such persons are unavailable, other people approved in advance by the institution. Relatives or individuals who have any association with the student cannot be proctors.

F. Test Proctor Duties

- Identification of the student by photo I.D. and verification of the student's signature on the examination certificate which accompanies the examination.
- Security of the sealed examination or examination file until it is opened or accessed in the student's presence at the beginning of the exam session.
- Provision of a quiet, well-lighted area as free from noise and distraction as possible, with adequate computer facilities (if needed), and within supervisory distance of the proctor.
- Verification of reference materials (if any) allowed during the examination process.
- Return all papers, including scratch sheets, examination questions.
- Termination of the examination, confiscation of exam materials, and immediate notification of the course instructor if there is improper conduct on the part of the student or any evidence that there has been a violation of the examination process.

3. Recordkeeping

A. Course Attendance Recordkeeping Procedures

The student must complete the Internet Class Logbook (see attachment A) in accordance with the guidelines in FAR Part 147.31. Time will be recorded ("logged") in .1-hour increments. In no case may a student log time in excess of 8 hours per day, not to exceed 6 days per week or 40 hours per week. Time logged in excess of these amounts, including any time spent in residence in Aviation Maintenance Technology courses may not exceed the above noted limits. The instructor will verify the accuracy of the Internet Class Logbook, which will be submitted along with the course academic records to the curriculum chairman. All recorded time must meet the individual class requirements for minimum class length.

B. Course Academic Recordkeeping Procedures

It is the responsibility of the instructor to ensure that each student has satisfactorily completed all the requirements for this course. The recordkeeping system used will show completion of all required course projects and quiz and exam scores. The assignment of a passing grade at the completion of the course (A, B, C, or D) signifies that all requirements have been satisfactorily met. After a student has completed the course, these course records will be given to the curriculum chairman, who will retain them until two years after the student has completed the AMTS program.

4. Learning Resources

A. Course Hardware & Software Requirements

Students enrolled in this course are required to have an Internet connection and current version of a graphic web browser. In addition students will need AutoCAD, Version 14.01. Specific computer hardware, software, and Internet connectivity requirements may be located at www.xxxxx.

B. Student Reference Material

All reference material required for the successful completion of the course may be located in the "Course Documents" section of Blackboard.

5. Security & Inspection

A. Course Security Procedures

All course access is password protected. Students who enroll in the course will be given a user I.D. and temporary password. The first time a student logs onto the system they will need to establish a new password. Other than the student, only the computer system administrator has access to the student's username and password. The course instructor will be able to monitor the student course activity.

B. FAA Monitoring

The FAA Airworthiness Inspector will have access to all course records through traditional inspection methods. In addition, upon request, inspectors will be assigned a course user I.D. and password to access Internet course materials. Off-campus proctored exams may also be monitored by the FAA.

Attachment A

SCHOOL NAME_____

STUDENT NAME_____

COURSE_____

SAMPLE

Internet Class Logbook

Date	**Time**		**Hours**	**Lesson**
	Start	**End**		

I certify that all the information recorded above is accurate:

_____

Signature

_____

Date

APPENDIX B - (SAMPLE) INSPECTION AUTHORIZATION RENEWAL TRAINING COURSE APPROVAL REQUEST

Inspector Authorization Distance-Learning Case Study

SITUATION: The FAA issues an Airworthiness Directive (AD) for an aircraft that requires the IA to perform a florescent penetrant inspection and make a critical evaluation of the results. Initial reports from the field indicate that there are problems with the compliance requirements of this AD.

CONCERNS:

1. Does the IA fully understand the procedures and critical steps required of a florescent penetrant inspection?
2. Is the written documentation referenced in the AD clear as to the specific area to be inspected?

PROPOSED SOLUTION: The FAA and/or manufacture would develop a training program to be delivered using the World Wide Web. The training program would include a step-by-step review of the procedures for the florescent penetrant inspection. Using photos and video, the precise location to be inspected can be clearly identified. Further use of photos, video and graphics would provide the IA with reference data for comparison with findings to insure that appropriate action is taken by the IA. The FAA could also add the completion of this training as a requirement of this AD.

OUTCOMES: The use of training designed for a specific task would ensure a higher level of proficiency of the required inspection.

OTHER ISSUES: There may be previously developed portions of the total training program available from sources such as FAR Part 147, schools, or certifying organizations such as ASNDT. These sources would allow for reduced development time and costs.

The following Inspection Authorization renewal course approval request is based on the above case study.

Inspection Authorization Course Approval Request

1. Curriculum & Instruction

SAMPLE

A. COURSE DESCRIPTION

Title: Detailed explanation of Airworthiness Directive: AD XXXX

Course Objectives:

The objectives of this class are to:

- Provide enhanced instructions for the proper accomplishment of this AD.
- Provide additional training on skills required for accomplishing this AD.

Course Units:

1. Review of AD
2. Background on why AD was issued
3. Enhanced florescent penetrant inspection procedures
4. Completion of down-loadable course on florescent penetrant inspections
5. Review of required logbook entries for AD completion

B. HOURS

The successful completion of this course will require 2 hours student participation.

C. STUDENT ENROLLMENT

The maximum number of students enrolled in this class will be 500. This class does not run on a defined calendar. Students will be allowed to enroll on-demand throughout the year. In addition, students will complete the course at various times.

D. STUDENT COMMUNICATION

This course will utilize the communication features of Blackboard.Com as the principle method of student/instructor communication. This system will provide students with e-mail, a discussion forum, chat room, student pages and course pages. Students will be required to complete a down-loadable course on florescent penetrant inspection. In addition to the computer communications, enrolled students will be provided telephone numbers to reach computer technical assistance and the course instructor.

E. COURSE ADMINISTRATION

The product support department of FlyHigh Aircraft is responsible for the content and delivery of the distance education classes.

The instructor assigned to the course will be I.M. Smart, Director of Product Support.

The application service provider, Blackboard, is being used to provide course management and administration support. Blackboard services include the following features:

1. Announcements - This area is used to display announcements, updates, and reminders. This area appears in the main course window each time a student enters the course.

2. Course Information - This area is used to display general information about the course. Typically, this contains an approved course description, a listing of pre-requisites, and times/ locations for lecture components.

3. Staff Information - This area contains specific information about staff or faculty who are involved in the course.

4. Course Documents - This content-specific area is used to hold the majority of information that will be delivered online such as course outlines, handouts, lecture materials, and related readings.

5. Assignments - This area holds course assignments, test, quizzes, and surveys.

6. Communication - This area holds all of the communication tools. Discussion, chat, and e-mail are located here, along with student and group pages.

7. External Links - This area lists helpful URL's the student can use to take virtual "field trips" or view related course material.

8. Student Tools - This area holds the tools needed to submit information to the instructor, view a course calendar, check grades, manage a homepage, and edit profiles.

F. Course Time Completion Requirements

Students are responsible for completing the coursework within 30 days of enrolling in the class. If satisfactory progress is being made toward successful completion of the class, a time extension, not to exceed a maximum of 90 days, may be given at the discretion of the instructor.

2. Evaluation

A. Course Evaluation Process

Given the purpose of this course, an evaluation of the course will be made based on student comments made after completion of the course. The course evaluation document will consist of a series of questions designed to determine if the IA was able to successfully comply with this AD in a safe and timely manner.

B. Final Examination Procedures

No final exam will be administered. Questions will be posed throughout the course to insure student is actively involved in the course.

C. Course Grading

A student completing the requirements of the course will be allowed 2 hours of IA renewal credit in accordance with 14CFR147 Part 65.93(a)(4).

D. Evaluation Security Procedures

No proctored exams will be given during this course.

E. TEST PROCTOR QUALIFICATION & SELECTION PROCESS

Not
Applicable.

3. Recordkeeping

A. Course Attendance Recordkeeping Procedures

The student must complete the Internet Class Logbook (see attachment X). Time will be recorded ("logged") in .1-hour increments. All recorded time must meet the individual class requirements for minimum class length.

B. Course Academic Recordkeeping Procedures

It is the responsibility of the instructor to ensure that each student has satisfactorily completed all the requirements for this course. The recordkeeping system used will show completion of all required activities. After a student has completed the course, these course records will be kept for a period of two years. Records must be made available or accessible to appropriate FAA personnel.

4. Learning Resources

A. Course Hardware & Software Requirements

Students enrolled in this course are required to have an Internet connection and current version of a graphic web browser. Specific computer hardware, software, and Internet connectivity requirements may be located at www.xxxxx.

B. Student Reference Material

All reference material required for the successful completion of the course may be located in the "Course Documents" section of Blackboard.

5. Security & Inspection

A. Course Security Procedures

All course access is password protected. Students that enroll in the course will be given a user I.D. and temporary password. The first time a student logs onto the system they will need to establish a new password. Other than the student, only the computer system administrator has access to the student's username and password. The course instructor will be able to monitor the student course activity.

B. FAA Monitoring

The FAA Airworthiness Inspector will have access to all course records through traditional inspection methods. In addition, upon request, inspectors will be assigned a course user I.D. and password to access Internet course materials.

Attachment A

COURSE TITLE_____

STUDENT NAME_____

INTERNET CLASS LOGBOOK

Date	Time		Hours	Lesson
	Start	End		

I certify that all the information recorded above is accurate:

_____

Signature

_____

Date

APPENDIX C - AIRWORTHINESS INSPECTOR'S HANDBOOK

CHAPTER 187 EVALUATE FAR PART 147 AVIATION MAINTENANCE TECHNICIAN SCHOOL'S CURRICULUM/REVISION AND INSTRUCTOR QUALIFICATIONS

SECTION 1 BACKGROUND

1. PTRS ACTIVITY CODES

A. Maintenance. 3384 (initial)/3385 (revision)

B. Avionics. 5384 (initial)/5385 (revision)

3. OBJECTIVE. This chapter provides for evaluating the curriculum or curriculum revision of an Aviation Maintenance Technician School certificated under FAR Part 147.

5. GENERAL

A. Definitions

(1) *Check:* A check verifies the proper operation but does not require it to return to service. The item checked does not have to be the item overhauled.

(2) *Quality Standards:* A school's highest priority is to develop, in the student, those manipulative skills needed to stimulate return to service. However, it is not necessary for the training aid itself to meet "return to service" standards.

(3) *Troubleshoot:* In order to "troubleshoot" the airframe, powerplant, or aircraft component, the item must be made operational.

(4) *Distance Learning:* Distance Education is defined as a formal learning activity that occurs when students and instructors are separated by geographic distance or by time, supported by Internet computer technology. The "distance" in the term doesn't imply any particular degree of separation. A distance learner may be located only a short hop across campus from the instructor, or can be thousands of miles away.

B. *Curriculum Background.* FAR § 147.21 sets forth the minimum curriculum requirements. Maintenance of curriculum requirements is set forth in FAR § 147.38.

(1) Practical projects referred to in FAR § 147.21 (d) include all functions specified in the curriculum that involve hands-on tasks. Therefore, practical projects should include virtually any task taught to levels 2 or 3, as specified in FAR 147 Appendices, since all of these require some practical application.

(2) FAR § 147.38 address the maintenance of curriculum requirements. Generally, the Federal Aviation Regulations prescribe minimum standards for certification and operation. These standards may be exceeded, but

only when they are part of an approved curriculum.

(3) An Aviation Maintenance Technician School must adhere to its approved curriculum. Any new course material the school wishes to add must be incorporated into the approved curriculum and approved by the FAA before it may be used. This does not prohibit a school from teaching unapproved courses, such as refresher courses or academic courses required to complete a degree program. However, those courses must be clearly distinguishable from approved Aviation Maintenance Technician School courses.

(4) The Aviation Safety Inspector (ASI) should inform the school of what will be required to keep its approved Aviation Maintenance Technician School curriculum current with industry needs by revising courses. It must be made clear, however, that these revisions require FAA approval before they can be implemented.

C. *Curriculum Components.* The curriculum or revision must be approved by the FAA. The FAR Part 147 curriculum will consist of the following for each subject:

- Subjects taught
- Course content
- Teaching level requirements
- Test requirements
- Classroom or theory hours
- The total number of hours required for successful completion
- Shop or lab hours
- A schedule of required tests or quizzes
- Order of instruction for each rating
- Courses to be delivered using distance learning technology.

NOTE: At the discretion of the ASI, and in consultation with the school, it may be advantageous to include the school's operating rules in the curriculum (FAR Part 147, Subpart C).

D. *Texts.* If specific texts are approved as part of the curriculum, any change to a different text will require FAA approval as a revision.

7. CURRICULUM REQUIREMENTS

A. *Hours of Instruction.* The number of hours of instruction offered must be at least the minimum specified by FAR § 147.21. The school may offer more hours of instruction; however, regardless of the number of hours offered, the FAA must approve the entire aviation maintenance technician curriculum at the time of initial certification. The following blocks of time are not to be included in calculating the minimum number of instructional hours specified in FAR § 147.21:

(1) Time used to take the FAA oral and practice test

(2) Time spent in taking the FAA written test

(3) Time set aside for review and final testing at the conclusion of the course. This is not to preclude review and testing from the curriculum, but to differentiate between the time spent in learning new material and the time spent in review.

B. *Order of Instruction.* The curriculum must describe the order of course progression for each rating offered. For example, Basic Electricity would be followed by Aircraft Electrical Systems.

C. *Subjects Prescribed by FAR Part 147.* The curriculum must cover the subjects and items prescribed in FAR Part 147, Appendix B, and in Appendices C or D, as applicable.

(1) Subjects that are submitted for approval as part of the curriculum will not be made part of the curriculum until approved by the FAA.

(2) Each subject item must be taught at the minimum level of proficiency as defined in FAR Part 147, Appendix A. When the school wishes to teach a subject item to a level beyond the requirements, the teaching level must be made part of the approved curriculum. Subject items must not be taught to a level less than that shown in the approved curriculum.

(3) Additional subjects/courses that are required by the school for their purposes, i.e., degree programs, shall not be submitted as part of the FAA approved curriculum.

(4) A distinction shall be made between additional courses/subjects that are part of the approved curriculum under FAR Part 147 and those that are not.

(5) The teaching of additional subject material beyond the requirements of FAR Part 147, Appendices B, C, and D will require additional instruction hours beyond those required by FAR § 147.21.

D. *Practical Application Projects*

(1) The curriculum shall list the practical projects that must be completed for each subject item. There must be sufficient practical projects to address the requirements of FAR Part 147, Appendices B, C, and D, as applicable. The curriculum shall include enough detail to evaluate the practical projects for correct teaching level, for equipment and tools needed, and for performance standards and objective grading criteria.

(2) The teaching level must be specified for each project under each subject item. The minimum teaching level is specified in FAR Part 147 Appendices. As in the case of theoretical courses, if the teaching level is to exceed the Federal Aviation Regulation requirements, it must be specified as such in the curriculum.

(3) The curriculum must show an appropriate amount of time for each project. ASIs shall look for time allotments that are excessive or insufficient.

(4) The curriculum shall provide that each task in each subject item is accomplished. For example, if a project requires that the student inspect and repair to accomplish a practical project, a requirement for both inspection and repair must be included in the project plan.

(5) The **overall** curriculum must be taught at least 50 percent in the shop or lab. However, not every subject item lends itself to 50 percent shop work. The ASI should ensure that shop and theory are balanced as appropriate to the subject item being taught. The ASI should review the curriculum if the courses seem artificially organized to meet the 50 percent requirement.

E. *Scheduling of Tests.* Upon completion of each curriculum subject, a test must be scheduled. In addition, quizzes may be scheduled between subject items.

F. *Grading Criteria.* A generally accepted academic standard for passing (including the FAA written exams) is a minimum of 70 percent. However, the school may require a higher minimum passing grade. All theoretical and practical portions of each subject listed in the curriculum must be passed to the approved grading standard. Each practical project must be passed as well to the approved standard.

G. *Make up Provisions*

(1) The curriculum must show the number of hours of allowed absences.

(2) All material missed shall be made up in the same subject area.

(3) All practical projects missed shall be made up.

H. Curriculum Delivered Using Distance Learning Technology. The true advantage of distance education is the flexibility that it can bring to the learner. It is imperative that if distance education is to be successfully implemented into AMT education that flexibility in program design and operation be maintained to the greatest extent possible.

(1) Curriculum and Instruction. Distance education is not suitable for teaching certain aspects of the subject matter listed in an AMT curriculum. It is primarily suited for, but not restricted to, subjects in the general portion of the curriculum and theory portions of the airframe and powerplant curriculums. Some subject matter may be totally taught using distance education. Subjects that have been typically taught using only lecture or lecture and paper laboratory assignments suitable for distance learning. Where appropriate, a program may design combination distance education and on sight laboratory format that would combine lecture material presented utilizing distance education with an on-campus session(s) to cover required laboratory material.

It is paramount when evaluating a course to be delivered using distance learning that student's level of competency in the knowledge, skills, and abilities as set forth in the

appropriate appendices is met. A maximum of 400 hours of an approved curriculum requirements may be delivered using distance learning methods. The ASI must keep in mind that the student completing a course delivered by distance learning must successfully complete all specific course requirements.

While it is expected that proposals to institute Internet instruction will vary in instructional methodology and content, approved course programs should address the following items:

- A description of the course content and a listing of specific student course requirements.
- A breakdown of the number of hours to be replaced in the approved traditional curriculum.
- A specific limit on the number of students enrolled in a class.
- A system and methods to be used for timely and appropriate interaction between students and instructor(s).
- A description of how the distance education class is administered.
- A specification on the calendar time allowed for the completion of the course.

(2) Evaluation and Assessment

- A description of the examination process.
- Methods for ensuring the integrity of student work and compliance with FAA minimum standards as listed in 14FAR147 Appendices A, B, C, & D.
- A description of the proctor selection and qualification standards to be utilized.

(3) Record Keeping

- A program shall keep distance learning course records in compliance with timeframe specified in their approved curriculum.
- An instructor must keep records of course activities to include: students enrolled, assignments completed and grades assigned.
- For distance learning classes the record of the student's successful completion of all course requirements meets the FAR 147.33 (a)(1) attendance record requirement.

(4) Learning Resources

- A description of the technology hardware and software to be utilized.
- A listing of the reference material required for the successful completion of the course.

9. REVISIONS TO THE CURRICULUM. Changes to the approved curriculum must be approved before implementation. Changes in the curriculum may include changes in any of the following:

- Teaching level
- Hours of instruction
- Testing
- Make-up provisions

- Course content
- Equipment or facilities affecting instruction in theoretical subjects or the accomplishment of practical projects
- Order of instruction
- Addition or deletion of a rating

11. CREDIT FOR PREVIOUS INSTRUCTION OR EXPERIENCE

A. *Crediting Previous Instruction at a Certificated Aviation Maintenance Technician School.* The school must use either a reliable method of evaluating documentation or an entrance test to ensure that previous instruction is comparable to that offered by the crediting school. When not using an entrance test, schools should be encouraged to use catalogs, course descriptions, and other documents to determine the credit to be granted.

(1) Students may take a course of study for one rating. The course of study will include the General portion of the curriculum. A student returning to school to study for a second rating after having graduated from the course for the first rating will not have to retake the General portion of the curriculum. The General portion undoubtedly must be separate and distinct from either the Airframe or the Powerplant portions and conform to the requirements of FAR Part 147, Appendices A and B.

(2) If a certified aviation maintenance technician school is under suspension by the FAA, courses taught during the suspension period shall not be credited retroactively, even if the school becomes re-certified later.

(3) An applicant must not teach students as an aviation maintenance technician school before school certification and then give credit for that training after the school becomes certified.

(4) A school may credit a student with instruction that was completed satisfactorily at another aviation maintenance technician school either before or after its certification (FAR § 147.31(c)(1)(iv)).

B. *Crediting Previous Instruction from Others Schools (Non-Aviation Maintenance Technician Schools, Accredited and Non-Accredited).* As a general practice, credit may be granted only for subjects that apply tot he General portion of the curriculum.

NOTE: Accreditation, as a referenced in FAR Part 147 refers to schools accredited within the United States. Certificated aviation maintenance technician schools may not grant credit for maintenance instruction received outside the United States.

C. *Crediting Previous Instruction from Military Technical Schools.* When credit is granted, it may be granted only on the basis of an entrance test, as specified in FAR § 147.31(c)(2).

D. *Credit for Previous Experience.* As a general rule, creditable previous mechanic experience shall be **aviation maintenance** experience. Credit for all previous experience must be documented and demonstrated by testing. The test must be equal to the test given to students who complete the comparable required curriculum subjects at the school.

13. INSTRUCTOR QUALIFICATIONS AND FACULTY REQUIREMENTS

A. *Faculty Requirements*

(1) An instructor must hold an FAA Mechanic Certificate with ratings appropriate to the subjects that the instructor teaches.

(2) Individuals listed as instructors, lab assistants or teaching assistants also must be certified properly if they are used for instruction in any subjects other than mathematics, physics, drawing, or similar subjects. The suitability of non-certificated instructors to teach certain general courses will be evaluated on an individual basis. Cases have arisen where instructors have not taught these subjects in a manner applicable to aviation maintenance. ASIs must be aware of this type of situation and ensure that the appropriate information is taught according to the FAA-approved curriculum.

(3) Distance Learning Proctors are used to monitor tests at off campus locations in distance learning courses. The program designates Proctors with the following guidelines in mind. Proctors should be education officials at a university, community college or private school site, other government or community officials, or if such persons are unavailable, other people approved in advance by the institution. Relatives or individuals that have any association with the student cannot serve as a

proctor. Students must submit identification documents tot he examiner proctor. Written examinations will typically be sent tot he proctor in sealed envelopes with instructions for supervising the exam process or available to the proctor. To insure the integrity of the testing process it is important that upon request proctored exams be open to ASI surveillance.

B. *Student/Teacher Ratios.* FAR § 147.23 requires at least one certificated instructor for each 25 students in each shop or laboratory class. The ASI must exercise discretion when prescribing a lower student to teacher ratio according to the needs of the class. Distance learning classes are exempt from meeting the student - teacher ratio of 25 to 1.

C. *Performance.* The ASI should encourage the school to provide for regular assessment of instructor performance.